Asia-Pacific Forestry Commission

IN SEARCH OF EXCELLENCE:

Exemplary forest management in Asia and the Pacific

RECOFTC

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Asia–Pacific Forestry Commission

IN SEARCH OF EXCELLENCE:

Exemplary forest management in Asia and the Pacific

Edited by

Patrick B. Durst, Chris Brown, Henrylito D. Tacio and Miyuki Ishikawa

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
REGIONAL OFFICE FOR ASIA AND THE PACIFIC

REGIONAL COMMUNITY FORESTRY TRAINING CENTER
FOR ASIA AND THE PACIFIC
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The **Food and Agriculture Organization of the United Nations (FAO)** leads international efforts to defeat hunger by helping countries improve agriculture, forestry and fisheries practices and ensuring good nutrition for all. FAO is also a leading source of knowledge and information on agriculture, forestry and fisheries, and acts as a neutral forum where all nations meet as equals to negotiate agreements and debate policy. FAO's mission in forestry is to enhance human well-being through support to member countries in the sustainable management of the world's trees and forests.

The **Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC)** supports community forestry development and the empowerment of local people in managing forests in Asia and the Pacific. Its efforts are aimed at promoting sustainable forest management and providing for the needs of the more than one billion rural people in the region who depend on forest resources for their livelihoods. Since its establishment in 1987, RECOFTC has trained more than 2 500 forest managers and development specialists in all aspects of local forest management, social development and livelihood improvement. RECOFTC conducts adaptive research and extension, and provides on-the-ground support to community forestry practitioners throughout the region.

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FOREWORD

The pursuit of excellence is at the heart of all worthwhile human endeavour. We try to do better than we did yesterday, and attempt to outperform others. Or we may simply work for the pride and satisfaction of a job well done. With so many people striving for excellence, how is it that forestry and foresters alike attract so much negative publicity? Literally hundreds of books and thousands of news items tell the story of deforestation and the failure to manage forests sustainably. It is, therefore, no surprise that the public perception of forestry is one dominated by mismanagement, avarice, irresponsibility and arrogance. The contradiction, however, is that the professional foresters one meets will tell you that they joined the profession not for a love of money, or the sound of chainsaws, but for an appreciation and enjoyment of forests and trees.

In search of excellence deviates from the path that most authors have taken. Instead of dwelling on the failures and the negative, it celebrates the "good" and the many positive management efforts in the Asia–Pacific region. It highlights the many people who are striving for excellence in forest management and seeks to encourage others to emulate these positive efforts. Collectively, the story of forestry that emerges may be more about endeavour and ingenuity than greed, indifference and incompetence.

This publication reflects the outcome of an ambitious initiative of the Asia–Pacific Forestry Commission (APFC), entitled *In search of excellence: exemplary forest management in Asia and the Pacific.* The initiative was coordinated by the FAO Regional Office for Asia and the Pacific (FAO/RAP) and the Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC). It has set out to make a difference by drawing our eyes from the negative to the positive. It has also significantly advanced understanding of the common elements of what constitutes good forest management and what can be generally regarded as "well managed" and a job well done.

The publication highlights a diversity of management approaches that have proven particularly innovative and successful in meeting challenges. Thus, it reaches out to foresters, policy-makers, planners and anyone interested in the future of forestry in Asia and the Pacific. This publication also marks a significant step forward in FAO's and RECOFTC's efforts to bring its forestry literature closer to general readers who are less familiar with the technical aspects of forest management, but no less concerned about the fate of the region's forests, natural resources and rural people.

He Changchui
Assistant Director-General and
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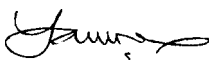

Yam Malla
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This publication is the result of the outstanding efforts of numerous individuals and organizations involved in the *In search of excellence* initiative over the past three years. FAO and RECOFTC express sincere appreciation to all the organizations and individuals who contributed to the success of the initiative. Our gratitude goes far beyond the list provided here and includes those people who nominated forests, participated in national workshops, involved themselves in e-mail discussions or helped to publicize the initiative. It also includes forest managers who allowed their forests to be nominated, and those who later assisted in the drafting of case studies by giving their time freely to show authors around the forests and, along with various other stakeholders, participated in interviews.

The *In search of excellence* initiative, an activity sanctioned by the Asia–Pacific Forestry Commission, was implemented under the supervision of Patrick Durst (FAO), Somsak Sukwong and Yam Malla (RECOFTC).

The following individuals played key roles in coordinating various aspects of the initiative: Patrick Durst, Chris Brown (Consultant), Karen Edwards (RECOFTC), Michael Victor (RECOFTC), Cor Veer (RECOFTC), Steve Rhee (Consultant), Henrylito Tacio (Editing Consultant) and Miyuki Ishikawa (FAO).

Valuable support was provided by various groups of individuals in each stage of the initiative. Initial preparatory work before and during the nomination phase was facilitated by Patrick Durst, Mette Løyche Wilkie (FAO) and Chris Brown. Ernesto Guiang (Consultant) led in publicizing the initiative and ensuring wide distribution of information and nomination forms, with assistance from Thomas Enters (FAO), Michael Victor and Tan Lay Cheng (Consultant). Special thanks are due to David Kaimowitz (CIFOR) who publicized the initiative through the POLEX list of contacts.

National nominating workshops were conducted in several countries. Particular thanks are due to Sushil Saigal (India), Ir. Agung Nugraha and Ali Arsyad (Indonesia), Surin Onprom (Thailand), Paul Lane (New Zealand), Ernesto Guiang (Philippines), Christian Sloth (FAO Viet Nam) and Pham Hoai Duc (Viet Nam), who coordinated workshops and national nomination processes, and to Winrock International, which provided support for the India national workshop.

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Two expert panels reviewed the nominations and selected forests for in-depth Jim Carle, Doug Williamson, Froylan Castañeda, Kailash Govil, C.T.S. Nair, Dominique Reeb, Oudara Souvannavong, Paul Vantomme and Adrian Whiteman, and an Asia–Pacific-based Technical Working Group comprising Karen Edwards, Brian Belcher (CIFOR), Cherukat Chandrasekharan (Consultant), Ernesto Guiang, Nigel Sizer (The Nature Conservancy), John Tay (Innoprise Corporation), Tang Hon Tat (FAO), Patrick Durst, Chris Brown and Thomas Enters.

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Finally, the most important tribute is to the forest managers in the nominated forests for their efforts to achieve excellent forest management. This book is a tribute to their enormous endeavours.

Dedicated to all the people who are striving to improve the management of forests in Asia and the Pacific

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SEARCHING FOR EXCELLENCE

People who have accomplished work worthwhile have had a very high sense of the way to do things. They have not been content with mediocrity. They have not confined themselves to the beaten tracks; they have never been satisfied to do things just as others do them, but always a little better. They always pushed things that came to their hands a little higher up, this little farther on. That counts in the quality of life's work. It is constant effort to be first-class in everything one attempts that conquers the heights of excellence.

Orison Swett Marden (1850–1924), Founder of *Success* magazine

In 1982, Tom Peters and Robert Waterman published an enormously popular book on business management, entitled *In search of excellence*.[1] Wondering why some firms were faring considerably better than others, the two authors chose a sample of highly successful firms and tried to uncover the ingredients and secrets of their success.

Six years later, *Saving the tropical forests*,[2] written by Judith Gradwohl and Russell Greenberg, appeared in bookstores. Their work featured a selection of case studies that illustrated two aspects of tropical forests across the globe; the unabated destruction of forests and options for their sustainable management.

Collectively, these two publications provided the germ for an idea that became *In search of excellence: exemplary forest management in Asia and the Pacific*. The Asia–Pacific initiative borrowed from the Peters and Waterman approach, to identify instances of exemplary forest management and examine the core components of high-quality forest management. The Gradwohl and Greenberg case-study approach provided the working model for the initiative.

The search begins...

Initial ideas for the initiative surfaced at the seventeenth session of the Asia–Pacific Forestry Commission (APFC) held in Yogyakarta, Indonesia, in February 1998. Forestry officials lamented the preponderance of exposure given to poor forest management, deforestation and degradation of forests. They advocated the need to balance such negative reports by recognizing the many positive instances of good forest management — the examples that many of them knew firsthand from their own work, or that they had heard or read about, or seen during field visits and study tours.

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[1] Peters, T.J. and Waterman, R.H. 1982. *In search of excellence: lessons from America's best run companies*. Harper and Row, Publishers. New York.

[2] Gradwohl, J. and Greenberg, R. 1988. *Saving the tropical forests*. Earthscan Publications. London.

A Working Group of the Commission, set up to promote sustainable forest management, made an initial effort to canvas forests demonstrating exemplary management. However, in the absence of a concerted effort backed with adequate publicity and the necessary financial support, the response was negligible and the initiative came to an abrupt standstill. The search for excellence remained dormant for more than three years, but in the minds of the people who had conceived the idea, the concept and its presumed merits were not abandoned. They recognized that greater effort was needed to develop a more structured approach to the initiative, including clever publicity, widespread dissemination of nomination forms, and national initiatives to promote and facilitate participation in the exercise. In September 2001, the FAO Regional Office for Asia and the Pacific (FAO/RAP) formed a partnership with the Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC) to coordinate the initial call for nominations under the revived initiative.

Intact sub-alpine forests in Japan managed for many years for water and soil conservation, wildlife habitat and ecotourism (courtesy Masakazu Kashio).

Publicity was generated in several ways. Nomination forms, brochures, flyers, e-mail notices and letters were sent to forestry agencies and organizations, universities and research institutes, environmental agencies, non-governmental organizations, and industry associations throughout Asia and the Pacific. The initiative was further trumpeted on websites, in forestry journals and trade magazines and on e-mail list-servers. Several national workshops were organized, spreading the news about the initiative in a more conventional way, to stimulate nominations and to initiate discussions on what actually constitutes excellence in forest management. These efforts combined to activate forestry stakeholders throughout the region, from India all the way to Fiji and New Zealand.

The debate that was stimulated by the initiative was refreshing and positive. Although considerable intellectual effort has gone into the development of "criteria and indicators" for sustainable forest management — largely through formal negotiations by bureaucrats — there is a suspicion that these have not been fully integrated into the thinking of most field practitioners. To have people who actually work in the forests discussing and deliberating what distinguishes good management from bad, and what makes for excellent forest management, was an exciting and rewarding means of relating vague concepts to practical experience. In addition, the *In search of excellence* initiative also became a useful vehicle for providing valuable feedback on expectations and perceptions of excellence.

In calling for nominations of well-managed forests, the *In search of excellence* initiative sought to identify:

- a broad cross-section of exemplary forest management in Asia and the Pacific;
- forests showcasing management that displays promise for the future;
- examples across a variety of forest types and ecosystems from many countries in the region, exemplifying management for diverse objectives and under different ownership arrangements; and
- examples of both large and small forest areas — the key requirement being quality of management.

Those interested in nominating a forest were asked to submit basic information on the forests themselves. But, more than this, nominators were asked to explain *why* they considered the forest to be well-managed, to describe what they perceived to be the exceptional management features of the forest and to provide information on the specific elements of demonstrated management excellence.

An initial — and as it turned out, ambitious — deadline of 1 February 2002 for the closure of nominations was extended to 1 May 2002 to facilitate further discussions and workshops.

Coordination of the initiative had to dispel a few misperceptions along the way. For example, some people thought the exercise was a competition (a few wondered what the prize would be for the grand winner). Others were concerned that the search might be perceived as some sort of alternative forest certification process. Neither was true. The initiative was — pure and simple — an effort to illustrate and acknowledge good forest management to a wide audience and to encourage others to take up some of the most promising ideas, methods and approaches.

The initiative also strove to promote the identified examples of success and to provide a measure of credit where applicable. A subset of forests was selected from all the nominations, which served as the basis for more detailed analysis of management experiences (see "Selecting the case study forests" in *Appendix 1).*

The search takes off...

More than 170 nominations (several forests were nominated more than once) were received from 21 countries. The smallest forest nominated is barely 20 hectares in area. The largest extends over nearly 2.5 million hectares — the size of a small country. The diversity in primary management objectives is astonishing. There are forests managed mainly for the protection of watersheds or the conservation of biodiversity. Others focus on the production of timber or non-timber forest products, or both. There are agroforests managed for both wood and food. Recreation and ecotourism dominate management of several of the forests — especially those with unique natural attractions. Some forests serve as experimental sites — their main function is to provide a "laboratory" for researchers. Most forests, with perhaps the exception of some industrial plantations, have more than one function and many nominated forests are identified as being managed for more than one use or purpose.

Nominations encompassed state-owned forests, private forests owned by individuals and corporations, community forests and joint ventures. Nominations were most numerous for forests in India (39), Indonesia (25), New Zealand (17), Nepal (14) and the Philippines (14).

The quality of the submissions was above expectations, with many nominees providing voluminous supplementary information including copies of forest management plans, proof of compliance with forest policies and regulations, codes of practice, corporate profiles, press releases and other supportive material.

All of the nominations were systematically screened and summaries for each forest were drafted (see *Appendix 2*). Through the screening process, the number of nominations was reduced to a more manageable list of 40 forests for further consideration.

The next step was to develop criteria for selecting the final set of forests for case studies (see *Appendix 1*). One important criterion was that case studies should tell a compelling story of innovations in meeting management challenges. The people involved in the selection process looked for examples that would capture the interest of everyone concerned with forests and forestry in the region. They looked for experiences that were out of the ordinary — initiatives that might provide learning opportunities for other forest managers. They also looked for some regional spread. Importantly, it was not the intention to select necessarily the best-managed forests from among the 172 nominated. Eventually, the screening exercise resulted in selection of 28 cases for further scrutiny.

The penultimate phase of the initiative commenced with the preparation of case studies. Independent authors visited the forests and discussed the issue of excellence with key individuals who were familiar with each forest. The case study authors were particularly requested to validate the information provided by the nominees and the dimensions of excellence asserted in nominations. Authors were

urged to conduct stakeholder interviews and to include comments and quotations as a means of highlighting direct perceptions about the excellence of forest management.

Someone had to bring a degree of homogeneity and harmony to the diverse reports that 28 individuals had prepared. A coordinating editor worked with the authors to determine the focus and approach of each case study, and to provide a first line of editorial input.

The case studies were prepared between February 2003 and January 2004. The results of the initiative were presented and discussed by 150 of the region's leading forestry figures, during the twentieth session of the Asia–Pacific Forestry Commission in Nadi, Fiji, in April 2004. Useful input from the Nadi meeting was incorporated into this book.

The search continues...

This book is about *searching for excellence*. As with any search, inevitably the search parties stumbled across controversy, conflicting information and disagreements. A large flock of sheep usually has at least a couple of black individuals. Readers should keep this proviso in mind and remember that the authors were asked to write about the bright side and the positive — those aspects from which we hope to learn most. In doing so, case study authors mainly steered clear of the black sheep, which does not mean that they do not exist or were not found.

Producing a book — especially one involving more than 40 contributors — is an exciting exercise, but in the end it can also be excruciating and tiring. Most authors are somewhat complacent once the book is finally out. They lean back and make a little "job done" check mark — if not on a piece of paper then at least in their minds. We have made a similar check mark. But, for this initiative the "tick" is only an interim milestone. We are very well aware that, while our search is over for the time being, the initiative has some distance to run. So much for leaning back!

It was never envisaged that the *In search of excellence* initiative should fully conclude with this publication. There is considerable scope to promulgate the results of the search, through the media and to more targeted audiences through workshops, seminars and conferences. The fascinating in-session seminar on *In search of excellence* held during the twentieth session of the Asia–Pacific Forestry Commission is but one example. Similar events are planned to assist the dissemination of ideas for improving forest management.

For forest managers in the Asia–Pacific region, the search for excellence continues. Excellence is an elusive goal. Forest managers — and we use this term very broadly — need to strive for continuous improvement; constantly reviewing

their objectives and procedures to ensure that their actions deliver economic, environmental and socio-cultural outcomes commensurate with society's expectations, perceptions and demands. One thing is certain, these goals continue to change and evolve and today's excellence may well be tomorrow's mediocrity. The search for excellence — for those who truly seek it — will thus be a ceaseless endeavour.

Courtesy Alain Compost

PERCEPTIONS OF EXCELLENCE: INGREDIENTS OF GOOD FOREST MANAGEMENT

Chris Brown, Patrick B. Durst and Thomas Enters

Nothing average ever stood as a monument to progress. When progress is looking for a partner it doesn't turn to those who believe they are only average. It turns instead to those who are forever searching and striving to become the best they possibly can. If we seek the average level we cannot hope to achieve a high level of success. Our only hope is to avoid being a failure.

A. Lou Vickery (Business author)

Ask people what they consider to be good forest management. In all likelihood, one will get almost as many different answers as the number of people asked. This should not be surprising because agreement on what constitutes sustainable forest management is still some distance from being reached. In many ways the question is too simplistic — some people would immediately demand detailed definitions for "good," "forest" and "management." In practice, meaningful answers usually depend on local conditions. Consequently, the answer of most respondents would start with, "Well, that depends on …."

Perhaps even more important than local conditions — the combinations of environmental, economic and socio-cultural factors that influence management — is that people have widely differing expectations and perceptions of forest management and, thus, intuitively use different indicators to measure its quality. For example, an environmental advocate might argue that excellent forest management requires a complete preservationist approach. Touch-not — or excellence is gone! A grassroots organization may consider the equitable sharing of benefits amongst local villagers as the outstanding feature and most important goal for forest management. At another extreme, shareholders of forestry companies might argue that the best indicator of excellence — or success — is a positive company balance sheet and increasing returns to investment. Between these perspectives is a multitude of perceptions that attempt to balance ecology, equity and profits.

Coordinators of the initiative were strongly cognizant of the fact that people see events and conditions through different lenses and each person has an individual sense of reality. While a key objective of the *In search of excellence* initiative was

to identify what constitutes *excellent forest management*, it was from the outset viewed even more important to stimulate healthy debate on the issue. The exercise was not necessarily seeking a single and precise definition to be considered for the next edition of forestry textbooks or international fora on forests. Instead of relying on the tools of the statistical analyst, the aim of the initiative was to learn from real life experiences, to listen to the voices of different people concerned with forest management and to document anecdotes and stories describing the actual challenges of management. Hence, the initiative expressly sought out the thoughts of a wide and diverse range of people on what they thought constituted good forest management and what lessons could be drawn in terms of achieving excellence or perfection in forest management.

Why are some of the nominated forests considered to be particularly well managed, while neighbouring forests are apparently not in the same category? Is it possible to identify common elements that distinguish good forest management from the bad (or downright ugly) — similar to the common elements of excellence in business management that Peters and Waterman identified? How does outstanding performance in forest management come about and who or what drives continuous improvements, the desire to do better than others and the persistence to strike balances and build consensus? These are fundamental questions that the *In search of excellence* initiative hoped to answer — perhaps not entirely but at least in part.

It is generally recognized that forest management is at very different stages of development and evolution in the countries around the region. In some situations people are confronted by very basic issues, whereas in others the basics have been overcome and the task has shifted to tackling the next generation of issues. Consequently, people involved in forest management, whether farmers, local communities, private entities, or government agencies, face quite different challenges in achieving the goals they have set for themselves. In some countries, the major challenges are as basic and fundamental as assigning enforceable property rights to forest areas. In other countries, forest managers work at the cutting edge of science and seek excellence through continuous improvement of specific operations and techniques.

This publication has tried to identify forests where people have successfully grappled with the challenges they face directly and on a daily basis. In fact, much of the "excellence" that has been brought to light has been described in terms of how people have overcome some of the very basic challenges — how they improved situations that others took for granted. In other situations, sophisticated solutions to complex problems are the centrepiece of excellence and this is what has been documented.

Having outlined these provisos and explanations, there is reason to wonder whether the search for excellence might become bogged down in an attempt to extract cohesive lessons. Interestingly, a close look at the nominations selected for

further analysis reveals some distinct commonalities among the components of good forest management. In addition, there are some shared ways in which people across the region have set about implementing these components. These commonalities can be interwoven into a model for good forest management that can make a difference to forest management and the benefits it can deliver to the people of the Asia–Pacific region.

Core components of excellence

One outcome from scrutinizing the case studies is a comprehensive list of components of excellence in forest management. These constitute the key elements of a forest management system that, when implemented to very high standards, would ensure that objectives are attained in an exemplary manner. The analysis uncovered 28 components or dimensions of forest management that contribute to overall excellence in performance (Table 1).

The 28 case studies listed in Table 1 are ordered into groups that highlight certain common characteristics. In broad terms, the nominated forests are arranged across a spectrum of primary management objectives that ranges from strongly socio-cultural to strongly scientific-economic. Those listed near the top focus strongly on people's participation, empowerment, maintaining cultural integrity and expanding livelihood options. These forests are predominantly managed by community-based groups. The cases further toward the bottom of the table emphasize scientific management of forests, technological aspects and profit maximization — or at least orientation. Actual management and decision making related to these latter forests are dominated by government agencies and the private sector. Forests listed at the top of the table are generally located in developing countries, while the latter ones are predominantly in developed countries. In part, this dichotomy can be explained by developing countries having a greater preponderance of forests managed by communities and greater numbers of forest-dependent people living in and near forests. It also seems likely that there are significant differences between developed and developing countries in people's priorities and perceptions of what constitutes good or bad forest management.

Several core components of excellence appear to be common to almost all forests. For example, every case study highlights one or more aspects of silviculture or ecosystem management as a dimension of excellence. This is not surprising since it is difficult to conceive of a forest being well managed in the absence of such ecosystem management. Similarly universal is the existence and importance of a management plan (although not necessarily formally approved by a governmental body) in guiding operations towards predefined and agreed-upon goals. Most forests also have tacit or explicit political endorsement of their objectives. Finally there is a common dedication and commitment to rise above the mediocre and average.

Table 1. Components of excellence in case study forest areas

	Core components of excellence in forest management											
Forest area	Strengthening tenure and property rights	Livelihoods for forest dependent people	Establishing institutional and management frameworks	Silviculture/Ecosystem management	People's participation	Empowering local communities	Application of business management philosophies	Holistic management	Formal management plan	Formal certification	Ecotourism/Recreation	Others
Kalibo Mangrove Reforestation Project	x	x	x	x	x	x			x		x	A,F,H,Q
Can Gio Mangrove Forests	x	x		x	x	x			x		x	A,B,C,H,O,Q
Sulia Reserve Forest	x	x	x	x	x	x			x			A.C.H,J,K,L
Forests of Kompong Phluk and Bos Thom	x	x	x	x	x	x			x			C,H,I,J,L,Q
Kalahan Forest Reserve	x	x		x	x	x		x	x			A,B,C,D,E,F,I,J,L,N,O,Q
Krui Damar Agroforests	x	x		x	x	x						B,C,H,N
Ifugao Muyong	x	x		x	x	x						C,F,N,Q
Fasak Eco–Forestry Project		x		x	x	x			x			E,K,N,O,Q
Periyar Tiger Reserve		x	x	x	x	x			x		x	B,C,D,H,J,K,O,Q
Chaubas–Bhumlu Community Sawmill	x	x	x	x	x	x			x			B,I,J,K,L,N,O,Q
Shree Binayak Pimidanda Community Forest	x	x	x	x	x	x			x			B,C,K,L,N,O,Q
Dugli–Jawarra Sal Forests	x	x	x	x	x	x		x	x			C,H,I,J,K,L,Q
Knuckles Range of Forests		x		x	x	x			x		x	F,H,J,M,Q
Forests of Huoshan County		x	x	x	x	x			x			E,F,G,K,L,O,Q
Lake Taupo Forest		x	x	x	x	x	x	x	x	x		A,B,F,G,I,J,L,N,O,Q
Imabari–Tamagawa–Asakura Forest	x		x	x	x				x			A,F,G,J,O
Forests of Dong Phou Xoy and Dong Sithouane	x	x	x	x	x	x			x	x		I,J,L,O,Q
Forests of Lin'an County		x	x	x	x	x	x	x	x		x	B,C,D,E,F,G,I,L,M,O,P,Q
Forests of Southwestern Australia	x		x	x	x		x	x	x			D,F,G,M,Q
Huon District Forests				x	x		x	x	x	x	x	D,G,I,M,Q
Anmyeon–do Recreation Forest				x					x		x	D,E,G,H,Q
Mount Makiling Forest Reserve		x		x	x			x	x		x	D,E,H,M,Q
Nakavu Forest				x	x	x			x			D,E,F,G,O,Q
Deramakot Forest Reserve			x	x			x	x	x	x		D,E,F,G,H,M,Q
Woodside Forest		x		x			x	x	x			A,B,D,E,F,G,O
Diamond Raya Timber Concession		x		x			x		x	x		D,G,O,Q
Timbercorp Blue Gum Tree Farm Estate				x			x	x	x	x		B,D,G,M,O
Forever Beech Limited			x	x			x	x	x			A,B,D,E,F,G,O

A = Leadership
B = Innovation and entrepreneurship
C = Capitalizing on traditional/local knowledge
D = Research
E = Education
F = Soil and water conservation
G = Science and technology
H = Protection from encroachment
I = Development of community infrastructure
J = Equitable distribution of revenue in the community
K = Equitable representation of minorities
L = Democratic decision–making processes
M= Consultative approach to management
N = Maintenance of cultural identity
O = Profitability
P = Enhancing urban landscapes
Q = Political endorsement

Where social and cultural outcomes are highlighted, integral components of outstanding management include creating new livelihood opportunities for forest-dependent people, empowering local people, ensuring representation and equity, and broad-based participation in decision making and management. Strengthening resource security or providing property rights are viewed as necessary conditions. This includes the recognition of traditional ownership patterns and institutions that are common in many countries in the Asia–Pacific region.

Conversely, where achieving silvicultural excellence or favourable returns on investment are considered most important, the core components of excellent management are significantly different. Generally, forest management thus tends to be consultative rather than participatory; that is, stakeholders — and sometimes shareholders — are involved in decision making, but not in the actual operations in the forest. Research into best practices, application of science and highly developed technologies, and formal business management philosophies are commonly stressed as important elements of excellence in these cases.

Defining property rights and strengthening resource security

One distinct group of case studies highlights experiences in rehabilitating severely degraded forests in areas where poverty is endemic. Most such efforts have succeeded because of the commendable efforts of local communities and individuals. The four examples that best reflect such accomplishments are the Kalibo Mangrove Reforestation Project in the central Philippines, Can Gio Mangrove Forests near Ho Chi Minh City in Viet Nam, Sulia Reserve Forest in the Indian State of Orissa and forests of Kompong Phluk and Bos Thom around the Tonle Sap Great Lake in Cambodia. In each of these four cases, a crucial dimension in rehabilitating the forests was the transfer of well-defined property rights and the strengthening of resource security, both recognized as absolute "musts" for achieving sustainable forest management. This infused not only the necessary confidence in local people to act but, more importantly, the legal authority to protect the forests from encroachment by outsiders.

While the stories from the four locations are very different, the keys to meeting the challenges the people faced were similar:

- local people recognized forest degradation as a problem and organized themselves into effective community-based management organizations for the purpose of rehabilitating a resource that was viewed of central importance to their livelihoods.
- formal or informal property rights were recognized and resource security was strengthened, which provided the fundamental foundation for protecting the forests.
- the forests were brought under some form of silvicultural management to produce timber and non-timber forest goods and environmental services.

When the Kalibo Mangrove Reforestation Project was first initiated, the forest existed only in people's minds. The area to be planted was nothing more than a bare mudflat that left the nearby town exposed to flooding caused by high tides and typhoons. This case documents the formation of a community-based organization (KASAMA) that effectively planted and maintained a mangrove forest. A key challenge for the community was to protect the area, and later the forest, from encroachers, including attempts by powerful individuals to expropriate parts of the area for their own use. KASAMA and the Department of Environment and Natural Resources eventually signed a Community-Based Forest Management Agreement that awarded secure rights over the mangrove forests and enabled the community to establish a successful ecotourism venture, capitalizing on its forest asset.

The Can Gio Mangrove Forests in Viet Nam, provide an interesting contrast with Kalibo. The Can Gio case documents a different approach to mangrove conservation, whereby the local government contracted impoverished residents to manage heavily degraded mangrove areas. Illegal forest cutting was a major contributor to the prior degradation of the forests. The government recognized its own limitations and accepted that local communities would be in a much better position to put an end to these activities. Management responsibilities were devolved to groups of local people, who were assisted in making their homes within the forests. At the same time, the reversal of degradation to sound management of the mangroves provided new opportunities for livelihoods and income generation. Local people's entrepreneurial leanings enabled them to diversify into an impressive range of enterprises including crab, shrimp and eel farming. The approach has been so successful that the Can Gio Mangrove Forests have been declared a UNESCO Man and Biosphere Reserve.

At Sulia Reserve Forest in Orissa, uncontrolled harvesting of fuelwood and poles over the years had left the forest in a dreadful condition. As one villager recalled: "The degraded Sulia forest barely had any trees left." Fuelwood shortages were so acute that villagers were walking ten kilometres to another forest to collect fuelwood, just to enable them to prepare their daily meals. The situation became so desperate that the various villages adjoining Sulia Reserve Forest resolved to form a comprehensive system of forest protection committees. The committees now operate in a well-defined structure. They have even managed to collect membership fees that are partially used to fund an elaborate patrol system to protect the forest from encroachers. Under a system of *de facto* property rights, the community is applying basic silvicultural practices and regulating harvesting in a forest that once again has trees.

Such experience in forming effective community-based management organizations is common among the case studies emphasizing "participatory approaches." Often the local organization provides a means by which communities can overcome their specific "tragedy of the commons" — commons that in fact have reverted to totally open access resources in many cases. Many of these case

studies also emphasize the importance of some form of democratic decision making within the community-based organizations, as well as ensuring minority representation and equitable disbursement of forest-derived revenues. The fact that self-regulation works (especially when everyone shares in the benefits and rights are clear), where government legislation has often failed, underscores the notion that people can respond strongly and positively to empowerment.

Poorly defined property rights were also the underlying cause of forest degradation surrounding Kompong Phluk and Bos Thom communities in Cambodia. Encroachment on the flooded forests and on fishing rights led the local people to band together into "Community Resource Committees" to actively rehabilitate and protect the forests. An important advantage in Kompong Phluk, relative to other communities in Cambodia, was that many older people returned to the village after the end of the Khmer Rouge regime in 1979. This assisted in the revival and retention of traditional practices and local knowledge of forest management. In 2003, the Cambodian government adopted a sub-decree on community forestry that strengthened resource security and provided the communities with a formal mandate to implement sustainable forest management.

Numerous lessons can be learned from these four examples. Foremost is that only when local communities have the authority to make decisions, to protect the resource from outsiders and to bring culprits to book, can they realistically take responsibility for forest management. There is a need for an institutional framework capable of enforcing well-defined rights and providing assurance that the benefits from today's hard work will still be there tomorrow. This does not necessarily mean providing communities or individuals with transferable land titles. Increasing tenure security, which can be achieved in various ways, may be sufficient and is often judged to be the most effective contribution to successful forest management.

Maintaining cultural identity

For a second group of forest-based communities, forest management has become a vehicle for self-determination for ethnic minorities. Among this group, management is highly participatory, but the most significant components of "excellence" are reflected in the traditional systems that distinct ethnic cultures have developed — sometimes over centuries — and embraced.

The Kalahan Forest Reserve in Pangasinan Province, Philippines provides a compelling example of an indigenous ethnic group (the Ikalahan) using forestry practices to help maintain cultural identity. The Kalahan Forest Reserve has emerged as a model for community-based forest management, and for reducing threats to ancestral lands. But, the Ikalahan have gone far beyond this in developing a holistic system of forest management. The system incorporates crucial aspects of Ikalahan culture, coupled with entrepreneurship and forward-

looking leadership focused on maintaining a viable ethnic culture in the modern world. The Kalahan Forest Reserve also provides perhaps the best example among the *In search of excellence* forests of another important ingredient for success: a dedicated "champion" providing the drive and motivation for success. The leadership and vision of the Reverend Delbert Rice have been crucial in enabling the Ikalahan to bridge the development divide and integrate their own ethnicity with modern Filipino culture.

The Krui damar agroforests tell a similar story. Krui is located on the southwestern tip of Sumatra, Indonesia. The Krui people — living in 60 villages forming 16 clan groups — have developed a unique agroforestry system that is based on tapping resin of damar trees (*Shorea javanica*). Management and utilization of these forests — which extend over 40 000 hectares — follows a well-defined traditional management system, governed by *adat* or customary practices. The agroforests provide livelihoods for the ethnic Krui minority group, which has also had to deal with serious threats to its customary land rights. In 1998, the Minister of Forestry signed a government order creating a new forest category: *Kawasan dengan tujuan istemewa*, which translates as "area with special or extraordinary objectives." The Krui people were thus granted the right to manage national forest land (for both non-timber forest products and timber). The official recognition by the Indonesian Government of the Krui as the rightful managers and owners of the damar agroforests was the culmination of several years of concerted effort by numerous organizations and sympathetic foresters within the Ministry of Forestry. This unprecedented step by the government did more than just recognize rights; it acknowledged century-old excellence and recognized the importance of protecting it.

The Krui damar agroforests and the Ifugao *muyong*, in the Philippines, are the only forests among these case studies that are not managed under formal management plans. In both instances, however, the well-defined traditional management practices of each ethnic group render unnecessary the need for written plans.

The Ifugao *muyong* are a component of yet another traditional system, practised by the Ifugao people of the northern Philippines. Depending on the perspective taken, the time-tested *muyong* system can be viewed as a forest conservation strategy, a watershed rehabilitation technique, a farming system or an assisted natural regeneration strategy. In landscapes otherwise characterized by deforested hillsides, *muyong* are patches of forest adjacent to Ifugao settlements, which help protect against runoff and erosion, and ensure a steady supply of water to nearby rice paddies even in times of drought. *Muyong* are cultivated to provide building materials, wood for carving traditional handicrafts, and other non-timber forest products that have been a part of the Ifugao cultural system dating back many hundreds of years. In common with the Ikalahan and Krui peoples, the Ifugao have also had to fight to retain their traditional land rights, eventually receiving certainty of tenure under the Indigenous People's Rights Act (1997).

In a slightly different twist, the Fasak Ecoforestry Project on the island of Espiritu Santo, Vanuatu, is assisting one indigenous group's aspirations for self-determination. This project has strengthened the capacities of the indigenous Fasak community to manage forests effectively. One focus of the project has been to change traditional attitudes towards forests — which have historically been viewed as an inexhaustible resource — allowing the Fasak people to realize more of the benefits of forest management. The local community has subsequently developed the capacity to manage and utilize its forest directly, rather than merely selling harvesting rights to concessionaires as in the past. The project also created jobs, which is seen as a very positive aspect, given that many unemployed young people in the area are easily attracted by the bright lights of the city. The Fasak Ecoforestry model for small-scale, community-based forest management is now being recognized and applied in other locations in Vanuatu.

What makes these four examples outstanding and what lessons can we take from them? Most evident is the focus on maintaining cultural integrity. In all four instances, forest management is an important vehicle in maintaining traditional — and sometimes ancient — ways of life. The use of indigenous knowledge and systems is explicit in the Kalahan, Krui and Ifugao cases. While the systems serve different purposes, the role of culture in their development and continued maintenance is pervasive. In fact, the revival and preservation of traditional management practices does not only go hand-in-hand with maintaining cultural integrity and identity; but they form a symbiosis, the survival of which is as crucial for the people as it is for the forest they manage. A struggle to preserve traditional property rights is also a hallmark in these communities. Conversely, a purposeful shift away from indirect exploitative management towards more direct and sustainable management by the Fasak people is seen as a new approach to uphold and strengthen traditional Fasak values and culture. In all four cases, the enhancement of livelihoods for local people is part of a broader strategy for maintaining cultural values. An important message is to think twice before tinkering with something that has worked for generations. It is most likely outstanding — otherwise it would have long been extinct.

Creating livelihoods for forest-dependent people

While creating additional income sources for forest-dependent people was a sub-theme in the eight examples of the first two groups, expanding livelihood options holds centre stage for forest protection in a third set of examples. These forests include the Periyar Tiger Reserve in Kerala, India, the Chaubas–Bhumlu community sawmill in central Nepal, Shree Binayak Pimidanda Community Forest in eastern Nepal, Dugli–Jawarra Sal Forest in Chhattisgarh, India, Knuckles Range of Forests in central Sri Lanka and the forests of Huoshan County in Anhui Province of China.

Common to all of these forests is the strong emphasis placed on people's participation in natural resource management, empowering local communities, and promoting equity and fairness in decision making and the distribution of benefits derived from the forests. The six case studies also highlight an appreciation of indigenous knowledge. However, the main emphasis is on creating new means of livelihood for forest-dependent people.

Developments in the Periyar Tiger Reserve are especially interesting and innovative. Efforts to support the management of the reserve and the surrounding areas specifically set out to create a suite of alternative livelihood options aimed at taking pressure off the reserve and promoting forest conservation. The story is of a group of convicted smugglers — whose basic means of livelihood was to illegally strip cinnamon bark from trees in the reserve — and their transformation into stewards of biodiversity. This almost magical transformation was brought about by "Eco-Development Committees" that were formed to establish and support ecotourism-related enterprises and forest protection businesses. These were so successful that the bark collectors now run wildlife spotting excursions for tourists. Other committees rehabilitate religious sites, maintain trails, produce and sell souvenirs, and provide accommodation and transport services for tourists and religious pilgrims who visit the reserve.

The villages of Chaubas and Bhumlu, in Nepal, have tackled forest-based livelihood creation head on. During the late 1970s, the community assisted in planting trees on hillsides surrounding the villages as part of a development project. A decade later, the government transferred responsibility for the management of the plantations to four Forest User Groups. After commissioning a feasibility study, the community opted to establish a sawmill as the best way to make use of the maturing plantation timber and to advance their economic well-being. The Chaubas–Bhumlu Community Sawmill became the first sawmill in Nepal to be managed directly by Forest User Groups. These four Forest User Groups have passed through a distinct evolutionary process. Community forestry at Chaubas and Bhumlu has evolved from a stage where emphasis lay on plantation establishment and protection, to one of active forest management and income generation. Revenues from the sawmill are divided equitably among members of the user group, after allocating a portion for community infrastructure needs. The positive experiences of these two communities provide lessons in poverty alleviation for the region and beyond.

The Shree Binayak Pimidanda Community Forest, also in Nepal, has set its sights on a different type of community enterprise to generate income for local villagers. Similar to the experience of Chaubas and Bhumlu, a Forest User Group manages the nearby forest — in this case, a natural forest of *lotka* (*Daphne* spp.), which is a preferred source of raw material for hand-made paper. Recently, the community established a factory producing hand-made paper, employing local residents and generating significant levels of new income for the community. Sound institutional structures, democratic decision making and a strong sense of

equity have helped bring success where others have failed. Another vital factor has been a strict adherence to sustainable management of the forest resources through management plans and harvesting guidelines.

At the Dugli–Jawarra Sal Forests in Chhattisgarh, India, the state government has moved beyond the forestry-oriented focus of Joint Forest Management and shifted to a more holistic "People's Protected Areas" scheme. Participation and empowerment through capacity building are at the heart of management strategies. The Dugli–Jawarra experience highlights the challenges related to ensuring transparent property rights and introducing new forest-based livelihoods designed to help people break out of poverty. Forest Protection Committees were formed and micro-scale action plans were drafted to ensure sound forest management. A strong focus has been placed on medicinal plants, which were identified, inventoried and are now being marketed to generate income. Complementary initiatives concentrate on integrated land management, including the construction and maintenance of irrigation systems, water-storage facilities and biogas plants.

Similar programmes are being implemented in the Knuckles Range in Sri Lanka, a cradle for plant and animal life. Historically, the greatest threat to the forests came from the "cardamom invasion." Its cultivation necessitates clearing of the shrubs and undergrowth, which prevents the growth of saplings of large canopy tree species. Combined with high demands for fuelwood — required for cardamom processing — cardamom cultivation ultimately leads to the demise of the unique high-elevation forest. Since a ban was imposed on destructive cardamom cultivation, concerted efforts have been made to create new livelihood opportunities for local people. Training in alternative agricultural activities, such as livestock management and dry land farming, are allowing people to diversify into new industries. The Forest Department is carefully consulting with local people on forest management issues and is gradually shifting more management responsibilities to community-based organizations.

A final example of livelihood creation for forest-dependent people comes from the forests of Huoshan County in China, where the focus is on expanding and intensifying forestry practices to help alleviate poverty. Farmers are being taught how to propagate new tree and fruit crops and are bing introduced to soil and water conservation practices that help maintain soil fertility and reduce erosion. Along the lines of a farmer-to-farmer training programme, innovative farmers are commissioned to act as "demonstration householders" and help build the capacities of others. Farmers have also organized themselves into self-help groups that share information and knowledge on how to cultivate and market forest-based produce. The overriding principle in Huoshan — and in most of the other case studies where creating livelihoods are important — is "helping people to help themselves."

The preponderance of case studies with a focus on livelihood creation and support underscores the importance of poverty alleviation in areas of high population density. These case studies also reveal the potential for building upon traditional communal management systems to combat poverty. The six cases provide a loud and clear message. It is not the inherent nature of people to destroy forests for pleasure. Forest degradation and deforestation are usually the result of overexploitation in search of income. Without alternative income-generating options, people have little choice but to resort to whatever livelihood opportunities that forests offer, often with severe negative repercussions on the forest.

Moulding the right institutional framework

In many of the *In search of excellence* forests, the creation of sound and robust institutional structures is considered essential for effective forest management and is highlighted as an important foundation of excellence. Where tenure rights are an issue, for example, the creation of credible community-based organizations to assume responsibilities and authorities is often necessary. In other instances, specific management challenges demand the formation of unique institutional structures, such as the Forest User Groups that have become a common feature of Nepal's forests in the middle hills and a cornerstone of its community forestry approach.

Lake Taupo Forest in the North Island of New Zealand provides an example of a very special institutional structure formed to meet a particular management challenge. The land on which Lake Taupo Forest was established is customary land, owned by people belonging to Ngati Tuwharetoa, a Maori tribal group. Fragmented ownership, with few tribal resources for development, meant these relatively large tracts of land brought only marginal returns to farmers or were left lying idle. This changed in the late 1960s, when Ngati Tuwharetoa entered into a leasehold partnership with the central government. This prepared the way for the government to establish a forest plantation on Ngati Tuwharetoa lands. Trees were planted on more than 22 000 hectares of land, and ownership of the trees is now reverting to Ngati Tuwharetoa under a transitional agreement. The Lake Taupo experience illustrates how institutional arrangements that fit particular circumstances can be set up and managed to enable win-win outcomes for very diverse groups (in this case, the government and the indigenous people).

A cable yarder in operation at Lake Taupo Forest, New Zealand (courtesy Lake Taupo Forest Trust).

The Lake Taupo case also highlights aspects pertaining to maintaining cultural identity — a perhaps unexpected priority in a developed country. In total, the management experiences at Lake Taupo are among the widest ranging in dimensions of excellence — matching technical silvicultural achievements with strong social, cultural, and economic concerns. Moreover, it illustrates the importance of trust between two rather unequal partners. If the two partners had not trusted each other, the initiative would have faltered before the first tree was planted.

The Imabari–Tamagawa–Asakura (ITA) Forest, in Japan, shares several similarities with Lake Taupo. The ITA Forest has a rich history of communal management that evolved over a period of more than 150 years. Initially, townships banded together in an effort to secure government recognition of communal property rights for what they considered their forests. Around the 1920s, the management structure evolved into a formal forest cooperative — with many individual members — in which ownership of the forests was vested. Despite the general stagnation of forestry in Japan in recent decades — due to high operating costs and scarcity of forest labour — the ITA cooperative model has proven effective in managing the forest in a sustainable and financially viable manner.

Managers at several *In search of excellence* forests have gone to great lengths to build consensus on forest management. The Dong Phou Xoy and Dong Sithouane Production Forests, in Lao PDR, provide a vivid example. The Forest Management and Conservation Programme (FOMACOP), initiated in 1995, helped to institutionalize the concept of "Village Forestry" as a core national forest management strategy and as a means of decentralizing forest management. During a pilot phase, local communities were entrusted with the management of production forests, and training was initiated to strengthen management capacities. The Dong Phou Xoy and Dong Sithouane Forests exemplify several components of excellence, including those most closely associated with participatory forestry — empowerment, livelihoods for local people, investment of revenues in community infrastructure and equity issues. At the same time, managers have maintained a strong focus on developing technical capacities. Among the case studies, Dong Phou Xoy and Dong Sithouane constitute the only truly community-managed forests to have applied for formal forest certification.

The forests of Lin'an County in Zhejiang Province of China also provide an insightful example of efforts to develop institutional structures for better forest management. During the past 25 years, Lin'an County has worked assiduously to reverse severe forest degradation and related problems arising from the underlying poverty in the county. Important institutional support has been gained in recent years through the county's participation in the International Model Forest Network. Most importantly, an effective partnership process has brought stakeholders together to set up voluntary, cooperative partnerships and a Model

Forest Partnership Committee. The committee is comprised of representatives of different stakeholder groups including the government, non-governmental organizations, industries, farmers, technology providers and academic organizations. The Partnership Committee provides a forum for exchanging ideas on forest management, resolving conflicts and encouraging participatory decision making. A unique feature at Lin'an, among these case study forests, is the incorporation of urban forestry concerns within the forest planning framework.

The successful development of hickory nut and bamboo industries has allowed Lin'an County to increase protection of remaining natural forests (courtesy Patrick Durst).

A final example highlighting the critical importance of institutional frameworks is provided by the forests of southwestern Australia. The Australian experience personifies multiple-use management of forests on a macroscale, and the institutional challenges engendered by conflicting management objectives. In this instance the government's forestry agency, the Department of Conservation and Land Management (CALM), was extensively restructured to ensure transparency and accountability in reaching multiple objectives. A Forest Products Commission was established to run the government's commercial timber operations, while a restructured CALM focused on management for conservation. A separate Conservation Commission was established to audit the work of the two new departments. This southwestern Australia case highlights how perceptions of an inadequate institutional structure may impede orderly forest policy development and implementation, and how organizations can overcome such weaknesses through responsive restructuring and reform.

Getting the institutional framework correct makes a huge difference! And yet, it is an area where forest management frequently fails. Ultimately, all situations are unique and expecting one blueprint to fit all invites failure. The examples described above have all dealt successfully with uniqueness and established frameworks and structures to fit their circumstances. None is perfect, but they combine the important features of trust, transparency, openness and flexibility. In addition, some have recognized that aspiring to excellence requires opening doors to stakeholders who traditionally would not sit together at the same table, let alone discuss how to bring about sound forest management.

Multiple-use management

Almost all of the *In search of excellence* forests are managed with a variety of uses in mind. For several of the forests, however, multiple-use management is the principal objective and also the defining feature of excellence. Among these are the Huon District Forests in Tasmania, Australia, the Anmyeon-do Forest in the Republic of Korea and the Mt. Makiling Forest Reserve in the Philippines. For these forests, striking a desirable balance among multiple — and at times conflicting — management objectives is paramount. However, as the Huon District case study reminds us, the definition of "desirable balance" is a matter of perspective.

The Huon District Forests are managed in a policy environment characterized by intensive debate among environmental advocacy groups, the timber industry and the state government. Forestry Tasmania — the state forestry agency — is mandated to manage the forests to meet the often-conflicting expectations of Tasmania's residents. This includes managing for a broad range of goods and services including timber, conservation, recreation and tourism, and soil and water protection. Extensive consultation with community and stakeholder groups is essential in striking an appropriate balance in managing the forests, as is transparency in planning and reporting systems. In Huon District, determining the objectives for forest management is a continuing source of controversy. However, the systems that deliver forest management, according to established government policy, are praised by many, although not necessarily by all.

Anmyeon-do Recreation Forest in the Republic of Korea is also managed by a state agency to meet a broad range of objectives. At Anmyeon-do, timber harvesting has been de-emphasized in recent years, as the focus has shifted to recreation in response to changing demands. Forest managers have not lost sight of essential management tasks. They continue to apply intensive silvicultural treatments to maintain forest health, look after experimental sites for long-running research studies and conserve the unique genetic resources of the forest, a particularly challenging task now that visiting the old forests and mountains has become fashionable among Korean people. Incredibly, the Anmyeon-do Forest has been under formal management for more than 1 000 years — delivering a wide range of products and services to support the ever-changing local needs for centuries.

Set up nearly one hundred years ago, the primary management aim at the Mt. Makiling Forest Reserve in the Philippines is to promote scientific and technical knowledge related to conservation and ecosystems through comprehensive training and education programmes. Besides researchers and scientists, however, there are much larger numbers of people who demand access to the mountain. The reserve is the only intact forest within the vicinity of Metro Manila and it attracts a growing number of ecotourists and recreational visitors. If that is not enough, the watershed protection services that the mountainous forest provides are also increasingly valued. The diversity of interests related to

the forest, coupled with booming population numbers, lead to inevitable conflicts over management objectives and practices at Mt. Makiling. These conflicts are effectively addressed through a multi-stakeholder participatory approach to the reserve's management. In 2003, a group of private companies and state agencies also vowed to intensify efforts aimed at preserving the ecological balance and the beauty of the forests of Mt. Makiling. Compromise in accommodating the requirements of local people — both rural and urban — has proven essential for successful management of the Mt. Makiling Forest Reserve.

An evident commonality among these multiple-use forests lies with the managing entity. The Huon District Forests and Anmyeon-do Forest — along with the forests of southwestern Australia, which are also managed for multiple uses — are all managed by government agencies. The Mt. Makiling Forest Reserve is managed by another public institution — the University of the Philippines Los Ba□os. Other case study forests managed by government agencies are Nakavu Forest and Deramakot Forest Reserve, where research is the primary management objective, and the Knuckles Range of forests in Sri Lanka, where management is slowly being devolved to local communities. This raises a moot question as to whether government agencies are in the best position to strike balances that are required for multiple-use outcomes, or whether multiple-use outcomes are demanded from forests simply because they are managed by government agencies. There are strong indications from the case studies — given the controversies that centre on several of these forests — that both are true.

Research — an important requirement for reaching the stars

Two of the *In search of excellence* case study forests emphasize scientific research as the basis for developing prescriptions for silvicultural excellence. These are the Nakavu Forest in Fiji and the Deramakot Forest Reserve in Sabah, Malaysia. As with multiple-use management, government agencies are in charge of these forests. Clearly, management devoted purely to research requires external funding and this is most readily available to government agencies, although external donors also lend a hand in both locations.

The Nakavu Forest is leading the way in developing guidelines for sustainable management of natural forests in Fiji. The Fijian Forest Department leased the forest from the villagers of Nakavu to test alternative silvicultural prescriptions in the context of communal forest ownership. An important aspect in developing the "Nakavu Model" was the continuous involvement of the native landowners in decision making and implementing much of the work. The research has clearly shown the potential for using less intensive and better-planned logging regimes than currently used. The results obtained at Nakavu have provided the foundation for the preparation of sound guidelines for scientific natural forest silviculture for possible adoption and implementation throughout Fiji.

A similar initiative is being implemented at Deramakot Forest Reserve in Malaysia, where the Sabah Forest Department has established an experimental forest to test elements of a model for sustainable management of the mixed dipterocarp forest. It is anticipated that this model will eventually be applied throughout Sabah. The model stresses the application of sound forest harvesting, known as reduced impact logging, but also allows for local people, living in proximity to the forest, to utilize it for subsistence needs — including clean water, medicinal plants, building materials and tools.

The Deramakot Forest Reserve and the Nakavu Model both provide examples of government taking affirmative action to help others to move up the ladder of standards; perhaps not to reach the stars, but to raise performance to unprecedented levels in their respective countries. It is not so much forest management that should be praised in these two cases, but rather the people who have put into practice the fundamental concept that sound research is needed to advance.

Silvicultural excellence

A high standard in the application of silvicultural practices is the unifying thread for the final group of case studies. The four forests are privately owned or managed, and have as a central objective the production of timber — but in a manner that maintains ecological integrity.

Woodside Forest is a small, family-run forest in the South Island of New Zealand. John Wardle, one of New Zealand's foremost experts in beech forest management, applies expertise garnered during a 25-year forest research career in managing the forest. The Wardle family practises "adaptive management," closely observing the impacts of their silvicultural and harvesting operations on the forest and adapting these to better mimic natural processes. The Wardles operate their own small sawmill, and also run a non-timber business producing beech honeydew. The forest's management also encompasses strong educational, research and demonstration components.

In contrast, PT Diamond Raya Timber operates a large-scale forest concession in the ecologically sensitive peat swamps of Riau Province, Indonesia, currently a hotspot of widespread illegal logging. Based on the best science available, the company utilizes comprehensive management planning and strictly adheres to the Indonesian Selective Cutting and Replanting System. Recognizing the value of research, Diamond Raya Timber has also set up a series of permanent sample plots to systematically identify and monitor the impacts of timber harvesting on the forest ecosystem. The company has invested considerable effort in ensuring its management and harvesting systems exceed normal standards and pass international scrutiny. To make sure it is on the right track, it applied for and obtained certification from both the Forest Stewardship Council and Lembaga Ekolabel Indonesia.

Similar to the example from Indonesia, Timbercorp Forestry is also a proud recipient of the Forest Stewardship Council's "seal of approval." The Company manages 75 000 hectares of Tasmanian blue gum tree farms in the Green Triangle region of Victoria and South Australia, and in the southwestern portion of Western Australia. The tree farms are managed on behalf of investors who subscribe to investment projects.

Timbercorp Forestry is taking a high-technology approach to forest plantation establishment and management. The company implements "Precision Tree Farming". In other words, resources and silviculture are matched to site attributes and the requirements of the trees planted — and technological solutions are used to solve management challenges and maximize financial returns to investors. The company has established a comprehensive system of procedural best practices, but continuously reviews and adapts the practices to reflect new information and knowledge as it becomes available. Comprehensive quality assurance systems and a strong emphasis on collaborative research help Timbercorp Forestry ensure the precision approach remains at the cutting edge of modern production forestry.

Using advanced technology to overcome management challenges is also a high priority for Forever Beech Limited, a recently established enterprise based in the South Island of New Zealand. Forever Beech has developed an innovative partnership approach that provides expertise in forest management to a group of small forest owners who would be unable to afford such expertise on an individual basis. Forever Beech stresses the application of high-quality silviculture in tandem with low-impact selective logging using helicopters. Helicopter logging eliminates the need for ground skidding and other destructive transport practices, and the absence of forest roads means that impacts on soil and water resources can be kept to a minimum. To the eyes of a layman, after logging operations are completed the forest appears almost undisturbed. The company strives to maintain the ecological integrity of the forests it manages, and has established comprehensive planning, research and monitoring systems.

Helicopters are used for low-impact selective logging by Forever Beech Limited (courtesy Ian Platt).

The forests in this final group are operating at the commercial end of the spectrum, where profitability is essential. At the same time, professional foresters are demonstrating exceedingly high standards of ecological management. While formal business management philosophies — the case studies make mention of such systems as "continuous improvement," "adaptive management," "adherence to best practices," "quality assurance systems," "decision-support systems" and "marketing and information systems" — are important ingredients of their success, managers at all four forests are also firmly committed to research and the application of science and technology. Audit and certification procedures are on the agenda of each company. PT Diamond Raya Timber has dual certification; Timbercorp Forestry is ISO 14001 accredited and very recently obtained Forest Stewardship Council certification; while both Woodside Forest and Forever Beech are complying with New Zealand's stringent natural forest harvesting regulations and have government-approved sustainable forest management plans.

Towards a model of good forest management

Has this *search for excellence* produced simply a narration that provides nothing more than entertainment? Or do all the stories have a moral that can be further processed to become input for a model of good forest management?

In the preface to their book, Peters and Waterman remarked that: "Some readers may say that the findings are motherhoods, but that's not true." We have drawn exactly the same conclusion. If the findings were all motherhood statements — things we have already known for a long time — then why is good forest management the exception and not the norm?

Analysis of the *In search of excellence* forests suggests significant diversity in the dimensions of excellence. This is not surprising. However, there are also some compelling commonalities. Certainly, features such as effective silviculture, systems that guide the management of forest ecosystems according to defined values and objectives, and well-defined planning and monitoring systems are common to virtually all of the case study forests. Several other core elements also emerge as necessary conditions that need to be met if success is to be achieved in forest management. These include:

- well-defined property rights and resource security;
- attention to the livelihoods of forest-dependent people; and
- development of appropriate institutional or management structures and frameworks.

Underlying — or perhaps overlaying — all of these elements is the development of social and community consensus on how a forest should be managed. To some degree this involves striking a balance on management objectives, or at least ensuring that stakeholders understand and respect each other's perspectives.

A number of less tangible factors might also be encompassed under a heading of business management philosophies, including elements such as those articulated by Peters and Waterman as the *McKinsey 7S framework* — style, systems, staff, structure, strategy, shared vision and skills. Perhaps most important of all, however, is a strong commitment to meeting objectives and to excellence, coupled with dedication to continuously do better, and enthusiasm to motivate others to similar aspirations. After all, forest management is not only about trees, it is also about managing people and their philosophies.

These various elements of excellence in forest management can be drawn together in a simple model as illustrated in Figure 1.

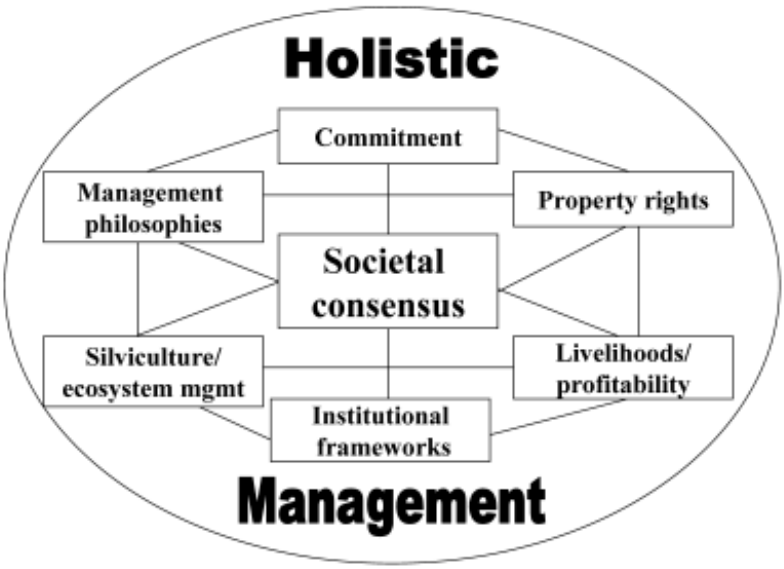


Figure 1. Components of good forest management

The model stresses the importance of inter-relationships between and among a range of components — commitment, resource security, attention to improving livelihoods for local people and/or profitatility, sound institutional and management frameworks, attention to silviculture and ecosystem management, and application of sensible management philosophies. The core of the model is anchored on reaching societal consensus with regard to how forests should be managed and what we want from forestry. Overarching the model is a holistic approach to management that recognizes the roles of the forest within broader ecological, economic and socio-cultural systems.

Each of the model components is important. The level of importance varies among situations and locations. What should be borne in mind is that excellence can only be achieved if all of the core components are addressed and in place. Conversely, remove one of the model's building blocks and the system easily collapses as societal consensus becomes unattainable.

The final conclusion is surely that the context in which management is occurring is the defining point of excellence, along with perspectives on the appropriateness of management objectives. Excellence, as it emerges from these case studies, is generally perceived in terms of how well managers have achieved stipulated objectives. All of the case studies demonstrate high levels of achievement relative to their defined — explicit or implicit — management objectives. To this extent "excellence" is superbly demonstrated.

Whether this constitutes "excellent forest management" may be much more controversial, since often there is disagreement about what the management objectives for a particular forest should be. Environmental advocacy groups believe some forests are managed inappropriately because they should have never been made available for timber production in the first place. Conversely, some forest-dependent people disagree with strong conservation objectives that encroach on their livelihoods. There are probably no absolutes and, with continually shifting perceptions and demands from society, it may be more realistic to strive for continuous improvement rather than "excellence" *per se.* Nonetheless, it is clear that there are many individuals and organizations striving to achieve "excellent" forest management as they perceive it, and this in itself is cause for considerable celebration.

A multitude of non-timber forest products are sold at local markets, China (courtesy Patrick Durst).

THE DISTRIBUTION OF EXCELLENCE

Miyuki Ishikawa

There are two ways of spreading light: to be the candle or the mirror that reflects it.

Edith Wharton, *Vesalius in Zante*

How widespread is excellence in forest management in the Asia–Pacific region, and can any conclusions be drawn about how well the distribution of *In search of excellence* nominations reflects the general distribution of excellence?

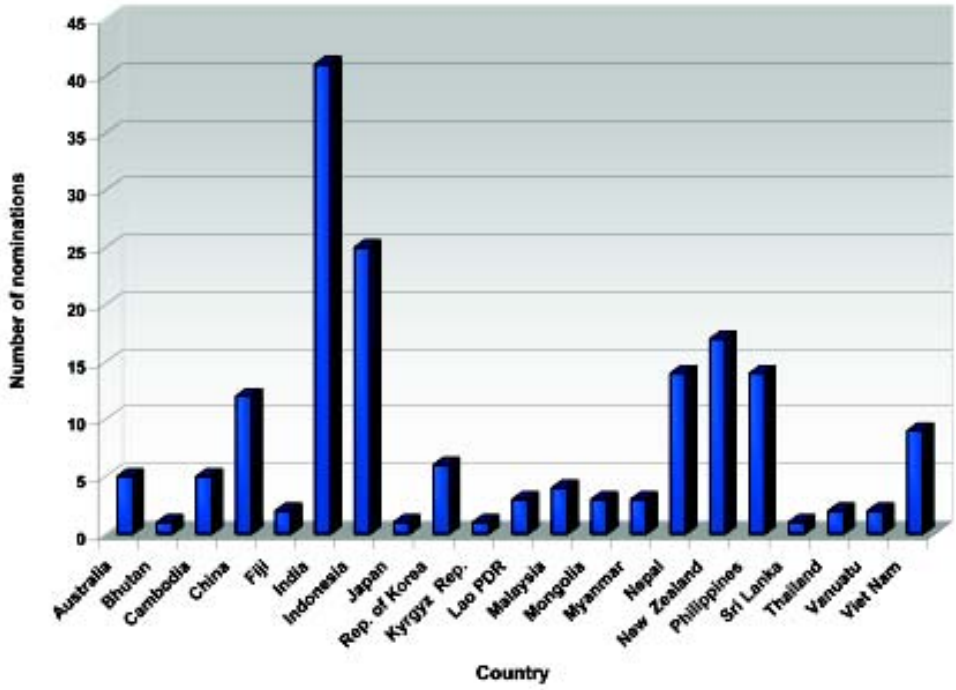
The nominating process for *In search of excellence* yielded 172 nominations from 21 countries, including several forests that were nominated more than once. Nominations were most numerous for forests in India (39), Indonesia (25), New Zealand (17), Nepal (14), the Philippines (14) and China (12) (Figure 2). Conversely, several countries with large areas of forest and renowned for expertise in forest management made only a handful of nominations — or in some instances, none at all.

In considering the distribution of nominated forests, it is important to recognize that nominations reflect people's *perceptions* of excellence, rather than necessarily excellent forest management *per se*. In any country, it should be expected that exemplary forest management will largely — but not exclusively — be assessed relative to other forests in that country. As a consequence, it might be expected that — all other things being equal — the distribution of nominations should strongly correlate with the actual distribution of forests throughout the region. Variations in national "standards of excellence" might be expected to be manifested in the management practices described, rather than in the number of nominations received.

Of course, all other things are not equal. The geographic distribution of nominations reflects a number of extraneous influences and biases that were introduced through the nomination process. For example:

- more nomination forms were sent to countries where FAO and RECOFTC have the strongest linkages and more contacts were identified (e.g. China, New Zealand, Philippines);
- greater effort was made in certain countries to familiarize people with the initiative and stimulate nominations through national workshops and e-mail discussions (e.g. India, Indonesia, Nepal, Philippines); and
- nomination forms were designed and written in English, making it much easier for potential nominators with a strong command of English to respond (e.g. India, New Zealand), compared with non-English speakers.

Figure 2. Distribution of *In search of excellence* nominations by country

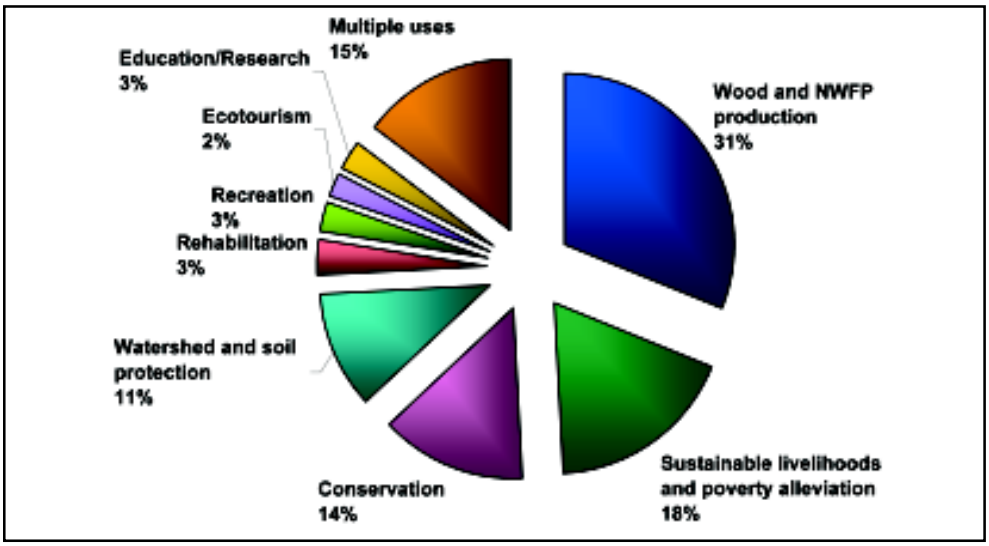


The process — probably along with some cultural factors, such as reticence to blow one's own trumpet — seems to offer the best explanation for the apparently skewed geographic distribution of nominations.

A second distributional aspect worth exploring is the types of management objectives that are most generally perceived to encompass excellence. Forests primarily managed for the production of wood and non-timber forest products (31 percent) comprise the largest group of nominated forests (Figure 3). This is not surprising, given the preponderance of forests managed for timber production throughout the region.

Other leading management objectives are sustainable livelihoods and poverty alleviation (18 percent), conservation (14 percent), watershed and soil protection (11 percent) and multiple use (15 percent). A very large proportion of nominated forests are managed for multiple objectives, but forests were only categorized as such when there was no clear primary management objective. This emphasis on multiple-use management reflects a paradigm shift from conventional, single-purpose forest management towards more integrated approaches. It also suggests that perceptions of excellence extend to a broad definition of forest management for socio-economic, ecological and cultural enhancement, beyond mere technical excellence in silviculture.

Figure 3. Distribution of nominations by primary management objective



The distribution of nominations by management focus provides interesting insights; forests managed by communities (often in partnership with government agencies under joint management arrangements such as Forest User Groups in Nepal and Joint Forest Management in India) had the greatest representation, with 42 percent of nominated forests identifying local communities as the "lead" forest manager. Forests managed by government agencies comprised 32 percent of nominations, while 20 percent of nominated forests were under private sector management. The remaining nominated forests were managed by research institutions and local governments.

A significant proportion of the nominations for community-managed forests were for forests supported by donor projects. In part, this reflects the additional resources that projects bring to their designated forests, but also relates to the relatively good access project staff tend to have to "outside information." Project staff would be expected to have a greater awareness of the *In search of excellence* initiative, as well as having greater capacity — and possibly more motivation to publicize their own initiative — compared with non-project forests.

In conclusion, it is unlikely that the distribution of *In search of excellence* nominations is particularly reflective of the general distribution of excellence in forest management in the Asia–Pacific region. The management styles and practices described in the nominations may, however — to some extent — reflect the distribution of "perceived" excellence in the region, where countries are at different stages of advancement in forest management. Depending on where the nominated forests were located, the nominations demonstrate significant variation

in people's perceptions of what constitute good forest management (see *Appendix 2* for the summaries of nominated forests).

On the other hand, the distribution by management objective and managing entities indicates general trends in forestry. The large number of forests managed for multiple objectives reflects a paradigm shift from traditional centralized forest management towards more integrated forest management for socio-economic, ecological and cultural enhancement. Also, the prevalence of community-management forests may indicate an increased awareness about the importance of, and the need for "decentralization and devolution of forest management" in achieving more integrated approaches to forest management.

Courtesy Alain Compost

ACHIEVING EXCELLENCE: CAN WE AFFORD IT?

Thomas Enters

The financial analysis is of critical importance in assessing the incentives for farmers, managers, and owners (including governments)… Will farm families have an incremental income large enough to compensate them for the additional effort and risk they will incur? Will private sector firms earn a sufficient return on their equity investment and borrowed resources to justify making the investment that the project requires?

J. Price Gittinger (1984), *Economic analysis of agricultural projects*

…the conceptual vocabulary of resource and welfare economics… which once served to justify social, especially environmental, policy has largely outlived its usefulness and has become a distraction and an important obstacle to progress.

Mark Sagoff (1988), *The economy of the Earth*

How much are pine kernels worth? How much is a songbird worth? Readers may find these questions strange and wonder whether they have ever been posed seriously. In fact, they have! The first question appeared in a recent World Bank publication[1] and spurred the authors to demand sanity checks on the results of some studies, which appear to make little real world sense. Funtowicz and Ravetz[2] posed the second question and contended that questions of such nature are the "stuff of impassioned politics." In fact, finding answers to such questions, being able to present the net worth of songbirds, pine kernels and all the other elements of the biophysical and spiritual environment, continue to be viewed by many as an important tool for rational, informed and effective decision making. As renowned economist Paul Krugman has observed, "Economics matter to people….[they] come to economists in search of emotional and political satisfaction."

It is only a small step from the questions about the songbird and the pine kernels to inquiring about the worth of achieving excellence in forest management. We don't necessarily expect all *In search of excellence* readers to ask this question.

[1] The World Bank. 2004. *How much is an ecosystem worth?* Washington, DC, The World Bank.

[2] Funtowicz, S.O. & Ravetz, J.R. 1994. The worth of a songbird: ecological economics as a post-normal science. *Ecological Economics* 10: 197–207.

But similar questions have been posed such as: "How much does achieving good forest management cost?" or "Can we afford to implement sustainable forest management?" These are clearly questions from the realm of economics and many readers will detect in these questions an attempt to make efficient resource allocation an important element of excellence.

Some readers will ask, at least subconsciously, the "economics" question and so we attempt to shed some light on the issue here. A further motivation is that a number of nominated forests appear to have been able to rise above mediocrity, to become special — at least in part — because they have benefited from externally funded projects or donor support. This has led some people to conclude that the managers of such forests are able to do better because they have received the financial resources needed to outperform neighbouring forests that do not benefit from similar inflows of funds.

There is no dearth of publications covering the domain of forest economics. Year after year, new texts appear on the bookshelves with guidance on how to assess the economic value of forests, how to conduct social cost-benefit analyses of forestry projects, or how to calculate the incremental costs of a change in practices, for example from conventional logging to reduced impact logging. Unfortunately, the tide of theoretical and conceptual discussions on the nature of costs and benefits is paralleled by an almost complete absence of hard data that could assist *Homo economicus*, the rational economic man, in decision making. If a person happens to ask, "Will local communities or forest managers have an incremental income large enough to compensate them for the additional effort and risk they will incur?" — a question very similar to the one posited by Gittinger (see above) — the quest for numbers that make sense may open a veritable Pandora's Box.

In Asia and the Pacific, that very question has been posed by many forest managers, concessionaires and logging operators to highlight their reluctance to adopt reduced impact logging (RIL) practices. In fact, several have redefined the acronym "RIL" to creatively press their argument, rephrasing it as "reduced *income* logging."

We certainly do not claim that adopting RIL and achieving excellence are one and the same. They are not! Yet, the RIL example can be used to probe deeper into the economics of excellence. RIL offers some advantages in this respect. For starters, it can be more easily dealt with than, for example, "devolved forest management" that involves a greater variety of stakeholders and for which distributional aspects — a tricky issue to deal with — are of significant importance. There are some reasonably good comparative data available for RIL to facilitate the debate. The brief discussion that follows is limited to financial aspects of logging and considers whether or not forest operators can afford to adopt RIL — reduced *impact* logging as opposed to reduced *income* logging.

On a global scale, over the last ten years, experiences with the application of RIL have been promising. RIL not only reduces environmental impacts, but can also be more efficient and cost-effective than (what is usually termed) conventional logging. In the Brazilian Amazon, under RIL the overall cost per cubic metre of wood produced was 12 percent less than under conventional logging[3] (Figure 4). However, under different conditions, applying RIL can be quite costly. In the Malaysian State of Sabah, profits reportedly fell substantially when a switch was made from conventional logging to RIL.[4] In the Malaysian State of Sarawak, researchers concluded that from the concessionaire's point of view, the costs of harvesting operations and royalties per cubic metre were 23 percent higher under the RIL system than under conventional logging.[5]

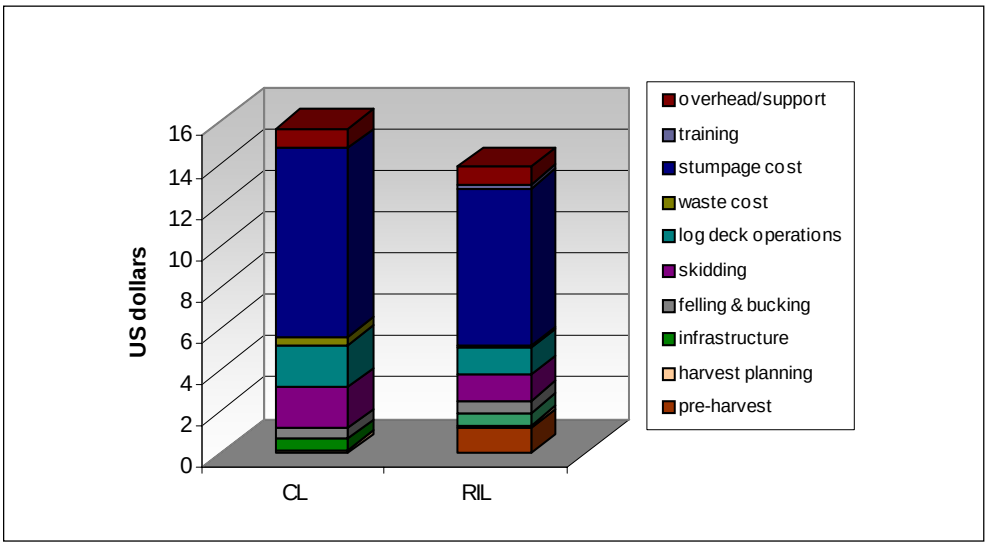


Figure 4. Costs of conventional logging versus reduced impact logging activities in the eastern Amazon[6]

[3] Holmes, T.P., Blate, G.M., Zweede, J.C., Perreira, R. Jr., Barreto, P., Boltz, F. & Bauch, R. 2002. Financial and ecological indicators of reduced impact logging performance in the eastern Amazon. *Forest Ecology and Management* 163: 93–110.

[4] Tay, J., Healey, J. & Price, C. 2002. Financial assessment of reduced impact logging techniques in Sabah, Malaysia. *In* T. Enters, P.B. Durst, G. Applegate, P.C.S. Kho & G. Man, eds. *Applying reduced impact logging to advance sustainable forest management*, pp. 125–140. RAP Publication 2002/14. Bangkok, Food and Agriculture Organization of the United Nations.

[5] Richter, F. 2001. *Financial and economic assessment of timber harvesting operations in Sarawak, Malaysia.* Forest Harvesting Case Study 17. Rome, Food and Agriculture Organization of the United Nations.

[6] Holmes, T.P., Blate, G.M., Zweede, J.C., Perreira, R. Jr., Barreto, P., Boltz, F. & Bauch, R. 2000. *Financial costs and benefits of reduced-impact logging relative to conventional logging in the eastern Amazon.* Washington, DC, Tropical Forest Foundation.

Most studies on the economics of RIL are of a partial nature only and of little deterministic value. Consequently, an answer to the question of whether RIL is financially viable as compared to conventional logging remains ambiguous. It depends on too many factors including topography, markets for inputs and outputs, scale of operation and the costing approach. This ambiguity helps to explain the hesitation of many governments and logging operators in committing to the adoption of RIL practices. On the other hand, there are reasons to doubt that many forest managers and operators are fully aware of all the costs and benefits of RIL.[7]

This brief excursion into the economics of RIL indicates that calculating marginal changes in costs, efficiencies or incomes is fraught with difficulty. Just when a person thinks one riddle is solved, another appears. In fact, it is likely that those who attempt to use efficiency criteria as a single common denominator for comparing alternative courses of action or investment options will never be fully satisfied with the numbers that financial analysts have been trained to generate. Differences in assumptions and definitions will always produce different results that one may or may not agree with. Hence it should be no surprise that there is still no consensus on the costs of meeting verious standards set as criteria and indicators for sustainable forest management.[8]

Putting the issue of consensus aside, many people anticipate that the resources required to achieve sustainable forest management will be astronomical. For example, in 1992, the International Tropical Timber Organization (ITTO) estimated that the annual price tag for meeting its Objective 2000 (a goal of having all exports of tropical timber and timber products coming from sustainably managed sources) would be US$458 million. Only three years later, the cost estimate had shot up to US$7 billion and this considered only the producers amongst the ITTO member countries. To many, this came as a shock and until today funds to cover the staggering costs have fallen severely short.[9]

But let us digress for a moment and ask whether those striving for excellence treat their commitment to excel as an option or even consider it as an investment. The monetary valuation of gains and losses arising from alternative allocations of scarce resources will undoubtedly continue to be important information in making decisions on competing uses. However, there are well-known practical problems with financial and economic analyses. Some critics also feel — and many economists find this a bitter pill to swallow — that the primary concern with

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[7] Applegate, G., Putz, F.E. & Snook, L.K. 2004. *Who pays for and who benefits from improved timber harvesting practices in the tropics?* Bogor, Center for International Forestry Research.

[8] FAO. 2004. Expert Consultation on Criteria and Indicators for Sustainable Forest Management. Rome, Food and Agriculture Organization of the United Nations.

[9] ITTO Secretariat. 1995. ITTO counts the costs. *Tropical Forest Update 5(4):* 16.

efficiencies in the allocation of scarce resources is based on a dubious assumption that there is always a shortage of capital available for investments.[10]

Peters and Waterman observed that, for those searching for *excellence*, the numbing focus on costs gives way to an enhancing focus on *quality*. Excellent companies, they argued, are not driven by either technologies or a compulsion to cut costs, though no company ignores costs or technologies altogether. To approach excellence, the focus shifts towards "close-to-the-customer" attributes, providing quality and satisfaction. The question is therefore not whether people are willing to pay more to move towards excellence. Rather, it is a matter of currency. People may not always invest money. Instead they pay attention to details, the opinions of others and especially the needs of clients (in the business world) or target beneficiaries (in the human development context).

Downplaying the supremacy of classical rational economic thinking does not mean that we open our arms to stupidity and irrationality. There are no excuses for wasting money or making poor decisions that could be avoided by conducting a thorough cost–benefit analysis. Indeed, careful analysis of the 28 case studies reveals that — in some cases — net present value *is* an important assessment criterion. Especially in the cases that fall into the category of profit-orientation, the question whether achieving excellence can be afforded certainly has been asked. In all likelihood, it has already been answered — in the affirmative.

Most likely, an almost identical question has also been asked by many, "Can we afford *not* to achieve excellence?" The forests of the Asia–Pacific region continue to be plagued by deforestation and forest degradation. In this situation, one has to wonder whether we can afford to even debate the issue — in doing so it seems we are implicitly willing to consider settling for mediocrity.

A close look at the current challenges facing forestry indicates that solving problems does not necessarily require additional investments. Instead, there is a need for openness to change and a will to leave the "bad" behind in order to move on to the "good." There is not necessarily a need to cough up more money. Instead, there is an urgent need to pay more attention to what's really required, such as political commitment and devotion to serve a cause — the cause of achieving sustainable forest management.

Admittedly, some of the exemplary cases in *In search of excellence* have found it easier to do the right thing because of the external financial support that they received. However, thousands of projects have been funded in the Asia–Pacific region during recent decades and only a small number have excelled. In many cases, the additional financial infusions have not been the main explanatory variable for success and excellence.

[10] Byron, R.N. 1991. Cost-benefit analysis and community forestry projects. *In* D.A Gilmour & R.J. Fisher. *Villagers, forests and foresters*. Kathmandu, Sahayogi Press.

There is no doubt that we can and must afford excellence. The case studies illustrate that excellence has a price, although it is not always possible to express it in monetary terms. What the case studies and the book do not show is that mediocrity also has its price. We should therefore be driven to ask whether we can afford to continue a course that is tantamount to promoting mediocrity and to use narrow economic arguments as obstacles to progress.

The consequences of falling short? A lone tree remains after forest has been cleared for agriculture, Khao Kor, Thailand (courtesy Masakazu Kashio).

About the author

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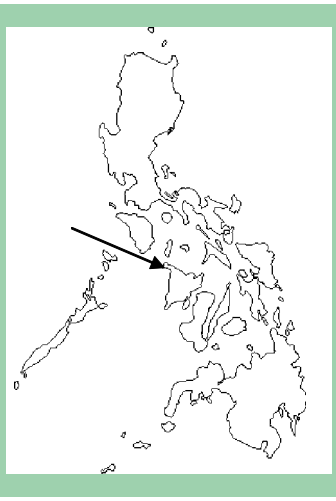
FOREST FROM THE MUD: THE KALIBO EXPERIENCE

Ernesto A. Cadaweng and Jun Ariolo N. Aguirre

Name of forest:	Buswang Mangrove Plantations
Location:	Municipality of Kalibo, Aklan Province
Area (hectares):	70
Managing entity:	Kalibo Save the Mangroves Association (KASAMA)
Mgt. objectives:	Mangrove rehabilitation, conservation and recreation
Country:	Philippines



"It was miraculous!"

This was how Elizabeth Ramos related her experiences with the Kalibo Mangrove Reforestation Project in the *barangay*[1] of New Buswang, on the island of Panay in the central Philippines.

New Buswang, located in the municipality of Kalibo, is situated 174 kilometres north of Iloilo City, and is one of the departure points for excursions to tourist sites on the world-famous island of Boracay. The flood-prone barangay is located at the mouth of the Aklan River — about two kilometres from the centre of the municipality. Residents of the area are mostly fisherfolk and subsistence farmers.

Elaborating on what she described as her "miracle," Mrs Ramos reported how a vast area of mudflats was transformed into beautiful mangrove forest capable of supporting ecotourism businesses. Prior to the reforestation programme, there was almost no vegetation growing in the area and the community was exposed to the ravages of the sea and severe river flooding during typhoons and heavy rains.

[1] A barangay is the smallest local government unit in the Philippines and often corresponds to a village or town district.

"It was just an open area of knee-deep mud," she added, "this mudflat area was a source of major problems for the residents — especially during the rainy season."

Formative years

During 1989, Attorney Fulgencio Factoran, the Secretary of the Department of Environment and Natural Resources (DENR), visited the province of Aklan and witnessed first hand the depressing condition of the area. Immediately, he instructed local environment officials to map out a strategy for reforesting areas around the mouth of the Aklan River as a means of mitigating the ongoing damage from storms and flooding.

A planning process was conducted, and several months later, the DENR approved the mangrove reforestation project and awarded a US$22 500 contract to the municipal government of Kalibo to implement it. The contract was signed in January 1990.

An area near the Sooc River at barangay New Buswang was chosen as the principal site for the reforestation project because of the broad expanse of mudflats in the vicinity. The site was almost completely devoid of vegetation, so successful implementation of the project was expected to provide an effective demonstration of the value of mangrove forests in buffering the community against bad weather.

The municipal government planned to implement the afforestation contract by encouraging residents of four surrounding barangays in the project area (Old Buswang, New Buswang, Bakhaw Sur and Bakhaw Norte) to organize groups to plant thousands of mangrove seedlings on 50 hectares of sprawling mudflats. Payments to the planters were to be made by the municipal government using funds from the contract.

Visitors' walkway leading through mangrove forest to the beach area (courtesy Ernesto A. Cadaweng).

Mrs Ramos was one of the first residents to be convinced by barangay officials to plant propagules (mangrove seedlings) under the reforestation project. However, many of her neighbours refused to cooperate in planting the propagules at first. "They were apprehensive that they might not ever be paid for their work," she explained.

Portrait of a subcontractor

To help allay the residents' apprehensions, Mayor Allen Quimpo subcontracted a non-governmental organization — the United Services and Welfare Assistance Group (USWAG) Development Foundation — to supervise the project and carry out coordination on behalf of the local government. The USWAG Development Foundation was perceived as an appropriate implementing agency, given its key objective of improving the lives of poor people in the community, particularly women and those involved in agriculture.

Initially, only 15 families from the barangays of Old and New Buswang expressed interest in being involved in reforestation activities. However, with persuasion from the municipal government, others joined, doubling the number of participants to 30 families. Once initial apprehensions about payments were overcome, the opportunity to earn money through the project had significant appeal to the impoverished residents. The municipal government provided the seedlings and paid approximately one US cent for each propagule planted.

DENR officials supervised the allocation of planting areas to the planters. "In order to ensure fairness, a system of drawing lots was used. Planters drew slips of paper from a 'hat' so their assigned planting areas were allocated randomly. This helped to minimize complaints and ensure smooth operations," explained Allen Quimpo, the former mayor.

"During the plantation establishment, the planters were often stuck in knee-deep mud, battling against strong waves and winds. The planters — assisted by their families — persisted against all odds," said Didi Quimpo, the Chairperson of the USWAG Development Foundation.

In good company

In the weeks immediately following the mass planting operation, questions began to arise as to who would protect, maintain and manage the reforested area in the long run. Mrs Ramos was among several people who questioned the USWAG Development Foundation about the immediate and long-term future of the project.

These were questions that needed immediate answers. Didi Quimpo took the initiative — after consultation with the municipal government and community members — to organize the planters into a community forest protection organization, which they named the *Kalibo Save the Mangroves Association* (KASAMA[2]).

Staff from the USWAG Development Foundation facilitated the formulation of the new association's constitution and by-laws. In July 1990, the association held its first elections and was formally registered with the Bureau of Rural Workers under the Department of Labor and Employment. Francisco Sutoniel, one of the original planters, was elected as the first KASAMA chairperson.

[2] Kasama means "companion" in Tagalog, one of the main languages spoken in the Philippines.

The new forest protection group organized the community to check the planted propagules regularly to prevent them from being washed away by high tides, to replace the dead propagules and to protect the area from animals and human intruders.

KASAMA has since become a model for how community-based organizations can help assure the sustainability of a forest project. The contribution of the newly organized planters was indispensable in protecting the planted mangroves, because they offered a constant presence in the area.

"The unity demonstrated by KASAMA has been directly responsible for minimizing incidents of illegal cutting in the mangrove area. KASAMA offers a far better means of protection than the local government could otherwise afford," indicated Ms Quimpo.

Fresh hope

The sacrifices of the planters eventually paid off.

In April 1994, KASAMA was awarded a Forest Land Management Agreement (FLMA) by the DENR. KASAMA's efforts were deemed sufficiently noteworthy that the agreement documents were presented to the association's representatives directly by President Fidel Ramos in a ceremony at Malaca□ang Palace.

The Forest Land Management Agreement between the DENR and KASAMA gives KASAMA tenurial rights over the reforested area for 25 years, with a right of renewal for an additional 25 years. The agreement stipulates that KASAMA has rights to sell, process, or otherwise utilize all products grown in the New Buswang mangrove area, in exchange for undertaking long-term maintenance and protection of the forest. In December 2000, the Forest Land Management Agreement was converted to a Community-based Forest Management Agreement (CBFMA), with similar terms and conditions.

In the meantime, Allen Quimpo's career had progressed from town mayor to his election, in 1995, as Congressman representing Aklan. His new position enabled him to provide tangible support to the reforestation project by allocating approximately US$4 200 from his Congressional District Fund for a new 7-hectare mangrove reforestation project to be undertaken by KASAMA.

Shortly afterwards the DENR contracted KASAMA to implement mangrove reforestation on an adjoining 13-hectare mudflat. These additional contracts added 20 hectares to the original 50 hectares, and expanded the original planting of 222 000 propagules to 311 000 propagules and seedlings. KASAMA planted 65 hectares with mangrove tree species, while the remaining 5 hectares were planted with nypa *(Nypa fruticans)* — a mangrove palm, the fronds of which are used for thatching roofs.

Significantly, the additional contracts were implemented successfully with minimal supervision from either the local government or the USWAG Development Foundation. KASAMA was able to organize planting, maintenance and protection on its own, thereby demonstrating the maturity of the organization. It was particularly effective in protecting and maintaining the new plantings, which are now almost two metres high. The earlier plantings now stand above 10 metres in height and some of the trees are 25 to 30 centimetres in diameter.

In accordance with the terms of their CBFMA, KASAMA will be allowed to utilize the forest once the trees reach a harvestable size. At present, some members of the organization supplement their incomes by collecting shellfish and crabs among the mangroves. Others work in the ecopark which has been established, and many have continued with their original livelihoods as fisherfolk and farmers.

Numerous awards

By 1994, the Kalibo Mangrove Reforestation Project — in addition to attracting Presidential notice — was also receiving management awards. The project was presented initially with the Galing Pook Award, which aims to promote innovation and excellence in local governance. The award is presented annually by the Centre for Development Management of the Asian Institute of Management.

The indisputable success of the mangrove project has led to the DENR's Community Environment and Natural Resources Office in Kalibo garnering the prestigious Eagle Award for Excellence. This honour is given by the DENR as a commendation for excellent performance to its leading regional and provincial offices.

In June 1995, DENR issued *awards of recognition* to KASAMA and the USWAG Development Foundation — citing their efforts and continued support for environmental protection. In 1996, Ms Medelyn Quadra, the project coordinator assigned by DENR, was recognized as the most outstanding woman project implementer — through her receipt of the Gender and Development Award — from DENR Secretary Victor Ramos.

KASAMA and the experiences in developing the Kalibo mangroves eventually became the models for mangrove reforestation projects in the west central region of the country. The initiative also became a showcase for prestigious visitors, including groups from the Asian Development Bank, the Overseas Economic Cooperation Fund, various review missions, the United States of America Peace Corps and universities.

The evident success of the project motivated Allen Quimpo's successor — Mayor Diego Luces — to continue the drive for sustainable management of the mangrove reforestation area.

"The mangrove forest has been recognized with several national awards because of its strong initiatives — so this gem of Kalibo should be properly maintained and promoted," stated Mayor Luces.

In the Philippines, garnering such support is not always straightforward. The incumbent mayor and other elected government officials seldom push for the continuation of projects initiated by their predecessors. Often, rivalries and personality differences invoke different project priorities. But Mayor Luces has continued to support the project driven by his personal goals of reducing erosion in the municipality and making the area a viable sanctuary for birds.

Support from other government offices

Studies and observations reveal that the mangrove forest has become a refuge for a number of bird species.

Wild ducks and birds come from nearby regions according to the Philippine Endangered Species and Conservation Project (PESCP) — an NGO dealing with the protection of threatened birds on Panay Island.

Following discussions between Mayor Luces, DENR officials, KASAMA and the USWAG Development Foundation, it was decided to designate the mangrove area as an ecotourism site. The plan is to target visitors not only from the province of Aklan, but also from the entire country, and even foreign tourists.

After consultations with KASAMA, the local government agreed to further support the mangrove project — including preparing and distributing promotional materials such as bookmarks, leaflets and posters describing the reforestation effort.

The promotional materials reached the office of Provincial Governor Florencio Miraflores, who agreed to fund continued protection and conservation of the mangrove area. Similarly, the Congressional District Office — led by Congresswoman Billie Calizo — pledged legislative and financial support to assist in the sustainable management of the reforested area. This support was offered despite Ms Calizo being a political opponent of the Quimpo-led coalition.

"Promotion of mangroves is essential to this town. We have a responsibility to help KASAMA alleviate poverty by inviting local and foreign tourists," concluded Ms Calizo, who owns a successful travel agency and is considered an expert on the tourism industry.

Some setbacks

Alongside the successes, there have been some problems as well.

Erlinda Fernandez, one of the original planters and currently Treasurer for KASAMA, admitted that they had suffered several setbacks in managing the mangrove area: "Some of the major problems encountered by KASAMA are the indifference of non-members, logistical difficulties, failed ventures, technical obstacles and illegal encroachment. Some of these problems pose a threat to the long-term sustainability of the project," she surmised.

Ms Fernandez singled out logistical difficulties and failed ventures as major problems. In their desire to supplement their livelihoods and incomes, KASAMA members have attempted to establish a number of income-generating projects, many of which eventually failed. Among the failed ventures were: a small store, established using funds provided by the cooperative; a motorized *banca* (boat with an outrigger) for fishing; and the production of king crabs with assistance from the Southeast Asian Fisheries Development Council (SEAFDEC).

"Had these ventures succeeded," she suggested, "KASAMA members would now have better and more affluent lives."

According to Didi Quimpo, the majority of these ventures failed due to mismanagement, with the root cause being the lack of educational training of the KASAMA members who supervised the ventures. But amidst these failures, the resilience of KASAMA as an organization was evident. The failures did not distract the members from the core activity of mangrove reforestation, which was the primary reason for bonding together — even though the financial incentives to work on project activities and ventures were very limited.

"There is currently not much financial incentive to work on implementing the project ventures, since most of us have to concentrate on our immediate means of livelihood, which is fishing," Elizabeth Ramos observed.

Mario Cervantes provides a case in point. He receives a meagre US$2 each month for maintaining and protecting his two-hectare mangrove allotment. And there are times when he receives no payment for several months due to wrangling between the local government and the Department of Environment and Natural Resources.

"The local government is rendered helpless in these situations, since it is not legally allowed to disburse or even advance funds of its own," Ms Fernandez complained.

In most instances, the USWAG Development Foundation bridged financial gaps for the project. In addition, USWAG also brokered much of the financing for income-generating projects run by KASAMA.

As the forest matures, the area's resources are increasingly attractive to outsiders. Encroachment and theft are inevitable threats. Most of the interlopers are nearby residents, who are non-KASAMA members, but see opportunities for exploiting the mangroves.

For example, in one instance a retired judge claimed a portion of KASAMA's nypa plantation as an extension of his shoreline landholding. Permanent dikes were constructed around a significant portion of the nypa plantation as boundaries of an expanded fishpond.

Members of KASAMA vigorously protested these actions, but in the face of the judge's influence they were ignored. KASAMA was forced to file a case to contest the encroachment in court, invoking their rights as provided by the CBFMA. The court provided an initial validation of their rights by serving a restraining order. The order was defied and the police were required to enforce it by arresting the hired workers. The court's final decision on the case is still pending.

Despite these problems, the USWAG Development Foundation encouraged KASAMA members to assume responsibility for managing the entire organization. So far, however, the members have refused, because many of them are getting older and they fear that they could not be effective managers.

"Most of us are already old," said Ms Edith Isturis, one of the founding members, "we are too old to start learning to manage the project."

To facilitate the eventual transfer of responsibilities, the USWAG Development Foundation is currently conducting leadership training for local youth, especially children of KASAMA members, in the hope of empowering a new generation to take on the responsibility of leading the entire organization.

"Who will manage the project once we pass away?" Ms Isturis inquired, "it will be our children. Now that they are grown up, we hope they will maintain the mangrove project we have started — for future generations."

Ecotourism site

Despite the ongoing challenges, prospects for the sustainability of the project are bright. The municipality of Kalibo — with leadership from its current chief executive, Mayor Reymar Rebaldo — has established an ecotourism site in the mangroves.

"We have launched the mangrove ecotourism site in coordination with KASAMA. We hope to be successful in promoting it as a regional ecotourism attraction," the mayor stated.

The ecotourism dream became a reality when the local government received a grant (US$600 000) from the Australian Agency for International Development (AusAid) and the Philippines-Australia Community Assistance Program (PACAP) to develop the area. The ecotourism site — the first in Panay — was opened to the public in April 2003, as part of the highlights of the province's forty-seventh anniversary celebrations. The festivities received extensive coverage in national and regional newspapers.

"The area is being promoted as an alternative tourism site alongside Boracay Island and Kalibo's Ati-atihan Festival," said Mayor Rebaldo.

Today, the USWAG Development Foundation receives funds for project operations from local and provincial governments, PACAP and the DENR.

Didi Quimpo observed that the USWAG Development Foundation recently obtained a PACAP grant totalling approximately US$40 000, which has been used for the construction of ecotourism facilities inside the Kalibo Mangrove Forest. The facilities include bicycle rentals for children and a small restaurant. Profits from the facilities are being used for day-to-day maintenance of the project, including staff wages and salaries. The new facilities employ several members of KASAMA, as well as their adult children.

In addition, Governor Miraflores recently released US$2 200 to help repair the visitor walkway used by tourists at the site. The walkway was built through the centre of the mangroves to allow visitors to fully appreciate the natural beauty of the forest. The walk begins at the entrance gate of the ecopark and meanders through mangroves on the western bank of the Aklan River. It crosses the river via a footbridge, passes through a tunnel-like mangrove forest and ends on the beach. The entire walk takes about 20 minutes. Members of KASAMA act as guides for visitors and answer questions regarding the area. Both foreign and domestic tourists visit the park, with a current average of more than 400 visitors per week.

Ms Isturis, employed as a cashier at the ecotourism site, reported that tourists from Korea, Australia, the United States of America and Germany are among the visitors to the area. However, most visitors are local tourists. Recently, tourism and environment officials from Cebu City and Antique Province visited the mangrove area as part of a study of development programmes initiated by the Kalibo municipal government.

The current perception of the community, as well as the assisting organizations and government agencies involved, is that it is possible to generate significant revenue from ecotourism. There is consequently an emerging consensus that the planted mangroves should be protected totally to maintain the appeal of the area to tourists.

Stout commitment

The most compelling aspect related to the rehabilitation and management of the Buswang mangroves is the commitment of the local people and the rewards that are slowly accruing through the process of "ownership" for KASAMA. Even before receiving formal tenure recognition, members exhibited stout commitment to the project. But the Forest Land Management Agreement and the CBFMA

have institutionalized and legalized the sense of ownership, which is a key factor in the sustainability of the project.

The vigilance of KASAMA was demonstrated powerfully in the decisive way it dealt with the case of illegal encroachment on the CBFMA area. It underscored KASAMA's maturity and capability as an organization. Similar vigilance has been maintained against smaller scale encroachment. When illegal reapers of mangroves are caught, they are warned for their first offence, but if apprehended for a second time then a fine is imposed. Members of the organization still patrol the fringes of the mangrove forest, especially areas that are very close to the community or otherwise vulnerable.

In 1998, the USWAG Development Foundation deliberately began to reduce support to KASAMA as it was confident that its members were nearly ready to assume independent management.

"For several years now, we have been assisting and supervising KASAMA and, as soon as they're ready, we will hand over full responsibility for managing the mangroves to them," Ms Quimpo commented.

Despite the success achieved by the mangrove initiative, Mayor Rebaldo admitted that additional funding from both the national and local government and from other non-governmental organizations is still required for the sustainable management of the mangroves.

He warned: "Without additional funding, we cannot maximize the potential of the mangrove area, and we do not know that it can continue to be maintained for forthcoming generations."

About the authors

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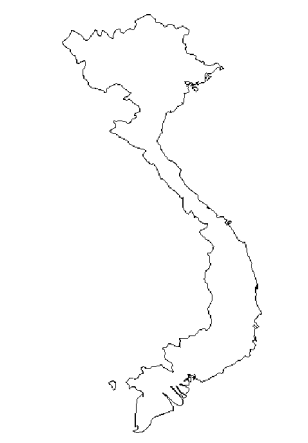
CAN GIO: TURNING MANGROVES INTO RICHES

Phan Nguyen Hong

Name of forest:	Can Gio Mangrove Biosphere Reserve
Location:	Can Gio District, Ho Chi Minh City
Area (hectares):	17 215 (core protection area 2 215)
Managing entity:	Management Board of Mangrove Protection, People's Committee of Ho Chi Minh City
Mgt. objectives:	Mangrove rehabilitation, conservation, recreation
Country:	Viet Nam



The searing heat, which typifies the waterway-studded Can Gio region of the lower Mekong River in Viet Nam, had abated after the previous night's rain; this signalled the end of the six-month dry season and already the ground appeared fresher and greener.

An early riser for all of her life, Ms Nguyen Kim Hoang enjoyed a rare relaxing moment in the quiet dawn gazing at the mangrove trees of the forest that her family had tended for several seasons. The trees were dear to Ms Hoang and her family, who had toiled over them for more than a decade. Sweat, tears — and more than a little blood — had transformed the land that had been allocated to her into a lush forest.

The ecological stability of Can Gio is evident in the diverse vegetation, carefully planted to supplement the natural regeneration of the forests. The diversity and structure is almost identical to the forests' original state, which was documented before the war. The recovery is remarkable and attributable to people like Ms Hoang.

Ms Hoang is well known in Can Gio — she has lived and worked in the mangrove forest for the past 23 years. Ms Pham Thi Huu, who lives in the Tam Thon Hiep Commune along with the Hoang family, and who has also succeeded

in protecting the mangrove forests allocated to her, explained that everyone regarded Ms Hoang as the most enthusiastic forest protector. While chatting with Ms Huu, through the window I noticed a frail woman hurrying towards the door.

"Are you from Hanoi?" the woman asked, "I was told that a researcher was here to see me."

And so I was finally introduced to Ms Hoang, who has become something of a celebrity as a result of her diligent mangrove rehabilitation work.

The past

Twenty-five years ago, Ms Hoang's family was one of the poorest in the commune. She and her husband found it hard to make ends meet, having five children to feed. The family lived in a dilapidated shelter, earning their living by collecting shellfish.

In 1980, the Hoang family was contracted by the Duyen Hai Forestry Enterprise to establish and cultivate about 100 hectares of red mangrove (*Rhizophora apiculata*) each year. By 1986, the family had planted 482 hectares of mangroves successfully. Ironically though, just when life started to become easier for her, Ms Hoang and her husband separated and she was left to take care of their five children. Ms Hoang wondered how she would be able to feed her children until she realized the answer was standing in front of her — the mangroves.

By the late 1980s, however, the mangroves in Can Gio, especially those planted by state agencies, were being threatened. The survival of planted mangroves was poor and poverty-stricken local inhabitants were rampantly felling trees for fuelwood. In 1990, in an effort to mitigate mangrove destruction, the Duyen Hai Forestry Enterprise tried a different approach when it began allocating mangrove forests to impoverished people in the six communes of Can Gio District. Their primary task was to protect allocated areas for 30 years. In exchange, they were paid a monthly wage and allowed to use thinnings and other forest products. The government also promised to facilitate their settlement in the forest on a long-term basis. Ms Hoang — along with nine other families — was among the first to join the scheme.

Many were surprised when Ms Hoang readily accepted management responsibility for 171 hectares, with only her eldest son, Nguyen Van To (who was 22), to help her. Her eldest daughter, Nguyen Thu Hong, 19, had married recently and moved far from home. The three remaining children were not yet teenagers, and thus were too small to help with heavy labour.

In the beginning, the family experienced severe hardship. The difficult work included land reclamation, tree planting and patrolling the forests.

"At that time, cutting of mangroves for firewood or for sale by local poor people was a regular occurrence. When we patrolled during the day, illegal forest exploiters cut down the trees at night, and vice versa. It was a gruelling experience for a family with few resources like ours," Ms Hoang recalled.

The Can Gio Mangrove Biosphere Reserve

Can Gio is situated on a recently formed estuary, where the Saigon and Dong Nai rivers discharge into the sea. A network of canals and rivers divide the site into many islets. The dominant vegetation is mangrove forests — both planted and naturally regenerated. The site also supports sea-grass beds and houses many species of mollusks, crustaceans, fish, amphibians and birds — as well as terrestrial animals.

In the past, the Can Gio mangrove forest complex covered more than 40 000 hectares. The average tree height was 20 to 25 metres. Before 1945, the mangroves were classified as productive forests and were exploited regularly. The former Saigon regime demarcated 28 000 hectares in Can Gio as protected forests. The remaining area, comprising mainly secondary forest, was exploited randomly. However, the Can Gio ecosystem was almost completely destroyed during the Second Indochina War (1965–1969) by chemical agents and bombing.

Following the war, Can Gio was allocated initially to the Duyen Hai District in Dong Nai Province. In 1978, however, management responsibility for Can Gio forest was transferred to Ho Chi Minh City. The area was degraded heavily, with 4 500 hectares of *Phoenix paludosa* (a prickly wild plant species), 10 000 hectares of barren cracking muddy soil and only 5 600 hectares of cultivable land. The remaining area was covered with unproductive shrubs and bushes. Precious wood-supplying trees such as *Rhizophora* and *Bruguiera* had almost vanished.

In 1991, Can Gio was designated as a coastal protection forest, in line with Prime Ministerial Decision 173/CT. Subsequently, in 2000, Can Gio was designated as Viet Nam's first Biosphere Reserve under the Man and the Biosphere Reserve Programme of the United Nations Education, Scientific, and Cultural Organization (UNESCO). Today, Can Gio is the largest area of rehabilitated mangrove forest in Viet Nam.

But, the story of Can Gio's rehabilitation is not straightforward, and mirrors the experiences and challenges of many other Asia-Pacific countries.

Early rehabilitation efforts

In 1978, the People's Committee of Ho Chi Minh City issued a policy for the afforestation and rehabilitation of the Can Gio ecosystem. This was implemented initially by the Duyen Hai Forestry Enterprise. Later on, the central government

established plantations on fallow and salt-marsh lands. These government-owned farms were designed not only to alleviate overcrowding and employment pressure in the inner city, but also to produce food and industrial crops including sugar cane, pineapple, cashew nut and eucalyptus. Can Gio forests were designated "production forests," with a view to providing fuelwood and construction timber to the city.

However, nearly all of these projects failed due to a combination of poor management, insufficient funding and lack of experience. The project managers, sent from the city and other districts, were not familiar with the local conditions in Can Gio. Farms were established on land that, without mangrove forest cover, had been leached of many of its nutrients and had become acidic and infertile. By 1999, many of the state-run enterprises had abandoned their rehabilitation efforts, returning the land to the city authority, because the crops and forests were growing too slowly to be commercially viable. Many planted areas were abandoned and became vulnerable to illegal exploitation.

A new strategy

This wholesale failure forced the government to change its policy and strategies. There was also increasing appreciation of the environmental and social benefits the Can Gio forests could provide. As a result, the Can Gio forest area was re-classified as an "environmental protection forest." Simultaneously, a more effective management strategy was applied by allocating land to local households for protection and management. A *Management Board of Environmental Protection Forests of Ho Chi Minh City* was established to undertake the strategic forest management functions previously carried out by Duyen Hai Forestry Enterprise.

In tandem with this local government strategy, the national Department of Forestry now operates 24 Forestry Units in the Can Gio Zone. Each unit works with its own diversified plan to ensure activities complement the efforts of households in planting and protecting regenerating forest areas.

The new strategy was designed to work according to three fundamental principles:

- it went to the root of encroachment problems by empowering impoverished local people, many of whom used to cut down forests, to manage forest areas. The authorities reasoned that the provision of secure tenure would encourage people to protect their assets;
- it capitalized on traditional knowledge using the rationale that local people, who have been living in or near the forests for many years, would know best how to manage them effectively; and
- it provided a transparent means of support through the State-funded Management Board, which served as a contact point — providing control, coordination and support to the forest-protecting households so that none of them would work in isolation.

Implementation of the strategy followed a carefully structured approach. Initially, the Management Board informed all local communes about the strategy, and households wishing to be allocated land were invited to make a formal application. The communal authorities and the Management Board reviewed each application and those selected were allocated forest lands at meetings where the respective head of the relevant Forestry Unit, representatives from the local commune authority and the district Department of Agriculture were present. Each household was given a record of the allocation, a contract for forest management and a detailed map of the allocated area (at a scale of 1:10 000). The allocations were formalized by the Ho Chi Minh City People's Committee.

Difficult beginnings

"As soon as I took the land," Ms Hoang recalled, "I found it very difficult. Without any boat, my children and I patrolled by wading all day through the forest. There was no choice as the trees were no longer the State's assets — but mine."

Due to exhaustion and poor efficiency, she often felt discouraged. Ms Hoang had no experience in forest protection; thus the forest encroachers quickly learned the timetable of her family's initial patrols, and trees were poached in between them.

Fortunately, forest rangers provided assistance by suggesting more effective ways to protect the mangroves. They began to frequently change both the timing and the route of their patrols. She and her two sons would begin a patrol together, but one person would be left in the forest as a sentry. If a problem was discovered, the sentry would hasten to a guard station to inform other people.

When they caught forest encroachers, Ms Hoang and her children would explain the importance of the forests to the family's livelihood. She sought their empathy and understanding of shared hardships. Since the encroachers were local people who lived with the same challenges and deprivations, amicable talks and explanations proved to be more effective than threats.

"With so few people protecting the forests, how can you stop the forest encroachers?" I inquired.

"It was difficult at first, but my neighbour Dinh Thi Hong and I persuaded the other households associated with forest protection to help one another. We took turns in our work so that there was always someone on duty to deal with illegal encroachers. In addition, the forest rangers and police helped us to enforce the regulations. The Forest Management Board implemented educational campaigns aimed at increasing the understanding of what we were trying to achieve. As a result, forest destruction decreased considerably," Ms Hoang replied with a smile.

Successful mangrove protection

The success of this collaborative effort in forest protection did not go unnoticed. In fact, it was singled out as an example for 57 forest-protecting families in the commune. The surrounding households adopted Ms Hoang's model, and began to help one another with new initiatives to further minimize the felling of trees. The Ministry of Agriculture and Rural Development recognized Ms Hoang's contribution with a Certificate of Merit and an award of US$20. She was cited for achievements in improving her family's living conditions and in managing and protecting the mangrove forests.

The forests allocated to the Hoang family — and other forest-protecting households in the district — have become integral features of their lives. Despite its own budgetary constraints, the city government has provided considerable assistance to the forest guardians, helping them to stabilize their lives. For example, when the initial forest allocations were made, each household was given US$150 to build a guard station, and to buy a boat, earthen water containers and necessary tools. Each family was paid a regular forest protection fee and allowed to harvest and sell non-timber products; they were also given a percentage of receipts from the sale of thinnings. The government assisted households engaged in fishing and aquaculture in improving their practices.

In return, the households were required to protect, manage and utilize the allocated lands and forests in accordance with the policies and regulations issued by the Management Board. To date, 167 households have been allocated 14 198 hectares of forest land in 18 Forestry Units.

"In fact, the initial forest protection fee was inadequate because it provided only monthly wages to the main labourers in each family, although in most cases other people from the household were also involved," explained Mr Nguyen Khac Ngan, Director of the Department for Agriculture and Rural Development, who also heads the Management Board of Can Gio Biosphere Reserve.

In subsequent years, the protection fee was calculated according to a formula based on the area being protected and topped up with additional income from the sale of thinned wood (35 to 60 percent of total proceeds).

New lives in Can Gio

The benefits accruing to the people directly involved in forest care and protection have been improved regularly under new city regulations and as the forests have matured. As of 1999, further thinning was prohibited because all the forests had been thinned at least twice. Since this reduced the revenues of the forest protectors, the city government has increased the annual protection fee from US$4.50 per hectare to around US$20 per hectare.

The living standards of the forest-protecting households are, however, still quite low. Transport is difficult due to the many rivulets and canals separating

forests, and shortages of freshwater are frequent in the dry season; fresh vegetables are scarce and, until recently, the forest guardians lived without electricity.

A long-held dream was realized when the city government, with assistance from local organizations including SOLARLAB (a laboratory researching solar energy) and international organizations including the Fondation □nergies pour le Monde (a French energy organization) and the Japan International Cooperation Agency, funded a solar power system to provide electricity to most of the forest-protecting households. Reserves of freshwater have also been increased with the installation of large plastic water tanks for storing rainwater; these replaced the initial earthen containers.

Mobile health care boats, provided by the city government, are used to improve health care services. The Dan Xay Bridge has been constructed with state funds to facilitate transportation from Ho Chi Minh City to Can Gio District; and children from forest-protecting households are given support to attend primary and secondary schools in their local communes.

The significant changes to the lives of local people have been the results of long-term and intensive efforts by various stakeholders. To ensure the development of the mangrove forests, the city government has provided preferential credit and commercial credit policies targeting inhabitants in the district, to assist them in establishing agricultural and forestry enterprises, as well as aquaculture, salt-making and other livelihood opportunities.

Improved livelihoods for local people mean reduced pressures on the mangrove forests. With alternative means of income generation and new energy sources, local people no longer cut down mangroves. Education and training provided by government technical staff have enabled local people to establish new industries, such as aquaculture, and gain higher outputs without affecting the mangrove environment. For example, the use of tidal flats in front of the mangroves for clam and blood oyster farming has significantly reduced poverty in Can Gio. Elsewhere, the city government has granted interest-free loans for planting nypa palm (*Nypa fruticans*). The Flemish Organization for Assistance in Development, a Belgian non-governmental organization, has supported remedial treatment of salinated agricultural land and mangrove planting.

I was surprised to find Ms Hoang living in a spacious new home with modern amenities including a television, cassette recorder and motorbike. She has also been able to build separate houses for her eldest son and her third son. This was a marked change from just a few years earlier.

Observing my astonishment, Ms Hoang laughed, "You're surprised, aren't you? To be frank, the wage paid by the government is only enough for daily needs. Our family is now involved in many other activities. We don't want the hard-earned money from our days of wading and planting in the mud and protecting the forests to sit idle in the bank."

"I considered various options, but after reading a newspaper article on the topic, I started rearing crabs in river cages. I obtained technical help from the District Fishery Department. After only 30 days of rearing, female crabs grow sufficiently to sell for US$6 per kilogram. Merchants from Ho Chi Minh City come here to buy them for export, so I don't have to go out to sell them. After nine continuous rounds of crab rearing in three years, I've earned US$900 profit."

Hard-working people like Ms Hoang no longer fear poverty. She is also very active and full of energy — more than many men of her age. "What about sea eel farming? Have you been involved in this?" I asked.

"Well, things do not always go smoothly, you know. Our plans to raise sea eels failed after the first harvest, because of oil spills that killed the eels," she replied.

Noticing the chickens outside scratching for food in the garden, I asked, "I was told that you had been raising goats. Where are they now?"

"Goat raising is very profitable. We started with three goats in 1991. By 1996, we had 31 goats. But, we did not have sufficient people to look after them, so the goats regularly escaped — destroying our neighbours' crops. I had to sell them to my brother," she reported sadly. "Like other local people in this area, I now rear pigs, chickens and ducks, which do not destroy the surroundings. These animals also help us to lower our bills for feed. We use chicken manure as feed for cultured fish. With income from both the animals and fish, we're very happy."

"I've also been farming shrimps for more than a year now. But, unlike people in other areas, my neighbours and I have not cut down mangrove forests for shrimp farming. My shrimp pond is 2 000 square metres, dug in an area where there were no mangroves. Training courses organized by the Management Board have helped us to understand the importance of mangroves. Without the forests, the land on which we are living and building our assets would be eroded. No longer would we be able to raise shrimp, crabs, oysters and other shellfish, because there would be no detritus for them to live on. The soil becomes acidic and cannot be used for cultivation or rearing at all. And we cannot simply destroy our own efforts spent during years of protecting our forests."

All these activities have not sapped Ms Hoang's energy. In 2000, after teaching herself about mangrove seedling nursery techniques, she signed a contract with the Management Board to establish nurseries of *Intsia bijuga*, *Thespesia populnea* and *Xylocarpus granatum* — three tree species that produce highly valued wood for handicrafts and furniture. This task is considered extremely difficult — even for technical forestry staff.

When thinning was no longer permitted in the Can Gio forests, Ms Hoang and several other people bought thinned products from neighbouring provinces and sold these as construction materials and fuelwood. Recently, she has earned around US$200 from harvesting nypa palm leaves, used for thatching roofs.

Free time is not a familiar concept among Ms Hoang and her family. In 1991, to make full use of unproductive areas, they collected *Rhizophora* propagules and planted them on 120 hectares of bare land. Ten years later, the city government issued a policy to buy back this type of land to expand the rehabilitated mangrove area. The city has subsequently purchased an additional 988 hectares, for US$3.6 million, to expand the Can Gio Biosphere Reserve.

The Hoang family's 2000 m² semi-intensive shrimp pond (courtesy Vien Ngoc Nam).

Nypa palm leaves provide considerable income for Hoang's family (courtesy Vien Ngoc Nam).

The present, the future

The success of Ms Hoang's family illustrates the effectiveness of combining mangrove planting, protection and the development of complementary enterprises. Starting with their bare hands, they now have capital for development and stable income. Ms Hoang notes that such achievements came not only from her family's hard work, but also as a result of assistance given by the staff of the Management Board. She also cites leadership at the city level and social organizations at home and abroad.

A preliminary evaluation of community participation in mangrove management following mangrove land allocation in Can Gio has been carried out by the Agriculture and Forestry University of Ho Chi Minh City in cooperation with the Department of Agriculture and Rural Development. The evaluation showed that not only have mangrove forests been well protected but local livelihoods have been stabilized as well. Payment of mangrove protection fees is sufficient only for daily meals, but supplementary enterprises have helped people to improve their living standards considerably.

A successful mangrove management model

It is clear that the successful management of mangroves in Can Gio is attributable not only to payment for mangrove protection, but also to empowering measures including provision of secure land tenure, assistance to local people in establishing homes and settlements and support for the development of viable enterprises associated with mangroves. The very existence of the Can Gio mangrove forests is a testimony to the 25 years of effort and creativeness of the authorities and people of Ho Chi Minh City and Can Gio.

Observing the immense mangrove forest stretching along the waterways spreading out to the six communes — extending to estuarine mud flats and islets in Can Gio — it is hard to believe that the area was once largely barren land. Can Gio mangrove forests, including the mangroves of the Hoang family, have become a source of great pride to the local people and authorities, especially since they have been designated as a World Biosphere Reserve. Educational materials distributed by the Mangrove Ecosystem Research Centre, various extension activities conducted by the city and nearly 100 training courses funded by UNESCO, have made local inhabitants fully aware of the major significance of Can Gio mangroves. They now proudly demonstrate to visitors from different parts in the world, how the mangrove forests are being protected and rehabilitated.

Today, Can Gio contributes to the conservation of the full biodiversity spectrum, including landscape values, ecosystems, species and genetic resources. It has also fostered economic and human development, taking account of sociocultural and ecological sensitivities. Support is provided for research, monitoring, education and information exchange relating to local, national and global issues of conservation and development. Can Gio has also become an important tourist destination and a research site for students and scientists. To facilitate these developments, Action for Mangrove Reforestation (ACTMANG), a Japanese non-governmental organization, and TIERRA, a Japanese enterprise active in environmental education, have funded the construction of five seminar/training centres in the mangrove area. The centres provide opportunities for people to interact and immerse themselves in the diversified mangrove ecosystem.

Meanwhile, Ms Hoang's family now employs seven labourers. Her eldest and youngest sons are both busy working in a motor repair shop in the centre of Tam Thon Hiep commune, but still help their mother in protecting mangroves at times. Her third son is a staff member of the Management Board. Her fourth son and his wife follow her example, protecting the mangroves.

Although she is already 55, Ms Hoang is still busy managing her increasingly large assets. In a picture taken at the wedding of her fourth son, she wore a big smile but still had mud on her feet. The mangroves have closed their canopy, and their strong roots have penetrated deeply and firmly into the mud. Yet Ms Hoang and her neighbours continue doing their silent work — protecting and rehabilitating the mangroves for the benefit of their families and many others for generations to come.

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About the author

Phan Nguyen Hong has been involved in mangrove ecosystem research for more than 35 years. He is the author of several books on mangrove ecology and management published in Vietnamese and English, as well as texts on biology published in Vietnamese. He holds a number of degrees in ecology including a Ph.D. obtained in 1970 and, most recently a Doctor of Science (1991). Currently, he is a Professor of Ecology at Hanoi University of Education and Director of the Mangrove Ecosystem Research Division, Centre for Natural Resources and Environmental Studies, Viet Nam National University, Hanoi.

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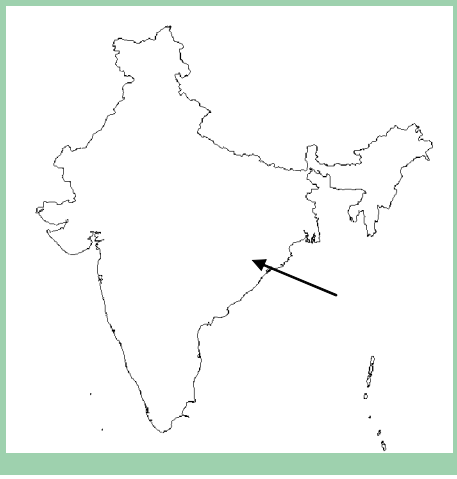
SULIA PARIBESH PARISHAD: GUARDIANS OF THE FOREST

Suprava Patnaik

Name of forest:	Sulia Reserve Forest
Location:	Orissa
Area (hectares):	6 324 (1 400 under protection of Sulia Paribesh Parishad)
Managing entity:	Sulia Paribesh Parishad (a community forest protection committee)
Mgt. objectives:	Forest protection, poverty alleviation
Country:	India



Every three days, Saila wakes very early in the morning and walks to the nearby forest to gather mushrooms and medicinal leaves, which she sells at the local market. On afternoons, during authorized periods, her neighbour Champaka also goes to the forest to collect branches and twigs to be used as fuelwood. Some days she finds nuts or berries that she collects and brings home for her family.

Both of them try to protect the forest. "To us, the forest means life itself. Without the forest, our lives here would no longer be viable," said Champaka, a farmer's wife. "It is the source of our livelihoods. We get fuelwood and building materials from the forest — even our water and medicines. This is the reason why we take care of our forest," added Saila, a mother of three.

It is not a new phenomenon for communities to be protecting forests in India. Local people have protected various sites and species for centuries throughout the country. Even now — with forest protection high on the national agenda — some of the best protected forests are the "sacred groves" guarded and nurtured by traditional communities.

In some parts of India, community institutions have initiated protection and management of forests — independently of government programmes. This generally occurs because the communities concerned are economically dependent

on forest resources, for either subsistence or income. Presently, there are several thousand of these self-initiated community forests.

The State of Orissa, situated in the eastern part of India, has a long tradition of community-led forest conservation and management. Efforts began as early as 1936, in Lapanga Village of Sambalpur District, and gathered momentum in the late 1970s becoming a widespread trend in subsequent years (Vasundhara 2000).

Currently, an estimated 8 000 village groups in Orissa are protecting approximately 2 million hectares of forest (Pattanaik 2002). Forest protection has usually been initiated in response to a scarcity of forest products resulting from forest degradation. Such efforts have emerged as village-based initiatives, without the support of the government, and are successfully protecting degraded or partially degraded stands in reserved and protected forests (Box 1). Communities generally begin by developing various institutional rules and directives, such as regulations covering extraction and distribution of forest products and penalties to be applied to offenders. Direct forest protection mechanisms vary, but typically include voluntary rotational patrolling or employment of paid watchers.

Box 1. Forest classifications in India

The Indian Forest Act of 1927 legally designates government forests into three categories that offer graduated degrees of protection. The greatest protection is afforded to reserved forests, in which only activities that are specifically permitted may be carried out. Conversely, in protected forests, a more limited degree of protection is provided. In practice any activity is allowed unless specifically prohibited. A third forest classification, unclassed forests, comprises forest land owned by the government, but not constituting a reserved or protected forest. There are fewer restrictions for unclassed forests as compared to reserved and protected forests.

Community forest management in Nayagarh District

Nayagarh District, which houses 864 000 people, is located in the eastern part of the State of Orissa. With a total area of 424 200 hectares, the district has an undulating topography with a broken mountain system intersected by plains, valleys and streams. Forest areas in Nayagarh District cover approximately 220 800 hectares and contain a range of forest types including semi-evergreen, moist mixed deciduous, riverine, moist peninsular sal (*Shorea robusta*) forest, and dry mixed deciduous forest. The Forest Survey of India notes that approximately 63 percent of the district's forest areas possesses a canopy density greater than 40 percent closure.

Community protection of forests in Nayagarh District began in the late 1960s, but gained momentum only in the 1970s. The process was further strengthened in 1982, with the emergence of a voluntary organization — Brikshya O' Jeevar Bandhu Parishad[1] (BOJBP) — which formed when 22 villages situated around the Binjhagiri and Malati hills united to protect forests on these degraded uplands under the leadership of a group of schoolteachers and respected leaders in the village. Both hills were heavily deforested and streams originating in the hills were drying up. The surrounding villages faced fuelwood scarcity, shortages of water and increased soil erosion (Kant *et al.* 1991).

The BOJBP provided a sound model for forest protection that was adopted by many villages in the district. Today, several hundred community forest management organizations have sprouted in Nayagarh District to protect forest resources in the district's three principal protected and reserved forests — Sulia, Ratnamala and Hatimunda. To date, 750 villages have united to form the Nayagarh Jangal Surakhya Mahasangha — a district-level forest protection federation.

Importance of Sulia Reserve Forest

Sulia Reserve Forest extends over 6 324 hectares and is one of three important reserve forests in Nayagarh District. It encompasses three forest ranges: Nayagarh (1 780 hectares), Mahipur (1 604 hectares) and Odogaon (2 940 hectares). The Sulia hill range starts near Machipada, which is about five kilometres south of the town of Nayagarh.

The majority of villagers living on the fringes of Sulia Reserve Forest either farm marginal smallholdings or are landless labourers. They are highly dependent on the forest for fuelwood, timber for housing construction and repairs, poles for fencing and for making platforms for stacking paddy and bamboo for a variety of utilitarian purposes. Non-timber forest products harvested from the forest include nuts, berries, leaves of sal (*Shorea robusta*), siali (*Bauhinia vahili*), harida (*Terminalia chebula*), bahida (*Terminalia belerica*) and several other medicinal plants.

"Compared with other reserve forests in the district," explained an Odogaon forest range officer, "the pressure on Sulia Reserve Forest is very high because it is very near to Nayagarh town and is surrounded by several large villages."

Satyabadi Mohapatro, from Machipada Village, recalled that in the past Sulia reserve had good forest cover. "It started to lose its forests when uncontrolled demand for timber from nearby towns and cities was coupled with unrestricted cutting of fuelwood and poles by the surrounding villagers."

In a relatively short period, the villagers living near Sulia Reserve Forest realized that if they did not protect the forest, their sources of livelihood would

[1] Which translates as "friends of trees and living beings".

be gone. "The forest resources were diminishing," remembered Chaitanya Prasad Barad, a retired teacher and resident of Solapatta. "The degraded Sulia hill barely had any trees. We could only see stones and had great difficulty in obtaining fuelwood, timber and bamboo." He recalled that the shortages were so acute that villagers had to get up early in the morning to travel the 10 to 13 kilometres to Ratnamala forest, to collect a cartload of fuelwood and other forest products.

It was a laborious task — especially the return journey — carrying bundles of wood, and it demanded urgent action. "Instead of going to other areas to collect fuelwood and timber, why don't we protect our own forest?" they asked themselves.

Protection committees working together

In 1989, the late Shri Raghunath Pradhan, a respected social leader of Magarbandh Village, and a youth group working in adjoining villages, motivated the villagers to band together to form the Sulia Paribesh Parishad. Over the years, villages around Sulia Reserve Forest organized individual (village-level) forest protection committees to protect specific patches of forest or, in some instances, clusters of villages have formed joint committees to protect large forest compartments. The largest joint committee encompasses 36 villages.

Today, the committees have coalesced into 14 forest protection groups. Some of these groups have organized themselves into regional committees to ensure better coordination of protection work. One such regional committee is the Sulia Paribesh Parishad, a group of 18 villages. These villages comprise more than 12 000 people of mixed professions and ethnic backgrounds. The village nearest to the forest is less than 3 kilometres away, while the farthest is about 10 kilometres distant. The villagers estimate the total area protected by the Sulia Paribesh Parishad to be approximately 1 400 hectares, covered with mixed deciduous forest.

With objectives including forest protection and sustainable forest management, the Sulia Paribesh Parishad has established clear guidelines for collecting and distributing forest products, protecting forests, granting access, fixing prices for different products and imposing fines and penalties. The rules take into consideration the various sectors of society and emphasize equal participation in terms of representation, and transparency in information sharing and subsequent decision making. The fundamental guiding principles of the Sulia Paribesh Parishad are based on democratic decision making, clear and flexible rules and location-specific management practices, founded on a rich base of traditional knowledge.

The decision making process for the Sulia Paribesh Parishad is managed by village bodies, a general body and an executive committee. Village bodies consist of a man and a woman from each household. Each village sends a minimum of

five representatives (including at least two women) to a cluster general body, which in turn elects the executive committee including the office bearers (president, vice-president, secretary and treasurer). The president and the secretary are the chief functionaries. The executive committee has 82 members (26 are women), with the remainder representing various tribes and castes. The general body convenes once each year, while the executive committee meets on a monthly basis. An informal core committee of 10 to 12 members advises the executive committee regarding the functions of the Sulia Paribesh Parishad.

Emergency meetings may be conducted at any time to address a particular issue. A good example occurred recently in Jiripada, a tribal village situated near Sulia Reserve Forest. One of the villagers felled trees illegally to make farming tools. The executive committee called an emergency meeting to deal with the situation. The person involved was summoned before the meeting and cautioned. The committee also confiscated the farming tools and fined him.

During executive committee meetings, various forest development and management activities are discussed. A regular agenda item is the organization's balance sheet. "Our organization believes in transparency," explained Sri Subhas Chandra Sahu, the current secretary. "Our accounts are audited and the income and expenditure statements are always reported during meetings."

The Sulia Paribesh Parishad mobilizes financial resources from various sources, with base funding coming from household contributions known as *chulichanda* (*chuli* means "stove" or "hearth" while *chanda* means "subscription"; in India, a joint family may have as many as 15 to 20 members constituting one household using a common stove or *chuli*). Members usually contribute US$0.09 per year as *chulichanda*. Other major revenue sources include charges levied for forest products collected during the annual thinning and harvest operations, auctioning of wind-thrown trees and seized products and fines. Principal expenditures are for forest management activities, salaries for paid watchers, networking and various community activities.

Ensuring sustainability

The organization has also established rules and regulations regarding the use and extraction of forest resources. Before the forest is opened for annual cleaning, thinning and harvesting, the executive committee meets to decide:

- dates of operation;
- types of forest products that may be harvested and quantities to be allowed;

- species to be harvested for various uses (Table 1);
- area of the forest or forest patch to be allowed for harvesting;
- fees to be levied;
- responsibilities of supervision;
- identification of major forest access points; and
- responsibilities for guarding checkpoints and checking receipts and entry passes.

Once these decisions have been made, they are announced to the villages. One member is identified in each village to issue entry passes and receipts. After paying the stipulated fee, villagers are issued a receipt and an entry pass. Checkpoints are set up and bullock carts are prevented from passing the checkpoints. Forest products are collected and carried manually by headloaders to checkpoints. This helps to eliminate pilferage of timber and other products.

Cleaning, thinning and harvesting operations are generally carried out over a three- to five-day period each year. Household collection quotas for various products may vary year to year depending on the demand-supply situation. Generally, each household is allowed 2 to 5 cartloads of thinning materials for fuelwood, 40 pieces of bamboo, 40 bamboo twigs (kanika) and 40 poles. A nominal price is charged for each of these forest products. For example, US$0.22 is charged for 40 pieces of bamboo, while one headload of fuelwood costs US$0.04.

Table 1. Specified species and harvesting period

Types of forest products and species	Harvesting period[2]
Fuelwood: nageri (*Lantana camara*), pokosungha (*Ageratum conyzoides*), nahalbeli (*Cipadessa fruticosa*) and kalachua (*Diospyrus sylvatica*)	January (5 days)
Small timber/poles: khakra (*Gelonium multiflorum*), karada (*Cleistanthus collinus*), halda (*Diospyrus montana*), and gotha (*Croton oblongifolius*)	October (2 days)
Bamboo and bamboo twigs: salia (*Dendrocalamus strictus*)	January (2 days)
Timber: kumbhi (*Careya arborea*), dhaman (*Grewia tilifolia*), char (*Buchnania lanzan*), dhaura (*Anogeissus latifolia*), khair (*Acacia catechu*) and sal	As per requirement

The protection and management of the forest is regulated according to rules on collection and utilization of various forest products. Collection of non-timber forest products is not restricted, while grazing was initially restricted for three years after the commencement of protection (1991–1993) to facilitate forest

[2] The value in parentheses is for the number of days allowed for harvesting of the product.

regeneration. Timber harvesting for the construction and repair of houses and agricultural implements is allowed for subsistence needs — but only after receiving properly submitted details of requirements. The executive committee assesses each application for approval, after which the member may collect the timber on payment of the stipulated price. However, there are special restrictions regarding cutting of important trees such as sal, mahua (*Madhuca latifolia*), tendu (*Diospyros melanoxylon*), asan (*Terminalia tomentosa*), jamun (*Syzygium cumini*), siris (*Albizzia lebbeck*) and bandhan (*Ougeinia oojeinsis*).

In special circumstances, non-members are also permitted to harvest timber; for example, to repair or rebuild houses damaged by natural calamities (cyclones or fires) or for religious and funeral ceremonies. The committee may approve non-member harvesting only after verifying the need and strength of an applicant's request. Sometimes, permission for timber harvesting is also allowed for community activities such as building schools, temples and community halls.

Protecting local resources

In the initial years of protection, the boundaries of the forest area and various compartments were demarcated. Three types of patrolling systems have been used to protect the forest:

- *thengapalli*;
- paid watcher; and
- general vigilance.

Thengapalli is an amalgam of *thenga* meaning "stick" and *palli* for "rotational turn." *Thengapalli* is a traditional system of stick rotation whereby a *thenga* is placed in front of the house of the person who is responsible for patrolling the forest on a particular day. At the end of the day, he leaves the *thenga* outside his neighbour's door, who assumes patrolling responsibilities the next day.

During the first six years of protection operations (1991–1996), the method of protection was *thengapalli*. For the first three years, four people patrolled daily, but in the following three years the number was reduced to two persons. By the seventh year, when it was perceived that the threat to the forest was less immediate, two watchers were hired at US$26.66/month. Although the paid watchers were responsible for the overall protection of the forest, the villagers also remained vigilant against threats. A "mobile committee" was established to supervise overall protection aspects of the forest (including supervising the work of the paid watchers).

When a theft occurs, or is anticipated, the villagers assist the paid watchers. For example, on one occasion a group of villagers received news that some bamboo artisans from an adjacent village (non-members of the Sulia Paribesh Parishad) were planning to raid the forest for bamboo poles. The villagers once again implemented *thengapalli* patrols to support the paid watchers until the planned raid was abandoned.

The committees have established informal rules and penalty systems to curb offenders (Table 2).

Table 2. Types of offenses and penalty system

Nature of offense	Penalty imposed	
	Fine	Others
Felling a sal tree	US$2.24	The product is seized and auctioned; cutting tools are seized
Felling any other timber species	US$1.13	- ditto -
Fuelwood collection without a pass:		
- Headload	US$0.22	- ditto -
- Shoulderload	US$0.47	- ditto -
Harvesting of non-specified species during cleaning/ thinning operations	Rs.3.00 per tree	Products seized and auctioned

Source: Adapted from Panda (2000)

The executive committee has fixed monetary fines according to the quantity (headload/cartload), species (permitted and non-permitted species) and type of tree (pole-sized tree or small timber) that are harvested without permission. Seized materials are generally auctioned, with the money generated (along with fines collected) being treated as a community resource.

Active management

The forest management systems being practised by the Sulia Paribesh Parishad are location-specific, needs-based and centered on traditional knowledge. For example, bamboo is not harvested between May and September because this is the time new shoots emerge. During the harvesting period, bamboo poles are not cut off at ground level. Rather, harvesters leave a length of two internodes (about 35 centimetres) to prevent rainwater damage to the rhizome.

Some specific management practices are followed for certain species and forest products. Permission to harvest particular species depends on the availability and abundance of the species. Before the annual timber-harvesting quotas are granted, committee members survey potential harvesting areas. They monitor

the composition and condition of the forest and only those areas that are deemed to have sufficient growing stock are opened for extraction. The estimation is based on visual assessment and experience. Species that are specified for fuelwood are usually of lesser value.

Local demand for poles of karada (*Cleistanthus collinus*) for medha is very high. As such, harvesting of *karada* species is allowed only every third year. This species is managed for short rotations and coppice shoots are harvested. In cases where demand exceeds supply, harvesting of *karada* species is controlled and harvesting of other species may be allowed to meet demand.

In 1996 and 1997, thinning, climber cutting and enrichment planting were conducted under a World Bank-aided Integrated Watershed Development Project. Enrichment planting was carried out with approximately 25 000 saplings of *Eucalyptus* spp., *Acacia auriculoformis* and *Cassia siamia* initially, followed by 10 000 supplementary saplings planted the following year as casualty replacements.

The district-level forest protection federation and the forest department

As an organization, the Sulia Paribesh Parishad has matured significantly over the past decade. It is one of the most active members of the *Jangal Surakshya Mahasangha* (the district-level forest protection federation) and it takes an active role in various issues related to community forest management. The executive members of the Sulia Paribesh Parishad are aware of various legal and policy issues relating to management of the forest and are receiving training in conflict resolution through workshops and meetings conducted by the *Jangal Surakshya Mahasangha*.

Interestingly, the forest protection efforts of many community forest management groups including the Sulia Paribesh Parishad are not formally recognized by the Orissa Forest Department within its Joint Forest Management programme. For the most part, local forest department staff are appreciative of the efforts of the community in protecting the forest. Ironically however, many of the products harvested — including timber, poles and bamboo — officially require departmental approval and so, strictly speaking, almost all of the harvesting does not have legal approval (Box 2).

Box 2. Transition in forest management in eastern India

"…without waiting for supportive policies and judicial decisions, since the 1940s and 1950s, thousands of communities started forming community forest management groups to protect their local forests, primarily in eastern India's tribal forest tracts. Village communities in West Bengal, Bihar and Orissa began responding to the environmental crisis as they watched the once densely forested hills and plains being denuded… The states of Orissa and West Bengal ratified guidelines for joint forest management in 1988 and 1989, respectively. This enabled local communities living in and adjacent to forest areas to manage public forests. Recognizing the Forest Department's own ineffectual attempts at forest protection, and the need and growing political pressure to include local communities in forest protection activities, the Government of India passed an Order in 1990 that solicited people's participation in joint forest management ventures honoring community rights to collect fuelwood, timber, fodder and non-timber forest produce collection from public forest areas they organize to safeguard."

Cited from *A critique of forest governance in Eastern India*, A.P. Chatterji

The local forest department staff are motivating many of the community forest management groups to form *Vana Samrakhyana Samiti*[3] and bring their management operations formally under the government's Joint Forest Management programme. Already, even without formal recognition of the Sulia Paribesh Parishad, local forest department staff are often asked to help resolve conflicts regarding boundary issues or illegal harvesting by outsiders. Generally, the forest department staff provide helpful assistance in resolving the issues and disputes.

Conclusion

After more than a decade of forest protection, Sulia Reserve Forest has been at least partially restored to its former glory. The regenerating forest can now provide a steady supply of forest products to the community. The subsistence needs of the local people are being met and distribution of forest products from thinning and cleaning operations are benefiting all segments of society. The most vulnerable people in the community — especially fuelwood collectors — have particularly benefited as they can gather a steady supply of fuelwood for a token fee.

Protection is the critical issue that has united the community to work towards a common goal. Forest protection interests have served to foster solidarity within the Sulia Paribesh Parishad and among community forest management groups at various levels. Community members take pride in describing the forest as *amo jangal* ("our forest"). They have grown confident in their actions and empowered in speaking out on issues that affect the forest that they have been protecting for more than a decade.

[3] Village forest protection committees that comply with, and qualify for recognition under, Joint Forest Management prescriptions.

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Community Resource Committees protect flooded forest near Kompong Phluk, Cambodia (courtesy Sasha Constable).

Cage culture of pangasius catfish and pigs in Kompong Phluk (courtesy Sasha Constable).

KOMPONG PHLUK AND BOS THOM COMMUNITIES: ASSERTING LOCAL RIGHTS

Melissa Marschke

Name of forest:	Kompong Phluk Flood Forest/ Bos Thom Community Forest
Location:	Siem Reap Province
Area (hectares):	8 864 (Kompong Phluk) 445 (Bos Thom)
Managing entity:	Community Resource Management Committee in Kompong Phluk/Community Forest Committee in Bos Thom
Mgt. objectives:	Conservation, sustainable use of natural resources
Country:	Cambodia

"I have been fishing in the flooded forests of Kompong Phluk all my life," said Las Hart, a local gillnet fisher. "Although fishing can be hard, because people sometimes steal my nets and gasoline is expensive, I love fishing these flooded forests." Like most Cambodians living in rural areas (about 84 percent of the population), Las Hart is highly dependent on natural resources. "We rely on fish and forests for our livelihood," Hart noted.

Kompong Phluk lies on the shores of Tonle Sap Great Lake, one of the largest freshwater flood plains in the world. At its lowest water level in May, Tonle Sap covers an area of 250 000 hectares. However, with the arrival of the monsoon in June, the Mekong River rises and the Tonle Sap River (which drains the Great Lake during the dry season) reverses its flow and expands the lake to cover more than one million hectares by the time the monsoon ends several months later. Almost half of the vast flood plain is covered by what is termed "flooded forest" — a mosaic of forest and brush lands. The local vegetation is uniquely adapted to this annual flood cycle, whereby trees and other plants spend four or five months submerged beneath metres of water, patiently waiting for the sun to

return. Common tree species of flooded forests include *Barringtonia acutangula*, *Diospyros cambodiana* and *Coccoceras anisopodum*.

Most of the trees and plants shed their leaves when the water rises, which adds organic matter to the lake and subsequently stimulates phytoplankton and zoo-plankton production, thereby boosting fish productivity. This unique cycle is the foundation of an exceptionally productive ecosystem for fish and wildlife. The flooded forests protect the core of the Great Lake during the dry season, and act as an immense fish hatchery during the wet season. They are, consequently, critical to sustaining the aquatic ecology of the Great Lake.

Local fisheries contribute a considerable proportion of daily protein requirements for the villagers of the Tonle Sap area, and are a key resource for the rural people. Continued access to fisheries and forest resources is vital for food security and sustainable livelihoods, especially to people with little or no land. However, access to these resources by the rural population has become precarious, especially since the early 1990s.

Declining resource base

Cambodia's once rich base of natural resources is being rapidly depleted, with the past decade being particularly damaging to the country's forest and fisheries resources. Reasons for this disturbing decline include use of illegal fishing gear, overharvesting of natural resources and widespread forest clearing.

Twenty-five years ago, forests covered nearly three-quarters of Cambodia's land area. The latest estimates, however, indicate that the country's forests have shrunk to only 9.3 million hectares, or only about half the land area.

The unique flooded forests have been particularly devastated, declining from more than 900 000 hectares in 1973, to less than half a million hectares at present. The fertile soil and flat topography of the flooded forest region make it attractive for farming, and clearing continues today with farmers seeking land for dry season rice, watermelons, mung beans and other vegetables.

The fishery resources of the Great Lake have been under similar intense pressure, especially during the 1990s. Fisheries on the lake were managed under a concession (fishing lot) system originally established during the French colonial period, approximately 100 years ago. Although the system was designed to maintain fish stocks at healthy levels, actual implementation of the system encouraged holders of fishing lots to extract maximum quantities of fish. Fishing lots were jealously guarded via intimidation and violence, and lots were progressively expanded at the expense of small-scale local fisherfolk.

Rising discontent over the inequitable fishing lot system led to its abolition in many parts of the Tonle Sap Great Lake in early 2001, throwing fisheries resources open to all users. In the initial three months following the abolition of

the fishing lot system, intensive exploitation of the fishery resources occurred.

"The wealthy fishers and powerful business persons benefited the most, while the poor fishing communities watched their resources being stripped before their eyes," wrote Patrick Evans, Chief Technical Adviser of the FAO-supported *Participatory Natural Resources Management in the Tonle Sap Project*, in a recent article featured in the fisheries periodical *SAMUDRA*. Although the initial "free-for-all" situation following the abolition of the fishing lot system resulted in rapid depletion of resources, it also created an enabling environment for reform, as local fisherfolk demanded assistance in establishing control over the local resources. Gradually, local communities have gained increased access and control over large areas of Tonle Sap.

Community-based management

Responding to destructive and inequitable resource exploitation, some communities began to organize themselves to find ways of protecting and better managing their resources. Several communities have demonstrated that destructive environmental practices near their community can be successfully curbed through active participation in resource management. Two such communities are Kompong Phluk Commune and Bos Thom Village — both in Siem Reap Province. The experiences of these two communities highlight the potential for community-based management as a means of protecting and managing natural resources in the Cambodian context.

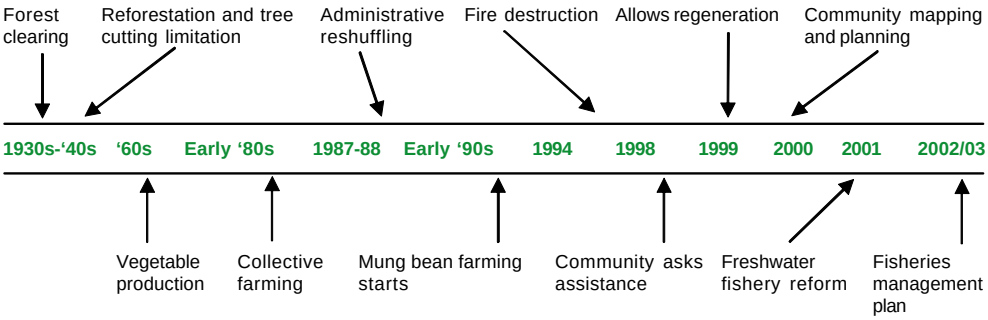
In both localities, people are heavily dependent on natural resources. In Kompong Phluk, people rely on the flooded forests to protect their homes from wind and storms and as bountiful fishing grounds, while in Bos Thom, people rely on the upland forests for income-generating activities and for crop production. Both communities receive support from the *Participatory Natural Resources Management in the Tonle Sap Project*, implemented by the Government of Cambodia in collaboration with FAO and the Government of Belgium.

The Kompong Phluk Commune

Kompong Phluk Commune, comprising three villages, has a long history of local resource management. The commune has been practising community-based management since the 1940s, and is perhaps one of the oldest examples of community forestry management in Cambodia. Many of the older people recall that as children they learned about the importance of forest protection from village elders. The small size of Kompong Phluk (currently 434 households) and the relatively large number of people that returned to the area at the end of the Khmer Rouge regime appear to have assisted the retention of traditional knowledge and practices in the commune.

"Old people knew," said Ros Norn, an elder and committee member in Kompong Phluk. "They knew a lot. Old people knew that fish lived in the [flooded] forest... and that the forest helps to protect the village — especially in the flood season — from water, waves and storms. Protecting the [flooded] forest meant that they were protecting the fish-breeding grounds. This meant that there would be enough food."

Figure 1. Historical highlights of resource management in Kompong Phluk



Commune elders remember working together to find a common strategy for resource management. Motivated to protect their homes from storms and winds, they agreed to stop the farming of watermelons near their villages in the late 1940s and to let the area naturally regenerate into forests. The regenerated forests not only helped to protect their homes from storms and winds, but also provided an important fish habitat. Villagers were motivated to continue these forest protection practices, especially near their villages. The former watermelon patch is now a dense forest that surrounds the commune.

Flooded forests

In the late 1980s, an administrative reorganization resulted in Kompong Phluk farmers having their mung bean fields allocated to other communes. Subsequently, upland farmers encroached steadily on flooded forest areas. These developments, together with population growth, resettlement of former Khmer Rouge cadres, limited access to natural resources and widespread overfishing led the community to "rethink" its natural resource management strategies.

This rethinking started, in part, as a response to the encroachment problem, and also to take advantage of working with a new FAO project that began operating in Siem Reap in the mid-1990s.

Historically, flooded forest protection was achieved through informal local management mechanisms such as oral agreements, with support from the local government. It was only in the late 1990s that these traditional resource

management processes — and the rules and regulations that were framed by the community resource committee — were formalized, with support from the FAO project.

"We began working on flooded forest protection since that is what we knew best," recalled Sok Plan, who was elected as the chief of the community resource management committee in 1999. Initially, an area of 927 hectares was identified for community management in Kompong Phluk, but this area was expanded markedly in 2001 to encompass more than 14 000 hectares.

Community resource management committee

The Kompong Phluk Community Resource Management Committee is instrumental in establishing roles and responsibilities for resource management in the commune and in developing a management plan for the flooded forest and fishery resources. This committee is elected every three years at a public meeting, with the participation of all stakeholders: local communities, commune council members, relevant provincial government officers, and a representative from the governor's office. Nine villagers (three per village) make up the central committee. Subcommittees, with specific responsibilities for patrolling, extension and finance, are formed subsequently.

The roles of the committee include:

- identifying and solving problems in the community in collaboration with local authorities;
- conducting forestry extension and training;
- demarcating boundaries of the community protected area;
- placing signposts around the community protected area;
- preparing a forestry-fisheries management plan;
- monitoring and evaluating implementation of the plan;
- coordinating with commune councils, government officers and specialized institutions involved in community development; and
- coordinating with national and international organizations to gain support for rural development activities in the commune.

"Long before the community (Community Resources Management Committee) was set up, people loved and took care of the forest," said Tep Pheoro, a Kompong Phluk committee member. "It was not perfectly managed, though, especially in recent times. So, it was good timing for the FAO project to come here — for them to help us. We wanted to stop the mung bean farming, which started in 1993, near our commune."

Specific management objectives of the committee include:

- rehabilitating the entire area of original flooded forest to enhance fish production;
- halting all destructive farming activities and protecting natural regeneration;
- delineating fuelwood harvesting areas; and
- protecting birds and other wildlife.

The committee meets once a month to review progress and to resolve any obstacles. The committee's annual programmes and budgets for the ensuing year are presented and approved, following in-depth discussions, at a meeting attended by a quorum of resource users and stakeholders. Regular extension meetings provide opportunities for monitoring of progress and listening to feedback from resource-users.

The resource management plan

The management plan for the community's flooded forest guides the community in managing the forest and fishery resources in a prescribed manner to ensure sustainable use of the resources, without impairing the environment. The plan also defines the organizational structure of committees, the roles and responsibilities of committee members and community residents, actions permitted and prohibited in the flooded forests and the fines and penalties to be imposed. Clearing of any flooded forest area is completely prohibited — as is hunting or trapping wild animals, and the use of illegal fishing equipment. The current plan is being updated to include both forestry and fishery resources, and to redefine community boundaries for resource management.

"Since our commune is small, we easily work together," observed Sok Plan. "Each village is responsible for protecting a part of the forest. However, all of us are responsible for protecting the forest near the village."

Working together

The community resource committee in Kompong Phluk has been working together for several years now, exploring different management options and strategies. While the committee recognizes that not all the issues can be tackled at once, they believe that they can solve many of the challenges by themselves — and with support from the FAO project, the more difficult ones can also be resolved. For instance, in addressing the encroachment issues arising from the boom in mung bean farming, the committee worked with provincial authorities and the FAO project to stabilize the situation. The committee also took a firm stand with

district officials, demanding that measures against further land encroachment be enforced.

"I feel good about working with the committee," remarked Sam Norn, a volunteer in the enforcement section of the committee. "I enjoy my work and know that it will help my children. Whenever I have free time, I try to help the committee with patrolling activities." All committee members are volunteers; the fact that no salaries are paid demonstrates that the villagers have great faith in the work of the committee.

Through education and extension, the committee has stopped the cutting of fuelwood in mature forests. Collection of fuelwood is now confined to designated areas and to the gathering of driftwood. To alleviate the problem of declining fishery resources, the committee created a kilometre-square fish sanctuary and conducts regular patrolling to combat the use of illegal fishing equipment. The villagers have adopted a combination of strategies — from protection to changing fishing practices — to ensure that the flooded forest and fishery resources are protected. However, the committee is realistic about what they can and cannot tackle, and is trying to devise systems that make best use of their capacities.

Several committee members explained how they react when illegal activities are reported. "After the report from a commune member, the committee quickly moves to confront the offenders and warns them. We try to explain our reasons for protecting the area and establishing rules. On the second and third offense, we fine them. But some have no money as they are poor people who live far away. In that case we let them go."

This attitude highlights the awareness of the committee of the fundamental reasons for continuing resource destruction and sensitivity toward poor families that are simply trying to survive. Striking a balance between strict enforcement and moral persuasion is crucial to their work.

It was only in December 2003 that the Cambodian Government adopted, after a lengthy process, a subdecree on community forest management[1], giving communities the security of tenure required to implement comprehensive measures for sustainable resource management. Hence, it is even more impressive that these community initiatives have been progressing since as early as 1940, despite the legal vacuum, indicating the high level of confidence in community approaches towards natural resources management.

While forestry legislation has been enacted recently, legislation for community fisheries is long overdue. "By the time they issue the law, there will be no fish left," commented Ou Ngeoum, another committee member, when asked if government policy could help local fisherfolk.

[1] N.B. This subdecree does not apply to the flooded forest area — only to the Bos Thom field site.

Although the provincial forestry and fisheries departments and the Siem Reap governor support community forestry, the committee recognizes that they need more support from the government if their activities are to be sustainable in the future. "We need technical departments to help us to better manage our resources, especially for patrolling activities and enforcement," said Ou Ngeoum.

Bos Thom community forestry

Bos Thom Village is more distant from the Great Lake, located close to evergreen forests of the upper watershed. But, its experiences provide additional insights into community-based forest management in Cambodia. "By protecting our forests, we are benefiting from increased wildlife, clean fresh water and regeneration of tree species. People have a place where they can harvest fruits and traditional forest products," said the chief of the Bos Thom community forest committee.

Bos Thom is somewhat different from Kompong Phluk. It is a small village, consisting of 72 households that collectively protect and manage 445 hectares of forest. Although the village had no previous history of practising community forestry, the rapid decline of forests in the area during the 1990s compelled the community to take action.

The process of organizing members of the village to address natural resource management issues has been similar to that of Kompong Phluk Commune; villagers elected a community forest committee and established appropriate resource management rules and strategies. Members of the committee are elected by secret ballot and the committee's term is five years. The roles and responsibilities of the committee are similar to those of the Kompong Phluk committee. The committee meets once a month to monitor progress. Extension meetings, held regularly, provide a forum for feedback from the broader community.

In 1998, confronted with declining availability of forest products and unreliable flows of water from natural springs, the villagers approached the provincial forestry department for assistance. The forestry department, working together with the staff of the FAO project, facilitated the process of community participation in forest management.

"We needed some help in organizing ourselves to protect our forest," recalled the chief of the committee. "We began working with the FAO team — looking firstly at the extent of resources in our village and then considering how we could best protect them."

The result was the establishment of a community forest, along with measures to ensure protection of the area. Following the election of the community forestry committee, rules and regulations were established, along with the development of a five-year operational plan for the forest.

Field facilitators from the FAO project assist the committee to prepare management plans. As part of the process, detailed discussions, sometimes lasting more than a week, are held among the committee members and the resource users, to designate specific management blocks, decide on management objectives and draft silvicultural prescriptions.

"Our Operational Plan helps us to protect the forest and to know where to harvest poles that we sell for much needed income. It also reminds us that we need to protect the area around our spring, to make sure that it doesn't dry up," commented one farmer. The community protects the forest from outside intrusion and has stopped all agricultural activities within the demarcated forest boundaries.

The management plan prescribes the blocks to be harvested, when they should be cut and how many trees can be removed. The area is dominated by forests of *Lagerstroemia* spp. and *Dipterocarpus* spp. — trees that effectively slow water runoff and reduce erosion and downstream sedimentation. Many of the "trees" in the forest are in fact spindly coppice shoots, originating from cut stumps. Harvesting operations are confined to blocks with many coppice shoots per hectare (20 000 to 30 000). Once the coppice shoots reach small pole-size, harvesting of up to 200 stems per hectare is allowed. Members of the community cut and sell the poles — these are used for fish trap construction — in the villages of Kompong Phluk and Kompong Kleang. A six-metre pole sells for about US$0.15. Harvesting using the coppice system is sustainable for at least three to four rotations — after which the stump may lose its vigour and the growth of coppice will deteriorate. In 2003, the community harvested 6 000 poles, which yielded US$1 575 from sales.

Selective harvesting of poles from the community-managed forests is generating regular income for the Bos Thom community. The income is used for community activities and development projects, including the recent construction of a primary school.

"We were very excited when we realized that we could make money from protecting and managing the forest and that we could use this money to help develop our community," noted the chief of the committee.

The committee also uses some of the money earned from selling poles to help people with particular difficulties. The committee believes that further development of the village can be achieved by planting fruit trees, to provide fruit for home consumption and for sale, and development is progressing in this direction.

Lessons learned

In a draft report summarizing a study of Cambodia's flooded forests, Mark Poffenberger of the Asia Forest Network wrote:

In most cases, the upheavals of the previous decades, which have undermined the fabric of the community and the traditional knowledge base, make it difficult for communities to pursue collective and meaningful resource management. Economic and cultural disparities in fishing communities hinder community fisheries management, although this is not to say there is no will on the part of community members, government and NGOs to make community fisheries management work.

Two areas that appear to be exceptions to this conclusion are Kompong Phluk Commune and Bos Thom Village, where significant progress towards collective resource management is being made. Both communities are reaping the benefits of natural resource protection and community management. In recent years, more and more policy makers from Phnom Penh and elsewhere have been visiting Kompong Phluk and Bos Thom to learn from villagers about how local resource management by local communes can work.

In the case of Kompong Phluk, the community has realized a positive increase in fish catches. In Bos Thom, money from the sale of poles thinned from the community forest has provided welcome development funds and more reliable water supplies. These two communities illustrate that community-based management *can* work, especially when the community believes that resource protection and management will improve their livelihoods. These success stories are based on ensuring that communities have a voice and take an active role in managing their common resources.

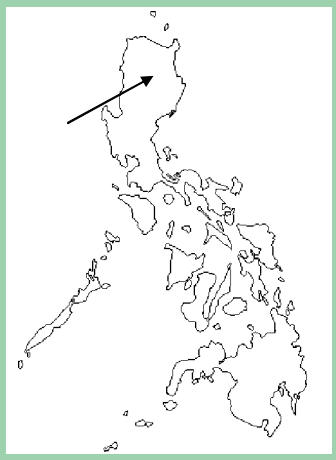
About the author

Melissa Marschke is currently pursuing her Ph.D. at the Natural Resources Institute, University of Manitoba in Canada. She worked in Cambodia as a consultant for the International Development Research Centre (IDRC) in a community-based management project from 1999 to 2002. Her research interests include sustainable livelihoods, community-based management and participation and decision making in resource management.

THE IKALAHAN: TRADITIONS BEARING FRUIT

Buenaventura L. Dolom and Rogelio C. Serrano

Name of forest:	Kalahan Reserve
Location:	Between Santa Fe, Nueva Vizcaya and San Nicolas, Pangasinan Province
Area (hectares):	14 730
Managing entity:	Kalahan Educational Foundation and Ikalahan Community
Mgt. objectives:	Rehabilitation, protection, sustainable use of natural resources, sustainable livelihoods
Country:	Philippines



In the Philippines, to be jokingly branded as *taong gubat* — literally "man of the forest" — connotes backwardness or being out of pace with the rest of society. But this is not so with the Ikalahan, who consider themselves "people of the forest." Their very name, as an ethnolinguistic community carries this description: *kalahan* literally means "forest" while the prefix *I* means "from" or "living in."

As one native Ikalahan proudly declared, "Why should I be ashamed of the forest when it is our home and it sustains us?" And they have extra reason to be proud: they are recognized as pioneers in community-based forest management in the Philippines, and indeed the world.

The Ikalahan are otherwise referred to as the Kalanguya, which is a subgroup of the Ifugao tribe in the northern part of the Philippines. They live in villages nestled in the Caraballo Mountains located 250 kilometres north of Manila and 7 kilometres off the Santa Fe Highway. As a result of years of struggle in defending their land from greedy speculators since the early 1960s, they have learned to love and value these areas and nurture their productivity.

A pioneering solution for indigenous rights

The signing on 13 May, 1974 of Memorandum of Agreement (MOA) No. 1 (the very first of its kind) between the Kalahan Educational Foundation (KEF) and the Bureau of Forest Development — the main government forestry agency at the time — was a significant step towards the protection of indigenous rights in the Philippines. This agreement, which established the 14 730-hectare Kalahan Forest Reserve, was a pioneering development for both the government and the Ikalahan in resolving threats to ancestral lands and the culture of indigenous people. It was a long struggle, but the desire of the Ikalahan tribe to secure tenure over their ancestral lands was a strong motivation.

The Reverend Delbert Rice, an American missionary for the United Church of Christ in the Philippines, who has been working in the Kalahan Reserve since the mid-1960s, and Mang Sario, an Ikalahan elder, are witnesses to these struggles. Both still recall the legal battles that the Ikalahan had to undergo every time there was an attempt by rich and influential outsiders, sometimes including government officials, to grab portions of their ancestral lands.

In 1968, two large blocks of land between San Nicolas, Pangasinan and Santa Fe, Nueva Vizcaya, covering about 200 hectares were titled to lowlanders. The area was part of the ancestral lands of the Ikalahan. The titles were issued with the help of a geodetic engineer who made it appear that the area was part of the "alienable and disposable lands" (a term used in the Philippines to describe lands that can be titled to individuals for agriculture or other development), and allegedly unoccupied. The Ikalahan, who were residing in the area, reacted vehemently and filed a case in court. The case dragged on for several years with the Ikalahan initially losing the legal battle in the lower court. However, with the help of the Commission on National Integration, an agency previously under the Office of the President and established to protect the welfare of indigenous cultural communities, the Ikalahan finally won the case on 24 August, 1972. The Court of First Instance of Dagupan City set aside the decision of the lower court and decreed that the land registration titles issued were null and void.

The biggest threat to their land, however, came in 1970. The government planned to convert about 6 300 hectares of the ancestral lands into a vacation centre, to be known as "Marcos City." Fake titles were used by relatives of high government officials in efforts to grab the land from the Ikalahan.

Alarmed, the tribal leaders in all adjacent communities held a major meeting to discuss possible solutions to the challenge they faced. They decided to file a case in court to force the government to recognize their ancestral land claims. The government attempted to have the case dismissed, but eventually, with the help of the late attorney Julian de Vera, a retired lawyer of the Commission on National Integration, the Ikalahan achieved legal victory in 1972. The court revoked the lowlanders' titles, and eventually forced the government to abandon plans to develop the area as a vacation centre.

With the establishment of the Kalahan Forest Reserve, such land-grabbing attempts are now issues of the past. MOA No. 1 legitimized the prior and vested rights of the Ikalahan tribe over their ancestral lands. It recognized their claims and assured that they would not be driven away from their lands. It further gave them complete control and authority to manage the natural resources within the reserve.

"We can now enforce indigenous policies and rules geared towards the protection and conservation of the natural resources within the Kalahan Forest Reserve," said Taynan Omallio, chairperson of the KEF's board.

Omallio cited the case of one tribal member who leased his farm to an outsider to be used for raising fighting cocks. When the lessee started to develop the land, he cut down the trees in the farm which caught the attention of the board. The board immediately summoned the member and asked him to explain the lessee's actions. There were no rules at that time governing this kind of problem but the board, which is composed mostly of tribal elders, fined the member US$60 and required him to plant an equivalent number of trees to those that had been cut. They also wrote to the lessee and informed him that the lease was terminated. As such, he could no longer develop the land leased to him.

The Kalahan Academy

With their lands safely secured, the tribal elders' next concern was to maintain Ikalahan cultural identity and prevent cultural erosion. They wanted young members of the tribe to be educated but were concerned about the possible emotional trauma on the youths who pursued higher education outside the community. Thus, the KEF established a high school, which is now called the Kalahan Academy. In June 1974, seven months after the KEF was registered with the Securities and Exchange Commission, the academy was established through the concerted efforts of the Ikalahan people who provided free labour and wood from the forests, supplemented by donations from private individuals and organizations.

Today, the income-generating projects of the KEF, such as the food-processing centre, support the academy, although some private organizations also contribute to its operation. Since the academy was established to instill cultural pride among the Ikalahan while providing the necessary educational preparations for higher education or vocational courses, the KEF's board sought Ikalahan teachers to inculcate Ikalahan history, mores and traditional practices effectively to the students. The high school curriculum of the academy includes subjects on forest ecology so that students are better prepared to manage the forest resources within the reserve.

Since its creation, 683 students have graduated from the academy. Some of them are now professionals who have returned to the community to serve the

KEF. In fact, most of the KEF staff and teachers are graduates from the academy. Others are serving as *barangay* (local government) officials in the Kalahan area or are working in the municipal office of Santa Fe, Nueva Vizcaya.

The Kalahan experience has become a model for Philippine Government programmes involving community participation in forest management. The succeeding community-based forest management programmes of the Department of Environment and Natural Resources (DENR) were largely patterned after MOA No. 1 of the KEF. For instance, the DENR's programme recognizing the ancestral domain of indigenous peoples and the subsequent Indigenous Peoples' Rights Act (IPRA) were patterned on the Kalahan experience. The Ikalahan's tenure over their land has further been strengthened with the signing in 1996 of the Kalahan Certificate of Ancestral Domain Claims that placed nearly 58 000 hectares of forest lands under the management and administration of three groups of Ikalahan tribes, including the KEF. They are now looking forward to receiving their Certificate of Ancestral Domain Title, as provided under the Indigenous Peoples' Rights Act Law, which will give them complete ownership of the land.

Clear individual rights within ancestral domains

After taking community control over their ancestral lands, the KEF allocated farm lots of up to 10 hectares to every family. This was necessary because for at least two centuries the Ikalahan had been producing their food on swidden farms (*kaingin*). In the past, each family was allowed to make kaingin anywhere in the forest. Usually, they selected areas which were heavily forested as these were very fertile. The result was frequent widespread burning, converting most of the forested areas into farmlands. Although the Ikalahan were observing fallow periods to regain soil fertility, the time needed for successful rotation was 15 to 18 years or even longer. As the Ikalahan tribe grew, the traditional farming system required more land for cultivation, which continually reduced the area of forests.

This practice ended when their ancestral land was finally recognized by the government and the Kalahan Reserve was established. The tribal elders developed simple but clear rules for recognizing individual rights within the ancestral domain. These rules and policies were formulated after a series of consultations with local community members in the reserve. They were initially drafted by the KEF's board, with representatives of the tribal elders from each of the barangays or villages. Afterwards, the draft rules were circulated to all barangay officials and discussed with the local residents. Comments were gathered and harmonized prior to finalization and approval of the policies and rules by the board. The implementation of these policies is carried out by the agroforestry office of the KEF, which comprises three foresters and forest guards.

Accordingly, any member of the tribe who wants to clear forest for a farm must select the site and request a permit from the KEF. The foundation's forester then inspects the area to determine its suitability. If the area is acceptable, the forester and the applicant delineate the site and the corresponding permit is issued within two to five days. No approval is given for areas reserved for parks, watersheds or sanctuaries; areas exceeding 10 hectares in size; primary forests; areas prone to landslides; or areas that are not claimed by others. The applicant signs an agreement along with a sketch map that shows the areas approved for use and protection.

The recognition of individual rights within the ancestral domain has encouraged about 550 resident families to develop their farms following land-use plans which they and their leaders have formulated. The tribal leaders work in the KEF voluntarily. They are provided US$3 for each meeting to cover transportation expenses.

Since each family has an average of six hectares of landholding, a significant portion of the reserve is now under the responsibility of farmer-members. This has resulted in the protection of thickly forested areas and the rehabilitation of degraded areas. "In 1974, most of the areas in the forest reserve were bare, open and dominated with grasses," noted Baliag Bugtung, a 67-year-old Ikalahan. "Today, you can see these areas teeming with trees, thanks to farmers who plant trees like alnos (*Alnus japonica*) before leaving the farm to fallow."

Strong enterprise development

The Ikalahan's strong sense of entrepreneurship makes them distinct from any other ethnic group in the Philippines. They see immense opportunities in their own resources and creatively pursue these with ingenuity. A case in point is the fruit-processing venture, which started in 1974.

"We have so many native guavas (*Psidium guajava*) ripening and just falling to the ground to rot," Reverend Rice recalled one Ikalahan saying. "If only we could gather and process them for commercial consumption, then we could benefit more people and increase incomes."

That was the beginning of their fruit-processing venture. Esther, Reverend Rice's wife and a food technologist, supervised the fruit-processing venture. Their first products were guava jelly, guava jam and guava butter. Their commitment to quality and good taste attracted people from outside the reserve to buy their products. Leading supermarkets in Manila also took notice.

Their products were entirely natural with no chemical additives. "We prepare our own sweetening materials and pectin to ensure high quality," Reverend Rice indicated. Quality control measures ensure proper cooking and sterilization. To prolong the shelf life of the preserved products marketed under the "Mountain Fresh" label, jars are sealed airtight.

Encouraged by the favourable acceptance of their first products, the KEF started processing other products from indigenous plants in 1980. These products include dagwey (*Saurauia subglabra)* preserves, dagwey jelly and spread; dikay (*Embelia philippinensis*) jelly; ginger (*Zingiber officinale)* jelly; passion fruit (*Passiflora edulis*) jelly; roselle (*Hibiscus sabdariffa*) jelly; and santol (*Sandoricum koetjape*) jelly and spread. Today, their products are sold in 10 major shopping centres in Manila and are exported to the United States of America, Japan and Australia.

Currently, the KEF is also establishing new forest-based ventures including organic vegetable production, orchid growing and furniture manufacturing. Shortly, they will also be involved in a bottled water business — tapping water from a clean mountain spring inside their reserve.

Transition of traditional system

While many ethnic communities are known to live harmoniously with nature, being content with their traditional knowledge system, the Ikalahan have gone a step further by learning about and practising more ecologically friendly and sustainable agroforestry skills. For example, Romeo Pangomis, an Ikalahan elder, carried out a trial several years ago by planting alnos (a medium-sized tree that grows quickly and contributes significant quantities of nitrogen to the soil) in fallow areas. He discovered that the trees help to restore soil fertility after only seven years of fallow. Today, this practice is widely adopted by Ikalahan farmers on their upland farms because, aside from shortening the fallow period, the trees can also be harvested for fuelwood in four years or for quality timber in eight years.

Reverend Rice, who has been a missionary in the area since 1965, has been steadfast in supporting the formulation of effective policies, plans and programmes for the Kalahan Reserve. His efforts are being rewarded with heightened awareness and participation among the Ikalahan community in the protection, rehabilitation and management of forest resources.

Although the Ikalhan know that a degraded forest can slowly renew itself through ecological succession, every individual residing within the reserve works to accelerate the process through "assisted natural regeneration." This practice consists of creating and expanding favourable environments for naturally growing tree saplings in the mountain gullies, and augmenting them with additional tree planting at the periphery of the expanding forests.

Every able resident living in the reserve is required to undertake at least one day of community service each year. This is mainly channelled towards reforestation activities. The agroforestry staff of the KEF work with barangay officials to organize tree planting activities every year, usually between June and September. Competing vines are removed so they do not choke the growing trees.

To date, the Ikalahan have reforested more than 2 000 hectares successfully. To support these efforts two nurseries were established, which produce about 200 000 seedlings of forest and fruit trees annually. The nurseries are maintained by the agroforestry office and the labourers are paid by the KEF.

Recalling what they have done through the years as a community, Baliag Bugtong, a board member of the KEF, expressed satisfaction: "The planting of trees is something that we should be proud of. Today, we have fully grown trees standing around our villages in contrast to the vast barren wilderness that existed in the 1970s. This is a lasting gift we have for our children and our children's children."

The efforts of the Ikalahan have been rewarded by the emergence of expanded forest cover that contributes to the ecological, economic and food security of the community. The Ikalahan have planted tree species like tuai (*Bischofia javanica*) that bears fruits relished by birds, as well as economic species, like mulberry, coffee, citrus, apple, pears and indigenous dagwey and dikay fruit trees.

Keen on conducting research on their own, the Ikahalan have planted trials of 160 varieties of sweet potato to identify those that best suit their requirements. Recently, they discovered a valuable use for a weed, which in local parlance is called "*panawel*." When composted and applied as a fertilizer to sweet potato, *panawel* eliminates the potato weevil, which previously destroyed as much as 40 percent of their crop.

Governance aspects

The KEF and its board manage the Kalahan Reserve. The seven barangays covering the ancestral domain are each represented by their tribal leaders on the board. Barangays Unib, Maliko and Imugan each have two representatives each because of their higher populations. Each of the other four barangays has one representative on the board. Representatives from the Kalahan Academy alumni, the local government and the youth sector bring the total membership to 13.

The board is responsible for formulating policies. It also serves as the final arbiter in resolving conflicts. The day-to-day operations of the KEF however, are carried out by the management staff who are organized into teams according to their functions. These teams are coordinated by an administrative team composed of all the team leaders and some administrative personnel.

The KEF organizational structure follows the social structure of the Ikalahan community and is very effective, especially in policy enforcement and conflict resolution. To demonstrate this point, Reverend Rice recalled an incident involving a boundary dispute between two Ikalahan members. The two parties were claiming an area of land which overlapped the boundaries of their farm lots. The problem was brought to the attention of the board who visited the site to settle the conflict. The two parties were both hard-headed and would not agree to the board's

suggestion to place their farm boundaries in between the disputed properties. Since neither party would yield, the board finally decided that the disputed area would be owned by the KEF. "Up to this time, this area still belongs to the Foundation," Reverend Rice said.

To add legitimacy to the KEF's decisions and to gain broader support, the foundation works very closely with barangay officials in formulating policies and implementing plans and programmes. The board drafts policies, sends them to the barangay council for review and approval and then the board adopts the approved policies. This process minimizes conflicts and builds stronger partnership between the barangay officials and the foundation.

The KEF also works with all barangay officials to develop uniform policies on resource management for all barangays covering the Kalahan ancestral domain. Through these initiatives, the KEF and the barangays are now implementing strict policies concerning the protection of wildlife inside the reserve. Two wildlife sanctuaries, covering approximately 3 500 hectares of forest, have been declared already. These areas are also protected by the communities for watershed purposes.

"The foundation has effectively managed the Kalahan reserve," said Fernando Zamora, Barangay Captain of Imugan and President of the Association of Barangay Captains of Santa Fe, Nueva Vizcaya. "Under the leadership of the board and with the help of barangay officials and members of the community, sanctuaries which were established to protect wildlife and watersheds are properly protected. That is why — up to the present — barangay Imugan continues to have clean water for drinking and irrigation," Zamora added.

Champion of the cause

The accomplishments of the Ikalahan people demonstrate what initiative and role modelling can do. Admittedly, the role of Reverend Rice — an electrical engineer and anthropologist by profession — has been instrumental in the development of the Ikalahan community and their metamorphosis into a model for community-based forest management.

Living together closely with the community, Reverend Rice has taught the Ikalahan to love and revere the forest and the rivers, and to be responsible stewards of these resources. For many years, he has served and worked with the KEF board and guided them with his advice. He has also been effective in securing funding support for community projects and in facilitating negotiations and fulfilling the bureaucratic requirements of the government.

Having worked in the Kalahan area for nearly 40 years, Reverend Rice has seen immense changes occuring in the community. "The kind of education offered by the Kalahan Academy and the livelihood opportunities provided by the food-processing centre have encouraged the Ikalahan to look at the forest in a new

way. They are now seeing other resources that they had never noticed before and are creatively looking for ways to properly use them. They are also looking more seriously at the sustainability of these resources. Most importantly, they have found that they can make changes without losing their culture and unity as a community," he noted.

Together with Reverend Rice, the leadership of the KEF has crafted a vision for a self-reliant and self-sufficient Ikalahan community. Together they have motivated the community to work tirelessly toward this vision. "In the past, the forests were cleared for farming. But now, we want to protect them to provide livelihoods for our community. We have policies to make this happen and with the help of our barangay officials we are able to enforce these policies," Taynan Omallio, chairperson of the KEF board, asserted with confidence.

The successes of the Ikalahan in productively and sustainably managing their forests attracted the attention of then DENR Secretary Fulgencio Factoran to the extent that many features of the KEF were adopted as a model for the DENR banner programme on community-based forest management. This programme grants community organizations the right to manage forest lands adjacent to their homes for periods of 25 years, renewable for subsequent 25-year periods upon satisfactory performance.

Being true pioneers in many respects, it is not surprising that the Ikalahan community, through the KEF, has received several awards. For their innovative work on the local processing of indigenous forest fruits, they have already garnered five awards from the Department of Agriculture and from scientific organizations. Their school, the Kalahan Academy, has been acknowledged as the most outstanding secondary school for environmental education in the country. More importantly, the academy has produced community- and ecology-oriented professionals, several of whom are now serving in various development projects in civil servant positions.

Wild guavas are used by the KEF as raw materials in producing guava jelly (courtesy KEF).

Conclusion

The Ikalahan proudly stand as a model of indigenous people's self-determination. They exemplify the utmost yearning of an indigenous community — to freely pursue their dreams and aspirations while wisely managing their forest resources for the benefit of current and future generations.

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CAT'S EYE FORESTS: THE KRUI DAMAR GARDENS

Anne Casson

Name of forest:	Pesisir Forest Area (Repong Damar)
Location:	Lampung Province
Area (hectares):	50 000
Managing entity:	Pesisir Community (United Traditional Repong Farmers of Coastal Krui)
Mgt. objectives:	Non-timber forest products, sustainable livelihoods
Country:	Indonesia

Damar gardens in the Pesisir represent totally original examples of sustainable and profitable management of forest resources, entirely conceived and managed by local populations (Michon *et al.* 1998).

If you were to visit the Krui damar agroforests for the first time, you could be forgiven for thinking that these forests are natural forests, barely touched by humans. You would then be surprised to learn that you are in fact in an agroforest, which has been cultivated and sustainably managed by the indigenous Krui people for more than a century.

The Krui damar agroforests — already well-known for their social, environmental and economic benefits — without doubt exemplify sustainable, community-based forest management. These agroforests, located along the southwestern coast of Sumatra (Pesisir) in the province of Lampung, cover an area of approximately 50 000 hectares and serve as a buffer zone for the nearby Bukit Barisan Selatan National Park.

The Krui agroforests are managed so that they can meet the short-, medium- and long-term livelihood needs of the Krui people. However, this unique forest management system does not only sustain the livelihoods of the Krui people; it also conserves biological values, enhances biodiversity and maintains ecological functions.

Because of these merits, researchers, non-governmental organizations and other organizations interested in innovative agroforestry systems have been drawn to the Krui area to learn from and support the Krui damar farmers. These groups have helped the Krui to gain substantial government recognition for their management system. They have also helped the Krui to set a legal precedent for the recognition of community-based natural resource management systems based on *adat* (customary laws and regulations) in Indonesia.

Ecology and history

While many types of fruit, wood, fibre, spices, medicinal materials and other products are harvested from the Krui agroforests, the dominant tree species is the damar tree (*Shorea javanica*). In fact, damar trees are believed to represent about 65 percent of the tree community and constitute the major canopy ensemble (Michon *et al.* 1998). The damar tree is a dipterocarp species, native to local forests in Sumatra. It reaches heights of 40 to 50 metres, and can live for 150 years. "Many of the trees in the Krui area are already over 100 years old," said Pak Ari, a local damar farmer.

Damar trees over 20 to 25 years produce a valuable resin, which has been traded internationally for centuries. In fact, historical records show that damar resin was traded between China and Southeast Asia as early as the tenth century when it was considered to be the best material for caulking ships. According to Michon *et al.* (1998), damar resin was also traditionally traded for use in incense, dyes, adhesives and even medicines.

Substantial trade with Europe and America began much later, in the nineteenth century, when damar became an important component of industrial varnish and paint. At this time, damar was obtained primarily from natural forests in southern and western Sumatra, as well as West Kalimantan. However, by the end of the nineteenth century, local people in the Krui area had begun to respond to the growing international demand for damar by developing a sophisticated agroforestry system that would not only supply resin, but also produce food, timber, traditional medicines and other useful non-timber forest products (Poffenberger 2000).

Damar resin (courtesy Anne Casson).

After 1945, damar exports declined significantly following the invention of synthetic petrochemical resins, which are

now preferred for most industrial uses. A market for damar does, nevertheless, remain. "Low quality grades of damar are now sold to low-quality paint manufacturers in Indonesia, while the best quality damar, which we call *mata kucing* (cat's eye), is sold to buyers in Singapore," reported Pak Ari. "In Singapore, the mata kucing is processed and re-exported as incense, or as a base for paint, ink and varnish factories in industrial countries."

The damar agroforestry system has been able to withstand fluctuating market changes and competition from synthetic substitutes. According to Pak Ari, the rupiah price for damar resin doubled during the recent economic crisis; local people who invested in damar agroforests were barely affected by the crisis.

Today, West Kalimantan and South Sumatra still produce some damar, but the main producing area is certainly the Krui area in Lampung. In fact, close to 80 percent of all damar traded on the world market today is produced by smallholder farmers residing in this area (Michon *et al.* 1998).

Agroforestry system

Damar gardens are established in three phases. "Firstly, the land is cleared through slash-and-burn," explained Pak Asabi, a local farmer who has recently cleared some new land to cultivate a damar garden. "Afterwards, the land is planted with rice and harvested once or twice. Land cleared for rice cultivation may contain old unproductive damar trees, low-quality brush and weeds, or in some cases natural forest. Permission from the village community (*marga*) must first be obtained if a farmer wishes to clear natural forest. Otherwise, the farmer may be sanctioned in accordance with local customary laws and regulations."

Pak Asabi continued: "After harvesting the rice, we plant a second 'intermediary' crop. This crop may include a number of agricultural products such as coffee, pepper, vanilla and chilli. A number of fruit trees, such as papaya and banana, may also be planted at this time." Coffee trees tend to be dominant at this stage, and are usually harvested for three to five years (but sometimes managed so that they produce for ten years or more). According to the World Agroforestry Centre (ICRAF), the introduction of semiperennial crops, with a primary goal of increasing profitability and lengthening the productive commercial period of the plot, considerably reinforces the competitive advantage of planted trees by delaying the establishment of natural regrowth.

"Thirdly, damar trees are added two to three years later, together with a number of tall-growing timber and fruit-bearing tree species. These trees usually reach maturity after 15 years, at which point the forest canopy closes and the semiperennial crops no longer receive sunlight and become unproductive. We then leave the area alone for a further 5 to 10 years. During this time, the damar tree becomes the dominant tree species."

According to ICRAF scientists, this fallow period allows natural vegetation (such as trees, lianas, shrubs, forest herbs, epiphytes) to develop along with the planted damar trees and fruit trees. The strategies for crop succession and diversification also allow Krui farmers to meet the majority of their daily needs while they wait for the damar trees to mature and yield resin.

"When the damar trees begin to produce damar (after 20 to 25 years), the plot is completely weeded; except for useful spontaneous species (such as mushrooms and other edible fungi), which are carefully preserved," Pak Asabi explained.

This so-called "successional" forest garden then increases in complexity over the years, influenced both by natural ecological processes and through planting and selective cutting by community members. As the damar garden matures, it acquires the characteristics of neighbouring natural secondary forests.

Traditional management system

According to Pak Ari, since the damar agroforests have been passed down to present generations from their ancestors (*nenek moyang*), the forests are managed in accordance with *adat*. These laws and regulations allow people to claim ownership over wild damar trees if they are the first to tap and collect damar from them. Individual families also have tenurial rights over the damar gardens they have planted and managed; and they can pass on these rights to their descendents — generally to the eldest son.

A Krui farmer collects resin from a damar tree (courtesy Anne Casson).

Pak Ari observed that in the case of other children, in particular, women, the eldest son is obliged to manage the forests for the benefit of the larger family. Daughters cannot inherit rights to the damar forests, but their fathers, brothers and husbands are morally obliged to ensure that they receive fair benefits from the agroforests.

Even though individual families have tenurial rights over the damar gardens that they have planted and

managed, they do not have full property rights (*hak milik penuh*) over them. This means that individual families are still subject to community approval if they wish to transfer ownership rights or cut down the trees. Land and tree-use rights, therefore, remain under the oversight of the extended family, and the larger community. Disputes over the management of the damar agroforests are also subject to arbitration by the village community.

The Krui tenure system is, nevertheless, primarily governed by moral obligation rather than regulation or enforcement. This is because the system supports and relies upon social cohesion, communication and cooperation. The head of a family is obliged societally to pass on the damar agroforests to his eldest son. The forests are, therefore, not his to sell or cut down, because the forests do not only belong to him, but also to his future descendents. According to Michon *et al.* (1998) Krui villagers will often say that the damar agroforests are "my heritage, not my property" (*hak waris bukan hak milik saya*). They will, consequently, invest in the planting of damar not only for themselves, but also for their children and their children's descendents.

Many resources within the forest gardens also continue to be held as community property, including fruits, sap from sugar palms, bamboo, thatching leaves and other goods. This is especially true for resources considered to be "wild" forest resources: rattan, wild vegetables, medicinal plants, and fuelwood. No one can claim rights over a piece of unmanaged, pristine forest (Michon *et al.* 1998).

Environmental and economic benefits

Not only do the Krui agroforests promote social cohesion, but they also provide a number of important environmental and economic benefits. Environmentally, the agroforests exhibit diversity typical of nearby natural forests. This is because the damar forests are by no means single species plantations. In fact, the forests provide similar ecological benefits to natural forests; including soil protection and the prevention of erosion (ICRAF 2001).

As in any secondary forest, the newly maturing damar plantation provides an environment for the propagation of plants originating from the neighbouring forests through natural dispersion. It also offers shelter and food to many species of mammals, some of which are highly endangered, such as the Sumatran rhinoceros. ICRAF researchers have stated that the number of primate populations (macaques, leaf monkeys, gibbons and siamang) found in damar agroforest sample plots is similar to those found in natural forests. At least 92 bird species have been identified in the damar agroforests (ICRAF 2001).

Economically, damar gardens constitute one of the most profitable smallholder forest production systems in Indonesia. This is because farmers are able to harvest resin from the damar gardens, on a regular basis, throughout the year. Resin

from each tree can be tapped at least once a month and sometimes every two weeks. Socio-economic studies conducted by ICRAF researchers have determined that one villager can harvest an average of 20 kilograms of resin a day. In the central district (Pesisir Tengah), a family can harvest an average of 70 to 100 kilograms of resin per month (ICRAF 2001).

Income derived from the sales of resin allows most villagers to meet their daily needs and to send their children to school. In fact, five days of work in damar gardens are usually enough to ensure a month's subsistence for a whole family (Michon *et al.* 1998).

The agroforestry system developed by the Krui also offers a diverse income base. On a tour through a newly established agroforest, Pak Asabi explained that income obtained from resin collecting was supplemented by seasonal revenues from fruit trees such as mangosteen, jackfruit and durian. At the same time, wild resources associated with damar trees support a wide range of gathering activities that are more typically linked with natural forest ecosystems — hunting, fishing and harvesting of marketable non-timber forest products such as rattan, medicinal and insecticidal plants. These products provide an important complementary subsistence resource for households. The diversity of this type of system, together with its low dependence on external inputs, creates an economic stability that is rare among poor societies.

Struggle for rights

Despite the numerous ecological, economic and social benefits attributed to damar cultivation in the Krui area, much effort was needed to persuade the Indonesian Government that local people should manage the forests. This was because the Indonesian State did not officially recognize the rights of local people to forest resources.

In 1967, the Suharto government adopted the Basic Forestry Law, which centralized much of the state's authority over forests and swept away many of the customary legal and jurisdictional obstacles to large-scale commercial logging (Ross 2001). The 1967 Basic Forestry Law placed all of Indonesia's forest land — about 75 percent of the total land cover — under the purview of the Directorate General of Forestry in Jakarta. In doing so, the rights of Indonesia's forest dwellers to use the forest land for swidden cultivation, and to gather plants, animals and other forest products, were significantly curtailed or extinguished. Concessions were then allocated, *inter alia*, to the military, Chinese entrepreneurs and members of the Suharto family (Dauvergne 1997). This policy, when backed by the military, was very effective in weakening *adat* institutions and restricting local people's access to natural resources (Ross 2001).

Until recently, the land tenure situation of damar farmers in the Krui area perfectly epitomized that of other forest farmers in Indonesia. Although they

had occupied the land for more than five centuries, they still had no legal title to it; most of the lands they developed and managed were located on state forest lands. Moreover, no official map above the village level recognized the existence of the damar gardens. The gardens were instead classified as swidden and dry fields, secondary forests and degraded vegetation (Michon *et al.* 1998). The Krui, nevertheless, followed their customary laws and regulations, which determined that individual families had tenurial rights over the damar gardens they had planted and managed. Consequently, they continued to plant damar and to manage the forests they had already established, sustainably.

The Krui agroforestry system did, nevertheless, come under threat in 1991 when the Suharto government declared large areas of the Krui agroforest to be State Forest Land in accordance with the 1967 Basic Forestry Law. Shortly afterwards, a logging company was awarded rights to harvest an estimated three million trees from the area. Two oil-palm companies were also granted rights to land covered by damar forest (Michon *et al.* 1998). When the Krui learned about these decisions, they stopped planting damar and other tree species because they were no longer certain that they would be able to reap the benefits of their work.

According to ICRAF (2001), the decision to allocate Krui lands to commercial timber and oil-palm companies "caused a chorus of disapproval, as environmental campaigners learned that a system renowned worldwide as a model of sustainable forest management might be lost forever."

A consortium of national and international non-governmental organizations — commonly known as TIM KRUI — was established to come to their aid by lobbying the national government to retract its decisions (Michon *et al.* 1998; ICRAF 2001). This consortium effectively used social, economic and ecological survey results, already gathered by respected ecologists and forest economists, to promote the "Krui case" as an outstanding example of reforestation and forest management by local communities. It also raised the profile of the damar agroforests through publications, videotapes and presentations; mapped the Krui damar agroforests through participatory mapping and provided moral support to the Krui people in the field.

After the fall of Suharto in mid-1998, a consortium of local people, non-governmental organizations and research institutions persuaded the former forestry minister to cancel the timber concession rights to the area and to issue a new and unprecedented decree which defined the damar agroforests as *Kawasan dengan Tujuan Istimewa* (KdTI) or "Forest with Special Purpose." The decree officially recognized the legitimacy of the Krui agroforestry system and restored the rights of the Krui people to harvest and market products from the trees they planted. The decree was perceived as a powerful instrument for restoring social justice and promoting sustainable development. In the short term, it is expected to benefit at least 7 000 families in the 32 000 hectares of reclassified Krui lands as these families will have tenure security and will be more willing to invest in their damar gardens (Fay and Sirait 2002).

Although the decree was only applicable to the Krui damar agroforests, it provided an official precedent for recognition of community-based natural resource management systems based on adat. Furthermore, it was the first case where local people were allowed to harvest timber in state forests, and where management responsibility for a state forest had been devolved effectively to a traditional community government structure (*Masyarakat Hukum Adat* or Customary Community). The Krui people now feel secure and are confident that the government will not attempt to allocate any further land to oil-palm or timber companies because they know that, as the world is watching, such action would not be tolerated.

In recent years, Indonesia has embarked upon an ambitious decentralization programme and the government has expressed some willingness to provide greater authority to customary communities over forest resources. It is therefore hoped that the pilot scheme established in the Krui area can be extended to other *adat* communities in Indonesia, which have also developed forest management systems that provide economic, social and environmental profits. With government recognition and continuing support from non-governmental organizations, research organizations and donors, community forest management has the potential to allow Indonesia's forest-dependent people to make a major contribution to the country's forestry sector.

Conclusion

The Krui damar agroforests are an excellent example of sustainable forest management. The Krui people have been able to establish, maintain and cultivate a healthy, diverse dipterocarp plantation that offers economic, social and environmental benefits. They have also developed a regulatory framework that promotes sustainability, equity and social cohesion. This system is highly efficient and it offers considerable insight into the merits of community-based forest management and the potential for agroforestry to contribute to reforestation, land rehabilitation and enhancement of biodiversity.

Fortunately, the Indonesian Government has recognized the significance and merit of the Krui damar-based agroforestry system and, in light of recent political changes, it has officially recognized the Krui people as the customary managers of the damar agroforests located in Lampung. This has meant that the Krui people now have the right to plant, harvest and market products derived from their agroforests. They also have an incentive to protect and sustainably manage their forest resources because they now have clear rights to the land and the trees they plant. With continuing support from non-governmental organizations, research organizations and donors, this initiative should provide a basis for official recognition of other innovative community-based forest management systems in Indonesia.

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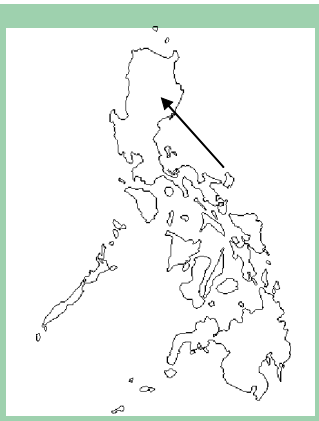
Muyongs *have evolved as a result of the Ifugao's recognition of the integral relationships between forest, water and agriculture (courtesy Patrick Durst).*

THE IFUGAO MUYONG: SUSTAINING WATER, CULTURE AND LIFE

Rogelio C. Serrano and Ernesto A. Cadaweng

Name of forest:	Ifugao Muyongs
Location:	Ifugao Province
Area (hectares):	12 542
Managing entity:	Ifugao indigenous people
Mgt. objectives:	Watershed protection, sustainable use of natural resources
Country:	Philippines



Tourists visiting the province of Ifugao, in the northern Philippines, gasp in awe at the grandeur of the Banaue Rice Terraces. From December to April, the topography is characterized by the vast contoured greenery of young rice plants, which metamorphose into golden yellow from May to July as the rice ripens. Such is the famed "Eighth Wonder of the World," which has also been declared a World Heritage site by the United Nations Educational, Scientific and Cultural Organization.

But suppose there were no trees and a period of drought ensued, with no water reaching the rice terraces. The vista would be a uniform grey-brown, with cracked dikes and barren paddies. The visitor suddenly realizes the importance of the forests — interspersed among the rice terraces that dominate the landscape. As the hidden fuel tank of a vehicle supplies petrol to the engine — resulting in motion — the Ifugao forests release water to the terraces, even in dry months, resulting in bountiful rice harvests.

These patches of forest, usually enclosing or adjacent to Ifugao[1] settlements, are known as *muyong* (or *pinugu* in another dialect). A *muyong* is an untilled slope

[1] Ifugao locally means "people of the hills" and also lends itself to the name of the mountainous province in Northern Luzon inhabited by the Ifugao people.

covered mainly with timber, fruit trees, climbing rattan, bamboo, palms and other associated natural vegetation, which is often used as a source of fuelwood. *Muyongs* are privately owned and managed, with clearly demarcated boundaries.

Over the years, most attention has focused on the rice terraces themselves (locally called *payoh*). It is only recently that outsiders have come to recognize and appreciate the critical roles of the *muyongs* in sustaining the land-use system of the Ifugao, and their lives and culture. *Muyongs* are an essential part of the agroforestry system in the steep mountainous region — protecting lower farmlands from runoff and erosion. There are, however, no records as to when and where the practice of maintaining *muyongs* began.

Environmental intervention

It is believed that, as in the case of the rice terraces, the Ifugao — in response to their specific needs — developed *muyongs* as an environmental intervention. Research conducted by the Bagong Pagasa Foundation Inc. (BPFI) has documented three probable reasons for the emergence of *muyongs* as given below.

1) Evidence suggests that the ancestors of the Ifugao were well aware of the relationship between the existence of forests and stable water supplies. In the same way that the Ifugao people exercised ingenuity and creativity in carving the terraces to support their tribal livelihoods, they also designed and established *muyongs* to create a stable source of water for their *payohs*.

2) Secondly, *muyong* establishment was reinforced when it became apparent that sources of fuelwood near Ifugao settlements were becoming depleted.

3) There are indications that some early *muyongs* were started by a low caste in Ifugao society — the *nawotwot* — as a means of uplifting their economic and social standing in the community. Ownership of large areas of *payohs* and *muyongs* are indicators of high social status or affluence in Ifugao culture.

In their own way and using local resources, the Ifugao developed their *muyongs* over generations — sharing and exchanging planting materials and labour in the process.

To date, there are no data available on the aggregate area of all the *muyongs* in Ifugao. However, research by Napoleon Hangdaan (a local researcher), shows that *muyongs* abound in 9 of the 11 municipalities of Ifugao (Hangdaan 2000). Hangdaan's account lists the locations of all *muyongs* in the identified municipalities and documents 603 *sitios* (villages) and sub-sitios where *muyongs* exist.

Three types of *muyong*

Classified on the basis of their establishment, three types of *muyong* can be distinguished:

- those that were planted and handed down through generations;
- those recently established on fallow swidden (or *uma*) land; and
- those established within the natural forest through a long usage claim.

The area of a single *muyong* ranges from half a hectare to three hectares and *muyongs* are generally located at a distance of up to one kilometre from the home, depending on where ancestral *uma* were first established.

The boundary between adjacent *muyongs* consists of a line of cleared land — one-and-a-half-metres wide. The owners themselves maintain the line by occasionally cutting saplings and shrubs that grow along it. Boundary disputes may arise due to failure of one or both parties to clean the line. An aggressive owner may sometimes alter the boundary in his favour by adjusting the line, thus encroaching on the area of the adjacent *muyong*.

The conversion process from *uma* to *muyong* necessitates that the owner periodically tends and protects the growing shrubs and forest trees. Through natural succession, vegetation in the *uma* improves from cogon (*Imperata cylindrica*) to talahib (*Saccharum spontaneum*), followed by the appearance of ferns, then the emergence of miscellaneous shrubs and medium-sized trees. This succession to larger and taller vegetation is indicative of improving soil fertility and a better microclimate, indicating more stable conditions. Eventually, dipterocarp tree species such as lauan (*Shorea contorta*), guijo (*Shorea guiso*) and bagtikan (*Parashorea malaanonan*) may begin to grow, which leads to the *muyong* reaching its climax, or most stable ecological condition. This process of natural succession may take 20 years or more depending on initial soil conditions. The owner may, however, accelerate the process by planting preferred tree species or by transplanting wildings from nearby natural forest.

Hangdaan records three modes by which ownership of *muyong* can be acquired:

- *By inheritance:* If a father inherits *payoh* and *muyong* from his parents, then these are bequeathed to the first born of his children. However, the first-born child may prefer to inherit the mother's inherited property, in which case the father's inheritance goes to the second child. The third child inherits whatever *payoh* and *muyong* may have been acquired or purchased by the couple. If there is a fourth child, he or she may inherit the couple's *uma*. Planting may be carried out on this fallow land, including the option to plant trees and convert it into *muyong*.

- *Via purchase from a hapless owner:* The transaction is brokered through a respected person in the community. Payment is made in the form of money or traded animals such as pigs, *carabao* (buffalo) or chickens.
- *Via the self-made method:* If a treeless vacant area in the uplands can be found, the prospective owner may clear the area and create an *uma*. As time passes, desirable trees are planted that grow to maturity and are harvested in time of need. The owner may then bequeath the property to his children.

Natural setting

The Ifugao *muyongs*, in their traditional composition, have a rich stock of varied plant species. In 1999, Dr Merlyn Rondolo, a scientist with the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), undertook a comprehensive survey of *muyong* composition that revealed a huge array of species utilized for various purposes. These included 171 fuelwood species, 112 species used in construction, 70 species that provide food and various species used for basket-making and containers, woodworking, cordage, shaman rituals and children's toys. Ten varieties of rattan were also found, most of which were planted and cultivated (Rondolo 1999).

"The Ifugao use as many as 45 plant species as medicine," explained Dr Rondolo. "While there is a trend towards less reliance on medicinal plants, in favour of commercially available medicines, it is worth examining the active components of these medicinal plants which may enable manufacture of pharmaceutical medicines."

The Bagong Pagasa Foundation reports that the Hapuwan subgroup of the Ifugao tribe uses indigenous pesticides to eradicate insects that damage rice in the terraces. For example, 20 aromatic herbs, many collected from the *muyongs*, are gathered, pounded and mixed to kill army worms. Other herbs containing potent compounds are used to stun and catch fish in streams.

"Our preparation of these botanical pesticides and potions involve rituals led by our elders. The pesticides produced are highly effective," said Benjamin Lunag, an Ifugao elder.

Care and maintenance

The Ifugao devote considerable time to the care and maintenance of the *muyongs* once the rice-planting season has finished. They take turns, through a system of shared labour called *ub-ubbo*, in developing silviculture in the *muyongs*. Trees are cleared of climbing vines that otherwise would choke and kill the woody perennials. In the municipalities of Lamut and Lagawe, coffee is often planted to

maximize the use of open spaces in the *muyongs*. Tree species that are regularly interplanted include gmelina (*Gmelina arborea*), narra (*Pterocarpus indicus*), mahogany (*Swietenia macrophylla*) and rain tree (*Samanea saman*). Rattan and bamboo are also planted.

Thinning and pruning are carried out during the dry months. Pruning improves tree form and enhances the volume of clearwood, and the pruned branches are gathered for fuelwood. Thinnings are used to make fence posts or for light construction and repairs to houses.

Mature trees are cut only when large dimension construction material is needed. The decision on which trees to cut is dependent on the intended use of the harvested timber. Tree species such as *baku-og*, *bultik-gotapan* and *bultik-tangayaan* are preferred for studs and flooring. Dalakan (*Alstonia scholaris*), a relatively fast-growing species, is used for non-load bearing building purposes, since its wood is soft and less durable than many other hardwood species. Directional felling is employed to avoid damage to other trees.

Rattan fruits are harvested annually and sold in local markets or brought to other municipalities for trading. A survey by the Bagong Pagasa Foundation revealed that an average of 115 kilograms of rattan fruits are harvested by each Ifugao household each year — most of which are sold for a price of around US$0.30/kilogram. Where coffee is interplanted, an average bean harvest of 406 kilograms/hectare/year has been recorded. Coffee beans are sold for a mean price of US$0.14/kilogram.

Each household also harvests approximately 2 000 board feet of timber *per annum* from the *muyongs*. About 80 percent of this is used for domestic purposes and the remainder is sold. Owners of *muyongs* located nearest to urban centres typically sell higher volumes of timber and other forest products. Each household also extracts an average of 106 bundles of fuelwood from its *muyong* each year. A standard bundle has a diameter of about 25 centimetres and a length of about 50 centimetres.

Wood carving

Wood for carving is the other major raw material derived from the *muyongs*, with volumes fluctuating in response to market developments and restrictive policies periodically imposed by the government. When a sealed road linking Ifugao to the Cagayan Valley and Manila was opened in the 1970s, the production and marketing of woodcarvings boomed. Items carved included religious relics like *Bulul* (the Ifugao rice god), household utensils and artistic figurines. Prior to the 1970s, only small volumes of woodcarvings were sold beyond village markets.

Wood carving expresses the cultural creativity of the Ifugao, whose nourishment and continuity is interlinked with the *muyong*. Alex Tayaban, an

Ifugao elder of Lamut, elaborated: "Many of our woodcarvings closely reflect our relationship with nature and with our gods. The same creativity that inspired us in carving the rice terraces inspires us as we fashion pieces of wood into masterpieces."

During the boom years for wood carving, container loads of carvings were transported to Manila and some even reached international markets. Raw materials were initially drawn from *muyongs* and communal forests. However, as suitable wood supplies declined, wood for carving was increasingly purchased from the nearby province of Nueva Vizcaya. The increasing threat to local forests led to intervention by the government and Ifugao elders, which helped to mitigate the destruction of the *muyong*. Today, the local woodcarving industry continues, but caters to a more limited market. Wood for carving is still obtained from the *muyong*, but in sustainable volumes.

Farming system

Dr Rogelio Serrano has studied the Ifugao for a number of years and refers to their farming system as "…an ancient spatial version of the new science of agroforestry." Seen from a wider perspective, the totality of the upland farming system of the Ifugao consists of the *payoh* (rice fields), the *muyong* (forest) and the *uma* (swidden lands). These components interact with each other, with Ifugao culture and with landscapes and ecosystems at lower elevations.

A macro-level interaction is between the *muyong* and downstream environments. The *muyong* serves to capture and store rainfall and slowly releases it throughout the year, thereby irrigating the terraced *payoh*. Excess water flows through the river system, passing through the province of Nueva Vizcaya, to be stored at the Magat Reservoir in Isabela Province. The stored water is used to irrigate lowland rice fields and to generate electricity for the large population of the Cagayan Valley. Water flowing from the *muyong* carries with it rich nutrients built up by the forest, which increase the fertility of the *payoh*. The *muyong* also serves as a source of rocks and stones to make walls for new terraces and to repair damaged older terrace walls.

A second interaction is between *muyong* and *uma*. *Muyong*, with its rich biodiversity, supplies seeds — dispersed by wind and wildlife — to the *uma* in its fallow period (*ublag*). Plant regeneration is, consequently, more rapid than in the absence of *muyong*. The *muyong* also serves as a buffer to nearby *uma*, providing microclimates favourable to the growth of fallow vegetation, as well as trapping eroded soil.

There is also interaction between the *muyong* and Ifugao households, and — at a larger scale — the community and Ifugao culture. The *muyong*, as part of the Ifugao ancestral land, is a host to the tribal culture. Many Ifugao settlements are in the middle of *muyong* clusters. Not only are houses built within the *muyong*, but

also the people's forefathers are buried there. The *muyong* is consequently seen as the abode of ancestral spirits and other benevolent spirits revered by the Ifugao. It is under the shade of the *muyong* where rituals are performed, including the *canao* – a thanksgiving feast for a bountiful rice harvest and favours obtained from the gods. Feasting on butchered pigs, tribal dancing and partaking of rice wine (*tapuy*) highlight the celebration.

Customary laws

Considering the values, benefits and attachment of the *muyong* to Ifugao families and the community, it is understandable that these small, forested areas are valued highly. In fact, the Ifugao are willing to fight and stake their lives to protect their *muyongs*. Thus, the tribe has evolved customary laws to settle conflicts over ownership and use of *muyongs*. The research conducted by Napoleon Hangdaan, himself an Ifugao, provides a detailed account of the processes that govern conflict resolution relating to the *muyong*.

Ifugaos may gather fuelwood from *muyongs*, even without permission from the owner — but only dead branches may be collected. This privilege must, however, be reciprocated by cleaning a portion of the *muyong*. Repayment in the form of *muyong* cleaning and tending is required even if the person gathering fuelwood is a relative.

If a tree is harvested, the person who fells it must plant two replacement trees and clean a large area of the *muyong* in repayment. The owner must give permission for harvesting and specify the exact trees to be cut.

A person caught stealing from a *muyong* is brought before tribal elders and severely reprimanded. The miscreant is also required to recompense the owner of the *muyong*. In case of a second offense, the owner can demand restitution through a third party negotiator. A third offense is perceived to indicate that the perpetrator lacks respect for the owner and the issue may end in violence.

Boundary conflicts are usually a more serious issue. Conflicts arise in the absence of clearly defined boundary lines and markers, or intentional shifting or removal of boundary markers. Conflict may also arise if two individuals claim the same former *uma* area whilst it is undergoing natural regeneration. In this instance, generally, both parties claim that their respective forefathers were the people who first cultivated the area.

To settle a boundary conflict, an ordeal called *haddaccan* — involving the two contending parties — is performed. The term derives from the word *ihadac*, which means "to rectify a mistake," or "to put to right a wrongdoing." The ordeal is performed in either of two ways: either *i bultong* or *i uggub*. The two parties, through a mediator, agree on the process that will be used.

The *i bultong* ordeal is basically a wrestling match between the two parties in conflict. The wrestlers need not necessarily be the actual persons in conflict; they

may substitute a carefully chosen relative to represent and fight for them. Attempts are made to ensure the opponents are evenly matched. In fact, the essence of the contest is to be evenly matched, so that justice, rather than strength, is perceived to dictate the outcome.

The *i uggub* ordeal involves the protagonists throwing *runo* (reeds) fronds and eggs at one another. After the performance of either of the two ordeals, a peace-making rite called *hidit* is conducted. This is to thank the gods for the result and to commit that both parties will peacefully abide by it. *Hidit* is conducted to ensure a firm reconciliation between the two parties — in the presence of many witnesses.

Following the establishment of the Regalian Doctrine,[2] which states that all natural resources — including lands of the public domain — belong to the state, the *muyong* lands of the Ifugao became (officially) the property of the Philippine Government. This government claim has been resented by the Ifugao for many decades, as the tribe considers that it occupied and "owned" the lands long before the Spaniards arrived and centuries before the establishment of the Philippine Republic. Though dissatisfied with the situation, many have lodged declarations for their *muyongs*, which give a semblance of tenure. This arrangement requires that the government be paid a minimal annual fee.

"People first"

In recent years, a paradigm shift — favourable to the Ifugao — has occurred within the government, particularly within the Department of Environment and Natural Resources (DENR). Moving from a stance of indifference towards upland dwellers, the DENR has, since the mid-1970s, advocated more people-oriented policies, and has begun to regard the Ifugao as partners in upland development. During the past 20 years, the DENR has adopted Community-Based Forest Management as a banner programme, with a philosophy of "People first, and sustainable forestry will follow."

Building on the Integrated Social Forestry Program (an early thrust towards participatory forestry, commencing in 1976) a series of people-friendly DENR programmes has followed. These include a process that issued Certificates of Ancestral Domain Claim. These certificates provided tenurial security for 50 years, legitimizing the presence of indigenous cultural communities in areas where certificates were approved. A number of Certificates of Ancestral Domain Claim were awarded to the Ifugao. This arrangement has afforded tribal members with legal recognition of their rights over their ancestral domain (including the exclusive rights to occupy the land, to develop it and to enjoy the fruits of their endeavours).

[2] This dates back to the arrival of the Spaniards in the Philippines when the country was declared property of the King of Spain. This has since been an overriding principle guiding the development of laws and programmes on natural resources. The present formulation has its origins in the 1935 Constitution.

Conclusion

Despite receiving the Certificates of Ancestral Domain Claim, many Ifugao remained apprehensive over the 50-year tenurial duration. The mindset of the Ifugao to ownership is not time-bound, and any duration of tenure is inconsistent with this view. These apprehensions were finally erased with the passage of landmark legislation in 1997 — the Indigenous Peoples Rights Act (1997). Devised by Senator Juan Flavier, himself a member of the Igorot tribe under which the Ifugao are categorized, the new act provides for an absolute Ancestral Domain Title. It also promotes the incorporation and practice of local people's customs and traditions in the development and management of their land. The law helps Filipino ethnic communities to fulfil their aspirations for self-determination, while enjoying the blessings of their locally managed natural resources. Thus, the Ifugao finally are assured the rightful ownership of their *muyongs* and adjoining lands.

"Our *muyongs* will be there to stay, till the end of time," declared Ifugao documentarist Hangdaan. The present indications are that they will be — playing key roles in supporting the agricultural production systems, and the cultural and significant values of the Ifugao people, far into the future.

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Ifugao woodcarvings reflect the people's relationship with nature and their gods (courtesy Patrick Durst).

THE FASAK ECOFORESTRY PROJECT: A NEW DAY DAWNING

John Liu

Name of forest:	Fasak Eco-Forestry Project
Location:	Sanma Province, East Santo
Area (hectares):	532
Managing entity:	Foundation of the Peoples of the South Pacific: Vanuatu (FSPV) and Fasak community
Mgt. objectives:	Sustainable timber production
Country:	Vanuatu

The island of Espiritu Santo — the largest in Vanuatu at 4 010 km² — is the centre of the country's forest harvesting operations. Rapid expansion of commercial logging activities, however, has raised concerns among many of the people living on Santo. "Most of our forests have already been logged. We have to do something to ensure that in the future our forests are harvested in a sustainable manner and with minimal damage to the surrounding environment," said Tom Ker Dick, the Regional Forest Officer in East Santo.

Sustainable management and use of natural resources is the key to maintaining and improving the social status of rural people in Vanuatu. Unfortunately, most people in Santo currently see little evidence of efforts to sustainably manage the island's forests. Pressure from unsustainable logging, conversion of land to agriculture, offshore interest in natural resources and an increasing population are threatening the forests. In particular, the major forestry companies are perceived, purely and simply, as loggers rather than as forest managers.

In stark contrast, the South Pacific Community Eco-Forestry (SPCEF) project, which operated from 1997 to 2001, demonstrated that forests in Vanuatu

can be managed effectively by — and for — local people. The project was implemented as part of the regional forestry programme of the Foundation for the Peoples of the South Pacific International (FSP-International), a network of eight South Pacific non-governmental organizations. "We work with interested landowning communities in Vanuatu, the Solomon Islands, Fiji, Tonga and Kiribati in developing country-specific and appropriate models for community-led sustainable forest management," explained project manager Mark Kalotap.

The SPCEF project was implemented by the Fasak clan in their traditional lands at Jerimbosoksok. The Fasak clan live in Natawa Village and surrounding hamlets, located at Shark Bay, East Santo. The project was supported by FSP-International's local affiliate, FSP-Vanuatu. Natawa Village has 72 Fasak residents, with an additional 200 Fasaks living in surrounding villages.

Isaac Lokai, the chairperson of the Fasak community, explained the project rationale: "We realized that we could easily manage our forest, but we needed proper training to teach us how to manage effectively. We were very fortunate that FSP-Vanuatu chose our community to initiate this kind of ecoforestry project."

The beginning

Extensive consultation was carried out with the Fasak community before the project started. Project staff wanted to develop a model that emphasized integrated forest management — covering all aspects of forestry — from forest ecology and management to timber marketing. The project strategy emphasized measures to increase the knowledge of resource owners, enabling them to make informed decisions on how to manage and utilize their own resources.

On 15 May 1997, the Sanma Council of Chiefs (known as *Supenatavutano*) declared the lands surrounding Jerimbosoksok as "customary lands" belonging to the Fasak clan. The Jerimbosoksok lands encompass 6 460 hectares of customary lands, including 4 795 hectares of forest land, comprising 220 hectares of coastal forest, 3 100 hectares of lowland forest and 1 475 hectares of mid-altitude forest. Once ownership rights were established, 550 hectares were allocated to the ecoforestry project. The primary project management area encompassed mainly mid-altitudinal forest containing a variety of hardwood species. Many of the species growing in the area are not commonly used in Vanuatu, but are regarded as commercial species elsewhere in the region.

"The project was extremely interesting," explained Mark Kalotap. "In the beginning, the identified villages were not really enthusiastic to support the project. But we involved them thoroughly in initial activities such as training, awareness-raising workshops, participatory rural appraisal and income-generating programmes. These activities helped the villagers realize the value of better management and protection of their forests."

But it was easier said than done. Early project activities quickly revealed a variety of problems that compromised the villagers' ability to balance family demands and community aspirations. For instance, a person might have to choose between working to earn money to pay school fees for his children or help in the construction of a water tank that would provide the community with a reliable water supply.

Box 1. Land ownership in Vanuatu

Vanuatu's 1980 independence constitution declares that all land belongs to indigenous customary owners, and that rules of custom are the basis for the ownership and use of land. Systems vary between clan (extended family) and individual ownership or rights of use. In general, forest management on customary land is relatively passive and follows traditional subsistence practices — largely centred on agroforestry close to settlements, and hunting and gathering in the high forests. Rural communities tend to rely on forests for many elements of livelihood.

Conflicts over land ownership are dealt with by the provincial Council of Chiefs (the Sanma Council in Sanma Province), the traditional supreme body, which forms a local court to deal with traditional land issues. In the Fasak case, conflict had arisen between the Fasak clan and another local clan over ownership of the Jerimbosoksok lands.

Forests are an integral component of the lifestyle in a typical Vanuatu village. However, when logging companies approach landowners, the community is faced with a tough decision: the long-term future of the forest area and the village community — or the possible short-term monetary gain, which may benefit only a few individuals. Unfortunately, the need for money is often a strong motivation in decision making.

The livelihoods of the whole community depend heavily on the forest, which reinforces the importance for sustainable forest use and management. "The forest is our life," declared Titus Lokai, a community elder. "Everything we depend on comes from the forest."

The forest resources utilized by the Fasak community include timber and poles used for building houses and making furniture, food and fruits, customary herbal medicines, and fuelwood.

The SPCEF project

The SPCEF project was designed to work with interested landowners in Vanuatu to develop a country-specific and appropriate model for community-led forest management. The SPCEF project gave landowners the option to manage and utilize their forest resources sustainably by developing a small-scale, community-based timber enterprise designed to provide quality tropical hardwood

products directly to the market. The profits were to be returned directly to the community. The project aimed to ensure long-term viability of sawmilling operations, and to enable landowners to manage their forests for long-term social, economic and environmental values. The project was funded by the European Commission through to February 2001, with an additional year of funding provided by the Canada Fund.

The SPCEF project led the Fasak community through a training process to put the community on a firm path towards sustainable forest management. The community attended a number of awareness and education workshops, which were supported by practical implementation training in the field.

A management committee was established and trained by the SPCEF project business officer. A basic training manual was written specifically for the project. A core group from the community was selected to participate in the forest analysis activities. All these factors, including the appointment of the project manager and business officer, were accomplished with the help of the SPCEF staff.

One of the important aspects for promoting project sustainability was generating sufficient awareness among the participating communities on the concepts of sound forest management. At Fasak, although awareness-raising efforts absorbed a significant proportion of the project time and energy, people were slow in absorbing relevant information. This was because the concepts involved matters beyond their traditional cultural dimensions — in this case, concepts of ecoforestry. The awareness campaign involved extensive field exercises, including visiting forests near the village to demonstrate practical aspects of silviculture.

These training activities were implemented by the two project staff members, with some assistance from the Vanuatu Department of Forests and Vanuatu Department of Cooperatives.

Technical workshops

Modern sustainable forest management requires considerable technical proficiency. Consequently, some of the concepts were difficult for villagers — who had very limited education — to comprehend. For example, the villagers had to be taught how to use a compass when carrying out boundary surveys. Villagers also needed training and close supervision while using heavy equipment. A number of technical workshops were organized to teach villagers the concepts of basic silviculture.

The training workshops implemented by the project included:

Basic forest ecology workshop: Landowners were made aware of natural forest functions and dynamics. This workshop provided a firm basis in ecological theory for subsequent training on sustainable forest harvesting techniques.

Forest inventory and survey workshop: This provided training on technical components of forest management. Trainees were taught how to read compasses and clinometres (for determining tree height), as well as use of tape measures for measuring distances and for measuring tree diameters. The training included establishment of sample plots and striplines, recording on plot sheets and computer analysis.

Workshop on setting of diameter limits: This workshop related the forest inventory to the setting of diameter limits for the proposed harvesting area. This was a new concept for Vanuatu, where a standard 60 centimetre diameter limit for harvesting of all species means fast-growing trees are often harvested before they achieve optimal size, while smaller species are often left behind even though they are over-mature.

Workshop on tree marking: Trainees were taught to mark trees for directional felling in order to avoid damage to potential future crop trees.

Designing forest management plans, business plans, coupe plans and harvest plans: Planning activities provided opportunities for members of the community to directly learn planning and management skills to enable them to implement sustainable forest management, including sustainable utilization of forest resources to maximize benefits to local communities.

Chainsaw tree felling/directional felling workshop: Trainees were taught how to operate a chainsaw safely in the forest and how to carry out tree felling operations with minimal damage to the surrounding vegetation.

Log scaling training: This training taught sawmill staff how to measure logs to determine accurate milling volumes.

Sawmilling workshop: Sawmill staff were trained how to operate a portable circular sawmill to mill timber to specific sizes for sale. This training also covered timber grading, timber drying, timber preservation and record keeping with an emphasis on quality control.

Marketing workshop: This training covered implementation of a business feasibility study, writing a business plan, budgeting and basic bookkeeping and banking. It also included skills for negotiating in markets and dealing with customers.

Aside from the core community group, other landowners and workers were also involved in the boundary survey and inventory data review. "I think the ecoforestry project has done a very good job in our community," said Malachai Lokai, a Fasak community leader. "We are now able to make informed decisions on which trees to cut and where to cut them, as well as knowing how and why we have to do things whenever a tree is harvested."

The project also emphasized the need for women to be more involved in forest management processes. Various workshops were conducted to involve

women in decision making, as well as to provide education and training. These helped to build a heightened awareness of local forest ecology. One of the most productive workshops focused on identifying specific issues of importance to women (e.g. tree planting and agroforestry) and developing an action plan to address those issues. Ms Jeanet Lokai, a youth member of the community, pointed out that, "Women in our community can't do heavy work such as using a chainsaw, tree felling or saw milling. However, they can help to keep production records and manage the accounts."

Training and operations manuals

One of the major contributing factors to the success of the Fasak project was the training provided to the community prior to and during the operational phases. In collaboration with the community, the project produced two types of manuals — training and operations — that document the process and content of training exercises.

The *Training Manual* provides detailed guidance for conducting training sessions and workshops, and identifies crucial elements that contribute to success. It also provides general data relating to training for small sawmill operations.

The *Operations Manual* contains information about the community, its resources and the techniques and education required for effective management. Both manuals are valuable tools for extension workers.

Management systems

The project followed two types of management systems:

- *Regulatory systems.* These relate to the development and documentation of forest management plans, coupe harvest plans, plans for operational cycles and community business plans. The development of procedures such as methods for effective customer relations and job descriptions for forest operators were also included as steps to implement the plans.
- *Organizational systems.* The project established a Project Advisory Committee, responsible for disseminating project information, obtaining advice on behalf of the project and establishing linkages between the community and agencies that could help its implementation. The committee — comprising members of the community, representatives of related agencies and NGOs, and SPCEF staff — conducted four meetings in eight months. For administrative purposes the project also established a management committee, involved the community core group, and liaised with the Vanuatu ecoforestry committee.

Several other agencies were simultaneously working in the community, including the Department of Forestry and Santo Joinery. Coordination systems were developed and joint training was provided to ensure that programmes and activities were implemented in a cohesive manner.

Direct benefits

Various workshops helped build awareness of the benefits that the community would receive by participating in the project. Direct benefits included:

- practical assistance to obtain a sawmill;
- support for informed decision making with regard to forest resources;
- environmental, economic and social benefits arising from improved forest management;
- enhanced knowledge and development of skills in forest management and land-use planning; and
- more effective marketing of timber products both locally and overseas.

The project also provided a number of benefits for sawmill operators including:

- the establishment of a marketing infrastructure for ecotimber;
- involvement in training and workshops;
- upgrading of skills to produce ecotimber; and
- the opportunity to market Vanuatu species other than whitewood (*Endospermum medullosum*).

Threats and challenges

The project identified a number of threats and challenges to its viability and success. The most significant were:

- *Cohesive momentum of the community.* The SPCEF project spent a great deal of time working with the 72 members of the community to build the cohesiveness needed for effective implementation. Initially, for example, women believed the project was not meant for their participation because traditionally heavy forestry work had been performed only by men. Women also noticed that the project was absorbing a great deal of their husbands' time, which left the women with extra responsibilities. These issues constituted a major threat to the project and had to be dealt with effectively to maintain cohesiveness in the community. This was handled through a series of participatory rural appraisal and conflict management

activities, which helped both men and women to recognize the short- and long-term benefits of the project.

- *Sustainability of the project when SPCEF involvement terminated.* A crucial factor in sustaining the success of the project was ensuring concentrated involvement of the community from the beginning and throughout the project period. This involvement ensured that the community took ownership of the project and retained control as managers of their own resources. In a very real sense, the community owned the project because they had designed it. SPCEF worked as facilitators to help implement and operate it.
- *Lack of ongoing long-term assistance from the Department of Forestry.* A major issue was that most of the financial support that the Department of Forestry was able to provide to the Fasak Project had been derived from the Australian-funded "Sustainable Forest Utilization Project." When that project terminated in February 2000, the department's capacity to provide assistance was severely curtailed.
- *Structural adjustment.* The Vanuatu Comprehensive Reform on the structural adjustment and downsizing of the civil service has also affected the provision of services that the Department of Forestry is able to provide to the small-scale sawmilling industry in Vanuatu — including the Fasak community.
- *Restrictions on equipment imports.* A further constraint was the ban on the importation of small sawmills into Santo and two other provinces in Vanuatu, imposed by the government in 1998 in an attempt to regain control of forest harvesting activities. The SPCEF project was able to secure a mill for its operation only after being granted an exemption to this ban by the Minister of Forestry.

Despite these constraints, government policy continues to support small-scale timber production and recognizes landowners as stewards of their resources. The government has established forestry regulations for small sawmills that sawmill owners need to understand to ensure they operate within the guidelines. These government policies and regulations were discussed thoroughly during the intensive training conducted by SPCEF staff.

Positive lessons learned

A number of positive lessons were forthcoming from the management of the project.

Preharvest preparations. The significant time and energy given to pre-implementation consultation and discussion with the Fasak community was a key to success. Community members were virtually saturated with information

relating to the requirements and operation of the project. People are the most important resource in any development project, and it is imperative that the local community take ownership of a project if long-term success is to be achieved. The people of Fasak community were thoroughly prepared and this was one of the main factors contributing to the success of the initiative.

Other preharvest activities given priority included resource assessment and inventory, identification of sensitive environmental and cultural sites, establishment of clear working procedures and systems, thorough training of workers on safety and careful maintenance of equipment and instruction on proper use. Some of these activities needed later refinement, but the foundations for effective management were well in place before the forest harvesting began. The saying, "well done preparation is work half done" certainly holds true in the case of the Fasak Project.

Harvesting operations. All forest harvesting activities were carried out in full compliance with the small sawmill regulations and the Vanuatu Code of Logging Practice. The Fasak community was well prepared in advance of harvesting, so that harvesting operations were completed with minimum difficulties. Well-planned operational cycles were also initiated by the community, SPCEF staff and the Department of Forestry. Harvesting was successful because all the stakeholders took part in planning as well as monitoring the implementation.

Postharvest activities. Recognizing the failure of most logging companies to adequately follow up on logging operations, the Fasak Project gave considerable emphasis to overcoming this shortcoming. Postharvest activities included general site clean-up, spreading sawdust piles and waste wood, assessing forest regeneration, tending and releasing seedlings and saplings, transplanting trees if natural regeneration was not sufficient and completing management assessment sheets.

Selection of appropriate technologies. SPCEF tested a variety of forest management and timber production systems and technologies to identify components suitable for application in the Fasak operations. The technologies and systems introduced to the Fasak Project were easy to implement with only basic skills and equipment, but still included all the important elements of sustainable forest management. One result was that the timber produced was of a very high quality compared to other portable sawmillers.

Training. The intensity of training — both in workshops and on-site — was a major component of the project. Training covered all aspects of sound forest management, which enabled the community to develop appropriate capacity to implement, manage and benefit from forestry activities. This enabled the Fasak community to be one of the first forest operators to be formally licensed by the Vanuatu Department of Forests.

Community integration. Acknowledging that community "ownership" is crucial for the sustainability of any development project, the Fasak community was heavily involved and integrated into all aspects of the project, right from the beginning. The project also noted that planning for forest management is much more meaningful when the whole community is involved. Existing government institutions and relevant NGOs also need to play an active role in all phases of forest management.

One of the most important outcomes of the project was the community realization that earning money was not the primary goal for participating in the project. Rather, the project would enable the community to maintain their forest and utilize only the timber they need. The project was recognized as the first community-managed area in Vanuatu to achieve sustainable forest management and to successfully implement the national Code of Logging Practice on a small scale.

Conclusion

The Fasak Ecoforestry Project provides an example of an initiative that was planned, implemented and managed effectively, and which is now owned and managed by the Fasak community itself. Mark Kalotap summarizes the success of the project glowingly: "Sustainability is not a new concept in Vanuatu, as can be seen by the way most communities have managed their resources for centuries, such as when a village chief puts a taboo (prohibition) on fishing in a particular area for a period of, say, two to five years to allow fish to breed and increase in number. Agroforestry, or interplanting of food crops with cash crops or trees, is also not new. However, increasing population pressures in Vanuatu mean that communities are now having to cope with shortages of land and resources. Managing small plots of land to sustainably meet household needs is becoming a critical requirement."

"We realized that combining new resource management ideas with already existing community knowledge and practices would improve the way people manage and use their resources. But, such ideas will not succeed unless local communities take ownership of the concepts and value the end results. Communities need appropriate training and resources to enable them to work independently once a project is finished, and the Fasak Project was able to deliver on these requirements."

The Fasak Ecoforestry Project has enabled the development of an SPCEF model, based on the experiences of FSP-Vanuatu staff working with the Fasak clan, as well as a separate ecoforestry project working with the Naone people at Hasavaia Village, South Santo. Training materials have been compiled to describe a logical process by which any village community could set up similar ecoforestry initiatives.

Looking to the future, Kalotap concludes: "The Fasak community experience provides a viable model for small-scale forest management throughout Vanuatu. It offers an excellent example for other communities to build upon, especially those with only modest forest areas ranging up to 1 000 hectares. Already two other communities — Aneityum and Eton, both on the island of Efate — have shown interest in applying the Fasak model and are planning to use the training manuals developed by the project to guide similar schemes in their areas."

About the author

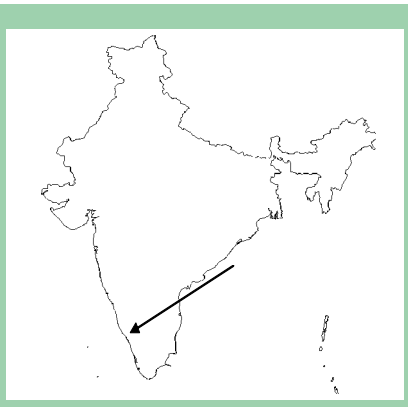
John Liu is from the island of Maewo in Vanuatu. He was formerly the Director of the Vanuatu Rural Development and Training Centres Association (VRDTCA), and the Second Secretary to the Minister of Education. He has spent 30 years working with local people in rural Vanuatu.

Sawmill in Vanuatu (courtesy Patrick Durst).

PERIYAR TIGER RESERVE: POACHERS TURNED GAMEKEEPERS

M. Govindan Kutty and T.K. Raghavan Nair

Name of forest:	Periyar Tiger Reserve
Location:	Thekkady, Kerala State
Area (hectares):	77 700
Managing entity:	Kerala Forest and Wildlife Department
Mgt. objectives:	Conservation, recreation, sustainable livelihoods
Country:	India



It began as just another day for the smugglers and poachers of Periyar Tiger Reserve. "On that fateful day, our group went into the interior forests of the sanctuary. We were already starting to peel off cinnamon bark from the vayana trees (*Cinnamomum* spp.) when suddenly a team of forestry officials appeared. Those who were on the ground were able to escape. But most of us, including myself, were up in the trees. We had to get down and before we could run, the government men had encircled us. There were eight of us who were caught and we were taken into custody," recalled Naushad Mohamed Haneefa, a former smuggler who is now a leader of an Eco-Development Committee (EDC), which helps to protect the forests.

Most of those who were involved in smuggling did so because they had no other means of earning money. "We earned our livelihood by smuggling and poaching for many years," Naushad indicated. "Generally, local merchants bought our smuggled products. If we were lucky, we might also have killed an animal, but the meat had to be sold discreetly. Of course, the money we got from these endeavours was not sufficient for a decent life. And the worst thing was that if we were caught, the merchants would not help us. Everyone in our village, including family members, considered us criminals."

Under the Kerala Forest Act, offenses committed by smugglers and poachers are punishable by imprisonment for up to five years and by a fine of up to US$105. Thus, most earnings from smuggling and poaching are spent on advocates to defend their court cases and payment of fines handed down by the

courts. "We had to spend considerable sums to defend ourselves in court," Naushad remembered.

Much of the remaining money was wasted on liquor and narcotics. To get more money, they had to resort to more poaching and smuggling. Being treated as criminals they behaved like criminals. They were caught in a vicious circle of crime, pursuit and punishment, and lived largely as fugitives from the law.

The Periyar Tiger Reserve

The Periyar Tiger Reserve lies in the Western Ghats in the Idukki District of the Indian state of Kerala. The northeastern boundary of the reserve is a 90-kilometre ridge, which also forms part of the boundary between the states of Kerala and Tamil Nadu. The reserve lies along the watershed of the Periyar and Pamba rivers — two of the largest rivers in Kerala.

In 1895, a dam was constructed across the Periyar River to provide irrigation for parts of Tamil Nadu. The forest around the new reservoir, the Periyar Lake, was declared as reserve forest in 1899 and was named Periyar Lake Reserve. The sanctuary was extended to 777 km^2 in 1950, and was designated as a Tiger Reserve in 1978. The core area of the reserve (about 350 km^2) was declared a national park under a preliminary notification in 1982.

Tropical evergreen and moist deciduous forests dominate in the lower regions, with grasslands at higher elevations interspersed with *shola* forests (small patches of evergreen forest with peculiar characteristics occurring in protected pockets amidst grassland). Many small rivulets and streams that ultimately form the Periyar and Pamba river systems originate and run through these grasslands and forests.

Wildlife is plentiful: 62 species of mammals, 318 species of birds, 44 species of reptiles, 16 species of amphibians, 38 species of fishes and 119 species of butterflies have been identified formally to date.

Natural habitat for tigers

In the early years of the reserve, the forest provided habitat for a significant tiger population. More recently, however, deforestation and other human activities have encroached on the forest and the number of tigers in the reserve has dwindled. In 1973, the Government of India introduced Project Tiger as a centrally sponsored scheme to ensure a viable population of tigers in India. Periyar was declared a Tiger Reserve under Project Tiger in 1978. At that time, only five tigers were known to inhabit the forest. Project Tiger implemented a range of programmes including consolidation of boundaries, relocation of human dwellings from the interior to minimize disturbances to wildlife, fencing or digging trenches

in vulnerable areas to prevent cattle from straying into the sanctuary, habitat improvement, prevention of wildfire, maintenance of swamps and waterholes, encouraging the growth of fodder species and elimination of commercial exploitation of forest products. By 2000, as a result of these efforts, there were 36 tigers living in the reserve.

Important place of worship

The reserve is famous for tigers, but it is also an important place of worship for Hindus. Two ancient Hindu temples — Mangaladevi and Sabarimala — are located within the reserve boundaries. During festival seasons, many pilgrims visit these temples for worship, especially between November and January. In recent times, new roads have improved access to the temples and created an enormous influx of visitors. In the past, pilgrims had to walk 45 kilometres through dense forests to reach the temples. Today, however, the walking distance is reduced to six kilometres and the Sabarimala Temple attracts five million visitors during the 60-day annual pilgrimage.

In the early 1950s, the area began to acquire its reputation as an important tourist destination. The major attraction was a boat cruise on the lake, from which a variety of wildlife could be viewed. At that time, very few of India's other wildlife sanctuaries offered this type of tourist attraction. Initially, the government provided only limited accommodation and tourist facilities. Today, however, the Kerala Tourism Development Corporation, an independent government agency, operates three luxury hotels and five boats.

Major threats

Since its inception, the Periyar Tiger Reserve has faced major challenges. The pilgrimage, for example, constitutes an ongoing and serious threat to the local environment. In the 1960s, throngs of people started coming to the hill shrines. Temple authorities were required to provide basic amenities to visitors and the influx prompted the construction of more roads (*ergo* the opening up of forests along the route to the shrine), permanent buildings to accommodate pilgrims and officials, sanitary infrastructure, water supplies, electricity and medical facilities.

As the business potential of the pilgrimage became evident, shops and hotels sprang up along the jungle routes. Trees adjacent to pilgrimage routes were felled for construction materials and fuelwood. Plastic and other non-biodegradable matter were discarded routinely in the forest, and insufficient sanitary facilities meant the forests were littered with human waste. For most of the impoverished people living near the pilgrimage routes, the increased traffic meant marginal improvement in living standards. Without money or influence, most of them had to settle for menial employment — working for the shopkeepers. Many were

engaged in illicit felling of trees, construction of makeshift hotels, shops and accommodation, and collecting fuelwood.

The challenges confronting Periyar are not confined to the pilgrimage. The successful promotion of tourism has resulted in an additional influx of tourists to the sanctuary. In 2001, more than 350 000 tourists visited the reserve. The crush of visitors has meant that facilities have regularly been overloaded. Business opportunities have attracted more people to the area, which has exacerbated pollution problems. At the same time, enhanced transportation infrastructure has facilitated access for poachers, smugglers, illicit grazers and other encroachers to the reserve. Smugglers and poachers continued to seek a range of products from the forest including the *vayana* bark sought by Naushad's band, highly prized sandalwood, teak, rosewood and elephants' tusks. Some people — including encroachers from adjoining Tamil Nadu State — have cultivated narcotic plants (e.g. *Cannabis sativa*) inside the Tiger Reserve.

The extent of these challenges led to a realization during the mid-1990s, that policing alone would not bring the situation under control. A handful of enthusiastic forest officers at the reserve — from the executive level to the supervisory level, and at policy- and decision making levels — realized that people's participation in management, decision making and in the day-to-day running of the park offered the only hope for solving the vexing problems facing Periyar Tiger Reserve.

The Eco-Development Project

In 1996, the Kerala Forest and Wildlife Department launched the India Eco-Development Project (EDP) for the Periyar Tiger Reserve with financial assistance from the World Bank and the Global Environment Facility (GEF). The important components of the EDP are village ecodevelopment programmes, improved protected area management, and environmental education and awareness campaigns. A fundamental basis of the project is the preparation of microplans for income generation and conservation measures for each of the villages fringing the reserve.

Efforts are being made to minimize biotic pressures resulting from grazing, fuelwood collection, non-timber forest product collection, fishing and fire, by providing alternative income generation activities and improving efficiency in the utilization of natural resources.

"Our vision is to minimize people-park conflict in every sense — for mutual benefits," explained Dr Veeramani Arunachalam, an ecologist with the Periyar Tiger Reserve. "The mutual benefits are biodiversity conservation, protection and maintenance of Periyar Tiger Reserve, and decent livelihoods for the people so they won't have to pursue illegal activities."

In implementing the programme, Periyar Tiger Reserve staff needed to redirect the people who were dependent on the reserve into sustainable and non-destructive livelihoods. This was not simple. In the vicinity of the Tiger Reserve, there was an immense diversity of people, based on ethnicity, profession, skills and ambitions. They included tribal groups engaged in the cultivation of pepper and other crops, migrants from other regions who had come to the area to work as labourers or petty merchants, graziers, poachers, smugglers and fuelwood collectors. The major factor that they had in common was that their livelihoods were at least partially dependent — lawfully or otherwise — on the Periyar Tiger Reserve.

Eco-Development Committees

After initial surveys and consultation, it was decided that the most viable approach would be to establish a number of Eco-Development Committees (EDCs), grouping together like-minded people to form each committee. Prolonged discussions were held with various groups to help in establishing EDCs based on locality, ethnicity, professional backgrounds and habits. Tribal groups on the fringes of the Tiger Reserve formed EDCs according to their ethnicity and culture, such as the Paliyakudy EDC and the Mannan EDC. Labourers engaged by merchants and traders along the pilgrimage route to Sabarimala Temple formed a number of *Swamy Ayyappan Poonkavanam Punaruddharana*[1] EDCs at different localities along the footpath to the temple.

Each committee was required to contribute to the protection and management of the Tiger Reserve. In return, they were given opportunities — essentially granted tourist or resource concessions — to earn legal livelihoods. To date, 72 committees have been established, with approximately 5 540 families participating — from an overall target population of 58 000 people living within a 2-kilometre radius of the Periyar Tiger Reserve.

The EDCs can be categorized into four functional groups depending on their mode of operation:

- *Neighbourhood EDCs* — families in a particular geographical or administrative area;
- *Professional EDCs* — organized along occupational lines;
- *User Group EDCs* — organized to utilize a particular physical resource; and
- *Pilgrim Management EDCs* — organized to provide a specific service to pilgrims.

[1] EDCs for rehabilitating the Holy Abode of the Lord.

Each EDC decides on a way of earning money, which is discussed, refined and approved by the Tiger Reserve authorities. All EDCs are required to follow general guidelines issued by the authorities, a fundamental component of which is the requirement to take an active part in protecting the reserve and conserving biodiversity.

In the preliminary phase — following the establishment of each EDC — Tiger Reserve staff conducted participatory resource assessment exercises with committee members. Microplans suitable for each EDC and its specific locality were drafted and approved. Reserve authorities and a special assistance committee helped EDC members to complete this phase.

Each EDC was eligible to receive working capital of approximately US$260 per family as a government contribution. The members of each committee were, however, also required to contribute 25 percent of the government allocation in either cash or in-kind contributions (e.g. labour or agricultural products). Each EDC had discretion as to how the government contribution was spent, provided expenditure conformed with microplan guidelines.

Some EDC members have been employed directly by the reserve authorities to provide specific conservation services. These employees are paid according to specified government rates. Approximately 10 percent of these employees' salaries are retained by the authorities and deposited in a revolving fund called the Community Development Fund (CDF). The fund is used mainly to create sustainable assets, provide loans to members and to meet unforeseen needs of the local community. It is envisaged that the CDF will be used as a means of continuing support beyond the conclusion of the India Eco-Development Project.

The decisions on the structure, formation and functioning of EDCs were crucial to the success of the initiative. Establishing EDCs on the basis of social, ethnic and occupational groups has given each EDC a strong degree of homogeneity that has helped to develop and nurture mutual cooperation and trust. Since members of any given EDC have largely similar socio-economic status, discussions and negotiations are equitable and disputes are resolved more easily. The reserve staff regularly arrange EDC awareness classes for students, government officers, people's representatives and the public, using real-life examples of dispute resolution.

Poachers become gamekeepers

In the meantime, what had happened to Naushad and his cohorts? Like most people living near the Tiger Reserve, they were aware of the new government project. "We heard about the Eco-Development Committees," said Naushad. "We discussed it among ourselves. Finally, we decided to join the government's programme. But our problem was how? Someone advised us to contact the Peermade Wildlife Society."

The Peermade Wildlife Society is a non-governmental organization, based in Kerala, which works with the Periyar Reserve primarily on tiger conservation. Peermade Society officials agreed to talk with government officials, provided the smugglers and poachers were committed to halting their illegal activities. As part of a negotiated agreement, the government agreed that outstanding poaching charges against them would be dropped. "We agreed, as forming an EDC was much better than living in fear, earning little and spending everything on court cases. Our EDC enables us to lead a normal life. In addition, we offer considerable help to the authorities to protect Periyar Tiger Reserve, since we know every corner of the forests," said Koshy Joseph, a former criminal who is now an elected member of the local *panchayat*.[2]

The group of former smugglers and poachers who had been caught peeling *vayana* bark formed their own collective — the Ex-Vayana Bark Collectors' EDC. They underwent intensive training in the basics of forest protection and management. Because they knew the Periyar Tiger Reserve so well, the group helped reserve staff to protect the forest and wildlife by forming patrol squads. These activities were carried out voluntarily — as their contribution to the conservation of the forests from which they earned their new livelihoods. The new EDC developed a series of tourism packages, including trekking, rafting on the lake and night camps in the jungle, which were refined by experienced Tiger Reserve management staff. The EDC members now take small groups of tourists on wildlife-spotting excursions; this is their principal business activity.

Seventy percent of the money the group earns from guiding tourists goes to the EDC Common Fund (from which members' salaries are drawn), while 10 percent is apportioned to a subsidiary Welfare Fund (used for giving loans to EDC members). The remaining 20 percent pays for operational expenditures, including food and camping equipment, reserve entry fees and business promotion costs. Each member of the group is paid a monthly salary of approximately US$75 from the Common Fund.

"Individuals are not allowed to receive payments directly," explained an official. "Payments are received by the committee and are remitted to the Common Fund. At the end of the month, each member is paid his base salary irrespective of the quantum earned through him."

As a tourist-dependent enterprise, the Ex-Varyana Bark Collectors' EDC tries to maximize its earnings during the peak tourist season. During the off-season, members draw their monthly salary from the surplus accumulated during the peak season. Today, most EDCs have accumulated hefty cash balances in their accounts.

[2] An administrative body of elected members for a group of villages.

Developing new ideas

Each EDC is expected to earn its own income. This requires members to work in an entrepreneurial fashion to develop new ideas to make money. Ideas are submitted to reserve officials for fine-tuning. "If a particular EDC is not profitable, its members are urged to come up with new profit-making ventures," the official explained. Some of the more innovative profit-making schemes have included manufacturing notebooks, umbrella-making and bamboo raft tours. The EDCs have also established contractual agreements with two commercial tour operators. A World Bank assessment of the project estimates that, to date, contributions to the Community Development Funds of all EDCs total almost US$600 000.

Live and let live

Today, the 85 former poachers and smugglers of the Ex-Varyana Bark Collectors' EDC are proud to contribute productively to a society that once despised them. "Now, I can influence others in the panchayat and organize environmentally friendly campaigns to help clean up plastic waste or expand sanitation works, not only in the sanctuary but in the whole panchayat. My ambition is to spread a message of 'live and let live' through the protection of forests and wildlife," said Koshy Joseph.

The EDC also undertakes welfare activities. For instance, it helps to pay school expenses for a student whose father — a warden in the reserve — died while on duty. Their laudable endeavours have earned the former poachers several prestigious awards. In 2002, they received the Green Guard Award (a national recognition of the best group engaged in biodiversity conservation) from Junglees, a non-governmental organization based in Kolkata. In the same year, the Kerala Forest and Wildlife Department awarded them an EDC Best Performance Award.

Reserve authorities took the initiative to organize more than 400 people from 25 local villages, who previously worked as casual labourers for shopkeepers on the pilgrimage route, into the *Swamy Ayyappan Poonkavanam Punaruddharana* (SAAP) EDCs. These EDCs are allowed to open shops during the festival season (but must dismantle them after the festival) under the strict supervision of reserve authorities. Materials used in construction of the shops are brought from outside the forest. Reserve staff oversee waste disposal and ensure quality and reasonable prices for food sold. Use of plastic packaging is not allowed, instead reserve staff supply alternative packing materials. A liquid petroleum gas outlet has been established to supply villagers with an alternative fuel source, thereby removing demand for fuelwood from nearby forests.

Tremendous results

The results of the Eco-Development Project have been tremendous. Not only have negative impacts been reduced considerably, but EDCs have been able to earn good incomes from new activities. Dumping of rubbish and littering, particularly of plastic waste, has been reduced substantially. "The effects are clearly noticeable in the excrement of wildlife, especially large herbivores," Veeramani observed.

Within a short time span, the forest has regenerated dramatically. "Every year, we save more than two million seedlings and saplings from destruction," noted Pramod Krishnan, Deputy Director of Periyar Tiger Reserve. In 1999, the Indian Government honoured the SAPP EDCs with the prestigious *Indira Priyadarshini Vrikshamitra Award*, one of the country's highest awards for environmental conservation.

Hilltribe families, who have been relocated by the government to the fringes surrounding Periyar Tiger Reserve, also have some success stories to tell. Members of this EDC are mostly illiterate. But after attending special coaching classes offered by reserve staff they can now speak English, according to Manikantan Churuli, who belongs to the Paliya tribe.

Haritha Sena (green army) women with a tracker-cum-guide EDC member on a field patrol (courtesy M. Govindan Kutty).

Indigenous tribal groups who were engaged in fishing and the collection of honey and fuelwood were organized to form an EDC called Tribal Trackers-cum-Guides. Initially, the EDC had 12 members, but this has expanded to 19, of whom 8 (including Manikantan) are employed directly by tour operators. They take small groups of tourists on three-hour sightseeing trips, either on foot or by riding a raft. Tour operators have an agreement with the EDC to pay guides a daily retainer. Other members of the Tribal Trackers EDC work as freelancers and take groups on their own into the sanctuary. Each guide receives US$70 per month from the EDC. As a sideline, the EDC rents out leech-proof socks to tourists and distributes colour brochures on Periyar Tiger Reserve. They have a telephone connection in their office and an extension in a reserve suboffice.

"The level of contribution to an EDC's Common Fund is decided by members themselves, and may vary slightly according to the capacity of the EDC to earn money," explained an official. "Since each functions as a totally independent unit, there should be no chance of disputes or dissatisfaction." Those who lag behind are, as stated earlier, free to initiate new fund-generating activities at any time.

Meanwhile, what will happen to the various EDCs when the World Bank funding expires in 2004? "We are not worried," assured Pramod Krishnan. "The EDCs are becoming self-sufficient. They can look after themselves."

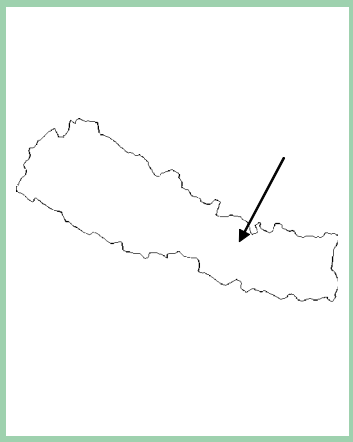
About the authors

M. Govindan Kutty and T.K. Raghavan Nair are retirees from the Indian Forest Service. Both have worked as Head of the Department of Forests in Kerala, India (as Principal Chief Conservators of Forests) in 1998 and 1997, respectively. They have postgraduate degrees in forestry from the Indian Forest College, Dehra Dun. Currently, they work as freelance consultants on forestry, wildlife and environmental issues, primarily with the Government of Kerala.

CHAUBAS–BHUMLU COMMUNITY SAWMILL: EMPOWERING LOCAL PEOPLE

Hukum B. Singh

Name of forest:	Chapani, Racchma, Dharapani and Fagar Khola Community Forests
Location:	Kabhre Palanchok District, Bagmati Zone
Area (hectares):	223
Managing entity:	Chapani, Rachhama, Dharapani and Fagar Khola FUGs
Mgt. objectives:	Sustainable timber production, poverty alleviation
Country:	Nepal



The Chaubas–Bhumlu community sawmill is the first sawmill in Nepal to be run directly by Forest User Groups (FUGs). The sawmill is managed by four community groups — the Chapani, Rachhama, Dharapani and Fagar Khola FUGs — and processes timber sourced almost exclusively from community forests.

"As a system that integrates both forest management and wood processing, the operation provides an excellent example of a viable community-based enterprise. While the main focus of the four Forest User Groups is on the commercial aspects of pine timber processing, they are also very serious about managing their forest plantations for a sustainable yield, especially because these are the main sources of timber for the sawmill," explained Guman Dhoj Kunwar, the former chairperson of the sawmill management committee.

The villages of Chaubas and Bhumlu are located in Kabhre Palanchok District, about 75 kilometres northeast of Kathmandu. These villages are a 4-hour walk, uphill from the Arniko Highway at Dolalghat, climbing some 800 metres from the Sun Kosi River to an altitude of 1 950 metres. In recent times, an 18-kilometre gravel road was constructed to link Chaubas with Dolalghat.

Field workers receive extensive training in sustainable low-impact timber harvesting practices (courtesy NACRMLP).

Prior to the construction of the "Chinese Road" to Kodari, which extended past Dolalghat in 1970, Chaubas and Bhumlu lay directly on the trekking path to Mt. Everest. At that time, trekkers passed through a region of overgrazed barren hills that were a stark testament to deforestation. Severe shortages of wood and landscape degradation motivated the government to launch the Kathmandu Valley Reafforestation Project in 1962. Today, thick pine forests cover the once barren slopes.

The history of the Chaubas–Bhumlu community sawmill dates from 1978, when the Government of Nepal adopted a strategy aimed at promoting the participation of local people in the regeneration, protection and management of forests.

"The District Forest Office was responsible for the protection and management of the forests," said Mr Prakash Pyakurel, a District Forest Officer. "Until 1978, we focused more on enforcing the law, rather than promoting the participation of local people in forest management."

New forest strategy

It took a long time for Forestry Department personnel to adjust to this radical change in the government's forestry strategy.

"The new strategy identified forestry as one of the principal sources and supports of livelihoods for impoverished rural communities," explained Pyakurel. "To effectively implement this new policy we had to make major adjustments to our modes of operation, learn how to facilitate people's involvement in forest management and how to ensure they assumed a role as key stakeholders in management and protection."

The new community forestry strategy initially emphasized people's participation only in the reforestation of degraded lands. Since the late 1980s,

however, the concept has broadened to embrace all aspects of forest management and rural development.

An important strand of the new policy was the establishment of FUGs to manage local forests. In essence, communities banded together to form FUGs, to which the government transferred control and management responsibilities for local forests. The FUGs were required to protect and manage the forest according to Forest Operational Plans, which also granted rights to use forest products as a means of livelihood. FUGs were allowed to sell forest products, raise funds and use the income generated for rural development and forest regeneration.

A second important development for the villagers of Chaubas and Bhumlu also commenced in 1978. The Department of Forests and local communities were brought together under the auspices of the Nepal–Australia Community Resource Management Project, which in 2002 became known as the Nepal–Australia Community Resource Management and Livelihoods Project (NACRMLP), to undertake a plantation afforestation programme in the hills of Kabhre Palanchok and surrounding districts. The principal species planted was *Pinus patula*, as it can tolerate drought and moisture stress.

In the mid-1980s the Chaubas and Bhumlu communities began forming four local FUGs, which in total comprised around 350 households. The process culminated in 1988 with the transfer of management responsibilities for the plantations. The plantation forest area currently managed by the FUGs totals 223 hectares. The FUGs are focusing on a broad range of forest management objectives, including protection, utilization and development. In the beginning, each of the FUGs worked with field staff from the Department of Forests to develop Forest Operational Plans that outline management prescriptions for the forests. Harvesting plans are regularly developed based on the prescriptions of the operational plans.

"We were successful in planting seedlings and nurturing them, to achieve the gradual establishment of large pine forests," recalled Mr Sher Thapa, a former FUG chairperson and, until recently, a member of the sawmill management committee. "As more trees grew, the forests became overstocked — thereby affecting the quality of the timber. With advice from the District Forest Office and from NACRMLP staff, we decided to look at options for better utilizing our forest resources, to maximize our income and to generate employment for the community."

Community sawmill

The FUGs commissioned a feasibility study to examine options for community-based projects that would meet their requirements and aspirations. The study identified the establishment of a sawmill as a viable community enterprise. After extensive discussion and negotiations, Chaubas–Bhumlu community sawmill was built in 1996, with financial support from the Australian Agency for International Development (AusAID).

The sawmill operates a 36-inch band-saw and has an estimated maximum practical capacity to process 1 060 cubic metres of roundwood *per annum*. However, the mill generally operates for only eight months per year and generally at below capacity. Currently, it is estimated to process approximately 425 cubic metres of roundwood each year, producing around 170 cubic metres of sawntimber. The sawmill owners are discussing the potential to purchase additional logs from another local FUG to enable greater capacity utilization at the mill.

"Even before the establishment of the sawmill, NACRMLP staff and divisional forest rangers conducted a number of meetings with FUG members to solicit ideas and get feedback on plans and proposals," indicated Gopi Pd. Poudyal, a forest specialist working for NACRMLP. These meetings resulted in the signing of detailed agreements between the government and the four FUGs relating to funding and purchase of the mill. The FUG members, with the help of the NACRMLP, worked out the initial establishment cost of the sawmill, and a plan for repayment of loans for equipment.

"To purchase the equipment, the NACRMLP loaned US$6 230 to the FUGs, which was to be repaid within three years of the sawmill being run at its full capacity," reported Poudyal. To date, almost two-thirds of the loan has been repaid.

The NACRMLP also provided capacity-building assistance for sawmill staff and FUG members via training to the factory manager, technicians and other stakeholders. The project also supplied information on, and facilitated linkages to, national and international timber markets.

To oversee the operations of the sawmill enterprise, the four FUGs established a management committee made up of representatives from each of the four groups. The sawmill management committee reports jointly to the Forest User Group Executive Committees which, in turn, each receive their mandate from their respective user group assembly for any major decision. The user groups receive all revenues from sawmill operations and pay the individual FUG members who work as labourers.

"The user groups are responsible for the management of the sawmill, while the forest guards and rangers of the Chaubas Range Post monitor the impacts of the sawmill on surrounding forests. We also provide whatever technical advice may be needed," said Hari Raj Kharel, a forest guard.

Until recently, the local District Forest Office was the only government institution that worked to monitor the activities of the sawmill and the FUGs. However, when the FUGs commenced the sale of timber in Kathmandu, they had to transport the timber through various police, army and forest department checkpoints. "It rapidly became apparent that the District Forest Office needed to intervene on behalf of the FUGs to enable them to get their timber to market with less difficulties. We wrote letters to the relevant offices and agencies to facilitate transportation of timber from the sawmill to Kathmandu," said Mr Pyakurel.

Marketing schemes

Since 1996, when it commenced operations, the Chaubas–Bhumlu Community Sawmill has purchased about 1 100 cubic metres of sawlogs from its FUG owners, paying a total purchase value of about US$26 000 to the FUGs.

FUG members utilize approximately 5 percent of the sawmill's output, while a further 15 percent of output is sold to the local market in Dolalghat, where sawntimber has recently sold for approximately US$100 per cubic metre. The remaining 80 percent of production is transported for sale in Kathmandu. The sawmill supplies sawntimber to the local community at a discounted rate (the mill charges a levy of approximately US$9 per cubic metre for sawing logs for use by FUG members).

The income from the sawmill is shared among the four FUGs, proportionate to the volume of logs supplied by each group. The sawmill agreement requires that the sawmill retains 20 percent of the income for maintenance requirements and other expenditures, and 80 percent is allocated to the FUGs. Each FUG uses the money initially for salary payments to members, with residual profits used for community development based on local needs. For example, the Chapani, Dharapani and Rachhama FUGs have invested substantial amounts of money in the construction of new school buildings and a playground at the school. They also pay the salary of the schoolteacher.

The four FUGs also undertake non-cash community activities including the provision of labour for local development activities. Such activities have included constructing school buildings, electricity-generating facilities, new roads, trails, drinking water systems and carrying out soil erosion work, nursery and plantation activities.

The prices charged for the various products extracted from the forest vary among the FUGs, but prices are invariably lower for sales to FUG members compared with non-members. For example, one FUG sells sawlogs to its members for approximately US$19 per cubic metre compared with the local market price of US$30 per cubic metre. Another FUG sells poles for US$5 to non-members, but only US$0.33 per pole to members. The price of fuelwood sold by FUGs varies from a minimum of US$0.03 per 40-kilogram load for members to a maximum price of US$0.93 per load at a local bazaar.

Employment opportunities

The establishment of the sawmill has had a major positive impact on local employment. Villagers are hired for a wide range of activities that support harvesting and processing including pre-harvest tree marking, logging, transporting logs, milling, timber stacking and loading.

"My four sons and I have been working in harvesting and loading logs and sawntimber since the sawmill's establishment," explained Yadav Pd. Pandey, an experienced forestry labourer on Chaubas Ridge. "This year, we earned 40 000 rupees[1] from harvesting and loading trees."

Since 1996, the four FUGs have paid wages and salaries totalling more than US$28 000. The sawmill provides employment to nearly 30 people. In cases where local people do not have the skills needed, people from other areas have been employed. For example, the present sawmill manager is a university-trained forester. Similarly, lower-caste men from an adjoining area are employed to physically carry logs across the Sun Kosi River at Dolalghat, where the bridge is no longer passable by vehicles.

Harvesting

The four FUGs take full responsibility for managing the forests including the development of harvesting plans. These harvesting plans are developed in accord with prescribed thinning regimes and planned rotations. "A thinning regime for harvesting is applied based on a rotation age of 40 years for *Pinus patula*," indicated Gopi Poudyel. "No harvesting is carried out on steep slopes, within 5-metre riparian strips on either side of streams, or within 10-metre buffer zones around water sources."

Future harvesting is to be carried out with great care. The forest is demarcated into specific compartments based on an approved operational plan. The trees in a specified compartment are measured and a sustainable quantity is marked for harvest during a pre-harvest inventory implemented by trained FUG members with the support of the range forester and forest guards. FUG members are hired as labourers to cut the marked trees. The harvested trees are measured and cut into logs, according to sawmill requirements, before being transported to the mill.

Harvesting during the rainy season is strictly prohibited. Also, harvesting of specified rare species is not permitted. Manual harvesting is generally carried out using 36-inch bow saws. A transport sulky — built by FUG members — is used for transporting sawlogs from the forest to the roadside. This is done to eliminate damage from skidding logs along the ground, as well as for ease of transport. Using the sulky, only two people are required to haul even large logs.

Various representations

The FUGs are comprised of ethnic groups including Tamang, Pahari and Chhetri. Each FUG has representatives of the main ethnic groups in its community on its executive committee. Representation is specifically designed to promote social

[1] Approximately US$534.

equity by ensuring avenues to voice concerns and for direct input into decision making.

Women are also represented on the FUG executive committees as well as on the sawmill management committee. There are 8 female members among the 21 members of the sawmill management committee and half the members of all FUG executive committees are women. Women's representation in decision making has increased over the past decade. In recent years, more women have attended and spoken at the FUG general assembly meeting, where in earlier years their attendance was negligible.

Women are also employed by the FUGs.

"I worked for 55 days this year," said Shova Bal, a female FUG member. "There were seven other women employed alongside me doing harvesting. I felled trees and carried logs. In fact, the latter job was supposed to be done by men only," she laughed. "We decided to get involved in such work just recently."

The 21 members of the sawmill management committee are made up of 4 members selected from each of the FUGs, the chairpersons of each of the 4 FUGs (non-voting members), and the sawmill manager is the non-voting Executive Secretary of the committee. Two female members from each of the four FUGs are members of the management committee. Committee decisions require a quorum of at least 50 percent of the members, including at least 2 members from each FUG.

Nonetheless, there have been problems in mobilizing members of the sawmill management committee.

"All members of the sawmill management committee now receive 50 rupees per meeting as an allowance for attending meetings and to partially cover the cost of their time," noted Sabita Gautam, a woman representing Dharapani FUG on the sawmill management committee.

The sawmill manager supports the sawmill management committee in ensuring the confidence and participation of the general FUG membership.

"To ensure broad participation, I visit FUG members in each hamlet to discuss the problems faced by the members and how these problems can be solved," said the sawmill manager.

Leaders and leadership

In last year's FUG Assemblies all four FUGs made consensus decisions to change their leadership (representation on the FUG executive committees).

"The sawmill management committee also changed its membership and to support this transformation, I volunteered to assist the new committee as an adviser," explained Mr Sher Thapa.

The changes in leadership provided unique opportunities for members of the FUGs to become new leaders. Normally, the hierarchical structure of Nepalese society — through feudal, autocratic and caste structures — is maintained and reinforced in local organizations. Generally, feudal and autocratic leaders are obeyed without question and differences in opinion are often equated with defiance of the status quo. However, in the four FUGs there are clear indications that the members are becoming more attuned to democratic decision making, by involving themselves in assemblies and meetings and voicing their opinions. There is still some distance to go in overcoming traditional reticence, however, and many subordinate caste members are more comfortable expressing opinions at informal gatherings rather than formally to the leaders. Even though many people may not aspire to assume leadership positions immediately, they have shown interest in exploring alternatives such as working as aides to executive committee members in meetings and in visits to the District Forest Office.

Conclusion

The types of community-based enterprises represented by Chaubas–Bhumlu Sawmill require both backward (sustainable supply of raw materials) and forward (especially marketing) linkages to be successful. A focus on existing products and markets can be successful, provided adequate attention is paid to research and planning.

In recent years, Nepal has embarked upon an ambitious decentralization programme and the government has expressed its willingness to provide greater responsibilities and opportunities to communities in managing forests and other natural resources. The Chaubas–Bhumlu sawmill serves as a useful pilot model that could be extended to other communities in Nepal that have developed similar forest management systems. With ongoing government recognition and continuing support from non-governmental organizations, research organizations and donors, community forest management has the potential to allow Nepal's forest-dependent peoples to make an invaluable contribution to the country's forestry sector.

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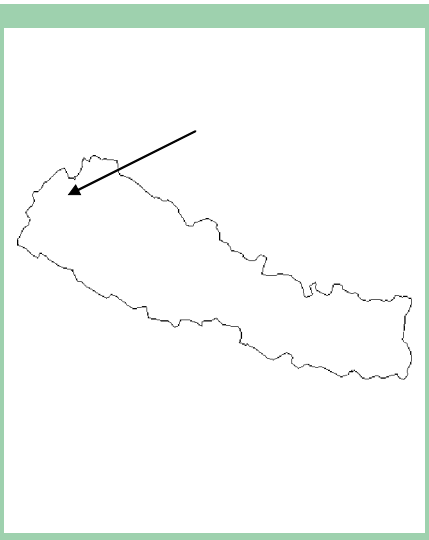
Hukum B. Singh spent 20 years working with the Nepal–Australia Community Forestry Project. He has held various senior management positions in the project relating to project coordination and training and extension. He has also been involved in the preparation of training and extension materials, including videotapes, field guides and training source books. He is one of the founding members of the Nepal Participatory Action Network (NEPAN) and a founding adviser of the Federation of Forest Users in Nepal (FECOFUN) and of the Himalayan Women's Grassroots Organisations (HIMAWANTI), Nepal.

Chaubas–Bhumlu community sawmill (courtesy NACRMLP).

SHREE BINAYAK PIMIDANDA COMMUNITY FOREST: MORE THAN A PAPER TIGER

Hukum B. Singh

Name of forest:	Binayak Pimidanda Community Forest
Location:	Bajhang District, Seti Zone
Area (hectares):	912
Managing entity:	Shree Binayak Pimidanda Forest User Group
Mgt. objectives:	Non-timber forest products, poverty alleviation
Country:	Nepal



Few would imagine that the path to good forest management could be paved with small sheets of plain hand-made paper. But this is exactly the case for a vibrant community forest in the far reaches of western Nepal.

"The Shree Binayak Pimidanda Community Forest in Bajhang is unquestionably one of the best managed forests in the country," commented Rama Kanta Yadav, a ranger with the District Forest Office. "It has become an excellent example of how a forest should be managed, largely as a result of the establishment of a paper factory. The members of the local Forest User Groups are very serious about sustainable forest management, as well as managing the commercial assets of the forest. With minimal support from outsiders, the community has dispelled the common belief that industries in the high mountains cannot operate profitably."

It is unlikely that first-time visitors to the factory premises of Malika Handmade Paper Industry, which the villagers refer to simply as "the Company," could imagine that a viable industry could be established in such a remote area. Nor could they expect that such an enterprise could substantially raise the standard

of living for the inhabitants of the isolated village. But such is reality. Even more impressive is the fact that the villagers have established the paper industry themselves.

The Company is located in Kailash Village, high in the mountains of the Far Western Development Region of Nepal. The surrounding forest of Shree Binayak Pimidanda, from which the Company draws its raw materials, covers an area of 912 hectares.

Shree Binayak Pimidanda Forest has more than a dozen different tree species. Non-timber woody species include the commercially important lokta (*Daphne* spp.). The mountain forest, which extends to an elevation of 3 660 metres, also provides habitat for various wildlife including the endangered musk deer and birds such as pheasants.

Kailash Village is located about 20 kilometres southwest of Chainpur, the principal town in Bajhang District. Forests surround the village on all sides. The major sources of income for the community include farming, animal husbandry, collecting non-timber forest products and seasonal manual labour.

"Although it can be reached from Chainpur in only three hours of walking, Kailash Village is one of the least developed communities in the district," noted Ms Ram Kumari Singh, a Kailash resident and an official of the Federation of Community Forest Users in Nepal (FECOFUN).

Deforestation in the community forest remains an important challenge, with the principal threats being illegal timber felling, shifting cultivation and encroachment.

"Shifting cultivation and open grazing are major problems in the forest and these are still creating conflicts and problems among forest users," said Govinda Kami, a Dalit caste representative of the Forest User Group Committee and a staff-member of the Social Development Centre — an NGO partner in the Asia Network for Sustainable Agriculture and Bio-resources (ANSAB).

Community forestry

In 1978, His Majesty's Government of Nepal adopted a new strategy aimed at promoting the participation of local people in the regeneration, protection and management of forests. This new "community forestry" strategy initially emphasized people's involvement in reforesting degraded lands. By the late 1980s, however, community forestry had embraced broader participatory forest management approaches and rural development issues. Nepal's forest policy envisaged handing over control of forests to groups of local residents with recognized rights to use the forests. Village people who agreed to use and manage community forests to support their farms and households were organized into Forest User Groups (FUGs).

Unsurprisingly, forest policies and laws formulated in distant Kathmandu need time to take effect in remote areas.

"The people of Bajhang District took interest in the idea of Forestry User Groups only after the World Bank supported a community forestry project in the area," commented Arun Poudyal, a Forestry Officer with the Ministry of Forests and Soil Conservation.

In 1994, the rights to Shree Binayak Pimidanda National Forest were transferred to a local FUG, to be managed as a community forest under an approved operational plan and FUG constitution. At the same time, the government requested that ANSAB conduct a feasibility study to determine prospects for viable income generation. The study was supported financially by the Ford Foundation and conducted in collaboration with staff from the District Forest Office of Bajhang.

"The area is very remote and poor in terms of infrastructure development and the economic conditions for the people living there," explained Bhishma Subedi, Executive Director of ANSAB. "However, it is very rich in natural resources. Non-timber forest products are important resources in the district and can play crucial roles in economic development. Bajhang has several important non-timber forest products — in fact, 11 different species — but very few enterprises utilize these at the local level to generate income for the poorest people of the district."

Paper-making vat and drying hand-made paper, Bajhang (courtesy ANSAB).

"The area around Kailash Village is endowed with abundant *lokta* resources," Bhishma elaborated. "This is a preferred raw material for hand-made paper.

"If the forest is properly managed, it can supply more than 20 000 kilograms of dry *lokta* bark per year on a regular and sustainable basis," added Sushil Gyawali, Assistant Project Monitoring Officer at the ANSAB office in Kathmandu.

After a thorough study — with the full participation of the local people — it was decided that prospects were sufficiently promising to embark on the establishment of a paper-making enterprise. ANSAB, with funding support from the Ford Foundation, has played an important role in the establishment of the paper factory, initially lending technical, financial and administrative support.

"Prior to the establishment of the community forest, local people used to cut *lokta* randomly. The raw material was sold to businessmen and contractors from elsewhere," recalled Surat B. Singh, chairperson of the Management Committee of Malika Handmade Paper Industry. "Without proper management, the *lokta* resource was dwindling fast. Many businessmen were making profits, but the locals were still poor."

Malika Handmade Paper Industry factory in Kailash Village (courtesy ANSAB).

Today, the Malika Handmade Paper Industry in Kailash Village is one of the best-managed community enterprises in the country. A report by Dyuthan Choudhari, of the International Centre for Integrated Mountain Development stated that: "The model is designed around forestry resources based on the FUG's common property, which provides sustainable income to local communities who have full rights over the resource."

Daily activities

The forest is managed by the Shree Binayak Pimidanda Forest User Group, which includes members from six hamlets. There are 242 households in the area, with a total population of 1 368 people. The FUG has a 15-member executive committee comprising 12 men and 3 women.

All the residents of Kailash Village were involved extensively in the FUG from its inception, with the community being fully engaged in formulating its constitution and forest operational plan. While the elected executive committee manages the day-to-day activities of the forest, the full involvement of all FUG members is crucial.

The FUG is linked intricately with the management of Malika Handmade Paper Industry, which was established in 1998. Bijaya Sumar Singh, who had to undergo a rigorous recruitment process before being hired as the company's current manager, explained: "I have to prepare progress reports and detailed bank statements, account balances, workplans and budgets to present to each monthly meeting of the Forest User Group Executive Committee. The manager, one technician, four workers and one guard run the company on a daily basis. During times of urgency, I can make decisions — even outside my normal authority — by getting verbal approval from the committee chairperson. But, I

still have to get subsequent endorsement from the monthly meeting of the FUG executive committee and normally all decisions are reviewed by the committee."

A factory management committee organizes regular meetings every three months. "This committee provides us with reports that cover the detailed financial status and factory management strategies," reported Chandi Amgai of ANSAB. Chandi's main role is to facilitate support for community forestry in Bajhang and he spends most of his time planning and supporting his partner organizations.

FUG members are free to visit the factory at any time. If members observe anything needing correction, or have suggestions for improvements, they are encouraged to send comments or recommendations in writing to the manager or to report to him verbally. "I am responsible for providing answers. If there are sensitive comments, I have to raise them with the factory management committee for further action," Bijaya observed.

"If we are not happy with any action the factory management committee has taken, we can ask the committee for clarification," added Govinda, a Dalit FUG member.

When this happens, Bijaya requests the chairperson of the factory management committee to organize a meeting — within seven days — to respond with written clarification to the Forest User Group Executive Committee. Once the clarification is issued, an urgent meeting is called. If the concerned parties are still not satisfied, they can "take action against the factory management committee." If such a conflict develops, a full assembly of the FUG is called upon to decide the case.

Forest management

Forest Ranger Rama Kanta Yadav is very positive about how the FUG is managing the forest. "Their methods have been extremely effective in providing a continuous supply of raw materials for paper-making as well as conserving *lokta* in its natural habitat," he said. Emphasis is also given to the sustainable management of high-value species such as medicinal plants.

"We have our own nursery for raising seedlings of preferred species such as *lokta*," Ganga B. Singh, the secretary of the factory management committee, explained. "We develop forest management and operational plans and harvesting norms, which are mandatory for harvesting of *lokta*. Accordingly, harvesting is restricted to stems that are at least 3 centimetres in diameter at a height of 10 feet above the ground."

The FUG members presently collect about 2 000 kilograms of *lokta* bark from the forest each year and sell it to the factory. The prices received for *lokta* bark are based on the quality. The premium quality bark — mature and high quality — earns approximately US$0.32/kilogram for the collector.

"The FUG has developed a systematic harvesting regime for *lokta* by dividing the forest into blocks and harvesting each block on a seven-year rotation," Ganga observed. "This permits the *lokta* shrubs in the harvested blocks to grow to maturity before the next harvest."

"By adopting this harvesting cycle and following the harvesting norms we are assured a sustainable supply of *lokta* and sound conservation is ensured. Integrated thinning, pruning and selective felling are carried out with technical assistance from the District Forest Office and ANSAB," Sushil said.

People who violate the harvesting norms are warned on their first offence, but fined if they persist. Fines escalate as the number of violations by an offender increases, so that the fine for a third offence is approximately US$20.

Major decisions

The FUG assembly, which convenes every six months, does all of the planning and makes all the major decisions related to forest and enterprise management. "All FUG members (one representative from each household) from the six hamlets attend the FUG assembly," noted Ram Kumari Singh, adding that most decisions are made by consensus. Actual voting is only exercised if consensus cannot be reached and for purposes of electing a new executive committee.

During the FUG assembly, major decisions are made in a forum. "If a decision made by the FUG assembly is not consistent with the approved operational plan and constitution, then the committee has to seek approval from the District Forest Officer. But if the decisions are within the approved operational plan and constitution, there is no need to go to the District Forest Office," Govinda explained.

Marketing strategies

The company does not sell its products randomly. "The paper we produce is sold mainly to Himalayan Biotrade, a national non-profit marketing organization based in Kathmandu. Himalayan Biotrade buys lokta at favourable prices," said Bijaya Kumar Singh, the current manager of the company.

"In the initial years after the factory was established," recalled Chandi of ANSAB, "we entered into a one-year agreement with the Bhaktapur Craft Printer Company. However, the FUG believed it was receiving very low prices for the paper produced by the factory. FUG members suspected that Bhaktapur was earning a disproportionate share of the profits. To increase their share of the profits, Malika Handmade Paper Industry and other community-based enterprises joined together to establish Himalayan Biotrade as an alternative marketing enterprise. ANSAB provided facilitation support to help get Himalayan Biotrade established."

There is a huge market for hand-made paper in western countries. To add value, traditional decorative printings are added to hand-made paper before it is exported. Official statistics indicate that hand-made paper, valued at more than US$1 million, was exported from Nepal in 1998. The main importing countries included France, Germany, the United Kingdom, the United States of America, Japan, Korea, Belgium, Denmark and Switzerland.

The District Forest Office closely monitored the Shree Binayak Pimidanda Community Forest and the paper company during the initial phases. Today, however, the main role for the District Forest Office is to provide technical advice and to monitor the transportation of the raw materials and products.

"These are now the key tasks because the FUGs have become the overall managers of the forest and are able to do their jobs properly," indicated Rama Kanta Yadav, the Forest Ranger.

To transport forest products to market, there is a need to pass through various administrative and security checkpoints before reaching Kathmandu or Nepalganja, the major markets of Nepal. At the request of the FUG Committee, the District Forest Office grants permits for transportation of legitimately harvested and processed forest products outside the district.

"ANSAB now operates only as a facilitator in supporting community forestry in Bajhang," noted Chandi. "I spend most of my time in the field, planning and supporting our partner organizations — the District Forest Office and the Social Development Centre — to develop their capacities to support enterprise staff, FUG members and other stakeholders through the provision of training and field-level support."

ANSAB also provides information and helps develop linkages with national and international markets. "We accomplish these objectives by providing relevant publications and funding study tours as needed," observed Sushil, a staff member at the Social Development Centre.

Employment opportunities

Women have found employment in the paper company, as well as men.

"In the beginning, some men did not like the idea of women working outside the house," recalled Ms Ram Kumari Singh. "Initially, traditional attitudes towards women prevailed. But this pioneering User Group is now encouraging women to work in the industry."

"After the Company opened, several of us were able to get jobs in the factory, while other women worked to collect supplies of *lokta* from the forest. The company provides an important source of livelihood for us," said Santi Devi Singh, a FUG member and one of the many female workers at Malika Handmade Paper Industry.

Janak Singh, a male co-worker at the factory, offered another perspective: "I've been working here since the factory opened. Like many others, I used to go to India for work in order to feed my family. But now, I'm working in my own village. I can save money and also look after my household affairs. I also have money that I can lend to help others."

Several young people also earn money by collecting and selling *lokta* to the factory. Bikram Khadka, a grade 7 student, explained: "I have a grandmother, one sister and one brother in India. I lost my parents when I was still very young. My brother used to pay to send me to school, but now I am earning money myself by selling *lokta*." Bikram is able to collect 50 kilograms of lokta from about 10 days of work for which he is paid approximately US$16. He uses this money to pay for his tuition, and for buying rice, clothes and other needs.

Share distribution

Local people have also benefited from the distribution of shares linked to the management of the forest and the factory. Each share is valued at US$1.33. A total of 5 000 shares were allocated to the members of the FUG and 5 000 shares were awarded to ANSAB. The shares allocated to the FUG were divided among members according to their contributions in the establishment of the factory — in terms of labour, the value of the land on which it is built and the timber provided for its construction. Recently, some FUG members purchased 600 of the shares held by ANSAB, and it is planned that eventually FUG members will buy the entire ANSAB holding. At the same time ANSAB's role in the enterprise is becoming less "hands on" and increasingly based around the facilitation of outcomes.

In the meantime, the shares yield an annual dividend (in 2003 the dividend was NRs10[1] per share).

Monitoring

Monitoring of FUG activities and of the paper-making enterprise is conducted at three levels:

- FUG monitoring is based primarily on the requirements for community forest management. Regular FUG committee meetings and assemblies provide a forum for FUG members and staff from supporting agencies to identify issues and provide options for improving FUG-level activities.
- Monitoring is also conducted collaboratively by various other stakeholders. For example, the FUG itself collaborates with the District Forest Office,

[1] Approximately US$0.13

the paper company and the Federation of Community Forest Users in Nepal and sometimes with interested organizations outside the project area.

- In addition, project-level monitoring is conducted by ANSAB and supporting donor organizations, which collect and analyse information at the project level. This process is aimed at maximizing project impacts in terms of conservation and sustainable use.

Conclusion

"The Malika Handmade Paper Industry is one of the first people-oriented forest enterprises in Nepal that is dependent on raw material from a locally managed forest — the Shree Binayak Pimidanda Community Forest. The Kailash Village community manages the paper factory and the forest in a highly sustainable manner, for the benefit of its inhabitants. Notably, this enterprise is the first instance in Nepal, in which local people have been allowed to harvest *lokta* in state forests, and where management responsibilities have also been entirely and effectively devolved to the local community," beamed Executive Director Bhishma with pride. "The people of Kailash are confident that with minimal support from outsiders, they can now sustain their industry and their livelihoods by sustainably managing the forest," he concluded.

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About the author

Hukum B. Singh has spent 20 years working with the Nepal–Australia Community Forestry Project. He has held various senior management positions in the project relating to project coordination, training and extension. He has also been involved in the preparation of training and extension materials, including videotapes, field guides and training source books. He is one of the founding members of the Nepal Participatory Action Network (NEPAN) and a founding

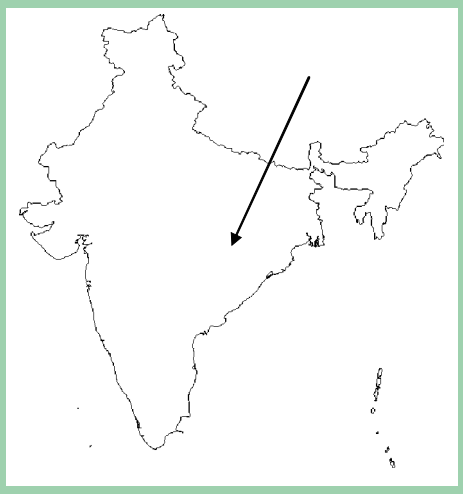
adviser of the Federation of Forest Users in Nepal (FECOFUN) and of the Himalayan Women's Grassroots Organisations (HIMAWANTI), Nepal.

Drying lokta, Bajhang (courtesy ANSAB).

BEYOND JOINT FOREST MANAGEMENT: DUGLI–JAWARRA PEOPLE'S PROTECTED AREA

Biswa Ranjan Phukan

Name of forest:	Dugli–Jawarra Sal Forests
Location:	Chhattisgarh State
Area (hectares):	27 457
Managing entity:	State government of Chhattisgarh and local communities (JFM)
Mgt. objectives:	Multiple use, sustainable livelihoods
Country:	India



How can impoverished people's attitudes toward conservation be changed, so that instead of perceiving conservation as a threat to their livelihoods, it becomes an integral part of their daily lives? This was the challenge confronting the Indian state of Chhattisgarh, where constant overcutting by local people seeking building materials, fuelwood and other forest products, had heavily degraded once rich forests.

Dugli–Jawarra sal forests, located about 80 kilometres from Raipur, the state capital of Chhattisgarh, were a typical example of the problem. The rich sal (*Shorea robusta*) forests, covering about 27 457 hectares, had been severely degraded by excessive exploitation by poor people eking out subsistence livelihoods in the vicinity of the forests. Dugli–Juwarra provides a compelling example of how community-based forest management, that empowers people to actively manage their local forest resources, can establish stable symbiotic systems that enable both forests and communities to thrive.

Background

Tropical moist and dry deciduous forests occupy 44 percent (135 224 km^2) of the area of Chhattisgarh. Sal and teak (*Tectona grandis*) are the most commercially important tree species growing in these forests. Chhattisgarh is predominately populated by tribal groups and most of these — in common with their landless non-tribal counterparts — are poor and depend on the state-owned forest resources for their livelihoods.

In 1991, the state government (at that time the Madhya Pradesh state government) launched the Joint Forest Management (JFM) programme to devolve responsibilities for protection and management of government forests to the residents of adjoining villages. Local committees were created and allocated rights to utilize wood and non-timber forest products deriving from the forest areas they were protecting. Currently, 6 881 JFM committees manage approximately 48 percent of the state's total forest area.

In 2001, the Chhattisgarh Government moved one step further than conventional JFM, introducing People's Protected Areas (PPAs), a concept based on the philosophy of achieving sustainable livelihoods through biodiversity conservation. The PPA approach goes beyond a narrow forest management perspective to give greater emphasis to holistic ecosystem management under the facilitation of the state forest department. The state identified 32 biodiversity-rich areas, extending over 500 000 hectares and covering 300 villages, to participate in the initial phase of the PPA programme. The Dugli–Jawarra sal forests were among the areas selected for priority attention. Its boundaries encompass 11 villages that are mainly populated by tribal groups, particularly the Kumars, Gonds and Halbas. The predominant forest types are moist peninsular low-level sal, dry peninsular sal and Terminalia tomentosa forest.

The main thrust of the Dugli–Jawarra People's Protected Area saw villagers and the forest department working together to adopt management strategies based on local community participation and empowerment, including:

- income generation opportunities through skill development;
- awareness campaigns;
- lectures on biodiversity conservation;
- promotion of non-destructive harvesting;
- equitable sharing of benefits from the managed forests; and
- engagement in various village development activities.

The successful implementation of a concerted programme of initiatives has resulted in recognition of the Dugli–Jawarra sal forests as a "proactive people-friendly" example of forest management. Dugli–Jawarra is one of eight project sites of the Indian Institute of Forest Management and the International Tropical Timber Organization project "Operational Strategy for Sustainable Forestry

Development with Community Participation," which is developing criteria and indicators for sustainable forest management. Mr. P.C. Kotwal, the project coordinator remarked, "I have observed positive changes among people's attitudes towards sharing responsibility for forest management. Improved natural regeneration can be seen in many forest stands, while major progress has also been made in controlling forest fires, and reducing illegal activities in forests. Major improvement is also evident in the development of village resources."

Problems in the past

The crucial underlying cause of the denudation and forest degradation observed in the Dugli–Jawarra sal forests area was overlapping or unclear ownership rights. The forest areas are owned by the state, and villagers living in and around the forests are legally entitled to harvest only non-timber forest products. However, as local populations surged, the demand for livelihood needs also increased, leading to illegal logging and consequent overharvesting of timber, as well as excessive exploitation of non-timber forest products. Villagers also cut live trees for fuelwood rather than limiting fuelwood collection to dead material, thereby hindering regeneration in the forests.

Other destructive practices included overgrazing and accidental, or sometimes intentional, forest fires. Additionally, because villagers had no ownership rights and therefore little incentive to involve themselves in any dispute, they paid little attention to unauthorized felling of trees. Some villagers even cooperated with the illegal loggers to earn extra cash.

Policy shift

In most parts of India, forestry was facing similar challenges. The government tried a variety of initiatives to curtail deforestation, but most programmes failed. During the 1980s, evidence of success through participatory approaches to forest management was brought to the government's attention. There was increasing realization that forests could only be protected if local people are actively involved in their management. In 1990, many state governments passed resolutions on JFM consistent with the recommendations of the National Forest Policy of 1988. The central government directed state governments to enable local people to participate in the protection and conservation of forests and to establish local-level forest protection committees.

Following such direction, the state government (then Madhya Pradesh) initiated a JFM programme in 1991, facilitating the formation of JFM committees for the protection and management of forests adjacent to rural villages. The villages around the Dugli–Jawarra sal forest constituted JFM committees in 1995 and 1996.

In successive years, the state government observed that there was scope for improving livelihoods in the Dugli–Jawarra communities by intensified conservation of biological diversity and improved ecosystem management. To implement these activities, the state government established PPAs, in consonance with the IUCN Category VI management category, identifying and delineating sites of predominantly unmodified natural ecosystems. These areas thus encompass several forests where JFM had been implemented previously. The National Forest Policy of 1988 and the State (Chhattisgarh) Forest Policy of 2001 provide the basic policy framework for PPA implementation.

In the Dugli–Jawarra People's Protected Area, the most prominent stakeholders are the Chhattisgarh Forest Department, forest-dependent communities and villages, sawmillers, timber and non-timber forest product traders, pharmaceutical industries and other local communities. Each of these stakeholders has different objectives, motivations and strategies. However, the stakeholder groups appear to work together coherently. For example, the State Forest Department is mandated to conserve forest resources and generate revenue. The department carries out its mandate by implementing silvicultural operations including felling, thinning and reforestation, in line with working plan prescriptions. On the other hand, forest-dependent people collect or harvest non-timber forest products and small timber as a major source of income and livelihoods. These two groups share management responsibilities for the Dugli–Jawarra forests and also share in the distribution of financial benefits.

"We talk with the villagers to identify their needs. Based on these needs, we work with the villagers to prepare programmes that enable both parties to meet their goals. In addition, we provide the villagers with financial and technical assistance," said N.P. Biskia, Sub-Divisional Forest Officer. He also acknowledged the roles played by villagers in taking care of the forests — protecting against illegal cutting, overharvesting and forest fires, among others. All mechanical thinning, and material from the cleaning of rehabilitated areas, is awarded to villagers. In addition, villagers receive 15 percent of the total value of the harvested timber and bamboo (30 percent in case of Village Forest Committees) as compensation for their management efforts.

People's institutions

In the JFM hierarchy, Forest Protection Committees (FPCs) and Village Forest Committees (VFCs) are prominent among people's institutions. Both are constituted under the facilitation of the State Forest Department. An FPC is formed in villages within a 5-kilometre radius of a specific forest area, if it has forest cover greater than 40 percent. A VFC is launched among villages where the forest cover is less than 40 percent. The 11 committees working in the Dugli–Jawarra PPA were formed between 1995 and 1996.

The procedures for constituting FPCs and VFCs are the same throughout Chhattisgarh. Each requires a meeting attended by at least 50 percent of the people from the village, who have voting rights in the *Gramsabha* — the village-level electoral body of people under the Madhya Pradesh *Panchayat Raj Adhiniyam* — to unanimously pass a resolution to constitute a committee. The Territorial Divisional Forest Officer registers the committee. On registration, the new FPC or VFC is formally recognized.

Any villager who is eligible to vote may become a member of the general committee of the FPC or VFC. It is mandatory that a woman occupy the post of either president or vice-president of the committee. A confederation of committee presidents is established at the forest division level. An Executive Committee of the FPC/VFC comprising between 11 and 21 members is elected from the general committee members to provide leadership to the general committee. The president of the general committee acts as *ex-officio* president of the executive committee. There are legal provisions to have adequate representation of women, scheduled tribals (any tribe or tribal community defined under Article 342 of the Indian Constitution), scheduled castes (under Article 341 of the Constitution) and other identifiable minorities in accordance with the village population ratio. The forest guard or area forester is appointed as *ex-officio* secretary of the executive committee.

The decision-making process for FPCs and VFCs is highly democratic. Every member has equal opportunity to express his or her opinion. The final decision is made by majority decision. A committee secretary records the proceedings of each meeting. The presence of 50 percent of the members of the executive committee and 30 percent of the general committee are required to reach a quorum.

In the Dugli–Juwarra case, a coordinating committee at the PPA level coordinates the various initiatives developed by the 11 FPCs and VFC. The presidents of all the FPCs and VFCs constitute the membership of the coordinating committee.

Forest Protection Committees and Village Forest Committees

The FPC (or VFC) prepares a micro plan and annual action plan in collaboration with the forest department. These plans include both forest management and village resource development aspects. Generally, the micro plan focuses on community and beneficiary aspirations. The activities in the micro plan are site-specific and include the development of village infrastructure, forest protection and various income generating activities. The committees ensure that committee members volunteer *Shramdan* (rendering free physical labour) in the forest, while also drafting the micro plan and maintaining the committee's accounting records.

Each family that belongs to a committee receives an annual *nistar* (an allowance of non-traditional forest products, including small timber and bamboo). The

members of committees also receive a share of any forest products obtained through thinning and other silvicultural operations. Members of the FPCs divide a 15 percent share of commercial timber and bamboo harvested from the forests they manage, while members of the VFCs divide a 30 percent allocation.

Forest management

One of the main activities of the Dugli–Jawarra PPA programme was to identify and manage medicinal plants in the area. In the initial stage, the forest department — with the help of knowledgeable local people such as *Vaidya* (herbal medicine practitioners) — prepared a list of medicinal plants found in the forest. Members of the committees, aided by experts, expanded the lists to identify the medicinal properties and economic importance of each species. In a second phase, local communities implemented a comprehensive participatory mapping and resource assessment methodology to assess the availability of each medicinal species, as well as its density, regeneration properties and sustainable yield.

"It was only after I joined in the process of medicinal plant identification that I learned the medical properties and economic value of each species," said Sukhram Natam, a neo-literate youth of the Gond tribe. "We had very limited knowledge about forest plants before the project. Some of our people harvest these plants, but since they have little knowledge about the true value of the plants, they trade these to middlemen or contractors at a very low price."

Prior to the project, forest fires regularly destroyed large tracts of forest and the plant resources found therein. Under the PPA, the committees are responsible for controlling forest fires. A primary means of improving forest fire control is the development of an early warning system and effective fire brigades. A number of unemployed youths have been hired as forest watchers and fire fighters. These youths patrol the forest areas as a group. When they detect a fire, they extinguish it or, if it is beyond their control, alert the villagers and forest department to join in fighting the fire. "Involving the community in controlling forest fires is more effective than previously, when it was the sole the responsibility of the forest department," observed Sardar Bhaire, a Forest Range Officer.

Conservation measures

In situ and *ex situ* conservation measures at the Dugli–Jawarra PPA have been practised since 2001. *In situ* conservation refers to on-site conservation, including propagation of planting materials that are locally available in natural forests, to protect these species from extinction. Other forestry operations include soil and water conservation schemes such as gully plugging (various combinations of biological and engineering structures to control gully erosion), removal of unwanted weeds, and tending of medicinal plants. To date, almost 2 000 hectares have been brought "under *in situ* conservation" and a further 1 000 hectares are

considered to be "under progress towards *in situ* conservation." In 2001, the net income from sales of non-timber forest products taken from *in situ* conservation sites was US$3 760, and this expanded rapidly to US$7 825 in 2002. To ensure protection of the *in situ* conservation areas, the forest department provides funds (approximately US$175/hectare/year) to the committees to assist in implementing protective measures such as those described above.

There are also 10 hectares in the Dugli–Jawarra forests that are allotted for *ex situ* conservation. As part of this effort, valuable medicinal plants such as ashwagandha (*Withania somnifera*), baibidang (*Emblica ribes*), lemongrass (*Cymbopogon citrates*), isabgol (*Platago ovata*), bach (*Acorus calamus*), keokand (*Costus speciosus*) and kalmegh (*Andrographis paniculata*), among others, have been planted in nurseries in Jawarra Village.

Sustainable livelihood options and initiatives

To reduce the dependence of villagers on forest resources, a number of new initiatives to develop sustainable livelihood options have been launched. In Jawarra Village, an irrigation facility has been established that provides water for 50 hectares in the *rabi* season (November to February) and 86 hectares in the *kharif* season (July to October). For Dugli Village, five diesel pumps have been installed at the nearby Kajal River for irrigation and 17 tubewells have been installed for lift irrigation in the village of Devgaon. These new irrigation facilities have enabled a shift in cropping patterns in these villages. In the past, villagers practised monocropping because rainfall was the crucial constraining factor. With the availability of irrigation facilities, the villagers are now planting paddy, wheat, pulses and vegetables.

The PPA project has likewise built and renovated water tanks (reservoirs) in the villages of Dinkarpur and Munaikera to store water for livestock and watering of crops. Potable drinking water facilities for villagers have also been established. In other villages, farmers have been assisted in establishing Gobar biogas plants. Improved *chullahs* (wood and biomass cooking stoves) for efficient utilization of energy have also been introduced.

In Jawarra Village, the Temple of Lord Hanumana (a Hindu deity) has been renovated. This has now become a place for social gatherings and a meeting place for villagers. The PPA management has also initiated an adult literacy programme for its villagers.

The forest department has established a training centre at Dugli, aimed at enhancing villagers' capacities for managing the resources of the Dugli–Jawarra forest. To date, the forest department has collaborated with partner institutions in conducting 24 training courses on such topics as forest management, techniques for cultivating medicinal plants, non-destructive harvesting of non-timber forest products, value-added processing, extracting salai (*Boswellia serrata*) gum,

marketing, managing self-help groups, beekeeping, health care, milk production, fishery management and forest protection.

Through their own initiatives and contributions, local communities have established a *Ram Kothi* (grain bank) in each village. The grain bank is maintained for two purposes: to provide high-quality seeds at the time of sowing, and for consumption in times of scarcity. When crops are poor, villagers are readily loaned grain from the *Ram Kothi*. After their next harvest, borrowers must replace the borrowed grains and provide an additional 50 percent of grain as "interest." The government takes the responsibility for replacing old stocks of grain.

"The grain bank is our salvation during misfortunes," explained Shrimati Senwati Dhrub from Jawarra Village. She expressed satisfaction that Jawarra Village has deposited more than 10 000 kilograms of rice in the grain bank, which is sufficient to meet the needs of the whole village during famine.

In recent years, women have openly expressed their concerns over the need for monetary savings and food security as a basis for raising living standards. Local women have organized themselves into a number of small self-help groups consisting of 10 to 20 members with similar aspirations. These groups promote savings among members and the money is pooled for members' emergency needs.

Market interventions

Marketing of nationalized (under state control) non-timber forest products such as *tendu patta*, sal seeds, *harra* and gum is done through a three-tier cooperative system organized by the Chhattisgarh State Minor Forest Produce (Trading and Development) Cooperative Federation Ltd. Impoverished villagers from the Dugli–Jawarra area, who collect non-timber forest products, are members of the cooperative society. Collectors of "nationalized non-timber forest products" — those under the control of the government — receive wages for their work. Net profits from trading are shared among stakeholders on an equal basis. For example, under the existing system for trade in tendu leaves, a family engaged in tendu collection receives an average of US$16-45 annually.

For non-nationalized non-timber forest products, however, no such system exists. In the past, villagers sold the products they collected to middlemen (most commonly a village moneylender or small businessman), at very low prices. Generally, the villagers were badly exploited in the absence of adequate market knowledge and without trading power or safeguards. In recent times, however, the forest department has facilitated the establishment of buy-back guarantee agreements with a number of private firms. These companies buy kalmegh (*Andrographis paniculata*), krishna tulsi (*Ocimum sanctum*), sugandhhijad (roots of a specific aromatic plant), salparni (*Desmodium gangeticum*), mahul patta (leaves of *Bauhinia vahilii*), shatawar (*Asparagus racemosus*), anantmool (*Hemi-desmus indicus*), baibidang (*Emblica ribes*), aonla (*Embilica officinalis*), dhawai fool (flowers

of *Woodfordia fruitcosa*) and charota (*Cassia tora*) seed. The buy-back guarantee agreements between the committees and the traders have eliminated unscrupulous middlemen from the marketing channels for non-nationalized non-timber forest products.

Successes and failures

The present management approach has brought a considerable level of satisfaction to the forest department and to the village communities who run the Dugli–Jawarra PPA. Joint management approaches have led to a substantial improvement in the quality and condition of the forests.

Villagers have benefited significantly through trade in non-timber forest products, and the development of infrastructure and skills. Market intervention has eliminated middlemen, leading to increases in sale prices for various non-traditional forest products. The new variety in village and forest development activities has also generated a host of new employment opportunities for villagers.

More importantly, villagers sit under one umbrella and make decisions by consensus. "We solve our conflicts and disputes among ourselves," noted Thakurram Kumbhar, a member of the Jawarra FPC.

Migration of labour from villages to urban centres has been curtailed. "No female from our village has left the village to seek employment during the last two years," observed a woman from Jawarra Village. "Now we provide employment to people from other villages. Before these initiatives, most of our people rarely ate more than one meal per day. Now, due to the new irrigation facilities, we can have at least two meals a day."

For a long time, accessing clean drinking water had been a major problem for the villages. Women walked for long distances during the summer season to collect water, thereby wasting many productive hours. But the new water tanks, renovated and built by the Dugli–Jawarra PPA have solved this problem. Literacy levels in the villages have also improved. More importantly, the system has empowered villagers to discuss their needs and aspirations with forest officials to find mutually acceptable solutions to challenges.

Behind the success

The people-friendly National Forest Policy of 1988 and the *Chhattisgarh Forest Policy – Unlocking Forests for People* of 2001 have gone a long way towards rehabilitating the Dugli–Jawarra forests. Both policies emphasize the involvement of local communities in managing state forests and conserving biological and cultural diversity. They have encouraged a paradigm shift in Dugli–Jawarra — from forest management for timber production, to a multiple-use framework oriented towards non-timber forest products. Credit should also be given to the

Chhattisgarh Government for its initiative in declaring Chhattisgarh "The Herbal State," thereby encouraging conservation, sustainable use and marketing of medicinal plants, while also involving local communities.

The visit of several high-profile dignitaries to the Dugli–Jawarra sal forests has been a major source of inspiration for staff of the forest department and the village communities. A member of Dugli FPC smiled, "Rajivji (late Rajiv Gandhi, then Prime Minister of India) came to our village in 1985. He spoke to us, he asked about our problems…. Afterwards, I was strongly motivated to do something to help my community." Visits of top officials from the state government such as the Secretary, Commissioner, and Principal Chief Conservator of Forests are always a source of encouragement and inspiration. The villagers, as well as forest department staff, appreciate the plaudits they are given for outstanding work.

However, amidst the successes, there remain several sources of apprehension. A major concern for the community is that ownership of the forests and forest land is not transferred to local communities and the forest department reserves the right to dissolve FPCs and VFCs. Some community members view the present status as "a high risk association in collective management." Another concern is that management of Dugli–Jawarra PPA must ensure an even distribution of resources and accumulation of natural and social capital among the VFCs and FPCs. Many community members believe that rewards should more fairly accrue to those who work hardest.

Future challenges

The present approach to management of Dugli–Jawarra sal forest is a promising example of forest development achieving livelihood security through conservation of biological and cultural diversity. The next challenge for the PPA is to tackle intra-community inequalities and ensure equal opportunity for all the villages that participate in managing the forests. There is also a need to refine management strategies to continue to develop better understanding and mutual trust between the village communities and the forest department. Most importantly, although the present levels of knowledge and managerial capacity are sufficient for the village communities to make rational, independent decisions, there is still a need for governmental facilitation and guidance.

The relationship between the forest community and the forest department does not remain constant, but rather it is dynamic and changes with every decision. Today's equilibrium will change tomorrow. As levels of education and exposure to the outside world increase, similarly the aspirations and requirements of community groups will change. The government will need to review policy instruments regularly to tackle changing situations in the future.

Mr Shrinivas Rao, Divisional Forest Officer of Dhamtari, summed up the success of the forestry programmes: "We strive to win the confidence of people

and we go for need-based programmes. There are three points that are essential to ensure a successful People's Protected Area programme: the willingness of villagers to participate in the programme; teamwork among forest department staff and villagers; and the most important of all, the political will of the country."

About the author

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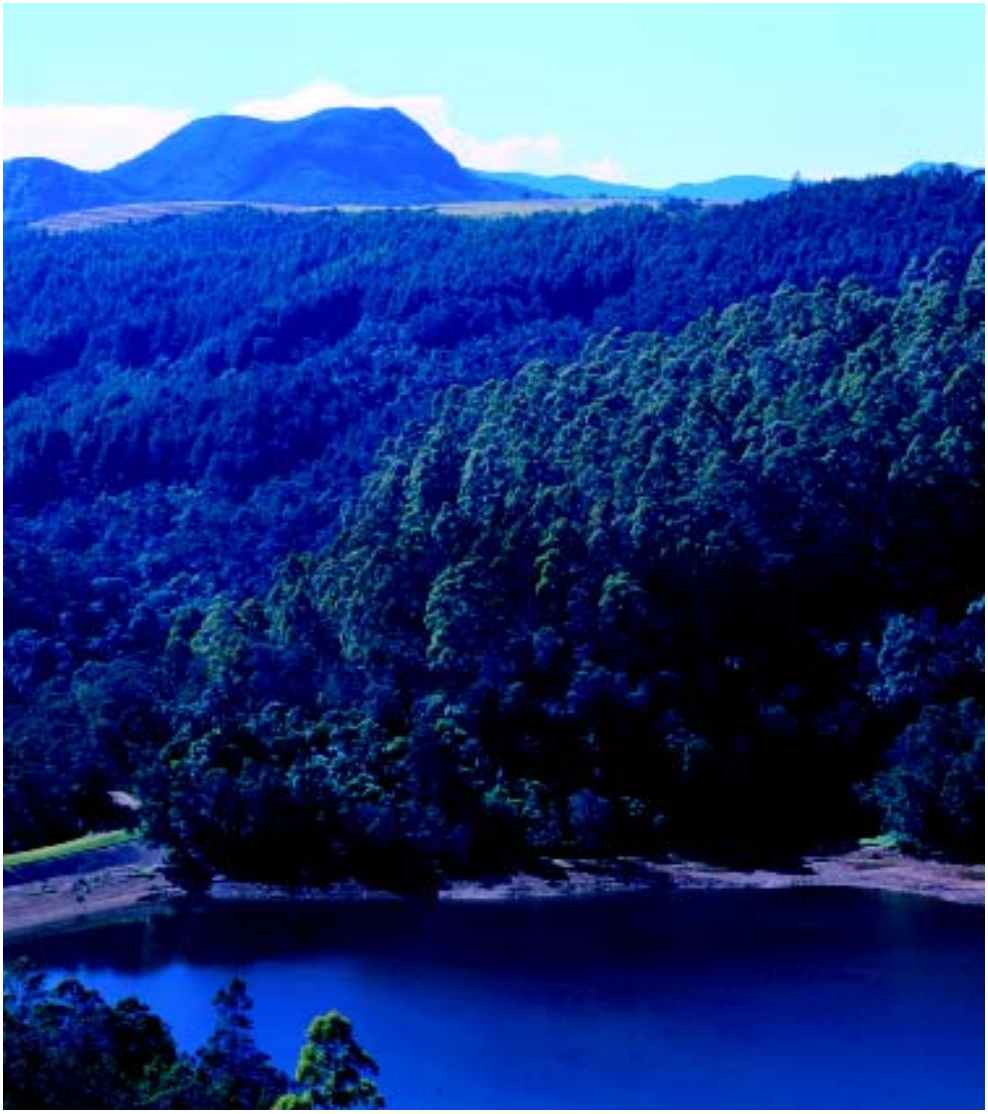


Landscape of natural forests and plantations maintained for watershed and biodiversity protection in central Sri Lanka (courtesy Masakazu Kashio).

THE KNUCKLES RANGE: PROTECTING LIVELIHOODS, PROTECTING FORESTS

H.M. Bandaratillake

Name of forest:	Knuckles (Dumbara)
Location:	Kandy/Matale District, Central Province
Area (hectares):	17 835
Managing entity:	Forest Department of Sri Lanka
Mgt. objectives:	Conservation of biodiversity, watershed protection
Country:	Sri Lanka

"I never saw before so perfect a specimen of forest scenery. Here lie trees of different kinds, sizes and ages: some saplings, some dead and decaying, and some of very great bulk and height towering above the rest in their prime," wrote British administrator John Davy in his nineteenth century volume, *An Account of the Interior of Ceylon in 1821.*

Davy was referring to the Knuckles Range forests, some of the most important tropical rain forests in Sri Lanka. But he is not alone in his awe of the Knuckles forests. Former Conservator of Forests, V.R. Nanayakkara, also commented on the range's beauty during his term in 1988: "The Knuckles Range and the entire massif are, without doubt, the most scenic part of the Highlands of Sri Lanka, containing, as they do, some of the most rugged, spectacular and breath-taking mountain scenery on the island."

The Knuckles Range lies in the central part of Sri Lanka and covers an area of 17 830 hectares, most of which is natural forest, although 1 880 hectares of forest plantations have also been established in the Knuckles Range. The Forest Department manages about 70 percent of the forest plantations and the remainder

is under private management. The Knuckles Range falls within the administrative districts of Kandy and Matale.

The area was named "Knuckles" by British surveyors, due to a prominent landscape feature — a group of five peaks that resemble the knuckles of a clenched fist — as seen from many observation points in the area. The local name for the Knuckles peaks is *Dumbara*, which means, "mountains covered with mist."

The unique landscape and spectacular scenic beauty are the main features of the Knuckles Range. The highest peak, Gombariya, reaches 1 906 metres and six of the major peaks are covered with montane and submontane forest types. In the montane forests, stunted trees (about one metre in height) characterize "pygmy forest." The Knuckles Range also has broad climatic diversity, from extreme wet on the southwestern slopes to very dry on the eastern slopes.

Blue mormon (Papilio polymnestor) *found in the Knuckles Range*

Tennent's Horned Lizard (Ceratophora tennentii), *endemic to the Knuckles Range, found nowhere else in the world (courtesy H.M. Bandaratillake).*

High level of biodiversity

Distinctive climatic, topographic and edaphic factors combine to create a unique ecosystem, containing exceptionally rich and diverse fauna and flora. Several species of endemic fish, amphibians and reptiles are confined solely to the Knuckles Range, while 14 of the 21 endemic species of birds in Sri Lanka inhabit the area. Many rare and very rare faunal species and some endangered and threatened plant species are also found. Among the fauna, 14 species of birds, 5 species of amphibians, 6 species of mammals and 10 species of reptiles are considered threatened. The World Conservation Union (IUCN) notes that 3 of these species are globally threatened and 32 are nationally threatened. "They should be saved in the Knuckles Range to prevent extinction of the species," a report by the IUCN stated.

Agricultural production

The direct economic contribution of the Knuckles region to the national economy has declined significantly since 1990, when the government imposed a ban on

logging in all of the country's natural forests. The Knuckles forests' most significant economic contribution comes from the 1 880 hectares of forest plantations and from non-timber forest products such as fuelwood, honey, medicinal plants, edible plants, roping material and bamboo. Local people also tap the flowers of the kitul palm (*Caryota urens*), which provide a base for "toddy" (a local alcoholic beverage) and a sugary substance that is used for making local sweets.

The Department of Export Agriculture reports that 2 700 hectares of cardamom (*Elettaria repens*) are planted within and around the Knuckles forests. This represents approximately 55 percent of Sri Lanka's total area under cardamom cultivation, and accounts for 32 percent of the country's cardamom production. In 2002, the contribution of cardamom cultivation to the national economy was around US$250 000.

A major economic activity in the periphery of the Knuckles Range is tea cultivation. Like cardamom, tea is a major export. Currently, there are about 40 tea plantations in the Kandy-Matale region — a number of which are found in the buffer zone of the Knuckles Range. Most of the tea plantations are owned by the state, but managed by private companies. Only a few are owned by individual farmers.

Most of the communities living near the Knuckles Range are dependent on forest areas for shifting cultivation (*chena*), cardamom cultivation, timber and fuelwood collection and harvesting of non-timber forest products.

"For the past several decades, most of us have cultivated cardamom in the forest, because it provides good income. In fact, it has become the main source of livelihood in my village," said Tikiribanda, a resident of Narangamuwa. "We do not have permission or authority from the Forest Department to carry out this cultivation. Some villagers own small paddy fields, but many do not. In any case, income from paddy cultivation is not sufficient and consequently most of us also engage in chena cultivation. Paddy and chena cultivation are the core components of our traditional way of living, but cardamom growing has become the most important activity because of the potential to earn cash."

"We are hopeful that the Knuckles conservation programme will help us to develop alternative sources of income and livelihoods from new agricultural crops or other sources. That way, we will be able to give up cardamom cultivation in the forest," added Tikiribanda. "We realize the need to protect the forests that we have inherited from our grandfathers and great-grandfathers. But we need to make a living as well."

Deforestation and logging

As in many other Asian countries, deforestation is a major concern in Sri Lanka. In 1990, in response to the heavy depletion of natural forests, the government

imposed a complete ban on logging in the natural forests in the country. The logging ban was implemented as a strategy to conserve the country's natural forests, safeguard biodiversity and protect soil and water resources. At the time it was imposed, the majority of the population, non-governmental organizations (NGOs), environmentalists and forestry professionals supported the logging ban and the conservation lobby strongly influenced the government in making the decision. The logging ban has continued to the present time and, as a consequence, natural forests throughout the country are no longer harvested for timber.

Consistent with national policy, the logging ban also applies in the Knuckles region. This is especially relevant given that the Knuckles region is one of the most critical watersheds in the country. It forms an important part of the catchment of the Mahaweli River, which provides water to irrigate large areas of agricultural land and for generating hydroelectricity.

New management regimes

The biological and hydrological values of the Knuckles Range have been recognized since as long ago as 1873, when the colonial government of Ceylon (under British rule), declared a section of the Knuckles region above 1 500 metres as "a climatic reserve." However, problems have persisted. Until recently, there was no appropriate legal framework under which the Knuckles Range could be protected. Furthermore, the area had no formal management plan and was susceptible to continuous shifting cultivation and the occasional illegal felling of trees. Forest boundaries were inadequately surveyed and demarcated in many areas — making it possible for people to encroach on the forest for unauthorized cultivation and settlement.

Faced with these varied and intricate problems, Ranasinghe Premadasa, the Prime Minister of Sri Lanka, commissioned a special cabinet paper in September 1985. The paper concluded, "The Knuckles Range is one of the few large natural areas with a unique ecosystem left in the country and, therefore, it is essential that the Knuckles Range be conserved."

The paper recommended improved conservation of the Knuckles Range for hydrological stability, soil erosion control, preservation of rare and endemic fauna and flora, and management as an outdoor laboratory for educational purposes and for research. An action plan for the conservation of Knuckles was developed and a special committee was appointed to oversee its implementation.

In 1994, as a follow-up to these initial activities, the government developed a more comprehensive management plan for the Knuckles Range in consultation with various stakeholders including state agencies, local communities, NGOs and community-based organizations.

The special features of this management plan were:

- community participation;
- restoration of degraded forests;
- development of alternative income-generating activities for village communities in the buffer zone;
- relocation of settlers;
- soil conservation;
- agroforestry;
- raising awareness; and
- provision of special legal status to the Knuckles forests.

The Forest Department, with the participation of local people living in peripheral villages, currently implements these programmes in the Knuckles forests and buffer zone areas. In the past, the IUCN has supported some of the programmes with supplementary funding and technical support.

Cardamom cultivation within the forested area remains a serious management challenge. It prevents the natural regeneration of forest tree species in the understorey. About 60 percent of the cardamom cultivation in the Knuckles Range is located in potentially sensitive areas — above 1 200 metres in elevation. These disturbed sites — without adequate natural vegetation — are highly susceptible to soil erosion. The eroded soil (as much as 10 tonnes/hectare/year) enters rivers, causing siltation problems in hydropower reservoirs.

The costs of banning cardamom cultivation in the Knuckles Range are estimated to be around US$104 000 per year. In spite of this, the Forest Department — in consultation with the scientific community, local government administrations and other stakeholders — has taken a firm decision to stop all cardamom cultivation in the Knuckles forests as one of the main strategies of forest conservation. The economic losses have been weighed against ecological losses incurred through biodiversity depletion and watershed degradation, caused by increased soil erosion.

The government has stopped issuing new permits for cardamom cultivation and has restricted farmers from maintaining existing cardamom plants. It is envisaged that these measures will enable the forest to revert back to its natural state. Obviously, they will have a major impact on local villagers, however, especially those who have been cultivating cardamom over the years. Consequently, the ban on maintenance is being phased in at a pace that will enable local people to adjust to other livelihoods. A number of activities aimed at improving the socio-economic conditions of peripheral area inhabitants have been introduced in the buffer zone, to help offset the losses due to the cessation of cardamom cultivation.

In 2002, as envisaged in the management plan, the Knuckles Range was surveyed, demarcated and declared as a "Conservation Forest" under the Forest Ordinance. Other significant activities prescribed in the management plan focus on providing alternative income-generating activities to the communities and restoring degraded forests. Key pillars in the development strategy focus on strengthening community groups. Activities include training and support in procuring materials for new livelihoods. The management plan outlines a programme for assisting local people in obtaining credit, training in micro-credit management, and establishing mechanisms to coordinate production and marketing.

A programme designed to promote rapid restoration of degraded forests is also being implemented. Key activities include enrichment planting and maintaining a physical presence in the forests to complement legislative protection.

In addition to enrichment planting and erection of boundary posts, other implementation activities include: opening and maintenance of nature trails, clearing of fire lines, assistance to build houses for relocation of families, buffer zone planting, an education and awareness programme for communities and schoolchildren, a micro-credit programme, construction of a mini-hydropower station, providing energy efficient stoves and assistance to minor irrigation work.

The main objective of the Knuckles programme is to use local resources to create new economic opportunities in the buffer zone, thereby diverting villagers from their dependence on forests. These income-generating activities include:

- assistance for agriculture via extension programmes;
- training for farmers in alternative activities such as dryland farming, livestock management and vocational training;
- provision of high-quality planting materials;
- rehabilitation of minor irrigation structures;
- provision of credit facilities;
- training in adding-value to non-timber forest products; and
- facilitating the marketing of new agricultural products.

Some families living in the buffer zone are being relocated to areas outside the forest reserve and awarded sufficient compensation to enable them to find new means of livelihood.

A number of conservation measures have also been introduced to minimize soil erosion, including the building of stone terraces, introduction of new cultivation techniques and the development of *taungya* (agroforestry). The Forest Department and the Department of Agriculture have jointly implemented agroforestry development programmes. The most common *taungya* system adopted in the area is known as "Farmers' Woodlots," in which farmers are given land and cash incentives for planting trees and crops, such as coffee and pepper, in an integrated manner.

There is a high level of community participation in the management of the Knuckles Range, from the development of strategies to the implementation of management prescriptions. Dayapala, a local farmer, explained: "It's good that the government has continually involved us in the planning and the implementation of various activities in the Knuckles conservation programmes. As a result, we know what actions we need to take and how to do things right. Our involvement has greatly improved our lives."

Farmers in Ranamure, Imaduwa, Narangamuwa, Lakegala and Illukkumbura are currently tilling 40 hectares, which will be planted with paddy and other agricultural crops. They have received assistance from the Knuckles conservation programme. "In the past, the income from cardamom cultivation contributed to around 40 percent of our families' cash income," Punchibanda said. "Today, as a result of the Knuckles programme, we have opportunities to earn alternative incomes from cultivation of additional paddy areas and other field crops. I think this will compensate for the loss of income from cardamom cultivation. All of us are now working as a team — to conserve our Dumbara forests."

Responsibilities for directly managing the forests have not yet been devolved to the communities. However, they participate in forest protection, enrichment planting and other management activities through community-based organizations. Collection of non-timber forest products and participation in ecotourism activities are also planned in consultation with community-based organizations. The new systems mean that the forest is protected while local villages also benefit, through employment, and because their voice is heard in decision making. The intention of the Forest Department is to transfer increasing degrees of management responsibility to local communities as capacity for community-based forest management is developed.

In the long run, the Forest Department plans to institutionalize these programmes through the development of strong community-based organizations. "These programmes will play a big role in facilitating development," noted H.G. Gunawardane, the Deputy Conservator of Forests who is in charge of the programme. "We want all the participating agencies, particularly those working directly with people living in the area, to be capable of managing their income-generating activities without the need for ongoing assistance from the Forest Department."

Future in tourism and conservation

The Knuckles area is rich in scenic, environmental, sociological and cultural resources. Local and foreign tourists enjoy panoramic views of mist-capped mountains, stunning valleys, impressive rock formations, crystal clear streams, hilly terrain, lush forests, waterfalls and cliffs. The ancient villages, picturesque rice terraces and cultural traditions of people living in the peripheral villages

contribute to a unique blend of nature and culture. Most of the local people still practise village traditions dating back to the time of the Kandyan kings.

In recent years, tourism has become an important source of income for local people. According to the IUCN and the Forest Department, more than 25 000 tourists visit the Knuckles forests each year. In 2001, the Forest Department and the IUCN prepared an Ecotourism Development Plan for the Knuckles Range.

In 2002, in acknowledgement of the Knuckles forests as a unique national heritage rich in biodiversity, the Forest Department submitted a proposal to the United Nations Education, Social and Cultural Organization (UNESCO) to include the Knuckles Range in the World Network of Biosphere Reserves.

Currently, UNESCO is reviewing this proposal. The proposal stresses the importance — at both local and global levels — of conserving the Knuckles Range. It highlights the area's significance given its "high level of biological diversity and endemism, natural high forest ecosystems, attractive landscapes covering 21 000 hectares of hilly terrain and one of the most important watersheds in the country." The proposal further states "it provides a variety of non-timber forest products for rural communities living in 77 villages and has very high potential as a site for nature-based tourism and recreation. It is a living laboratory providing facilities for environmental education and research for foreign and local researchers."

"We are confident that the Knuckles forests will qualify as a UNESCO Reserve and we intend to further upgrade these forests to achieve World Heritage status in the future," observed Sarath Fernando, the Conservator-General of Forests.

Conclusion

The courageous step of the government in declaring the unique Knuckles Range as a conservation forest, despite the socio-economic consequences, attests to the determination of the Government of Sri Lanka to conserve this unique ecosystem. However, the success of the conservation programme largely depends on finding alternative income generation options for the peripheral dwellers who depend on cardamom cultivation for their livelihoods. The programme implemented to date has achieved a measure of success in strengthening people's participation and augurs well for success in the conservation of the Knuckles Range.

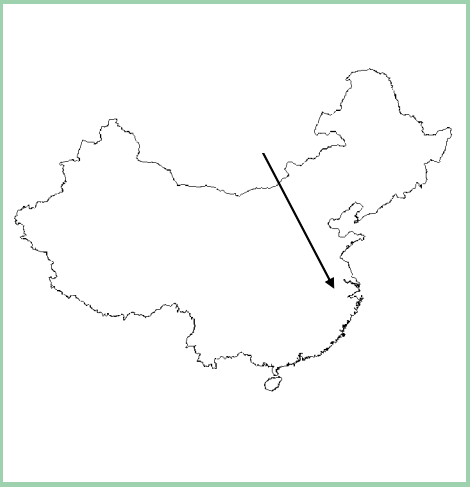
About the author

H.M. Bandaratillake has long experience as a forester with the Forest Department of Sri Lanka. From 1993 to 2002, he served as Conservator-General of Forests, the country's top government forestry post. Currently, he is Director of the Forest Resources Management Project of the Ministry of Environment and Natural Resources of Sri Lanka.

FORESTS OF HUOSHAN COUNTY: A PATH TOWARDS POVERTY ALLEVIATION

Jiang Chunqian

Name of forest:	Huoshan County Community Forests
Location:	Houshan County, Anhui Province
Area (hectares):	3 000
Managing entity:	Individual farmers and Huoshan County Forestry Bureau
Mgt. objectives:	Multiple use, poverty alleviation
Country:	China



Historically, Huoshan County, in China's eastern province of Anhui, has been one of the country's poorest areas. In the late 1970s, the annual income per capita averaged less than US$18.50. Starting in 1978, in line with nationwide economic liberalization, the government facilitated significant social and economic development in Huoshan County. These efforts resulted in steadily increasing incomes in the county, reaching US$192 per capita per year by 2000.

Nonetheless, enormous challenges still confront the county. Transportation facilities remain poor and only 21 villages — out of 280 — are accessible by road. Soil erosion is a serious environmental problem, with landslides and related natural disasters occurring frequently. Infrastructure for combating floods is insufficient. Many people do not have adequate access to potable water.

"Even though the standard of living for many farmers has improved, many people still have problems in meeting their basic needs," deplored Li Qiyi, an afforestation programme officer for the county.

Huoshan County is predominantly rugged, with three-quarters of the county's 204 570 hectares classified as mountainous. Only 20 620 hectares are considered suitable for permanent agriculture. The county contains 24 townships and 280 villages, with a total population of 366 000 — about 90 percent of whom are farmers.

The educational level of most farmers is very low, thus limiting their ability to understand and implement improvements based on scientific advancements and introduced technologies. Even those farmers who have learned to read still face a major challenge to gain access to technical information, which is rarely available in this remote county.

Fortunately, Huoshan County has abundant natural resources such as bamboo, tea, mulberry and medicinal plants. The county is best suited for forestry development because the mountainous topography is generally unsuitable for agriculture. Therefore, it is perhaps not surprising that 75 percent of farmers' incomes is currently derived from the forests. The county actively participates in several national forest initiatives, including the Natural Forest Protection Program and various reforestation programmes.

In March 1996, China and the Netherlands signed a Memorandum of Understanding on Development and Cooperation, funding a five-year cooperative project in Huoshan with the aim of alleviating poverty in the county. The Sino-Dutch Poverty Alleviation Project started in December 1997, supporting a broad range of activities including agriculture, forestry, irrigation, enterprise development, hygiene, education, transportation, participatory development and institutional strengthening.

Community forestry — which includes a number of individual programmes such as "Household Forestry," "Farmers' Self-help Organizations," "Demonstration Households" and "Training in Participatory Concepts and Forestry Techniques" — is one of the key sub-projects of the Sino-Dutch Project in Huoshan County. There are three basic principles guiding all project activities: participatory approaches, gender consciousness and environmental protection awareness.

Xu Jiaqi, a community development specialist for the project, explained: "Everyone is involved in project activities. Each person is allowed to share his or her ideas during meetings and discussions. A decision is made by the group before the end of the day. Women are given importance in all activities. In fact, in some groups such as the Bamboo Farmers' Association, most of the members (70 percent) are women."

Community forestry activities have been implemented in 68 villages surrounding the townships of Manshuihe, Daoshichong, Shangtushi, Taipingfan, Taiyang, Zhufo'an, Heishidu, Luo'erling and Taoyuanhe. These areas were chosen because they were among the poorest in the county. More than 16 000 households have participated in community forestry, covering an area of 55 119 hectares. As

a result of the project, the forest cover of the county has increased from 59 percent in 1989, to almost 70 percent in 2002.

Household forestry

The concept of "Household Forestry" focuses on the establishment of micro-level projects by individual farmers. Household Forestry is a component of the Community Forestry sub-project and incorporates a number of discrete activities such as establishment of economic plantation forests, afforestation on barren hills suitable for tree planting, improvement of low-yielding forests, conservation of forest resources and prevention and control of pests and diseases in economic forests.[1] The farmers themselves decide on the type of forest management activities that are to be implemented. Forestry officials and technicians support communities in their activities by participating in discussions and providing advice. They also assist in the design of activities, participate in joint decision making and monitoring of activities — besides supplying technical help.

Lands surrounding individual households are selected as project sites. Often, the key objective is to enhance soil and water conservation on steep farmland. Some farmland is converted into forest by planting trees and woody species including chestnut (*Castanea* spp.), *moso* bamboo, tung tree (*Aleurites fordii*, which produces tung oil) and tea oil camellia (*Camellia oleifera*). Most of these species are able to rapidly generate income for farmers.

Some of these "economic species," including chestnut and moso bamboo, had been tested earlier, but did not grow well and production was low; others were damaged by pests and diseases. Many farmers were becoming increasingly discouraged, until the township forest station and the project intervened through Household Forestry activities to offer assistance in overcoming technical problems.

Many farmers applied to participate in the project, from which the best-qualified were selected as "demonstration households." Selection was based on gender, educational background and practical capability. The project provided researchers and technicians to train demonstration householders in techniques to solve problems relating to the cultivation of tree crops.

Demonstration households were contracted by the project to assist other farmers in solving problems relating to forestry activities. In turn, the demonstration households received funds to improve their project sites. These undertakings have worked effectively to improve productivity and to increase the incomes of participating farmers.

From 1998 to 2002, a total of 3 810 hectares of forest plantations of economic species, such as chestnut, bamboo, oil camellia and various medicinal plants were

[1] "Economic forest" is a term generally used in China to describe trees planted primarily to generate income from fruits, nuts, oils, medicines and other non-timber products.

established through Household Forestry activities. More than 15 000 households are benefiting from these activities, with current incomes totalling US$0.95 million.

Sustainable and viable?

Key questions about project activities relate to their sustainability and long-term viability. An exemplary case is that of Mr Su Huaxun, a very poor farmer from the Lao Jia Wan Group in Daganjian Village. Mr Su's family has five members, including his 80-year-old mother and a disabled son. He was made aware of the project through the township forest station.

Since 1988, Mr Su has been involved in chestnut grafting. "I have grafted almost a hectare of chestnuts and have interplanted them with tea," he said, describing his accomplishments to date. "After two years of tending, I was able to harvest 800 kilograms of chestnuts from my plantation, earning me an income of more than US$420. This is a huge amount of money for me."

This lucrative initial income motivated Su to farm his chestnut plantation more carefully. To learn more about chestnut farming, he attended a training course organized by the Sino-Dutch Project. He likewise developed a closer relationship with the township forestry station. The additional knowledge he accumulated through these activities enabled him to increase the production and quality of his chestnut plantation, thereby increasing his income and lifting his family out of poverty.

Income is not the only factor that motivates farmers. Membership in groups such as Farmers' Self-help Organizations also provides motivation. There are three types of these organizations: "Farmers' Professional Associations," "Community Development Fund Management Organizations" and "Forest Products Processing Associations." Mr Xu Jiaqi explained: "The primary aim of Farmer's Self-help Organizations is to improve the economic and social environment for farmers and their families. By empowering farmers to manage their farms according to their own livelihood preferences, it is hoped that their dependence on the government will be reduced. Farmers are free to join or drop out of any organization — as they choose. Each Self-help Organization has its own rules and regulations. The farmers themselves elect the management committee."

Songlin Village provides an interesting example of the effectiveness of a Self-help Organization. Due to its remote location and difficult access, most farmers in Songlin Village of Tainyang Township were very poor. Nonetheless, the village is endowed with abundant mixed coniferous and broadleaf forests, and since 1997 especially, local farmers have cut secondary broadleaf forest to obtain raw material for raising edible fungi.

Unfortunately, the farmers initially lacked technical knowledge on how to use forest resources sustainably. Large trees were felled and cut into small pieces to provide a medium for raising mushrooms and other edible fungi. The farmers in neighbouring villages also followed this pattern of exploitation, quickly depleting the resource and denuding an area of nearly 200 hectares of natural forest surrounding the villages.

To help curb this practice and to bring an element of sustainability to the operations, the project office consulted with the farmers. The consultations resulted in an agreement to establish a Forest Farmers' Association that worked with farmers to allow their continued use of the broadleaf forest resources, but in a sustainable manner under controlled harvesting regimes. The project awarded a grant of more than US$6 000 in community development funds to support the establishment of Forest Farmers' Associations in village communities.

Mr Li Qiyi, of the county's Forestry Bureau, explained: "Aside from the project grant, farmers also paid US$200 as shares to join the association. The money from the grant and the farmers' contributions was put together as a community development fund. This fund is managed by the association according to established rules. The members of the association can each borrow US$25-200, which is used for mushroom production. Less than 50 percent of members are allowed to borrow money at any given time. The borrowed money must be repaid with interest, within six months. The association members who have not borrowed money, supervise the use of the money. The money raised from interest payments is used to send drop-out children back to school."

Local farmers assisted the Forest Farmers' Association to identify 160 hectares of mountainous forest land for natural regeneration. The Farmers' Association implemented new mountain closure techniques, which identified tree species and vegetation to be conserved, but allowed other species to be harvested and used as raw material for fungi cultivation.

This practice protects the overall forest health while enabling farmers to continue improving their economic status. In the first year of the project alone, 100 participating households harvested 140 000 bags of edible or medicinal fungi, netting revenues of more than US$25 000. The money earned was divided equally among participating households.

Demonstration households

Some households have been selected as technology demonstration households in the implementation of community forestry. The demonstration households were identified as being exceptionally skilled and proficient in farming and forestry. Most of the participating farmers are high school graduates.

The heads of the selected demonstration households signed agreements with the project, under which the farmers received training and technical assistance from the project, while in return the farmers agreed to help other farmers to implement new techniques. The project regularly evaluates the performance of each demonstration household. Only farmers who meet all the requirements of the agreement are retained as demonstration householders. Most of the demonstration households have good credit standing, which enables them to successfully apply for loans from rural credit cooperatives.

An interesting example of the use of demonstration households is Liang Ganchong Village of Shang Tushi Town. In Liang Ganchong, 10 chestnut demonstration households were trained by project staff to manage chestnut orchards effectively. The knowledge acquired through training was applied to local farms. The benefits of applying the new methods are readily apparent, with at least 2 households harvesting more than 1 500 kilograms of chestnuts in a single year, yielding approximately US$850 for each household.

While developing their own chestnut orchards, the 10 demonstration households also assisted 70 other chestnut growers in improving their management techniques. Mr He Yu, a 35-year-old farmer, who owns a small chestnut plantation in Chang Chong Village of Taiping Township explained how the system works: "I heard about the project from the township forest station. I sent my application to participate as a demonstration householder, including letters of recommendation from neighbouring farmers. After a thorough review, the project approved my application and I was selected as a demonstration householder. When I joined the project, I underwent training and learned new techniques for chestnut tending and management. Our chestnut production increased to 3 000 kilograms in 2002 and I was able earn US$1 700 from sales. I have used my training to help 19 other households to improve their chestnut plantations."

The training provided by the project has been cited as one of the key reasons why most programmes in Huoshan County have been successful. There are three levels of training: training for trainers, training for technology demonstration households and training for farmers. The project has implemented an extensive series of training courses, resulting in large numbers of technically proficient farmers with the skills and motivation to effectively transfer techniques and technologies to their neighbours.

A total of 405 forestry technicians have been selected to attend *Training for Trainers* courses. The contents of the training courses include participatory approaches and intensification of applied techniques (such as grafting procedures, silvicultural management, pest and disease control for chestnut-growing, bamboo and Chinese fir cultivation, and uses of common pesticides). After training, the course graduates became instructors for other groups that have expressed interest in improving their forest management.

Outcomes

The results of social forestry activities in Huoshan County are becoming increasingly evident. Farmers in the project area have increased their incomes significantly by participating in household forestry activities, Farmers' Self-help Organizations, technical training and other project programmes.

The project has also provided various other tangible benefits. Farmers are now adopting management techniques that encourage soil and water conservation. During land preparation, small holes are dug along contour lines for planting trees rather than cultivating entire slopes. In addition, stone dams shaped in a half-circle are built around planting holes on the downslope to prevent soil erosion and loss of fertility. The burning of grass and shrubs, and full cultivation of the soil — previously used in forest planting — are strictly forbidden. These measures have greatly enhanced farmers' awareness of environmental protection.

During the implementation of the project, activities focusing on protection and integrated utilization of secondary natural forests were carried out. Closing mountains for natural regeneration was also implemented. These trial activities have changed traditional forestry practices in which utilization generally led to deforestation and required subsequent re-afforestation efforts. The changes are in line with current natural forest protection strategies enacted by the Chinese Government. The project has consequently played a significant role in improving the environment, conserving biological diversity, enhancing people's standards of living and realizing sustainable development.

Another project benefit has been a reduction in the unemployment rate, thereby maintaining and enhancing social stability. On the one hand, the processing industry has created additional employment opportunities for landless labourers and women in rural areas. On the other hand, various types of hillside development activities have attracted farmers, who have abandoned uneconomic plots of land, to earn their livelihoods by participating in various forestry activities.

Awareness of gender issues has also been built up in local communities. Women in rural areas have generally taken the lead in carrying out forestry-related activities. As the project has evolved, women have been increasingly willing to participate in activities, as well as relinquishing traditional reticence towards taking part in decision making. The project has consequently enabled women to improve their social status.

Conclusions

The Sino–Dutch Poverty Alleviation Project has acted as a catalyst for significant changes in forestry practices in Huoshan County. The project effectively developed partnerships between county officials and local farmers, and implemented a variety of participatory mechanisms for technology transfer.

The project's participatory approaches have won popular support among farming households. Most project activities have encouraged participation from beginning to end, while also ensuring that farmers have maintained control of all facets of their operations. This approach encourages farmers to pursue project objectives as a means of improving their own livelihoods.

The participatory approach has utilized two primary means of extending training: the first is from the project office through township governments and forestry stations to farming households; the second involves township governments utilizing Farmers' Self-help Organizations to assist farming households. Township leaders have played key roles as project coordinators and as conduits for extending new technologies to local farmers.

The core focus on capacity building has meant that nearly all participating households have learned at least one or two applied techniques; this has established a foundation for further development and increased self-reliance and capacities to alleviate their own poverty. At a larger scale, the county's forestry sector has accumulated experience and capacity to implement similar projects in the future. Township governments have improved coordination skills. Forestry staff have changed their approaches from a bureaucratic role — overseeing and directing — to a partnership approach that enables the establishment of equitable relationships with farmers and encourages the mutual exchange of knowledge and information.

An old saying asserts: "Give a man fish and he is fed for one day, but teach him to fish and he is fed for a lifetime." This reflects a key philosophy in Huoshan County, and provides enormous optimism that progress will continue well beyond the life of the project. By "helping people to help themselves," the project has ensured the long-term adoption of sustainable forestry practices.

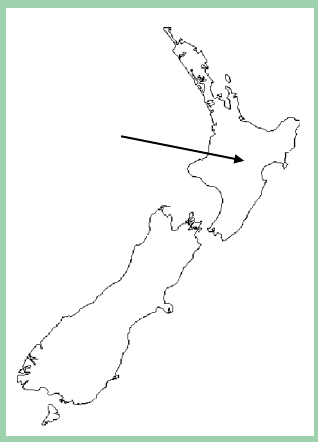
About the author

Jiang Chunqian is a researcher at the International Farm Forestry Training Centre of the Chinese Academy of Forestry. He is also the Deputy National Counterpart for the Regional Model Forest Project in Asia and the Pacific and Chief Secretary of the China Model Forest Network. He has worked with numerous national and international programmes and projects. He holds a Ph.D. in silviculture from the Chinese Academy of Forestry and is a specialist in participatory forestry, agroforestry, rural development and poverty alleviation, non-timber forest products and training and programme management.

LAKE TAUPO FOREST: PARTNERS IN DEVELOPMENT

Don Hammond and Bryan McKinlay

Name of forest:	Lake Taupo Forest
Location:	Taupo, Central North Island
Area (hectares):	22 000 (stocked plantations), 7 000 (reserves/waterway protection)
Managing entity:	Joint venture between government and Ngati Tuwharetoa (a Maori tribal group)
Mgt. objectives:	Sustainable timber production
Country:	New Zealand



Sixty-year-old Joe Heke stood on a small hill overlooking a forest on the eastern shores of Lake Taupo in the central North Island of New Zealand. In the distance, he could see a vast expanse of planted trees, while immediately in front of him he watched a skidder drag another load of logs to the landing. As the logs arrived, he saw the workers, including his son and two grandchildren, begin the process of cutting the stems into high-value logs destined for markets. Where, a few weeks ago, orderly rows of trees had stood — now there was bare ground. Not a single tree remained standing, amid the debris of what was once a stand of mature forest. While many people would see this as devastation, Joe viewed it through different eyes. What he saw was the realization of a dream.

As a young boy, Joe had stood on this same hill while out hunting wild pigs. These are his ancestral lands. As a young man he had again stood on the hill gazing out over the unproductive scrub-covered lands. It was apparent that these scrub lands — belonging to his *iwi* (tribe) — could never support him and his family unless major changes were made. He was forced, like so many others, to move away to seek work. But always he harboured a dream — living and working on his own land and having his *whanau* (family) working with him. Today, this dream has come true and Joe is a very happy man.

Lake Taupo Forest provides an outstanding example of a joint venture between an indigenous people and government. Two markedly different parties have been able to combine their resources to create an outcome that is truly beneficial for both. One party (the New Zealand Government) sought to invest funds in commercial forest development, while the other, *Ngati Tuwharetoa* (a Maori tribal group) were owners of large tracts of underutilized land, but lacked the financial resources to develop it.

Central to any viable development proposals had to be an understanding of Maori traditional linkages to land. Alienation of the land in any form was not acceptable. Thus, a formula whereby both parties could reap benefits while at the same time being assured of the sanctity of their contribution, was pivotal in any agreement.

The result was a management structure that ensured a world-class forest was developed, with substantial and ongoing input from the landowner. Key conditions within the agreement included the ultimate return of the land to the owners along with the opportunity to derive employment and a share in the financial returns.

Today, all parties look at Lake Taupo as a highly successful model for developing such joint ventures.

History of Ngati Tuwharetoa

Among the first people to arrive in New Zealand were the Maori. They arrived from other parts of the Pacific around 1 000 years ago and settled in various locations, mainly around the coast. One of the few groups that ventured further inland to settle were the Ngati Tuwharetoa.

They settled on the shores of Lake Taupo with their traditional lands encompassing the lake and the surrounding lands and the mountains to the south. In spite of gifting the mountains to the government in 1887 to form the nucleus of a national park (the second in the world after Yellowstone in the United States of America), the people retained unbroken ties with the land.

European settlement began in the early 1800s, again, predominantly in coastal locations. Movement inland, however, was not long in following. The Treaty of Waitangi — signed in 1840 by agents of the British Government and the chiefs of various *iwi* — has been a key element in the development of New Zealand's society. A central theme of the treaty, and a cause for ongoing debate, conflict and political pressure, is the concept of "sovereignty" or *tino rangatiratanga*. This concept of sovereignty or self-determination has been a driving force in the progressive resumption of Maori control of natural resources in New Zealand.

Box 1. Maori — the indigenous people of New Zealand

The Maori are the indigenous people of Aotearoa (New Zealand). Referred to as *tangata whenua* (people of the land), they settled in New Zealand after migrating from Hawaiiki. The Maori are a tribal society with a social structure based around *whanau* (family), *hapu* (subtribe) and *iwi* (tribe). The various *iwi* occupy different *rohe* (regions) throughout the country. The Maori are now fully integrated in mainstream New Zealand, with a number of prominent Maori politicians, entrepreneurs, scientists and athletes.

The Maori have embraced a drive in recent decades to assert further acceptance of their language and culture in mainstream New Zealand, and avoid losing their *tikanga* (protocol and values) through assimilation into New Zealand/European culture. This has coincided with an acceptance from the government that obligations under the Treaty of Waitangi must be honoured continually. This is exemplified in the changing nature of resource ownership in New Zealand.

The *iwi* are custodians of the land and have a responsibility to maintain the land for future generations. This is achieved through the concept whereby *iwi* are *kaitiaki* or stewards of the land. Forestry concepts and timeframes relate well to the Maori who believe in an intergenerational responsibility to the land. The notion that the land sustains the people and that people in turn have an obligation to sustain the land is deeply rooted in the Maori psyche.

Establishment of Lake Taupo Forest

Joe turned to his friend Charles Schell and commented, "It has taken a long time and it's been a tortuous path but it has happened. It has happened because the government, through people like yourself and those before you, and men like Sir Hepi[1] had a vision and had the courage to see their dream fulfilled."

Mr Schell, the general manager of Crown Forestry, a wholly government-owned group charged with managing the government's remaining interest in planted production forests, agreed with Joe, with whom he has worked for many years. "Neither party could have achieved this outcome without the other," he pointed out. "This is a day to celebrate and the beginning of an even stronger relationship between the government and Ngati Tuwharetoa."

The planting of Lake Taupo Forest started in 1969. The government, under a lease agreement with local landowners, established the forest. The necessary financial resources were provided by the government. A total of 22 000 hectares of commercial forest (primarily *Pinus radiata*) has been established over a total leased land area of 31 000 hectares. This area is spread over 61 land blocks, representing some 10 000 Ngati Tuwharetoa landowners. The establishment of Lake Taupo Forest took approximately 17 years, with an average of more than 1 000 hectares being planted each year.

[1] Sir Hepi Te Heu Heu was the late paramount chief of Ngati Tuwharetoa.

A cable hauler in Lake Taupo Forest harvesting mature trees with a piece size of 2 to 3 tonnes (courtesy Lake Taupo Forest Trust).

The establishment of Lake Taupo Forest was initiated for many reasons. John Malcolm, the New Zealand Forest Service District Ranger initially responsible for the establishment and management of Lake Taupo Forest, noted that, "Lake Taupo is a very important ecosystem deserving a high level of protection. The government believed that conversion of this land to pastoral farming could have detrimental effects on the lake and its tributaries, and therefore had a preferred option of converting the area to commercial forestry." In addition, the government had a policy of expanding the commercial forest estate, of creating employment and of assisting regional development. The core concept was to provide economic benefits from future timber harvesting, while bringing undeveloped or idle land into production. Environmental and ecological benefits would include soil and water conservation, which in turn would protect the lake and its tributaries. Cultural benefits and values would be retained as they were specifically incorporated into the lease agreement. As described below, large areas of the land were left undeveloped to protect cultural sites and areas of unique or important vegetation or scenery.

Gaining consent from the collective owners on the Maori lands proved to be one of the greatest difficulties in establishing Lake Taupo Forest. Each land block has a separate title with different groupings of owners. This multiple ownership and governance structure affects the traditional development patterns of these lands. Decision making is slowed by the need for inclusive dialogue and collective agreement. Often the smallest and least economically viable blocks have the greatest number of owners, which makes reaching a collective agreement a challenging process. To further complicate matters, many individual owners did not live near the land, and in some cases were living abroad. Ngati Tuwharatoa *iwi* went through an exhaustive process of engagement with a diverse group of tribal families scattered not only around New Zealand, but around the globe.

It is little wonder that it took the resources of the government to attempt this project, because many private sector interests would have been daunted by the complexity of the challenge. "In particular," observed Mr Malcolm, "the lease came about because two groups, which had similar goals, felt comfortable with each other, and felt they could commit to a long-term project in an environment of trust and understanding."

Yet, without the willingness to include both large attractive blocks and the smaller less attractive blocks, the deal might not have proceeded. There was an unspoken desire to see the same opportunities afforded to all members of the *iwi*. Creating an environment of trust and inclusiveness required considerable determination.

From the landowners' perspective, the largest impediment to the development of their land was lack of access to finance. Normal sources of finance, where the land is used as security for loans, were not acceptable to the members of the *iwi* on the basis that it puts the land at risk (albeit small) of alienation. Additionally, and perhaps more pertinently, debt funding of forestry is generally ill-advised given the absence of cash flow from which the debt can be serviced.

The project required access to considerable funding from the outset. The many individuals involved meant that the initiative incurred significant costs just to seek their participation. At the time, financial resources even to enable the initial owner-coordination process was beyond the means of the Ngati Tuwharetoa.

Most of the land supported naturally regenerating low forest, resulting in high costs for land preparation and plantation establishment — creating a further barrier to the self-development option.

A project of this nature requires not only a vision, but also the energy and leadership to make it happen. The *mana* (esteem) of Sir Hepi and other senior members of the *iwi* cannot be underestimated in ensuring the project got off the ground.

"Many landowners could see little benefit for themselves in planting trees, as the rewards were 30 years hence and many were likely to have passed on by that time. Why then should they forgo what little benefit the land could produce now, for a greater benefit that they might never see in the future? Convincing them to see the long-term benefits for future generations was a significant challenge," admitted John Hura, now a professional forester working for New Zealand Forest Managers Ltd.

Mr Hura's grandfather was one of the many people involved in getting the forest concept accepted, and it is a fulfillment of the vision to see people who were not even born at the time the forest was started, now being employed at all levels of operations, and additionally earning a significant financial return from their ownership of the land.

Previously, the land on which Lake Taupo Forest is planted was used for low-intensity livestock grazing, or comprised cutover indigenous forest and scrub lands that had little productive use. The land was, at best, marginal for farming with the multiple land ownership and separate titles making it difficult for farms of a viable size to develop. Infrastructure development and enhancements such as fertilizer application were limited.

It is with this background that Joe, as a boy, could see all this land that his *iwi* had, but there was no way of earning a living from it. They did not have the money to develop the land into something productive. Selling the land was not an option. *Toitu te whenua* ("the land remains forever") was what all his people believed. They belong to the land and the land belongs to them.

When the government expressed interest in forest development, a change in land use to commercial forest was mooted. However, a decision was not made overnight. The owners had been farmers for a long time, and the thought of tying up the land in commercial forestry activities for at least a generation was not an easy pill for many to swallow. To overcome these attitudes took courage on the part of the leaders and some innovative thinking in terms of management.

Ownership and management structures

The government was itself involved in large-scale afforestation projects in New Zealand for many years through the New Zealand Forest Service. This government agency established and managed commercial forests throughout the country, while also pursuing social and environmental goals as an employment provider and as a conservation agency. During the 1970s and 1980s, the establishment of large-scale commercial forests on leased Maori land was seen as the blueprint for extending the nation's forestry estate and providing a development option on largely undeveloped land.

Commercial forest development by the government on Maori land in New Zealand reached 52 000 hectares across 20 lease forests by 1987. Most leases were for 99 years (long enough to support three rotations of commercial forest crops) and involved the payment of annual rent to landowners (most rentals are generally in the order of six to eight percent of land value per year). In exceptional cases, a stumpage-sharing arrangement was incorporated into the lease agreement. This structure was written into the Lake Taupo Forest lease agreement (the largest Crown forest lease) along with a timeframe of 70 years.

Collaboration among the principal stakeholders — the government, the landowners and forest management companies — continues to highlight the principles of partnership. Stakeholder communication is vital. The landowners are preparing to move from the role of forest landlords to forest resource owners and managers, and this is requiring increasingly strong leadership and collective vision.

Two companies, representing each of the ownership interests in the forest, currently manage Lake Taupo Forest. New Zealand Forest Managers Ltd. has managed the forest for the past 15 years on behalf of the government. Management covers all aspects of the lease (including harvesting) through to the time when ownership of the forest will be transferred to the Ngati Tuwharetoa. When this transfer occurs, the Lake Taupo Forest Trust (the representative body

that acts on behalf of the multiple owners) will assume full management control and ownership. Lake Taupo Forest Management Ltd, a private forest management company, has been commissioned by the Trust to ensure that optimal forest management is maintained throughout the transfer process.

"The combined commercial, social and environmental model of Lake Taupo Forest is an excellent example of the ability to marry together different entities with multiple objectives, through constructive sharing of resources," said Mr Schell. "These multiple objectives focus on the delivery of economic goals along with environmental, social and cultural outcomes for the landowners and the government."

Excellence in forest management

The Lake Taupo Forest Lease was structured around the concept of multiple-use forestry. The lease agreement included objectives such as erosion control, wildlife management and protection of *wahi tapu* (sacred sites) — in juxtaposition with the production of timber. Adhering to this respect for cultural and spiritual connections to the land (that is, respect of *wahi tapu*) is a vital component in the relationship between landowners and the government. The high degree of cooperation among stakeholders has made this a special case.

The forest is being managed with a major focus on growing high-value timber suitable for sawing and peeling. The species of choice is *Pinus radiata*, a softwood tree originating in California, which has adapted so well to New Zealand conditions that growth rates are among the highest in the world. Superior genetic stock is selected, taking advantage of New Zealand's extensive radiata pine-breeding programme. Land preparation techniques and silvicultural regimes aim to maximize site utilization and grow large-diameter sawlogs on relatively short rotations (28 years).

The management regime focuses on clearwood production, typically involving three prunings and two thinnings to produce clear, knot-free logs with large sheath of clearwood grown over the knotty core. Labour-intensive pruning and thinning provide the added benefit of employment in the early- to mid-rotation years of the forest.

Clear felling is the main harvesting system used in plantations in New Zealand, with particular emphasis being placed on volume and value recovery. Harvesting in Lake Taupo Forest consists primarily of ground-based extraction systems. Some harvesting on steeper slopes necessitates the use of cable-hauler logging systems. Soil protection is a key objective, with the use of rubber-tyred skidders to minimize soil disturbance and soil compaction. The presence of riparian strips adjacent to all major watercourses ensures that sediment generated from forest operations is trapped before entering streams and rivers.

The forest stands generally produce up to 700 cubic meters per hectare at harvest. Of this, up to 30 percent are high-value pruned logs — with a further 50 percent being suitable for general sawlogs.

A major recent achievement has been the attainment of Forest Stewardship Council (FSC) certification for Lake Taupo Forest. The FSC is a globally recognized independent certification system sought by forest owners as testimony to the sustainable management practices within their forest. Important measures relate to forest sustainability, environmental standards and social contributions. This certification benchmarks the management alongside the best in New Zealand and helps ensure continued market access for "certified" products.

The location of the forest — on the shores of New Zealand's most popular lake, and a major tourist destination — means the visual impact of forest operations can be a major issue. Adherence to best practices for harvesting and road construction, coupled with the rapid replanting of the harvested site ensures that negative visual impacts and consequent detrimental public perceptions are minimized.

The main highway connecting the two major North Island cities, and extending the entire length of the island, skirts the western boundary of the forest. This exposure to the public brings problems related to forest protection. Fire control is a major issue in the hot summer months and general access issues for public use (recreational activities such as cycling, fishing and hunting) are an ongoing concern. The forest is generally closed to the public in the interests of fire control and to further protect the forest from the impact of clandestine activities.

Benefits of development

The benefits of the forest are evident from the financial earnings derived from harvested trees. Forest harvesting has returned significant monetary benefits to the government and Ngati Tuwharetoa. Infrastructure development (especially road construction) has expanded — especially as the forest has matured and wood-processing facilities have been established.

During the initial planting years (1969–1991), many jobs were created for local people. Much of this workforce made the transition to silvicultural activities (pruning and thinning) once the establishment phase was complete. Further employment was generated as road construction and harvesting commenced and the forest cycle was completed. Since this employment and development occurred on previously undeveloped or idle lands, it represents job creation as opposed to job replacement. Less tangible social benefits achieved through employment — including increased self-esteem and establishment of role models — are difficult to quantify, but nonetheless are important.

"It is vital that whatever we do, we ensure the government gets a proper return on the funds it has entrusted to us. The benefits that accrue include earning a financial return on investment, combined with meeting the government's social and regional development goals and assisting Maori to achieve their aspirations," explained Murray Sherwin, Director-General of the Ministry of Agriculture and Forestry.

Environmental and ecological benefits are also important. Lake Taupo and its tributaries are a world famous fishing and tourism attraction. Recreational lake users have benefited from the improved water quality that has resulted from better and more sustainable soil and water management in Lake Taupo Forest catchments.

The full potential of the economic power that the forest bestows on Ngati Tuwharetoa has yet to be realized. Lake Taupo Forest Trust administers an enormous asset that produces an increasing cash flow. This allows the Trust to invest in a range of other initiatives. The forest cash flow provides a debt-servicing capacity and enables borrowing to invest in new projects. This gives the *iwi* potential to develop its own processing or value-added plants if it chooses, without putting the land at risk.

Lake Taupo Forest also helps the government to meet its targets for expanding Maori business, economic and social benefits. "When looking at the history of Crown involvement in Maori land development, the Crown Lease model has been probably the most successful to date," observed Mr Schell.

Ownership in transition

A variation to the lease in 2000 established a process by which Ngati Tuwharetoa will resume management control of the area at the rate of around 1 000 hectares per year. This will result in ultimate stewardship of the entire resource (land and trees) by landowners within two decades. These decisions on behalf of Lake Taupo Forest beneficiaries pose major commercial and logistical challenges for the Lake Taupo Forest Trust. Substantial sums of money are being dealt with and prudent investment decisions on behalf of beneficiaries are needed.

Proceeds from forest harvesting are re-invested in forestry, and also in other sectors such as health, housing, education and community projects. In particular the *iwi* is committed to providing education for young people with the hope that they can become part of the Ngati Tuwharetoa management team (in forestry and in other sectors such as tourism). Already, many of the people and businesses operating in the forest (including contractors) are of Ngati Tuwharetoa descent. Thus the process of managing their own destiny with their own resources is well advanced and is continuing to develop.

Joe Heke, who is a member of the Trust, has watched at close quarters the way its activities have expanded in the past few years as the owners have assumed a greater degree of ownership and management responsibility for the forest. This aspect of taking part in the decision-making process and having increasing local control is particularly pleasing to Joe. "Controlling our resources for the long-term benefit of our people is part of our duty as *kaitiaki* (stewards) of the land whilst we are here," he acknowledged.

Implementing the transfer of the government's forest ownership rights to the Maori landowners is the current task of Mr Schell. Detailed planning and liaison with the Lake Taupo Forest Trustees is vital to facilitate a smooth transition. This is part of the mandate of Crown Forestry, acting on behalf of the government.

Maintaining a professional management approach to ensure forest sustainability is an integral part of the handover process. "Clear communication between stakeholders is imperative in this," said Mr Schell. Both the government and Lake Taupo Forest Trust are aware of the expectations of each party and the need for the handover process to take place with a minimum of disruption to ongoing forest operations.

The benefits of this continuity are re-iterated by Mr Heke: "As Trustees we see the need for a strong relationship with the government," he explained. "This helps our forest management company, and in turn, helps our contract workforce. We are conscious of the need to create a suitable operational environment for our contractors."

The transfer of control is catalysing a paradigm shift for Ngati Tuwharetoa — from passive landlords to active forest owners, managers and decision-makers for the forest. This transition, achieved through the planned and deliberate transfer of forest areas, has helped Ngati Tuwharetoa to achieve control of their resources and has empowered the *iwi* to determine its own destiny.

The story is not over yet, and adapting to new challenges with strong leadership and innovative thinking will be inherent to the success of Ngati Tuwharetoa. Forming the original Trust and entering into the lease agreement with the Crown took courage and vision. This must now be extended to the next phase of resource ownership by ensuring that re-investment of revenues is astute and commercially focused. "The Lake Taupo Forest Trust looks forward to meeting these challenges on behalf of our Ngati Tuwharetoa people," Mr Heke indicated. "It is our responsibility to give our children a future on their land, a land that is in better shape than when it was given to us to care for, and in turn those children to hand it on to their children. *Toitu te whenua.*"

The scar across the forest that Joe and Charles looked over is the result of harvesting the first crop of commercial trees from the land, the beginning of the process to transfer ownership of the trees to the owners of the land. The

government has received a return on its investment — and at the same time, the *iwi* has received cash and retains the land, ready for the cycle to start anew. The land will soon be replanted and green again, as the next crop of trees further builds on the foundation prepared by those farsighted people who began the process more than 30 years ago.

It is indeed a moment for reflection and satisfaction that with vision and determination, great things can be achieved.

About the authors

Don Hammond, has worked for more than 25 years in all aspects of forest management within New Zealand and internationally. He is a New Zealand Institute of Forestry Registered Consultant, and has completed numerous assignments for commercial and government agencies. His highest profile work in recent years has been the eradication of the painted apple moth from New Zealand by aerial spraying over a large city. Previous positions include Senior Policy Analyst for the New Zealand Ministry of Forestry, Manager of the New Zealand Forestry Training Centre and Operations Manager for the New Zealand Antarctic Programme.

Bryan McKinlay, prior to his work as a private forestry consultant, was General Manager for a large Maori-owned forestry company that was in a joint venture partnership with a Korean Company. The joint venture established several thousand hectares of radiata pine plantations on Maori-owned land. Bryan previously managed the East Coast Forestry Project, aimed at encouraging planting of trees on erosion-prone land and for a wide range of other forest management operations.

Pruning in Lake Taupo Forest, New Zealand (courtesy Lake Taupo Forest Trust).

IMABARI–TAMAGAWA–ASAKURA FOREST: A CENTURY OF WATER CONSERVATION

Yasuhiko Nisawa

Name of forest:	Imabari–Tamagawa–Asakura Watershed Forest
Location:	Ehime Prefecture
Area (hectares):	2 500
Managing entity:	Imabari–Tamagawa–Asakura Watershed Forest Cooperative
Mgt. objectives:	Watershed protection, recreation, wood production
Country:	Japan

The prefecture of Ehime, located on the island of Shikoku in southwestern Japan is one of the country's most disaster-prone areas. Typhoons and drought frequently devastate the area. Although the prefecture receives relatively little precipitation (about 1 200 millimetres annually), floods frequently occur along the Soja River — especially when typhoons generate torrential rains. The area also suffers from severe droughts periodically.

For many years, two major concerns of the people and officials in the region have been to manage the excess water during times of flooding and to alleviate water shortages during droughts. Considerable emphasis has been given to regulating water flow through careful management of the mountainous forests in the region.

During the feudal era (prior to 1868), the governing feudal lords attempted to protect the Soja River watershed by restricting people's access to parts of the surrounding forests and prohibiting the harvesting of forest products. The feudal lords also constructed dykes to control the water flow of the Soja River. At the

same time, the meandering course of the river was straightened to guide the flow of water directly from the mountains to the sea in order to minimize damage to the watershed.

These water management initiatives took many years to complete. Even after completion of the initial stages, all men over 16 were required to work every year to dredge the channels and maintain the dykes. "Although the work was hard, people generally obeyed the order, knowing that they would benefit from the work. Today, after many generations, we appreciate what they did as we now have controlled water flow from the river," said Ken Aoi, the current chairperson of the Imabari–Tamagawa–Asakura Common Forest Management Cooperative (ITA Cooperative), which manages a major watershed area in Ehime Prefecture.

With the establishment of central government control under the Emperor in 1868, the government consolidated revenue collection, including the taxation of landowners. The government began conferring legal ownership over *de facto* private lands and started collecting land taxes from the "new" landowners. In fact, many lands were controlled privately, even before 1868, but without legal status.

In many areas, farmers had difficulty establishing ownership over communal forests since they did not have adequate evidence of prior use and occupancy. Many were also afraid or unwilling to pay the land tax levy. Throughout the country, many communal forests were nationalized in the absence of identifiable private "owners" to whom the land could be allocated.

The experience with the Imabari–Tamagawa–Asakura forests was, however, markedly different. In 1880, the local farmers, fearing the loss of their communal lands, petitioned the prefectural governor to recognize their communal property rights. However, despite the governor's support, the petition was rejected by the central government.

During the following years, the local people paid for land surveys, filed an endless number of petitions and made provisional payments of land taxes with support from the prefectural government. The prefectural government condoned the status quo, recognizing the importance of the communal approach toward forest management developed over the years by the local people and endorsing the people's close relationship with forests.

In 1891, the continued strong petitions by the prefectural government finally struck a chord with a central government official, who had once been a governor of the prefecture. In 1892, the central government finally recognized the rights to communal ownership of the forest by local people — 12 years after the initial request. Initially, ownership rights to the forests were vested in towns and villages. By 1926, however, ownership had evolved into a cooperative, which was recognized as a special legal entity. The cooperative was accorded recognized ownership and management rights over 2 500 hectares of communal forest lands in the prefecture.

Evolution of the ITA Cooperative

In 1897, a new Forest Law came into effect, providing a legal basis for forest protection and management endeavours in Japan. Separate legislation was framed to allow the creation of specialized cooperatives to manage communal lands, such as the Imabari–Tamagawa–Asakura Common Forest. However, only a handful of cooperatives were established to manage communal lands, mainly because of difficulties in achieving consensus among the diverse stakeholders from various towns and villages.

The ITA Cooperative was unusual in that the community was exceptionally cohesive as a result of the many years spent struggling together against floods and droughts, and working to control the Soja River.

"These characteristics helped to build consensus among people for creating a cooperative aimed at forest protection," observed Dr Fusho Ozawa, former Director-General of the Forestry Agency of Japan, who has taken personal interest in the modern development of the ITA Cooperative. "There are two key factors which have carried the ITA Cooperative through to the present — long-term commitment by the community and selfless leadership by a handful of strong individuals," he added.

Extensive floods in 1892 killed 23 people, injured 10 others and destroyed 1 300 houses, as well as roads, dykes, bridges and several hectares of paddy fields. The newly-formed cooperative recognized the urgency for conservation efforts in the 2 500 hectares of forest lands. However, the cooperative was not endowed with funding and contributions had to be collected from the cooperative members.

In 1893, the (still *de facto*) cooperative decided to permit half the communal forest to be used by non-members on payment of a subscription fee. This was a means of raising the necessary funds to implement effective forest management. The local assemblies, which were members of the cooperative, also paid membership dues. The promulgation of the new Forest Law provided access to new resources since the law enabled the central government, through prefectural governments, to provide funds and technical guidance to encourage tree planting.

Encouraged by this assistance, the cooperative took an important step forward by deciding to undertake extensive tree planting to rehabilitate its forest lands. In the early stages (around 1902), trees were planted mainly for soil erosion control and water conservation. Growing realization that the cooperative must become financially self-reliant led to the decision to plant more commercially-oriented timber species such as Japanese cedar (*Cryptomeria japonica*). The first trees, planted across 280 hectares, have now been growing for more than 85 years and those remaining from these early plantings currently have an average diameter of 70 to 80 centimetres.

Planting continued for 20 years, during which time a total of 1 048 hectares were afforested. Among the first trees planted were 75 hectares established by students, with financial support from schools and parents. It was envisioned that the schools and the cooperative would share the final revenue.

Japanese cypress (Chamaecyparis obtusa):*85-year-old (upper-storey) and 8-year-old (lower-storey) trees (courtesy Yasuhiko Nisawa).*

In 1926, following the early success with forest rehabilitation, members of local assemblies in 14 towns and villages in the prefecture decided to formally transfer ownership of the communal forest lands to the cooperative — enabling it to become an independent entity.

The subsequent years — from 1927 to 1940 — are now referred to as "The Silvicultural Period," when the focus was on protection and maintenance of the planted trees. In 1940, the ITA Cooperative celebrated its fiftieth anniversary and the fortieth year since the first trees were planted. However, around this time, plans for the expansion of rehabilitation efforts were hampered by a lack of funds. Available funds were exhausted for the maintenance of the planted trees, road improvements and various other infrastructural developments.

During and immediately after the Second World War, a heavy demand for timber throughout Japan resulted in the harvesting of many trees in the communal forest. In 1943, approximately 30 hectares of 30-year-old forest were destroyed by fire. Following the war, and during an acute timber shortage, local governments urged the ITA Cooperative to permit harvesting of trees by the owners. These various factors contributed to the reduction of the planted forests to only 150 hectares — about one-seventh of their maximum previous extent.

In September 1945, a strong typhoon almost destroyed the dykes along the Soja River, creating an imminent danger of flooding. The memoirs of Mr Michitora Ochi, the eighth chairperson of the cooperative, recall this as a major catalyst for stimulating the rehabilitation of the denuded forests.

Second planting phase

Throughout the late 1940s to the early 1960s, the cooperative continued rehabilitating the denuded areas. This period is documented as "The Second Planting Phase," in the history of Imabari–Tamagawa–Asakura Forest. Initially, 150 hectares of deforested areas and 150 hectares of bare lands were targeted for reforestation and afforestation, respectively.

Prior to tree planting, ITA cooperative staff, headed by a trained forester, conducted surveys, planning and evaluation of potential planting sites. The cooperative hired local farmers to carry out tree planting. In order to accelerate planting, the cooperative introduced a revenue-sharing scheme, designed to benefit those who participated in planting and protection, when the trees were eventually harvested. The cooperative planted 600 hectares under its direct supervision, with an additional 600 hectares being established under the revenue-sharing strategy.

During this period, the cooperative placed special emphasis on the construction and maintenance of roads. An adequate road network is indispensable for tree planting and good forest management. "Forest roads are very important, not only in the ITA Cooperative, but throughout Japan, because they facilitate effective and economical transport of workers, seedlings and equipment," explained one official. "In addition, roads enable thinning and harvesting operations to be mechanized, thereby overcoming labour scarcity."

The ITA cooperative staff implemented initial surveys and carried out the basic design for forest road construction. Local firms were commissioned to provide the detailed design and to implement the actual construction work.

Adjusting to stagnation in the forestry sector

In 1961, the central government liberalized the timber trade in Japan, because demand for timber was very high and the domestic timber supply was limited. At that time, increasing timber prices were cited as a leading cause of price inflation in Japan. The liberalization resulted in heavy timber imports, causing the domestic forest-growing industry to languish.

By 1986, 2 181 hectares (88 percent) of the total 2 500 hectares managed by the ITA Cooperative had been planted. The influx of low-cost wood imports, however, made it increasingly difficult to justify expenditures on plantation development and management from a financial perspective.

The downturn of the industry led to what is known as the "the stagnation of Japanese forestry," which has largely persisted until the present time. With massive timber imports holding down domestic timber prices and rising wage rates in the expanding Japanese economy, the financial viability of domestic forestry was eroded dramatically during the 1980s — a worrying situation for the ITA Cooperative.

As early as 1963, the ITA Cooperative had adopted a 50-year-harvesting cycle, which was maintained as the standard for the cooperative until 1986. The 50-year-cutting regime is several years longer than that officially prescribed for the region. The cooperative harvested only one-fiftieth of the total area every year, thus allowing adequate time for trees to regrow in harvested areas. This

approach was previously considered to be optimal for maximizing revenues, while also being beneficial in terms of forest conservation.

By the mid-1980s, like most forest managers in Japan, the cooperative faced significant financial challenges. In 1983, the ITA Cooperative abandoned direct employment of local farmers and opted instead to contract the local Forest Owners' Association to carry out silvicultural work. This change was made for three reasons:

1. The aging of the rural population and migration from rural areas to urban and industrialized centres resulted in a critical decrease of available labour.
2. The capacity of the local Forest Owners' Association was underutilized and it had considerable forest management experience to assist the ITA Cooperative.
3. The quality of work by the Forest Owners' Association silvicultural teams was considered to be generally higher.

Forest Owners' Associations were first created in Japan in 1907, under the mandate of the new Forest Law. In 1978, an independent Forest Owners' Association Law was promulgated. Along with the increasing importance of Forest Owners' Associations in practical forest management, an important legal consolidation has also taken place. In Japan, there are almost 1 100 Forest Owners' Associations and approximately 1.2 million forest owners. Forest owners participating in the associations are not confined to individual forest owners but also include companies, temples, shrines and various other types of organizations. Forest Owners' Associations have their own labour forces, and are paid for the forest-related work assigned to them.

Environmental conservation

Although the ITA Cooperative has faced major obstacles that have hindered financial viability, the value of its forests for environmental conservation is now fully recognized. "The founding philosophy of the ITA Cooperative — water conservation through forest conservation — is finally blooming after 100 years of people's endeavours," enthused the present cooperative chairperson, Mr Ken Aoi, who also stressed the financial difficulties that the cooperative is experiencing.

Nonetheless, Mr Aoi noted that that the structure of the ITA Cooperative affords it several advantages over most other private forest owners. For example, the ITA Cooperative belongs to the Ochi–Tamagawa Forest Owner's Association, which has about 1 300 members who collectively own 7 000 hectares of forests, including the 2 500 hectares owned by the ITA Cooperative. Thus, all other forest owners, on average, own 3.5 hectares of forests. This confers the ITA Cooperative significant scale economies in its forest management activities. In

addition, the central government pays the cooperative for its services in planning, road design and construction and for forest land conservation activities that are designated as public works, thus providing a valuable source of revenue to help defray forest management costs.

In total, the ITA Cooperative has planted 2 412 hectares, mainly with Japanese cedar and Japanese cypress (*Chamaecyparis obtusa*). An extensive forest road network has been established (with a per hectare road density of 20.4 metres), and is carefully maintained by the cooperative.

The ITA Cooperative has largely solved the problems created by excesses and shortages of water through proper forest management. Since 1979, the region has not experienced any significant flooding. Water flow in the lower parts of the watershed catchment has stabilized. Even during droughts, the Soja River maintains its water flow, thereby meeting the needs of people, particularly farmers. Today, water from the Soja River contributes to the development of a local industry — towel production — which requires significant volumes of water in the manufacturing process. Ehime Prefecture is the largest towel production centre in Japan.

The establishment of a complex, multistoryed forest with long-harvesting cycles — along with a dense forest road network — is ideal for good forest management. The ITA Cooperative, which started out rehabilitating bare forest land in 1927, now provides an exemplary forest management model for the rest of Japan — and the wider Asia–Pacific region.

Present situation

The future of the ITA Cooperative forest seems brighter. "To ensure proper watershed management and natural disaster prevention, we always have to keep in mind the fragile soils of this region," said Mr Akira Ochi of Tamagawa town. "From this point of view, adopting a longer harvesting cycle, in tandem with a multi-storyed canopy forest, constitutes prudent forest management. Longer harvesting cycles (combined with heavy thinning that assures a continuous timber supply to the local people) are the only way to cope with continuing stagnant timber prices."

The ITA Cooperative is now applying a 100-year-cutting cycle, harvesting only one-hundredth of the total forest area each year. Total volumes harvested are consequently lower, but comparatively higher-valued timber is produced. Unit prices for older wood are higher and the costs of tending each year are lower. The longer harvesting cycle means that the final crop trees are larger and the density of stands must be kept lower. Consequently, some additional revenue is earned from larger volumes of thinnings.

"Privately-owned forests in the region are now generally in disarray due to stagnant timber prices. In fact, very few forest management activities are now being undertaken by private forest owners," lamented Mr Akira Ochi. "For instance, thinning is no longer carried out in a timely manner. Consequently, forest stands are excessively dense, retarding tree growth and preventing sunlight from reaching the forest floor. This in turn inhibits understorey growth and kills forest grasses, thereby reducing the water-holding capacity of the soil. In comparison, the floor of the well-managed ITA Cooperative forest receives considerable sunlight — thanks to its multi-storyed canopy and the careful thinning regime carried out by the Forest Owners' Association on behalf of the cooperative. The ITA forest, in my view, demonstrates a system that must be followed by other local forest owners."

About the author

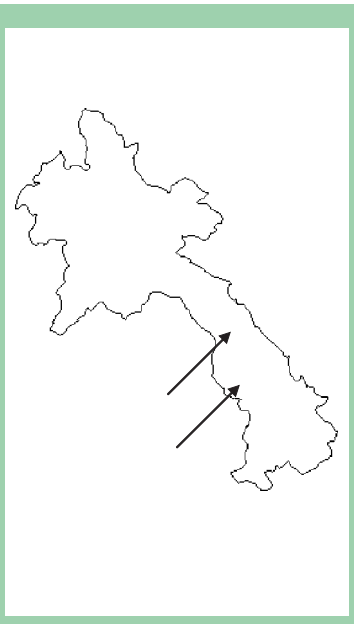
Yasuhiko Nisawa graduated from the University of Kyoto in 1966 and joined the Forestry Agency of Japan in the same year. During his 30 years of dedicated service to the forestry sector, he also worked with the FAO Forestry Department (1980 to 1985), and with the Japan International Cooperation Agency (1992 to 1994). He retired from government service in 1996. Currently, he is Executive Director of the Japan Overseas Forestry Consultants Association (JOFCA).

Primary school pupils planting Pinus *spp. and flowering trees (courtesy Yasuhiko Nisawa).*

DONG PHOU XOY AND DONG SITHOUANE PRODUCTION FORESTS: PAVING THE WAY FOR VILLAGE FORESTRY

Yayoi Fujita, Thoumthone Vongvisouk, Houngphet Chantavong and Somvilay Chanthaleunnavong[1]

Name of forest:	Dong Phou Xoy Production Forest/Dong Sithouane Production Forest
Location:	Dong Phou Xoy, Khammouane Province/Dong Sithouane, Savannakhet Province
Area (hectares):	115 000 (Phou Xoy); 212 000 (Sithouane)
Managing entity:	District agriculture and forestry offices and village forestry associations
Mgt. objectives:	Multiple use, sustainable livelihoods
Country:	Lao PDR



For centuries, the Lao People's Democratic Republic (Lao PDR) was known for its abundant forest resources. In the past 60 years, however, forest cover has dwindled dramatically — from more than 80 percent in 1930 to 54 percent in 2000. According to the national Science, Technology and Environment Agency, forest area continues to decline at a rate of 300 000 hectares per year. Timber and wood account for approximately 40 percent of national export revenues, constituting a critical part of the country's economy.

[1] Text relating to SUFORD has been adapted by the editors — from contributions by Manuel Bonita and Edwin Payuan — and added to the original case study.

Shifting cultivation and land clearing for permanent agriculture are the main causes of deforestation. Poor logging practices further contribute to forest degradation. Management challenges include weak planning capabilities, poor harvesting practices and a lack of monitoring capacity.

Forest Management and Conservation Programme

In the midst of increasing environmental awareness, the government has implemented several initiatives since the early 1990s — to encourage conservation and to promote sustainable forest management in state-owned production forests. One such programme, the Forest Management and Conservation Programme (FOMACOP), was initiated in 1995 to promote sustainable forest management and biodiversity conservation with the active involvement of local authorities. Particular focus was given to involving provincial and district agriculture and forestry offices and local villagers. The World Bank, the Government of Finland, the Global Environment Facility and the Lao Government together provided US$20.3 million for FOMACOP implementation.

FOMACOP commenced in January 1995, with a planned duration of 10 to 15 years. A central project office was established in the Department of Forestry, which administered two subprogrammes. The Forest Management Sub-Programme (FMSP) focused on "village forestry" in production forests. The National Biodiversity Conservation Area Management Sub-Programme supported the sustainable management of national reserve forests. The two subprogrammes were operated at the field level through project offices located at the Provincial Agriculture and Forestry offices in Savannakhet and Khammouane provinces.

In 1997, the FMSP commenced its field operations in two central provinces. FMSP activities covered 327 000 hectares of forests, previously designated as Provincial Production Forest under a forest survey conducted in 1989 by the National Office of Forest Inventory Project. The forested area is situated west of the Annamite Range along the Mekong Plain. The area, with an annual average rainfall of 1 450 millimetres, was covered originally by lowland semi-evergreen forest, with extensive areas of dry dipterocarp forest, and mixed deciduous forest.

The majority of the population in the region is classified into two main ethnolinguistic groups — Mon–Khmer and Tai Kadai. The main livelihood is agriculture, primarily paddy cultivation in association with swidden farming, cash cropping and livestock husbandry.

The FMSP had an overall objective of working to institutionalize "village forestry" as a core national forest management strategy.

Village forestry

The concept of village forestry or village-based forest management launched a major policy debate in Lao PDR regarding decentralization of production forest management — from state-owned to locally owned and managed forests. Village forestry essentially means local communities take the lead in managing the forest in partnership with district and provincial foresters. The rights of villagers to manage and utilize forest resources are recognized legally. Villagers become active participants in resource management planning processes and village district authorities, rather than provincial authorities, make decisions regarding forest resource use. This is a major change from the past when all management decisions related to production forests were made by state and provincial forestry enterprises. Such forestry enterprises typically promoted wasteful, large-scale commercial logging that generated few benefits and little income for local people. Village forestry consequently introduced a significant and innovative change in philosophy to encourage the sustainable management of production forests by local people.

Participatory field training provides opportunities for strengthening local capacities (courtesy Patrick Dugan).

The FMSP focused on legitimizing the local management of forests as well as strengthening the villagers' ability to manage resources. The FMSP trained core groups of local villagers (the *koum kaen sane* or Village Forest Management Groups) on forest inventory and survey techniques and the principles of sustained-yield management based on a 5- to 10-year harvesting cycle. The *koum kaen sane* consisted of up to 15 volunteers from a given village, with literacy generally being a prerequisite to membership. The *koum kaen sane* were largely informal units organized within the village and trained in forest management during the first year of the FMSP.

Following initial activities, the FMSP encouraged the conversion of the *koum kaen sane* into Village Forest Associations (VFAs), which were based on formal membership, and therefore could be officially recognized by both district and provincial authorities. VFAs were required to develop long-term resource use and management plans based on the production capacity of the forest. Management rules and procedures for monitoring their forests were also put into place.

The FMSP also encouraged economic independence for villages by introducing a "village fund" established with profits earned from timber sales. The VFA decided how the village fund would be utilized contingent on final approval by district authorities, including the district governor. In most instances, village funds were

used to develop roads, schools, small-scale irrigation systems or to provide community services.

To implement forest management activities, local people were hired not only as labourers, but were also key decision makers in the management process. Villagers were involved in forest boundary delineation, forest inventory and survey, resource-use planning, drafting of rules and forest monitoring. The emphasis on decentralized forest management is best illustrated in the underpinning motto of the FMSP: "Whoever manages decides. Whoever decides plans. Whoever plans collects the necessary information."

Village Forestry Associations in Dong Sithouane and Dong Phou Xoy

In 1995, the FMSP initiated activities in Dong Sithouane in Savannakhet Province. Dong Sithouane covers an area of 212 000 hectares encompassing 85 villages in two districts. The initial activities of the FMSP in Dong Sithouane involved 10 villages that were grouped together into 6 *koum kaen sane*. These groups were provided with basic training in forest survey and inventory, management planning and sustainable logging techniques during the first year of operations. They worked closely with district foresters and staff from the Production Forest Unit of the provincial forest department.

The FMSP commenced activities in Dong Phou Xoy in Khammouane Province in 1996. This forest covers a total area of 115 000 hectares, including 73 villages in three districts. In Dong Phou Xoy, an initial 13 villages formed ten *koum kaen sane*.

"As the name suggests, we started to work with a small core group of villagers to train them in forest management techniques. In a way, it was just like nurturing a seed (*kaen sane*) to grow a tree," explained Bounoum Vilaysone, from the Production Forest Unit of Khammouane Province.

In 1996, an additional 23 villages were incorporated into FMSP activities in Dong Sithouane. During the course of the year, the *koum kaen sane* were transformed into VFAs, which had broader membership among villagers. The formation of VFAs broadened the forest management responsibilities of local communities — beyond forest surveys and logging timber — to include requirements for preparing forest management plans and developing rules for access and management of forests, as well as implementing more extensive

Training on tree marking for local forestry officers and villagers (courtesy Patrick Dugan)

monitoring activities. Following the harvesting of timber, VFAs managed revenues from timber sales and invested these in village social services. By the end of the second year of the project, 23 VFAs had been established in Dong Sithouane while, in Dong Phou Xoy, the original 10 *koum kaen sane* had also been transformed into VFAs.

Not another government plan?

"When the project first approached us," a villager from Bakkhumkham Village in Dong Sithouane noted, "we were suspicious that it was just another plan to log our timber."

However, observing the development of the *koum kaen sane* and that profits accruing from timber sales actually returned to villages and were used for community development, the villager was convinced: "This could be a good way to manage our forest and actually bring benefits to our village," he acknowledged.

Other villagers in both Dong Sithouane and Dong Phou Xoy expressed similar views regarding the benefits of VFAs.

VFAs were organized on the basis of membership. Each member paid a membership fee of approximately US$0.75 upon registration. Members were eligible to participate in activities organized by the VFA such as forest inventory and survey, forest protection, monitoring and logging. Members who participated in these activities were paid by the VFA. In addition, VFA members collectively decided how to manage their forest and how to use the village fund.

Bounoum Vilaysone confirmed that village forestry facilitated close relationships between local foresters and villagers. "We conducted forest surveys and forest inventories together with a group of trained villagers. We also checked regularly with each village to monitor how each VFA was functioning," he elaborated.

Planning for sustainable forest management

Commercial logging was previously based on short-term profits for the companies, often at the cost of forest degradation in the village.

"When logging companies left the villages they would often leave vast areas of disturbed forest. We had no control over our forests," reported a member of the Xome Village VFA.

Another member of the same VFA said that they could not object to commercial logging under the old system because it was decided by the village leader who signed an official document with the private company.

Even foresters working at the provincial level had little say over the political decisions that allocated logging quotas to private companies. Furthermore, while the Forest Law (1996) obliged logging companies to undertake reforestation and rehabilitation, it was very rare that a company complied with this requirement and the provincial and district forestry offices did not enforce it.

The FMSP encouraged low-intensity and low-impact logging on a 5- to 10-year felling cycle. Low-intensity logging required a minimum of 25 metres between selected trees and excluded trees located within 30 metres of a stream. There was also a requirement to leave at least 10 seed trees per hectare. In addition, the FMSP facilitated active involvement of villagers in developing forest management plans. A series of training workshops developed villagers' organizational skills and strengthened the sense of mutual responsibility for forest resources in each village.

Bounoum Vilaysone worked closely with members of the VFAs in Khammouane Province and witnessed, first hand, the way that a sense of responsibility — for managing forests effectively — gradually increased among the members of the Dong Phou Xoy VFA. Several VFAs also entered into negotiations with outside resource users.

"It was interesting," Mr Bounoum observed, "that private companies were only half-joking in complaining to me that FOMACOP villages were tough to negotiate with — and that the companies could no longer operate commercial logging as freely as before in these villages."

The environmental benefits of the forest management introduced by village forestry were apparent to observers. "The kind of forest management encouraged by the Forest Management Sub-Programme took time and cost money, but it had much less impact on the environment," said Mr Bounoum. "Sustained-yield management required patience, but it mitigated forest degradation," he added.

The villagers who established VFAs in Dong Sithouane and Dong Phou Xoy noticed a marked decrease in forest degradation by the commercial logging operations of both private companies and state enterprises following the development of village-based management plans.

Monetary benefits

One of the important challenges arising from village forestry was devising an equitable way to share profits from sustainable harvesting between the VFAs and respective provincial and district forest offices. A system was developed whereby net profits (i.e. after deduction of royalties and taxes) were shared, with the local VFA receiving approximately 43 percent of the profit, and the rest being divided among various government agencies to compensate for administrative costs incurred during the facilitation of village-based forest management.

From the VFA share of profits, people who contributed labour to manage the forest were allocated a 10 percent share as a wage. The remaining money was pooled as a village fund. Redistribution of profits from timber sales was perceived by the members of the VFA as the greatest benefit of village forestry. With the introduction of a village fund, the profits accrued to the village and benefited a wide range of villagers in a tangible way. VFA members were generally content to see financial benefits returning to their village and not to particular individuals.

"In the past, when private companies came to log our timber, only the village head and those that were hired as labourers gained benefits," indicated a member of Xome Village VFA in Dong Phou Xoy. "The village fund gave us more autonomy to decide and initiate activities within the village without waiting for government assistance."

Box 1. Kengkhen Village, Dong Phou Xoy

The village forestry concept was introduced to Kengkhen Village in 1996. In the following year, a VFA was formed to manage approximately 500 hectares in the local vicinity, and nine villagers were selected to join forest management training organized by the FMSP.

The Kengkhen VFA worked to develop a forest management plan based on a five-year felling cycle. In 2001, the village carried out its first scheduled harvest and earned US$5 100. In the following year, the VFA opted, on advice from district foresters, to forfeit harvests in the areas designated as second and third year harvest plots due to inadequate forest density.

The VFA used the profits from the first sales of timber to provide credit to households with limited areas of paddy fields. New forestry legislation prohibited expansion of swidden lands (i.e. land for shifting cultivation), and it became essential for households to secure permanent agricultural land and diversify their livelihood basis. However, the majority of the households lacked financial resources to clear and convert forest into agricultural land.

Almost three-quarters of the village households borrowed from the village fund (at a nominal interest rate) to convert degraded forest lands into paddy fields. As a result, the proportion of households experiencing rice shortages decreased from 47 percent to five percent. It also enabled diversification into new livelihood opportunities. For example, Bounpheng Phommasing, the head of Kengkhen VFA, began to cultivate cash crops such as corn, peanuts and chilli peppers on his new agricultural land. Increased income and access to village credit also allowed his family to expand its agricultural activities into cattle raising.

Lessons from village forestry

The village forestry model triggered two main developments in villages that established VFAs:

1. *The development of village-based sustainable forest management plans.* Through village forestry, villagers gradually organized themselves and became accountable for implementing sustainable forest management. Resource boundaries were delineated and management responsibility was institutionalized. The development of VFAs also encouraged villagers to decide ways to manage forests collectively and to establish enforceable rules.
2. *Villagers were empowered through recognition of their rights to access and use resources as well as through their management decisions.* Where previously private companies and state enterprises had conducted unregulated commercial logging, villagers were now able to negotiate the terms of intervention with outside resource users.

Collaborative relationship

An additional benefit of the village forestry approach was that local resource management authorities were able to establish formal collaborative relationships with the villagers.

"Through the Forest Management Sub-Programme, we were encouraged to work with villagers who knew more about their forest," commented Bounoum Vilaysone. "This close working relationship with the villagers helped us to overcome the constraints imposed by shortages of staff working on village forestry activities," he added.

Furthermore, village solidarity was strengthened through the development of VFAs, which provided a mechanism for villagers to approach local forest degradation as a village problem.

Villagers who joined VFAs had their rights to access and use resources protected and also profited from the tangible financial benefits resulting from timber sales and the village fund. When a decision was made to develop village infrastructure, villagers offered their labour, which strengthened the sense of *kwaam saamakkhi* or solidarity.

Shortfalls and weaknesses

Although village forestry highlighted the potential of sustainable forest management by local communities, it also raised concerns regarding equity, overlapping resource tenures, replication to other villages and compatibility with central government policy. A major concern was the disparity in forest allocations among villages in production forests.

"The system benefited villages with greater access to forests, while other villages with limited access benefited little from the system," indicated Bounchan

Xayphannha, Deputy Director of the Forestry Office in Khammouane Province. "The benefits of village forestry were also greater for those villages with access to roads and to markets."

These disparities occurred due to the size of forest allocations, as well as the differing quality of forests. Villages that had access only to degraded forests received few benefits from establishing VFAs.

The delineation of boundaries in village forestry sometimes created conflicts between neighbouring villages that customarily had shared resources. Despite boundary delineation, villages in both Dong Sithouane and Dong Phou Xoy continued to face problems of forest degradation caused by encroachment and illegal logging.

"After the delineation of village boundaries, disputes between neighbouring villages emerged as we customarily used forest resources together in the past," said a leader of the Bakkhumkham VFA in Dong Sithouane. It proved particularly difficult to apply village forestry concepts beyond VFA villages.

Bounoum Vilaysone insisted that it was difficult to replicate village forestry in other villages located within Dong Phou Xoy without continued financial and technical assistance from external resources.

The profit distribution mechanism devised under the FMSP during its first phase allowed Mr Bounoum's office to continue basic forest surveys and extension support in ten villages after the termination of FOMACOP's first phase in 1999. However, limited financial resources to manage production forest also meant that some areas of production forest once again became subject to unregulated commercial logging.

There was also uncertainty over government support for village forestry. Villagers were concerned over fluctuating timber prices and possible revision of profit-sharing arrangements. A number of villages had to draw from the village fund to cover delays in distribution of the previous year's profits by the government. A World Bank Evaluation Mission identified substantial problems in the forestry sector — including lack of adequate supporting legislation and policy measures that inhibited the smooth implementation of the village forestry management model.

Genesis of SUFORD

FOMACOP's project cycle ended in 2001, but the lessons from the programme were not about to be lost. At the same time that FOMACOP was terminated, the design phase of a new project, SUFORD (Sustainable Forestry for Rural Development Project), was initiated.

Mr Manny Bonita, who helped to draft the SUFORD project document explained: "SUFORD is based on the experiences in community-based forest

management started by FOMACOP." The project goals and objectives of FOMACOP/FMSP and SUFORD are fundamentally the same and most of the key elements, approaches, activities, and methodologies being planned and implemented in SUFORD are inspired by and adapted from FOMACOP. The salient features of FOMACOP which are incorporated in SUFORD project planning and implementation include:

- *Participatory forest management*, including roles of forestry staff and organized villagers in forest management, spelled out in the forest management agreement, and benefit sharing.
- *Training and capacity building* through a "pyramid approach" in training. Training includes a series of combined classroom and on-the-job learning starting from training of provincial trainers and district extension workers through to training of villagers in field applications and other work jointly carried out by forestry extension workers and village teams.

The FOMACOP Village Forestry Handbook and Training Manual are being used by SUFORD as key references in drawing up the necessary implementation guidelines and training materials on participatory sustainable forest management.

SUFORD has, however, expanded and elaborated several key aspects of the FOMACOP programme. Most importantly, SUFORD is a project designed to help institutionalize participatory sustainable forest management through project implementation covering initially eight areas in four provinces, but eventually nationwide. SUFORD also covers more activity components compared with FOMACOP, including sectoral policy reform, preparation of forest management guidelines and procedures, strengthening forest management capacity, improving participatory mechanisms and strengthening monitoring and control. Village development is already an integral part of the SUFORD project design and implementation, unlike FOMACOP where village development became a focus only towards the end of the project, to demonstrate that forestry could truly be a "vehicle for rural development."

Mr Edwin Payuan, Participatory Forestry Adviser to SUFORD, summarized the comparison between the two projects: "SUFORD is perhaps best understood as a vehicle for institutionalizing and propagating on a massive scale, the sustainable forest management approaches, techniques and approaches developed under FOMACOP."

Future steps

FOMACOP has made a significant contribution in highlighting the opportunities and constraints in decentralizing production forest management in Lao PDR. The project also highlighted the need to improve mechanisms that allow local authorities to work in close collaboration with villagers in managing forest resources. Unlike several other Asian countries where violent conflicts have broken

out over control of natural resources, decentralized forest management in Lao PDR has been carried out without significant upheaval. The government has also displayed considerable willingness to devolve management responsibilities to local authorities and villages.

Parisak Pravongviengkham, editor of *A national advocacy for a holistic and decentralized approach to forest management in Lao PDR* (2000), argues that current government efforts to decentralize forest management need to aim at improving the managerial capacities of local communities to use resources based on the characteristics of traditional collectives. This signifies that — beyond recognition of legal rights to use resources — decentralized forest management in Lao PDR requires organizational capacity building at village levels, including the development of local enterprises and capital formation to undertake new ventures.

The experience with the village forestry model has led the government to develop new legislation that underlines procedures for community-based forest management in production forests. Prime Ministerial Decree No. 59, issued in 2002, stipulates the need to establish Village Forest Organizations (similar to VFAs) that will design and implement forest management plans together with district foresters and government offices. While the scope for participation and distribution of benefits depends on terms of negotiation in each case, the concept recognizes the responsibilities of local communities — as well as claims for financial returns to communities, are commensurate with management efforts. The existence of this clearer and specific enabling policy for participatory sustainable forest management is allowing SUFORD to promote participatory sustainable forest management at a wider scale than during the era of FOMACOP. A close perusal of new laws and regulations relating to sustainable forest management in Lao PDR reveals that many of the approaches, techniques and practices espoused by FOMACOP are being embraced.

The concept of community-based management of production forests is also supported in the government's *Forestry Strategy to the Year 2020 of the Lao PDR*. Given the financial and human resource constraints that hamper government forestry agencies, greater involvement of local communities in resource management appears to be a practical choice for Lao PDR. However, as the experiences in Dong Sithouane and Dong Phou Xoy have shown, strengthening local resource management capacity requires additional financial resources as well as technical services provided by the local authorities. In addition, to ensure long-term sustainable forest management, the legitimacy of local people's rights to access and utilize forest resources needs to be recognized and supported by policies at the central government level.

In the meantime, participatory sustainable forest management continues in Dong Sithouane and Dong Phou Xoy with SUFORD support. In fact, the two forests have also applied for Forest Stewardship Council certification, with an initial pre-certification assessment carried out in 2003. That the forest managers

have sufficient confidence to make this step highlights the strength that participatory forestry can bring to communities and indicates the importance of providing tangible economic benefits to ensure ongoing commitment from local people.

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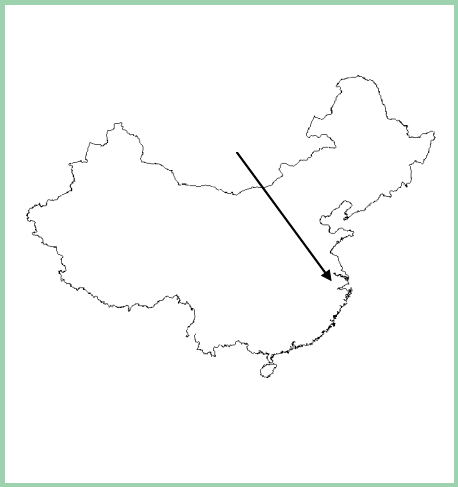
LIN'AN COUNTY: A MODEL FOR THE FUTURE?

Yu Ling

Name of forest:	Lin'an Model Forest
Location:	Lin'an County, Zhejiang Province
Area (hectares):	259 500
Managing entity:	Forestry Bureau of Lin'an County
Mgt. objectives:	Multiple use, ecotourism, non-timber forest products, sustainable livelihood
Country:	China



Prior to the late 1970s, forest management in Lin'an County, in China's eastern Zhejiang Province, focused almost exclusively on the production of timber. With little attention given to the sustainability of harvesting operations, however, the forest had been steadily degraded and soil erosion was reaching disturbing levels. The problems were exacerbated by uncontrolled clearing of forests for agriculture and indiscriminate exploitation of forest resources. Growing concerns emerged, especially over the resulting deterioration of water quality and flow. A poverty cycle revolving around deforested mountains, food insecurity and limited livelihood opportunities prevailed throughout much of the county.

However, after China adopted the strategies for economic modernization and restructuring in 1978, the people of Lin'an County dramatically reversed this trend, making enormous progress in protecting and cultivating forest resources and stabilizing forest production. The local government in Lin'an spurred this turnaround by advocating a development goal of "greening the mountains, beautifying the environment and increasing incomes." It is pursuing a development strategy based on promoting forestry, stabilizing agriculture and focusing on the exploitation of slopes.

"We have undertaken a broad variety of initiatives to promote sustainable forest management in the mountains," explained Mr Tang Mingrong, a Deputy Director of the Lin'an Forestry Bureau.

With a population of around 510 000 people and a land area of 310 000 hectares, Lin'an has moved to the forefront of national efforts to increase forest cover and expand forest plantations. Particular focus has been given to developing forests on rolling hills and gentle slopes, with the aim of establishing village-level forest farms specializing in the production of non-timber forest products.

With forest cover now extending over nearly 75 percent of its land area Lin'an County has become a centre of excellence in China, particularly noted for its high-quality hickory forests and bamboo plantations. Lin'an City, the main urban centre of the county, has garnered several awards and citations including being named, *Town of Bamboo of China*, *Town of Hickory Nut of China*, and *Excellent Tourism City of China*. Lin'an city has also been included in the lists of *Demonstration Cities for Integrated Development in Mountainous Areas*, *Demonstration Cities for Prospering Forest through Science and Technology*, and *Demonstration Cities for Ecological Development*.

Lin'an Model Forest

Lin'an is the only county in China that participates in the International Model Forest Network. The Lin'an Model Forest Project, supported by the Food and Agriculture Organization of the United Nations (FAO) and the governments of Japan and Canada, has played an important role in shifting from a purely resource-based focus, towards the identification of profitable forest-based commodities. The result has been rapid environmental and economic transformation in the mountainous areas of the county.

The Lin'an Model Forest was formally established in 1999, with the principal goal of testing and demonstrating the best available approaches to sustainable forest management relating to innovative governance and techniques. The model forest area encompasses all of Lin'an County. From 2000 to 2003, the Lin'an Model Forest received core support from the Chinese Academy of Sciences and the FAO-supported Regional Model Forest Project.

Model forests, within the International Model Forest Network, are established as working-scale models aimed at moving from conventional forest management towards more sustainable production and environmental conservation. Each model forest attempts to demonstrate sustainable and integrated forest management, to transfer new knowledge to forest managers and to apply relevant technology to operations. Model forests are managed with the involvement of all interested stakeholders, who form partnerships to support and carry out sustainable forest management.

The principal accomplishments of the Lin'an Model Forest to date include:

- establishment of the Lin'an Model Forest Partnership Cooperation Committee, with over 33 partners or partner groups;
- recognition as one of China's leading demonstration areas for sustainable forest management;
- development of 10 new ecotourism sites attracting more than 2 million visitors per year;
- training of more than 5 000 people — mainly local farmers — in the sustainable propagation of high-yield edible bamboo shoots and hickory farming techniques;
- review of forest policy changes and impacts on forest and land-use practices; and
- active pursuit of networking opportunities and business linkages outside of China.

There had already been much progress in many of these directions prior to 1999, but the model forest initiative provided the means for local people and the authorities to rapidly accelerate progress.

Four types of benefits

The people of Lin'an realized that in order to improve standards of living and break the cycle of poverty, they would have to give up conventional exploitative forestry practices and change their management approaches. They identified four types of benefits that they wanted to pursue in order to achieve sustainable prosperity:

- *Environmental benefits.* Lin'an needed to pay greater attention to balancing economic development and environmental protection in order to overcome the abuses of the past that had resulted from undue emphasis on economic exploitation, especially in mountainous areas.
- *Structural optimization.* It was perceived that poor economic returns were largely due to inefficient industrial structures, including low levels of industrial and technological development, low-intensity operations and exportation of resources as unprocessed commodities at low prices. Optimization of industrial structures was considered crucial for economic development, including developing broad product mixes and the creation of brand recognition for high-quality products.
- *Economies of scale.* In the early 1980s, hillsides and forest rights in Lin'an were allocated for private use. Families and collectives constituted the basic management unit. This small-scale management entailed high costs, and benefits were commensurately low. It rapidly became evident that

individual small-scale "owners" would benefit from cooperation and collaboration to increase the scale of management entities and enable joint promotion of selected products.

- *Progressive science and technology.* It was recognized that support to science and technology needed to be strengthened and its application intensified to accelerate economic development. In particular, the potential roles for science and technology in developing mountainous areas were recognized.

Increasing overall benefits

Since 1995, the Lin'an local government has given priority to consolidating afforestation accomplishments, improving the environment, increasing economic benefits and accelerating the modernization of forestry. The goal of the Lin'an Forestry Bureau is to "increase the overall benefits of forestry, promote the protection of forest resources and the environment, and create a new prosperous Lin'an with green mountains and a sound environment."

To this end, Lin'an has designated 122 600 hectares of forest (48 percent of its total forest land) for conservation and protection purposes. Measures to protect the natural broad-leaf forests have included large-scale "mountain closure" (a formal process for limiting access and use for a specified period of years to allow the forest to rejuvenate), prohibitions on the collection of fuelwood for charcoal production and restrictions on full-tillage land preparation (thereby reducing soil erosion). Efforts have also been stepped up to convert marginal steep agricultural land to forest.

Several greening and afforestation activities have been carried out in townships and villages to enhance urban and rural landscapes. Public green spaces within Lin'an City have been increased to almost 7 square metres per person. Tree planting has been undertaken along highways and river courses, with 87 percent and 83 percent of these areas having been revegetated, respectively. More than 2 000 ancient and precious trees have been identified and placed under protection as scenic landmarks in the county.

Two nature reserves

Two national nature reserves are located in Lin'an County — the West Tianmu Mountain Nature Reserve and the Qingliangfeng Nature Reserve. These reserves encompass a range of unique forest, landscape, geologic and human values, as well as having immense significance as sites for scientific research, tourism and recreation.

The West Tianmu Mountain Nature Reserve has accorded great importance to the development of management protocols including institutional development, the regulatory environment and capacity building. As a result, a sound balance

between protection and utilization has been established. Forest protection efforts have achieved notable success. For example, there have been no forest fires in the reserve area for more than 40 years. In 1997, West Tianmu was declared a Man and Biosphere Reserve by UNESCO.

The Qingliangfeng Nature Reserve contains an abundance of wild fauna and flora including 31 endemic plants. The vegetation structures are complex, with an enormous range of species, and the area also has a rich and multifaceted geological history. To better protect this unique area, the Lin'an Forestry Bureau drafted a formal development strategy and formulated a policy of "reinforced protection, active development, wise use, and promotion of conservation through development and utilization." The reserve has recently been extended to 10 800 hectares and now includes exclusive conservation zones for protecting endemic fauna and flora such as Sika deer (*Cervus nippon*) and Chinese allspice (*Calycanthus chinensis*), a very fragrant shrub, which derives its name from the fact that its fruits smell like three spices, namely *Syzygium aromaticum*, *Cinnamomum sieboldii* and *Myristica fragrans*.

Supportive mechanisms and incentives

To safeguard and maintain investments in afforestation, the local government is actively protecting forests from pilferage, disease and fire. Simultaneously, the Lin'an Forestry Bureau has encouraged its forest officers, farmers and other land managers to adopt effective management measures through four focused networks for:

- forest protection organization;
- forest fire prevention;
- forest pest and disease prevention and quarantine; and
- forest resource information management.

The abundant resources of Lin'an County make it well suited for developing industries based on non-timber forest products and services, including products such as fruits and bamboo shoots, and ecotourism. The local conditions in Lin'an lend themselves well to a strategy of diversity: "planting bamboo in the east and fruit trees in the west." Three bamboo types and products (vegetable bamboo, *Moso* bamboo and bamboo shoots) are the main forest produce in the eastern part of Lin'an, while hickory nuts are given priority in the western part of the county.

To encourage farmers to participate in comprehensive agricultural development, the local government has formulated and applied a series of policies, including unified planning, continuous planting, management by individual households, "he who plants the tree owns it," and long-term ownership.

The local government has encouraged farmers to invest in forests and forest management by offering support and guidance, supplemented by discounted bank loans. People with expertise and training in agriculture and forest product processing have also been given incentives to establish and develop businesses in rural areas. These policies have generated enthusiasm and creativity in exploring agricultural development and stimulated the cultivation of key commercial crops such as bamboo and fruit trees. As a result, the neglected upland slopes and denuded mountains have now become productive farms.

"We are very pleased with the level of support we have received," said Wang San, a farmer. "We now know far better how to earn a living without destroying the natural resources."

Livelihood options

To expand markets and livelihood options, Lin'an County has given high priority to research programmes focusing on fruit, bamboo and ecotourism.

Bamboo forestry: The rapid expansion of bamboo plantations producing edible bamboo shoots is an important recent development that is helping to accelerate income generation and rural prosperity. At present, more than 30 000 farmers are involved in the cultivation of courtyard bamboo. Farmer Bao Zichao's experience is typical of potential returns to growers. Over the eight-week winter harvesting season, his 27-hectare farm of established bamboo produces more than 1 000 kilograms of bamboo shoots, generating income in excess of US$1 566.

Lin'an County also boasts 18 000 hectares of *Moso* bamboo forest — producing more than four million stems *per annum* for use as construction poles. Since 1985, *Moso* bamboo forests have become an additional source of edible bamboo shoots. Lin'an has also further diversified into a range of new uses for bamboo resources. Bamboo is processed into bamboo flooring, strands, matting, chopsticks and various handicrafts. Bamboo poles are used for scaffolding. Bamboo branches are made into brooms and other fibrous products, while bamboo leaves are recycled as compost or ground cover for newly germinated *Lei* bamboo shoots.

Horticultural trees: The major product grown in western areas of Lin'an County is hickory nuts. Daoshi Township is the centre of hickory nut growing and is known as the "first township of hickory plantation in China." At present, hickory plantations in Lin'an County cover more than 22 000 hectares, and constitute 57 percent of the national hickory resource. Approximately 2 500 tonnes of hickory nuts are produced annually. At present, more than 220 hickory nut-processing enterprises have been established, with the value of sales in 2002 exceeding US$18.5 million. The most important hickory nut products include fried and hand-peeled hickory nuts, hickory kernels and secondary products such as hickory cakes, oil and wine.

Value-adding enterprises: Lin'an has vigorously developed new enterprises and given priority to leading products, while also fostering and restructuring old enterprises. The county has established more than 300 enterprises engaged in producing bamboo poles and processing bamboo products and hickory nuts, and processing capacity is continually expanding. Processing of bamboo products has evolved from a limited number of traditional products to now encompass almost 500 product lines covering architecture, decoration, handicrafts, foods and daily necessities. Hickory products have also been developed into scores of product lines.

Many bamboo- and hickory-processing enterprises have established processing subsidiaries as well as attempting a degree of "vertical integration" through close collaboration with farmers. The local government of Lin'an and the Lin'an Forestry Bureau have developed an enterprise model that relies on the establishment of a processing base driven by factories in cooperation with farmers. This model plays an important role in nurturing key industries and promoting the process of agricultural industrialization.

Ecotourism: Lin'an boasts abundant tourism and scenic resources, and the county has declared tourism to be a priority industry. Several investors have been attracted to the sector and tourism development is being carried out under clear principles of government planning and guidance, social investment and public participation.

Lin'an recently adopted a strategy aimed at developing the county as China's premier ecotourism site by promoting Tianmu Mountain and Qianwang Mountain, with an emphasis on ecologically sound development. Lin'an has proactively conducted integrated planning exercises and has successfully opened a number of scenic attractions to tourism, including Tianmu Mountain, Qinghshan Lake, Linmu Taihu Lake Headstream, Longxu Dyke and West Zhejiang Gorge.

Today, tourism has become an important industry that is a driving force in the comprehensive development of the service sector in Lin'an. More than 10 ecotourism attractions have now been developed in Lin'an County. In 2001, more than two million tourists visited Lin'an, generating revenues in excess of US$120 million.

Marketing strategies

A focus of Lin'an's development philosophy has been to strengthen intensive processing industries, but the county has also attached great importance to marketing and logistics. At least 10 large-scale markets for bamboo products have been established in Lin'an City and other major towns. West Tianmu Township, for instance, is a major collection and distribution centre for dried bamboo shoots. In 2001, more than 2 000 tonnes of dried shoots were processed and sold, earning revenues in excess of US$4.8 million.

The local government gives considerable emphasis to assisting farmer cooperatives and private distribution organizations with timely market information, marketing techniques and policy development. Lin'an produces 40 000 cubic metres of timber, 100 000 tonnes of fresh bamboo shoots, 3 000 tonnes of dried bamboo shoots and 5 000 tonnes of hickory nuts annually, which have ready markets throughout the country and internationally.

Box 1. Experiences with consumer marketing

The Wangxiang Group Corporation has invested US$1.8 million in establishing a hickory plantation covering more than 130 hectares, and has signed supply contracts with more than 4 000 farmer households. The company's products have entered more than 970 supermarkets in Jiangsu and Zhejiang provinces and Shanghai Municipality.

Similarly, Hangzhou Donglin Green Food Co. Ltd is a leading company of agricultural products, whose "Donglin Brand" product series won the Gold Medal at the National Excellent Forestry Products Exhibition, and was awarded the title of "Famous Products of Zhejiang Province" at the China International Agriculture Exhibition in 1999. Organically-grown *Lei* bamboo shoots of the "Tianmu Mountain" brand, bamboo flooring of the "Qingfeng" brand" and hickory of the "Donglin" brand" have each won several gold medals and have become well-recognized brands.

Working together

Following training and publicity carried out by the Lin'an Model Forest Project, the local people have realized that science and technology must be given high priority in the bid to develop agricultural resources and foster key industries. Focus has been placed on addressing key scientific and technical problems and providing support and demonstrations to provide leadership by example.

In recent years, the people of Lin'an have successfully elaborated a series of best practices including "Technology for Cultivating Early and High Yield Lei Bamboo Shoots," "Technology for Cultivating High and Steady Yield Hickory Nuts," "Technology for the Improvement of Low-yield Dried Shoot Bamboo Stand," "Timber and Shoot Producing Bamboo Stand Technology" and several other applied technologies, especially for high-yielding bamboo products.

The local government of Lin'an is emphasizing the importance of cooperation and coordination among governmental officials, technicians and farmers to effectively extend applied techniques and standards. The county has launched several technology-extension networks at city, district, township and village levels and has established the Bamboo Shoots Association, the Bamboo Shoots Processing Enterprises Association and the Hickory Nuts Association. These and other specialized groups provide farmers with practical information and technical services. The Lin'an Forestry Bureau and the Model Forest Project have

established pilot sites for the demonstration of "forestry prosperity through science and education" to promote overall development. To date, the Model Forest Project has launched 10 demonstration sites for *Moso* bamboo, dried shoot bamboo, *Lei* bamboo, hickory nuts, chestnuts and other economically important plants.

"The Model Forest Project has helped us to better understand the meaning of sustainable management, as well as providing us with practical management techniques. Most importantly, the project has helped us improve our farming skills," said Tang Jinhua, a farmer who has attended several training sessions conducted by the Model Forest Project.

The project has also facilitated important processes to support the development and protection of forest resources. It has brought stakeholders together to set up voluntary, cooperative partnerships and has established a Partnership Committee of the Model Forest, which is comprised of representatives of different stakeholder groups including government, non-governmental organizations, industries, farmers, technology services and academic organizations.

"The Partnership Committee provides a forum where people can exchange ideas on forest management and conflict resolution," explained Wang Guoan, a forestry officer. "In addition, we want people to learn how they can participate in decision making." The Partnership Committee of the Model Forest also organizes training seminars and lectures to promote the concepts of comprehensive sustainable forest management, large-scale industrialization and "thinking big" in terms of marketing.

The Partnership Committee provides unique opportunities for farmers to discuss modern farming techniques and principles and means of adapting to the market economy. This helps farmers to update their knowledge and farming concepts, and to enhance their understanding of sustainable management. Practical training on ecotourism and social forestry helps technical and administrative staff to integrate theory with practice.

The Partnership Committee has sent a number of technicians to assist the "110 Technical Network," a technical service hotline through which farmers can obtain technical advice on forest management from experts via telephone or written communication. During the past two years, the Partnership Committee has organized several television lectures and more than 70 technical training courses. It has also distributed more than 10 000 copies of various training materials, and has trained more than 5 000 persons.

"We have learned what kind of technologies we need to adopt, how to sustain the forest we are managing, and how we can increase our incomes," summed up Chen Xing, a farmer from Baisha village, on the role of this information campaign.

The efforts of the people of Lin'an during the past few years have resulted in the following significant developments in the model forest area:

- the area planted with bamboo and hickory forests has expanded;
- tourism is now booming;
- a system of consensus building and negotiation has been established among the partners; and
- training and consultation have provided technical support to forestry production and broadened the perspectives of local people.

Government officials have changed their mode of thinking and have adjusted their methods of decision making to be more inclusive and participatory. Companies and farmers have accepted the concepts of sustainable management, and environmentally sound production has become a tenet of development.

Challenges abound

There remain, however, a number of significant challenges. For instance, Gaohong Town of Lin'an has been chosen as a demonstration town for production of high-yielding *Lei* bamboo shoots. However, because of the substantial economic returns to *Lei* bamboo, Gaohong focuses its business on the management of only this single bamboo species. This intensive production is causing concerns related to monocultures, including reduced biological diversity, forest degradation, soil erosion and deteriorating water quality.

There is also a need to resolve remaining conflicts between some farmers' desires to maximize economic returns and broader societal goals of sustainable forest management and the conservation of biological diversity. In recent years, farmers' activities have gradually shifted to the low hills, where development is relatively easy. Conflicts have subsequently arisen over issues of forest land tenure and rights to develop non-timber resources.

"Such a shift calls for adjustments to our thinking, and changes in our management," mused a government official. "Only by settling these conflicts properly can we ensure social stability in mountainous areas, and attain sustainable development of resources and the economy."

"It is a new breakthrough action," said Chen Tongai, a senior adviser to the Expert Group on Integrated Mountain Development in China, in describing the Lin'an approach. "It has effectively combined forestry with agriculture and tourism, and dealt with issues of production, conservation and cultivating resources — all in the context of local conditions. It is a concrete example of a new economic concept. And it has led to Lin'an being declared as a demonstration and extension county for all China."

About the author

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Centuries-old Cryptomeia fortunei *are a major feature of Lin'an County's rapidly expanding ecotourism industry (courtesy Patrick Durst).*

Hickory nuts growing in a plantation near Daoshi township (courtesy Yu Ling).

Modern packaging, meticulous hygiene, and sound marketing have contributed to the outstanding success of the hickory nut industry in Lin'an County (courtesy Patrick Durst).

FORESTS OF SOUTHWESTERN AUSTRALIA: WINDS OF CHANGE

Fiona Scarff and Sonya Duus

Name of forest:	Southwest forests of Western Australia
Location:	Western Australia
Area (hectares):	2 470 000
Managing entity:	Department of Conservation and Land Management, Forest Products Commission
Mgt. objectives:	Sustainable multiple use
Country:	Australia

"Conflict over land use in Australian forests has a long history," explained John Dargavel, an academic who has made a study of forest history. "Early tensions between foresters and farmers wanting to clear land have given way to a new debate. Now conservationists clash with foresters over the conflicting goals of conservation and timber production. The Australian timber industry is strongly based on harvesting in native forests rather than plantations — and most native forests are on government land. So, the longstanding conflicts over forest use in Australia have led to over 70 government inquiries and other processes to try to resolve them."

There is a direct conflict in the forest itself — where harvesting operations conflict with conservation values. Another, subtler tension pervades forest administration at the government policy level, where decisions can be influenced by competing conservation and production interests.

The native forests of southwestern Australia are dominated by a range of eucalypt species, including jarrah (*Eucalyptus marginata*), karri (*E. diversicolor*), marri (*E. calophylla*), and wandoo (*E. wandoo*). The forests comprise a range of vegetation types, from wet sclerophyll forest through to drier woodlands,

interspersed with wetlands and other ecosystems. An assessment of forest ecosystems identified over 2.6 million hectares of forests, including 1.8 million hectares of jarrah, a commercially harvested timber species. When forest areas outside the survey boundaries are taken into account, the full extent of forest ecosystems exceeds these figures. The native forests are managed for multiple uses, so conservation and timber are just two of many interests. Traditional Aboriginal owners, water resource managers and bee keepers share the forest with bauxite mining, tourism and a wildflower industry. But no two groups have so polarized the community and ignited public opinion as the timber industry and the conservation lobby.

The winds of change are blowing through the southwest forests, where public debate is reshaping the way forests are managed. Since the forests are publicly owned, community debate over the best way to balance the demands of different land uses is vigorous. Clashes over land use, in particular tracts of forest, are not uncommon.

Uncertainty

These challenges can create uncertainty for the future of disputed areas and this uncertainty undermines the goals of all stakeholders. "Conservation reserves can't protect biodiversity unless they are secure and don't shift around," observed Beth Schultz, from the Conservation Council, a major non-governmental conservation organization. Logging contractor Greg Smeathers also needs certainty: "I can't plan to buy new harvesting equipment unless I know I will be allowed to cut enough timber to get a return on my investment later. Some of my equipment is 20-years old, but I can't replace it until I know. And it makes it very difficult to employ people."

Sawmillers likewise need to buy expensive milling equipment, and cannot justify doing so without some certainty as to the amount of timber available. At a more personal level, the livelihoods of employees are at the mercy of shifting debates over land use. "I'm lucky my wife works," declared Brett Moss grimly, as he waited for the outcome of a major planning decision. "I've just bought a house."

Long-term, rigid plans provide the security everyone is seeking — but rigid plans do not allow for changing community attitudes or new scientific findings. Both factors influence planning. To strike a balance, Forest Management Plans are produced once every 10 years (Box 1).

Ten years seems to be the shortest feasible interval. "It has been two-and-a-half years of hard work for everyone involved … I wouldn't want to have to go through this any more often!" exclaimed Keith Low, a policy adviser with the Forest Products Commission (FPC). Conservationists Beth Schultz and Mary Frith agreed fervently. The workload for this process is intense, for both government agencies and voluntary community groups. For timber workers like Brett Moss, it means that periods of uncertainty come at 10-year intervals.

The 10-year plans provide guidelines on the direction for forest management, including the amount of timber that can be extracted. However, they do not supply the detail of exactly which forest areas will be logged, and when. The FPC conducts this level of planning each year.

Box 1. Forest Management Plans

Forest Management Plans are prepared by the Conservation Commission and the Forest Products Commission. The plans are released for public comment. After receiving the comments of the public and any conditions imposed by the Environmental Protection Authority, the two commissions make recommendations to their respective ministers (emphasizing principles of contestable policy advice). For its part, the Conservation Commission is charged with the protection of conservation values, and its members are appointed for their expertise in biodiversity and sustainability issues. On the other hand, the Forest Products Commissioners are charged with developing the timber industry, and are appointed for their expertise in commercial matters or experience with plantations. Once the ministers have resolved any differences, the plan is formulated for the next 10-year period.

These annual harvesting plans are available for the public to view. However, the role of the public in the planning process is much more limited than for the 10-year Forest Management Plans. "We try to accommodate requests from neighbours with land adjacent to a forest coupe. But we can't change our minds every time someone has a problem with logging — it wouldn't be workable," explained FPC officer Peter Beatty. Logging contractor Greg Smeathers added: "To me, all this planning is like a big wheel. It takes a lot to get it turning — once it's going you don't want to have to change direction."

Another major issue for conservationists and industry alike is the issue of land tenure — the classification of government land according to who is responsible for it and what it can be used for. Security of tenure and purpose is another way of providing a degree of certainty, in an environment where the legitimacy of different land uses is frequently contested. "A change in tenure or purpose of forest land use would require the agreement of both Houses of Parliament," said FPC's Keith Low. "It is very secure."

Logging operations in re-growth karri forest (courtesy Fiona Scarff).

Beth Schultz of the Conservation Council was not so sure: "Formal reserves such as national parks are secure. But although every sizeable stream that runs through a logging coupe has its own reserve on either side of it, these sorts of informal reserves aren't mapped and consequently their reserve status is not secure."

Continuity of land use is important for forest lands to be managed well. Efforts to provide security of tenure and purpose address this fact, although the enforcement of these measures in informal stream reserves presents particular challenges.

Forest administration

Between 1984 and 2000 in Western Australia, the Department of Conservation and Land Management (CALM) was responsible for both timber harvesting and conservation values in public forests. There were strong public criticisms of this arrangement, which was perceived as a conflict of interest. People wondered how CALM could be the guardian and custodian of forest conservation while simultaneously making money from logging.

When CALM was formed in 1985, it was an amalgamation of the existing Forests Department, the National Parks Agency and a section of Fisheries and Wildlife. Beth Schultz from the Conservation Council was a strong critic of CALM. She declared: "At the time of amalgamation, the Forests Department was the largest and best-funded of the three agencies. Forestry staff dominated the new organization at both the lower and senior levels. So CALM became dominated by a forestry ethos."

In response to public concerns, CALM was split into three separate agencies in 2000, namely: the FPC, a "new" Department of Conservation and Land Management and the Conservation Commission.

In effect, CALM's responsibility for harvesting and marketing of timber has been transferred to the FPC. The FPC develops timber resources and markets timber products. The Department of Conservation and Land Management, the "new CALM," implements conservation management plans and manages forests prior to harvesting. The Conservation Commission operates independently. It audits the forest management carried out by the Department of Conservation and Land Management and the FPC's harvesting work.

Has the restructuring of CALM succeeded in its goals? The Department of Conservation and Land Management is now funded by general government funds instead of through timber revenues. "The conflict of interest could never be resolved while CALM still received money from timber revenues," Schultz asserted. She remains uncomfortable with the fact that the Department of Conservation and Land Management still receives money from the FPC for its expenses in

managing forests destined for logging. "But the split is a good thing. I'd like to see the same thing happen wherever there is a way to make money out of the forest. Tourism, the wildflower industry… they all create conflicts of interest."

"Cultural change in the institutions is at least as important as restructuring," Schultz mused. "Can the new Department of Conservation and Land Management be so very different in its attitudes from CALM, when it is staffed by the same people, originally trained as foresters?" Others maintain that the perceived conflict of interest in CALM was never more than a public impression. "Insiders believed that it was a perception, that's all," indicated Low, "but it needed to be addressed all the same."

Efforts to create a distinctively different ethos in the FPC and Conservation Commission seem to have been highly successful. The FPC's Commissioners are selected for their expertise in commercial activities, the plantation industry and labour relations. In contrast, the Conservation Commission members are appointed for their understanding of biodiversity conservation, environmental management and natural resource sustainability. Further, whereas the FPC makes recommendations on forest management to the Forestry Minister, the Conservation Commission gives separate advice to the Environment Minister.

Increased transparency

Keith Low agrees that previously there was a perceived conflict of interest in CALM. "I believe in democracy, so I believe these changes were right. If CALM's operations were not transparent to the public, then it was important for the organization to be restructured," he stated. He believes that these changes have definitely increased the transparency of the agencies responsible for forest management, and have also moved decision-making more into the public arena. "Instead of issues of forest management being settled within CALM, debate now occurs between agencies and within the government itself, so it's in the public eye. Agencies try to resolve conflicts, but debates also have to progress into the political arena. This may not be as smooth, but it is appropriate."

The experience of CALM highlights the importance of commitment to transparency in government organizations, especially when politically contentious issues, such as forestry, are involved. Transparency is worth pursuing whether or not there is an underlying problem in the management ethos of an agency.

Old-growth forests and the Regional Forest Agreement

No aspect of the forestry debate in southwestern Australia has inspired such passion and widespread community interest as the management of old-growth forests, which are generally defined as essentially undisturbed areas of forest with mature trees.

Why did old-growth forests become so important to the community? "Logging old-growth forests is not timber *harvesting* — it is more like *mining*," claimed conservationist Beth Schultz. "The forest will never be the same again." Harvesting planner Wayne Keels disagreed: "People see a logged coupe and they think it's gone forever. But the truth is, it grows back."

Whether or not forest managers are able to return logged forest to its original state, stands of mature and undisturbed forest remain the benchmark by which environmental values are measured, and are a rallying point for conservationists.

The fight to reserve old-growth forests from logging gained widespread publicity in Western Australia as a result of the Regional Forest Agreement signed with the federal government. The Regional Forest Agreement resulted from a planning process, which required a review of the boundaries of forest nature reserves. A comprehensive, adequate and representative system of nature reserves was an essential component of the Regional Forest Agreement.

The formulation of the Regional Forest Agreement ignited community debate over the fate of old-growth forests. The dispute saw passionate confrontations between conservationists and timber workers and the split of the ruling political party into two separate parties over forest issues. "When the Regional Forest Agreement was finalized in 1999, to remain binding for the next 20 years, significant old-growth areas remained outside of reserves and therefore subject to logging. The conflict over old-growth forests did not subside with the signing of the Regional Forest Agreement," recalled Schultz. When the Labor Party won the state election in Western Australia, in 2001, after eight years in opposition, they swept to power with a promise to prevent logging of old-growth forests.

Once in power, the government wasted no time in implementing its promise. "The speed of implementation was incredible," recalled Wayne Keels, of the Forest Products Commission. "The election was on a Saturday, and the directives to pull out of recognized old-growth logging coupes went out on Sunday evening. All the logging in those particular patches was over by the first Wednesday after the election." Logging contractor Greg Smeathers remembered having partly harvested an old-growth coupe when the directive came through. "We were in there with all our gear and we had to pull out."

The story of old-growth logging in southwestern Australia illustrates how quickly forest management can be changed if there is strong support for doing so. However, with such rapid changes, normal organization and planning is disrupted. "We took the directive as given," Peter Beatty, an officer with the Forest Products Commission, reflected. We literally had to stop the contractors overnight. But we still had contracts to supply them with timber, so we had to find them new coupes as fast as possible."

Ray Curo, a commissioner with the FPC, said: "I've heard that the stopping of old-growth logging in Tasmania was phased over a 10-year period. Here in

Western Australia it was a few days. A more gradual change might have been better for industry. Forest management is about long-term planning." Beatty agreed: "We were left in the lurch. Normally we plan coupes on an annual basis. It was an unusually dramatic change."

"Industry has come to accept that the old-growth policy is here now," Beatty continued. "They just get on with it." The idea of reserving a portion of the old-growth forest has support within the timber industry, although most would have preferred to have some old growth still available for logging. Conflicts remain over the precise definition of "old growth" — because this determines exactly how much forest can still be cut. Although the general definition is fairly simple — "very little disturbance and mature trees" — there are still disagreements over how much disturbance is "very little," and exactly how old a tree must be before it is mature. Complete resolution of conflicts like this seems to depend on a strong consensus on definitions. Whilst the days of massive public rallies for old-growth forests appear to be over, different interpretations of "old growth" will probably continue to fuel disputes at some level, for the foreseeable future.

Farm forestry

"Farm forestry can benefit everyone — families, communities, land, stock…the trees help with soil salinity problems, and we also see the sheep huddle their lambs beneath the trees for shelter. It can also help reduce the pressure for logging in native forests," declared Mary Frith, a farmer in the Bridgetown Shire in the southwest of Western Australia. "We've been farming here for the last 43 years. After a big fire came through, in 1978, we decided to re-plan our farm — and shortly afterwards we moved into farm forestry," added Jim Frith, Mary's husband.

The couple said that there are special benefits to integrating timber production with farming for other products, particularly in lower rainfall areas. "Farm forestry returns more cash than farming either annual crops, or trees, alone. The trees provide shelter and shade for stock. Also, trees grow faster because they are more widely spaced than in plantations or native forest, and they are less likely to die when there is a shortage of rain," they affirmed.

Mary and Jim's district has seen a number of agricultural trends over the last 100 years, including dairy cattle, fat lambs and apple orchards. Commercial woodlots on privately-owned land began appearing in southwestern Australia in the mid-1980s. The trend was driven by community opposition to the government clearing native forest and buying agricultural land to develop plantations, and also by land degradation issues in the region.

The Forest Products Commission is currently involved in promoting farm forestry in Western Australia. "Farm forestry is an important means of addressing land degradation issues. Trees help reduce soil salinity, water-logging, wind and

water erosion," said Keith Low. "Trees also fix carbon, which helps reduce the threat of an enhanced greenhouse effect, and one day may be used as part of a carbon-credit scheme. It can also help to develop economies and communities in regional areas. We're really excited about the potential here."

Involvement of farmers

Farmers are encouraged to plant trees that are suitable to their areas, depending on soil types and rainfall. Eucalypts, pines and sandalwood are amongst the recommended timber. Farmers can join the business of farm forestry in three ways. They can enter into joint ventures with the FPC, with timber companies, or with companies that raise money from investors.

It seems that everyone involved — farmers, conservationists and government agencies — supports the concept of developing a farm-forest industry in Western Australia. However, the benefits of farm forestry will not be enjoyed unless there is serious commitment to supporting tree farmers in the growing and marketing of their products.

"Farmers going into farm forestry need reliable technical advice on selecting and tending the trees, and marketing the timber," explained Jim Frith. "Trees for sawlog production need to be pruned and thinned at appropriate times." The Friths have witnessed some dilemmas: "There are farmers who planted trees, but now they can't sell them. Small farmers often have a hard time selling their timber to millers who only want to deal with bigger organizations." To address these challenges, Jim and Mary Frith helped to establish a cooperative of tree farmers to pool their timber and strengthen their marketing position.

Market conditions for timber shape the industry in important ways. In Western Australia, the price of plantation timber compared to timber from native forests has been the source of some debate. Some claim that underpricing of native timber has promoted native forest logging and suppressed the development of plantation and farm forestry. Others argue that prices are fair, and that native timbers are so different from plantation timbers that the two products compete in different markets.

In all, farm forestry provides an exciting opportunity for farmers, although as Keith Low explained, a range of variables will influence a farmer's decision to try farm forestry. "Farmers realize that moving into farm forestry involves foregoing a portion of their farm to trees, and adjusting their farm plans to a long-term investment," he said. "Farm forestry won't always be profitable for the timber alone. We need the other benefits to be recognized and valued — benefits such as carbon credits and even salinity credits — to finance it all. There are people who are willing to bet on that. On the other hand, some farmers are prepared to invest in farm forestry, just knowing that they are looking after their land."

Environmental concerns

"10-80" is the trade name for a poison widely used by farmers to kill pest animals. Coincidentally, the substance that makes "10-80" toxic is also found in a group of plants native to Western Australia's southwest. Leaves of *Gastrolobium*, or "poison pea," are deadly to birds and mammals alike.

However, some mammals native to the southwestern forests display an unusual resistance to the poison. The woylie, a smaller cousin of the kangaroo, is a good example. Foraging in areas where *Gastrolobium* grows, these animals have been exposed to the toxin for so many generations that they evolved a unique tolerance to its deadly effects. This tolerance has handed forest managers a rare opportunity — they can use poisoned baits to kill feral pests such as foxes, without risk to poison-resistant native animals.

Why are foxes a problem? "The introduced fox preys upon small native mammals," explained Department of Conservation and Land Management scientists. "There is solid evidence that controlling foxes improves survival rates in animals like the woylie. We laid out baits laced with "10-80" and found that fox numbers fell and woylie numbers increased."

Woylies had disappeared from many areas of the forest. Scientists observed that attempts to re-establish this species were much more successful in areas baited to reduce foxes. "We fitted collars equipped with radio transmitters onto the woylies before we released them. We were able to keep track of what happened to them. It was harder to monitor the foxes — we made careful studies of their tracks and determined that baits do, in fact, help to reduce their numbers."

Spurred on by these results, the Department of Conservation and Land Management has introduced widespread fox baiting within the southwest forest region, under the banner of "Operation Western Shield." The baiting programme offers the opportunity to improve the conservation status of the range of native mammals preyed on by the fox.

Baiting programmes such as this one can be an important part of wildlife management in Australia's forests. The problem of introduced predators is certainly not unique to Australia's southwest. To be used successfully, however, many issues need to be considered.

Firstly, care must be taken to ensure that native animals will not be poisoned. Resistance to "10-80" poison appears to be rare outside of Western Australia, so this particular toxin is probably not suitable for other forests, unless there is a way of stopping native animals from taking the baits. In addition, the pest animals themselves can sometimes develop resistance to poisons.

Secondly, it is important to remember that predators may not be the sole cause for a species' decline. Recent work by Department of Conservation and Land Management scientists has revealed that foxes are not the only problem that native marsupial populations face. They also need appropriate habitat. When predators are only part of the problem, baiting can only be a part of the solution.

For the woylie, baiting has been highly successful. It is fortunate that this success did not cause researchers to focus so much on predators that they missed the important habitat link. It is critical that the success and convenience of predator baiting — or any aspect of wildlife management — should not obscure the importance of other factors.

Conclusion

The story of southwestern Australia's forests shows that much can be done to address conflict, from organizational restructuring, to planning for community input, to developing timber resources outside of native forests. These various approaches to addressing conflict offer great benefits, but only under the right conditions. Some of these conditions are largely out of managers' hands — sun, rain, wind and soil. Otherwise, it is up to forest managers to get it right.

For example, on farm forestry, there is clear agreement by everyone as to the immense potential of farm plantations. As Mary Frith opined: "This benefits everyone — families, communities, land and stock." However, it is clear that these benefits will only be seen if farm forestry is commercially viable, which will depend on a range of factors including market conditions, the value placed on land care and the quality of technical advice available to farmers.

The issue of "10-80" baiting shows how important it is to be open minded about the science of forest management. Embracing preconceived ideas too closely can blind managers from seeing other options — important ones. This does not only apply to science. The importance of openness to new ideas and the flexibility to adopt them run as themes through the southwest Australian experience. All the way from the Cabinet to the forest, ability to change is important. Changes in government agencies and in attitudes to farm forestry are good examples. Sometimes, situations demand more than just flexibility in policy — major cultural changes are involved. Cultural changes in the forest arena call for a level of commitment from everyone above and beyond what it takes to change policy.

Flexibility and change have to be balanced with measures to provide certainty for the men and women whose lives are caught up in the shifting tides of Australia's southwest forest. At stake are the livelihoods of timber workers and farmers, the endurance of community groups staffed by volunteers, and, as Mary Frith points out, "the very fabric of the Earth."

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Sonya Duus has recently finished her Honors research at the Australian National University's School of Resources, Environment and Society. Her research is concerned with dispute resolution in environmental management, and has included a focus on indigenous people and forest management.

Turpentine and rosin from pine resin are important materials for many industrial products including solvent for oil paints, adhesives, and germicides (courtesy Masakazu Kashio).

MANAGING AMIDST CONFLICT: THE HUON DISTRICT FORESTS OF TASMANIA

John Dargavel

Name of forest:	Southern Forests of Tasmania
Location:	Huon District, Tasmania
Area (hectares):	123 000
Managing entity:	Forestry Tasmania
Mgt. objectives:	Sustainable timber production
Country:	Australia

"A continual balancing act," is how Steve Davis describes his job of managing Huon District's state forests. Davis is an experienced forestry professional who works as Huon District Forester for Forestry Tasmania, the state government's forestry agency.

"I have to balance expectations for timber production against expectations for conservation," he says. "Everyone expects that I will do the best that can be done for each, and that somehow everything is going to be rosy — to turn out well. At the same time, I have to think about the local community and the people who work in the forests."

Steve Davis considers his job to be one of the most difficult in all of Tasmania.

"Although I try to please everyone, no one ever seems to be satisfied," says this exemplary manager, whose job description entails gathering detailed information about the forests, developing comprehensive forest management plans within a well-defined legislative and policy framework — and spending a lot of time explaining all this to community and stakeholder groups. His path to effective management is based on the establishment of clear and transparent processes to help him deal with the pressures of conflicting expectations and multiple objectives.

"Forestry in Tasmania is a controversial and often heated topic," he observed. "We have to have robust systems that can stand up to intense scrutiny."

Tasmania

People have lived in Tasmania and used the forests for at least 30 000 years. The isolation of the indigenous Aboriginal people ended in 1803, when British colonists arrived on the island. Disease and frontier conflicts decimated the indigenous population. Most of those who survived were displaced and much of the traditional knowledge of forest management was lost, although recently, attempts to reconstruct it have been initiated. Colonial society developed slowly during the nineteenth century, with the principal forestry developments centred on establishing a number of small sawmills that provided timber for building and for export to the mainland. In 1901, Tasmania joined other Australian colonies in forming the federal nation of Australia.

Tasmania is Australia's smallest state with a population of 478 000 people. Since the 1930s, much of Tasmania's industrial development has been based on abundant, cheap hydro-electricity and plentiful wood allocated by licences or in forest-harvesting concessions. In the 1990s, the concessions were replaced by a system of long-term sales accompanied by a legislated commitment to make a minimum quantity of sawlogs available to industry each year. The majority of wood produced in Tasmanian forests is pulped for use in paper mills, including a substantial volume exported as woodchips to overseas markets, primarily to Japan. Tourism is also an important industry for Tasmania, with the beauty of the natural forests constituting an integral part of Tasmanian landscapes.

Forest management under scrutiny

In March 2004, 10 000 people marched through the streets of the state capital, Hobart, protesting against the continued clear-felling of old-growth forests. They were particularly incensed about felling giant trees, some over 80 metres tall, in the Styx Valley. Their protest was the latest in 30 years of public and political controversies about how the forests should be used. A week later, a similar number of people marched through Launceston, Tasmania's second city, in support of the forest industries and the employment they provide.

Tasmania has the most vehement environmental controversies in Australia. These have deeply divided the community and in spite of many attempts to resolve the controversies politically, the situation was still potent enough to influence the major political parties in the 2004 federal election. Forestry issues are so controversial in Tasmania for the following reasons:

- Forests cover over 50 percent of the island, the largest proportion of any Australian state. Forests are highly valued for wilderness, conservation and timber.
- Tasmanian forests contain *Eucalyptus regnans*, the world's tallest hardwood tree, as well as endemic conifers.
- The forest industry is the largest employer in Tasmania, a state with a higher rate of unemployment than Australia generally.
- The industry is highly concentrated with one company, Gunns Ltd, processing over 70 percent of all the wood felled in the state. The industry is politically powerful.
- The environmental movement, spearheaded by the Wilderness Society, is very active and is linked to national and international environmental organizations. It enjoys considerable public support and is adept at gaining media attention.
- The Tasmanian Parliament has four Green Party members that keep forest issues before its 25-member House of Assembly.
- Australia's voting systems enable minor parties, such as the Green Party, to exert political influence.

The Tasmanian State Government has jurisdiction over its land and forests, but the Australian Federal Government controls foreign affairs and trade, and most of the budget. Spurred by the environmental vote in the big mainland cities of Sydney and Melbourne, the federal government blocked the Tasmanian Government from building dams in wilderness areas. The federal government successfully nominated a large area in the southwest of Tasmania to be declared as a UNESCO World Heritage Area — in recognition of outstanding natural, scientific and Aboriginal heritage values. Logging and mining are not allowed in the World Heritage area.

To try and resolve the environmental controversies across the country, the federal and state governments agreed on a National Policy Statement that aimed at:

- having a system of "Comprehensive, Adequate and Representative" conservation reserves;
- sustainably managing forests outside the conservation reserves — such as the Huon state forests; and
- developing an internationally competitive timber industry.

The policy was followed by a Regional Forest Agreement process that identified the conservation reserves and the areas to be used for commercial purposes. It defined the tasks of forest management, established guidelines and assigned responsibilities.

The federal and Tasmanian governments entered into a 20-year Regional Forest Agreement in 1997. It divided Tasmania's 3.2 million hectares of native forests into roughly equal areas of conservation reserves, state forests managed for multiple uses including wood production, and private land. This was not completely accepted by the environmental movement which continues to argue that many state forest areas — especially those with old growth — should be transferred to conservation reserves. However, the state forests still have to be managed by foresters, such as Steve Davis in the Huon District, for the uses that the state and federal governments have authorized.

Huon District

Steve Davis and his staff manage 123 000 hectares of forests on a beautiful upland landscape that extends to a coastal area of small farms and orchards. The state forests of Huon District lie just outside the World Heritage Area and comprise mainly tall eucalyptus rain forests, with dense temperate understoreys. The magnificent *Eucalyptus regnans* dominates the best sites with some trees being more than 80 metres tall and 450 years old. A significant proportion of the forests, including some areas scheduled for harvesting, has not previously been logged.

In 2001, the roundwood harvest from natural forests in Huon District totalled 415 000 cubic metres of timber, of which 75 percent comprised pulpwood, with the majority of the remainder being sawlogs or peeler logs. Among the timber

Regeneration in Compartment Picton 39A in Southern Tasmania (courtesy Forestry Tasmania).
a) 1989: The compartment was logged for pulpwood, sawlogs and veneer logs in 1988, followed by aerial sowing with eucalypt seeds collected locally in 1989.
b) 1994: Eucalypt re-growth at five years of age.
c) 2003: Eucalypt re-growth at 14 years of age. At 8-years of age, the trees had reached a height of 15 metres, by which time shrub undergrowth had also regenerated naturally.

species, *Eucalyptus obliqua* and *Eucalyptus globulus*, are highly valued for veneer, furniture making, construction timber and paper pulp — with large volumes also exported as woodchips. Myrtle (*Nothofagus cunninghamii*), which grows in the rain forest understorey, provides a fine furniture timber. The endemic conifer, celery top pine (*Phylocladus aspeniifolius*) is valued particularly as a timber for boat building. Two other endemic conifers, Huon pine (*Dacrydium franklinii*) and King Billy pine (*Athrotaxis selaginiodes*), grow locally but are not harvested in Huon District. Leatherwood (*Eucryphia lucida*) is prized by apiarists for the distinctive honey produced from its flowers.

Silvicultural systems

Coupe felling is the principal silvicultural system. It is used because the Eucalypts are strongly light-demanding species that cannot be regenerated under an overstorey or in the presence of the remaining understorey. In natural systems, *Eucalyptus regnans* and *E. obliqua* forests on wet sites regenerate only after occasional severe wildfires have killed the old trees and left bare, scorched ground on which the prolific seed can generate new trees. A site for collaborative long-term ecological and silvicultural research has been set up at Warra to monitor change and see if alternative silvicultural systems can be devised.

Logging contractors clear-cut the forest in coupes of 50–100 hectares and transport the best logs to sawmills and veneer plants. Some rare conifers and other specialty species are sold for boat building or local woodcrafts. The remainder which accounts for three-quarters of the wood cut in the district is despatched to woodchip export mills.

Once logging is finished in each coupe, foresters burn the slash and remaining understorey to create a bare "ash bed" onto which seeds are dropped from aircraft to regenerate the forest. Steve Davis reports that this process is generally successful, although at times some wet south-facing slopes are difficult to burn and have to be planted with nursery-grown seedlings.

To prevent wallabies and other native animals from eating the growing seedlings, some areas are treated with "1080" poison. Native animals can be killed only if the Department in charge of the environment issues a permit. If used properly, the poison can be specific only to the target species and its use has to be supervised by the water authorities to prevent contamination. Although it is an effective means of raising a new crop of trees and probably has negligible residual environmental effects, poisoning is highly unpopular. Although its use against native animals is still legal in Tasmania, Steve Davis and his team will stop using it in 2005.

The new crops of trees are to be grown on rotations of 80 to 100 years. On about seven percent of the area, where slopes are gentle, thinning operations are carried out at mid-rotation.

Community views

Harvesting operations are a point of major controversy in Tasmania. Protests against logging in the forests have been held throughout Tasmania for more than 25 years. The protests have led to considerable antagonism between the environmental movement and forest product companies, their logging contractors and workers.

"There are still large tracts of old-growth forest that are directly threatened by logging. These adjoin the World Heritage Area and we believe they should be included within it," said Mike Noble, of the Wildness Society, an active environmental advocacy group. Adam Burling, from the local Huon Valley Environment Centre, agreed. He organizes regular public protests against logging of the forests to ensure the issue remains at the forefront of public awareness.

Tony Ferrier, Manager of Environment and Development Services for the Huon Valley Council, reported that there was also significant local concern about the effect on long-term biodiversity in the forests:

"Many people believe that the relatively short harvesting regimes result in inadequate time for non-eucalyptus species to regenerate, and monocultures are being actively encouraged," he said.

Apiarists, craft workers and other groups have joined the environmental advocacy groups, in more recent times. One group of small businesses, furniture makers and craft workers, the Timber Workers for Forests, argues that clear-felling the forests depletes the supply of myrtle and the rare conifers needed by artisans producing high-value wood manufactures. But another group of woodworkers — the Woodcraft Guild Tasmania — sees the situation quite differently. Their President, George Harris, feels that the forestry managers give a lot of attention in their planning to supplying the speciality timbers that his members need. This is done by providing salvage areas that people can apply for, and by arranging for a storage yard, Island Speciality Timbers, to keep parcels of rare timbers until needed. His experience is that, "the foresters are fair and decent people, easy to talk to and straight-dealing."

The controversies pervade society and even divide families sometimes. Scott McLean, Secretary of the Forestry Division of the Construction, Forestry, Mining and Energy Union has gone so far as to introduce a special programme to help forest workers deal with the continual criticism. He provides them with basic facts about forest management on a foldout card they can keep in their pockets. He also trains them to deal with conflict in a non-violent way.

"Don't get into fights with environmentalists; take a deep breath, think for a moment or two, and then just tell them the facts from your point of view," he often tells his workers.

Today, the workers are looking forward to a national training package that will cover quality assurance and product care in the forest industries. Workers hope that — when this becomes a reality — they will finally be given proper recognition for their skills in balancing production and conservation.

Planning system

The challenging situation in Tasmania requires that Steve Davis and his forestry team have a well-developed, clear and transparent planning system for managing the Huon state forests. It incorporates:

1. a legal and policy framework;
2. assessment and mapping;
3. Forest Management Plans; and
4. operational plans.

1. Framework

The legal framework is based on the *Forestry Act*, first passed by the Tasmanian Parliament in 1920 and updated several times since. It makes Forestry Tasmania the government agency responsible for managing state forests, but not for managing national parks. The Regional Forest Agreement, mentioned earlier, also sets out management responsibilities.

Forestry Tasmania has policies aiming to make it an "internationally competitive" and "sustainable multiple-use" forest manager. Its processes in environmental management have been certified as meeting the ISO 14001 Standard.

2. Assessment and mapping

Tasmania has a long history of assessing and mapping the timber values of its forests and, since the late 1980s, their heritage values. The Regional Forest Agreement process provided funds for comprehensive assessments of the environmental, economic, social and heritage values. A substantial database of these values provides the basis for planning how the Huon and other forests are managed.

A Management Decision Classification system uses the data to map the state forests into zones. Separate zones delineate areas for wood production, and those that require special care — such as those next to the World Heritage Area, those that have indigenous or cultural heritage values and those containing rare or endangered plants and animals. Much of the Huon area is on limestone, or karst country, and ancient glacial moraines are present in several areas. Tasmania is

among the world-leaders in recognizing the "geodiversity" as well as the "biodiversity" values in forests. However, it is difficult and expensive to find many of the heritage and geological features hidden by the dense understorey in these forests.

3. Forest Management Plan for the Huon Forest District

The *Forestry Act* requires a comprehensive Forest Management Plan for every state forest and specifies that the responsible Minister must approve them. The 10-year Forest Management Plan for the Huon Forest District is a concise, readable document that describes forest management objectives and activities. The current plan was approved in 2000, after its predecessor was amended to bring it into line with the Regional Forest Agreement. The plan provides the forest manager, Steve Davis, with clear guidelines and a mandate for implementing forest management activities. A key ingredient in the process of formulating the plan is provision of extensive opportunities for public participation in the planning process.

The current plan identifies 21 production, conservation and process objectives. For example, it delineates the various management zones and allocates forest for production purposes (52 percent), for production with additional special management (22 percent), for tree plantations (3 percent) and for forest protection (23 percent). The plan describes the silvicultural prescriptions that are to be applied for general wood production, special timbers and plantations. Prescriptions for management of biodiversity, old-growth forests, wilderness, flora, fauna, geo-conservation, soils, landscape and heritage values are also covered. The plan also has sections devoted to management for recreation, education, access, fire, mining, honey production and other activities.

In addition to the comprehensive Forest Management Plan, there are several subordinate operational plans. A three-year Wood Production Plan has been developed in consultation with the major wood-processing companies and local municipal councils. It sets out where new forest roads are to be built, which coupes are to be logged, and which municipal roads will be used to haul the wood to market.

4. Operational plans

A Forest Practices Plan is written for every coupe before it is logged. An experienced forester, trained in the provisions of the Forest Practices Code, prepares each plan. Manuals covering heritage values, biodiversity, geomorphology and other considerations guide the foresters in writing the plans. Each plan consists of a detailed topographical map showing the area to be felled, the boundaries of any patches to be given special care or not to be felled, designs for roads, tracks and log landings, and the general direction in which logs are to be hauled to landings.

The plan guides practices at the landings including de-limbing, and sorting. Any special prescriptions are noted on the plans, such as the care to be taken if any sinkholes to underground limestone caves are discovered during the course of operations.

The Forest Practices Plan is signed by the logging contractor and the company buying the wood. Once logging is completed, a forester inspects the coupe to assess whether the plan has been complied with, or whether the contractor needs to complete remedial work.

The Forest Practices Code is based on a principle of co-regulation by the forest manager, the company and its contractors. However each year, a separate government agency, the Forest Practices Board audits 15 percent of the coupes against 124 criteria. This monitors performance and has improved the standard of logging. In the Huon Forest District, the audits have found a compliance rate of more than 90 percent in the last three years. The Forest Practices Code and plans are subject to extensive debate. For example, some people believe that current pre-harvesting assessments are not adequate, and that high costs are used as an excuse for failing to implement satisfactory systems.

"Tasmania should follow the practice in the State of Victoria where detailed flora and fauna surveys are done before any coupe plan is prepared," advised Adam Burling. "We need these types of surveys in order to give greater protection to rare birds, such as eagles and owls." He also fears that the use of poison to kill browsing animals might have serious negative effects higher up the food chain.

However, Gary King, Environmental Planning Manager for Forestry Tasmania rebutted such criticism: "Every coupe is surveyed for flora communities and fauna habitat including nesting sites for eagles and goshawks, and the impact of "10-80" is monitored," he pointed out.

Monitoring and reporting

The planning system has procedures for monitoring and reporting progress against its components at each of its four levels. For example, at the legal and policy level, the first five-yearly review of the Regional Forest Agreement has recently been completed. It found that most forest management issues are being satisfactorily addressed, and made only a few recommendations for issues where "further progress needs to be made." However, the political sensitivity of forest issues in an election year was such that the federal government stalled on responding to it, even months after it was completed.

"We are structured on a corporate model — as a government business enterprise, rather than as a traditional forestry department or a commission," explains Gary King in Forestry Tasmania's Head Office. "This has encouraged

us to set clear objectives and to implement proactive measures achieve these aims. Our performance is required to be measured and reported to Parliament and the public every year." Huon District has its own business plan with detailed performance measures — mostly established in quantifiable terms — such as the amount of wood produced, compliance rates with the Forest Practices Code, or minimizing the area burned in wildfires. Each year, Steve Davis is required to report on progress made against the plan's targets.

The municipal government, the Huon Valley Council, sponsors a "Healthy Rivers Program" and has a similar attitude to measuring performance. The Council collates water quality measurements taken by government agencies as well as those taken by local schools and community groups. One of its initial findings is that the quality of water coming from the forest is virtually unaffected by the forest operations. Steve Davis and his team also monitor water quality in all streams immediately below sites where chemicals are applied, and the results are published annually. However, Adam Burling from the Huon Environment Centre remains worried about pollution and thinks that the water should be more rigorously tested for residues of the herbicides and fertilizers used in the plantations.

Long-term visions

Although the current Huon Forest District Management Plan will expire in 2010, the forest managers have much longer-term visions for the future. Six hundred hectares of new plantations are established each year, approximately half with the local blue gum, *Eucalyptus globulus* and most of the remainder with the fast-growing *Eucalyptus nitens* from Victoria and a small area of *Pinus radiata*. The wood from these plantations — and from regenerating trees in the coupes previously cut over — is expected to generate a fourfold increase in wood production in the future. Development of industrial capacity to utilize the additional wood is being pursued vigorously, with a bold plan to build an integrated forest products' processing centre. The planned centre will comprise a log sorting yard, a sawmill, a factory to make laminated timber and an electricity co-generation plant fuelled by waste wood.

Tourism and the economy

Forestry Tasmania seeks to capitalize on opportunities to develop tourism. Deep in the forest, at the confluence of the Huon and Picton rivers, it has built the "Tahune Air Walk" — a forest canopy walkway suspended 45 metres above the river bank. The facility includes a stylish visitors' centre, forest walking tracks and interpretive signs that explain how the forest is managed to balance production and conservation pressures. The walkway has proven very popular and presently attracts more than 150 000 visitors each year. A Forest and Heritage Centre in

the nearby township of Geeveston complements the Air Walk, with displays depicting the history of the timber industry and a woodcrafts' gallery.

The economy of the Huon Valley, in particular Geeveston, has been revitalized and business confidence turned around by the boom in tourism and by plans for the establishment of an integrated processing centre, which will be built nearby. New cafes, craft shops and accommodation facilities have been established to supply the tourist market.

Tahune Air Walk, suspended 45 metres above the river bank, attracts many tourists (courtesy Forestry Tasmania).

Public consultation and participation

Public consultation is an established part of Australian planning practice, but may not affect the outcomes of the political process. For example, Tasmania undertook the extensive, multi-sector, "Tasmania Together" public consultation

from 2000 to 2003, that proposed to "end clear felling in areas of high conservation value old-growth forest by January 1, 2003, and cease all clear felling in old-growth forests by 2010". However, the government had to balance this with economic and employment pressures, and it continued as it had agreed to under its Regional Forest Agreement with the federal government.

Facilitating involvement in forest management by the Aboriginal community requires that the various groups be consulted and that sufficient time be allowed for consensus views to be developed. Steve Davis is actively working with the Tasmanian Aboriginal Land Council to plan the protection of Aboriginal heritage values of the Riveaux Cave area in Huon District. While progress is being made in this direction, Aboriginal cultural historian, Kaye McPherson of the Manuta Tunapee Puggaluggia within the Lia Pootah community, believes that the government fails to acknowledge the diversity of indigenous Australians and their remaining traditional knowledge.

Nevertheless, consultation is an essential part of good forest management and can be successful at the local scale. Steve Davis spends a lot of his time explaining forest management to community groups. A recent example of re-routing a historic walking track to the Hartz Mountains showed that face-to-face discussions could be helpful in finding acceptable compromises between production and conservation on a small local scale. More importantly, he demonstrates to community groups that forest management in Huon District is conducted in an honest and open manner, even if some people disagree with the forest policies that he implements.

Conclusion

Forest management in Southern Tasmania has developed a detailed planning, monitoring, auditing and reporting system in response to international and national agreements and policies. It operates in a climate of widespread community debate and general dissatisfaction over the felling of old-growth forests. It is under intense scrutiny from environmental and other groups with very high expectations of what should — and can — be achieved. Although the context is often contentious, forest management generally proceeds in a clear, orderly and professional way.

About the author

Dr John Dargavel has worked as a forester in government, industry and universities for more than 40 years. He has authored numerous scientific papers and is the author or editor of 10 books on forest management, policy and history. He is a Visiting Fellow in the Australian National University and is a former President of the Australian Forest History Society.

ANMYEON-DO RECREATION FOREST: A MILLENIUM OF MANAGEMENT

Se-Kyung Chong

Name of forest:	Anmyeon-Do Recreation Forest
Location:	Changgi-ri Anmyeon-eup Taean-gun, Chungnam Province
Area (hectares):	5 175
Managing entity:	Anmyeon Recreation Forest Management Office
Mgt. objectives:	Recreation, tourism
Country:	Republic of Korea

"Let's sing the national anthem and go to the mountain." This slogan will be remembered with pride by older generations of Koreans, recalling their dedication in reforesting the denuded Korean peninsula.

Korea is a mountainous nation, with forests covering more than 65 percent of the country's total land area, amounting to approximately 8 million hectares. Historically, forests provided fuelwood for cooking and heating and served as a primary source of building materials. Forests were also a cornerstone for Korean philosophies that centred on a strong respect for nature and the environment. The important roles played by forests in Korean life and spirituality, allied with only moderate physical demands, resulted in forests remaining rich sources of biodiversity until the end of the Chosun Dynasty, the period of the last Korean emperors. Mountainous regions, for example, were habitats for the now long-extinct Korean tiger.

Since the end of the nineteenth century, however, forests have been subjected to long periods of devastation wrought by wars, social instability and colonial

exploitation. During these periods of turmoil, extensive areas of forest were cleared or heavily degraded. National forests, including the Anmyeon-do forests, which had been protected by the former royal dynasties for their unique natural values, were no exception. In modern times, degradation increased in the period following the Second World War. Illegal felling of timber was pervasive, with the worst peak lasting from 1955 until the early 1960s. Forests adjacent to rural villages were often totally denuded as a result of dramatic increases in shifting cultivation for subsistence, and demands for fuel. Korean families during this period utilized "On-dolls," a unique wood-burning system for heating and cooking. Fuelwood was the prevalent energy source in rural areas until the late 1970s, eventually being replaced by oil, gas and electricity. A dramatic population increase also contributed to deforestation during this period. A national forest inventory carried out in 1955, immediately after the Korean War, found that the non-stocked forest area totalled 3.3 million hectares, accounting for approximately 50 percent of all forest land. The average growing stock was a mere 8.6 cubic metres per hectare. Effective forest management was demonstrably lacking.

Reforestation since the 1950s

Since the end of the 1950s, the Korean Government has made continuous efforts to improve forest management and to implement forest restoration projects, including reclamation of denuded areas, establishment of fuelwood forests, planting fast-growing trees and discouraging shifting cultivation.

The Korean Government took the lead in rehabilitation efforts with numerous reforestation projects, and encouraged villagers to re-establish community cooperatives (*San-lim-gye*). The government also introduced the *Sae-ma-ul* movement, which was a nationwide people's association to eliminate poverty and improve living conditions. Such initiatives were designed to revitalize the traditional spirit of cooperation and unity and eventually became pivotal in the successful regreening of forests.

The Confucian ideals of Korean society also helped. A strong cooperative spirit, and community-based traditions of unity, invoked historical traditions of *Doo-rae* or *Kil-sam* — systems for cooperative assistance based on community-sharing of agricultural labour. Traditional cooperative systems were redeveloped, including several forest cooperatives, such as the *Song-gye* system, which involved partnerships between surrounding villages to manage and protect specific forests.

A potent driver of success was the late President Park Chung Hee's strong political commitment to reforestation. President Park initiated the *Sae-ma-ul* movement, which cultivated a spirit of self-help and self-reliance. This movement encouraged rural villages to develop a community spirit centred around village leaders. It successfully focused national attention on reforestation and encouraged people to participate in various reforestation projects. Hundreds of thousands of

people dug trenches on barren mountains and carried soil to create terraces for supporting trees. The result was a seemingly miraculous rebirth of forests from barren land.

Completely degraded forest in the 1960s (courtesy Korea Forest Research Institute).

The reforestation effort restored the forest area (courtesy Korea Forest Research Institute).

Forestry in Korea

In recent years, visiting the old forests and mountains has become fashionable among Koreans, and there is a burgeoning appreciation of nature and ecology. Traditionally, Korea's forests have constituted an integral part of the respect for the *Keum-Su-Gang-San* — the Korean homeland — that literally translates as "the land embroidered with mountains and rivers." People are also flocking to the mountains because of the spectacular landscapes and to express and reinforce patriotism.

Oak (*Quercus* spp.) and pine (mainly *Pinus densiflora*) forests feature in many of Korea's best-loved landscapes. National forests cover 1.43 million hectares and comprise 22 percent of the country's forested area. Other public forests encompass an additional eight percent, but the majority of Korea's forests (70 percent) are privately owned. National forests are mainly located in the mountainous areas in eastern Korea, with smaller blocks scattered throughout the country.

National forests are managed by five National Forest Offices, whose spheres of operation extend nationwide. The average stocking of national forests is 88 cubic metres per hectare, considerably higher than the national average of 63 cubic metres per hectare. The national forests are considered to be fundamental to the country's efforts to conserve endemic oak and pine forests.

Within the national forest estate, 90 forests — including Anmyeon-do — have been designated as recreation forests, totalling 120 000 hectares. Many of these recreation forests comprise compartments of larger national forests. In general, they are the jewels of the country's forest estate — selected for their outstanding scenic qualities, unique natural values and well-managed resources. In 2000, approximately 3.8 million people visited recreation forests across the country.

Anmyeon-do Recreation Forest

One of the most popular tourist destinations in Korea is Anmyeon-do Recreation Forest. Anmyoen-do (*do* means "island") is a small island located off the west coast of the Korean peninsula. In fact, Anmyeon-do was originally part of the mainland but, during the Chosun era, a canal was cut across the Anmyeon-do peninsula to allow passage for boats. Administratively, the island belongs to Tae-Ahn County of Chung-Nam Province. The island has a total land area of 11 907 hectares with approximately 13 000 inhabitants.

The Anmyoen-do forest is one of the best protected forests in western Korea. Forty-three percent of the island of Anmyeon-do, totalling 5 175 hectares, is covered with trees. Of this area, 75 percent (3 902 hectares) is provincial forest. Pine is the dominant tree species, particularly red pine (*Pinus densiflora*), also known as *Anmyeon-song* (*song* means "pine"). Along the coast, black pine (*Pinus thunbergii*) or *Hae-song* (*Hae* means "sea") is common. Of special importance are 434 hectares of high-quality red pine forests, ranging in age from 80 to 120 years, and reaching up to 360 cubic metres of standing volume per hectare. The Anmyeon-do Recreation Forest was demarcated from this area and consists of 175 hectares of natural pine.

The long history of Anmyeon-do forest

The Anmyeon-do pine forest has been managed intensively and protected for more than 1 000 years — first by the old royal dynasties, then by central governments and, most recently, by the local government of Chung-Nam Province. In medieval times, the Anmyeon-do forest was protected for the exclusive use of the Crown, beginning with the 400 years of the Goryeo Dynasty (918–1392 A.D.). During the Chosun Dynasty (lasting until 1910), several areas in the Anmyeon-do forest were designated as *Geumsan* or *Bongsan*, which means "blockade forest". These forest areas were demarcated with stone markers called *Bongpyo*, which indicated "Crown Forests reserved for timber supply." Of the 282 Bongsan-designated areas throughout the country, 73 were located in Anmyeon-do. There are several reasons why the Anmyeon pine forest was favoured by royalty. Firstly, the high quality of the timber was appropriate for special royal purposes including the construction of palaces and castles, coffins for royal personages and ship

construction for royal fleets. A second reason was ease of transportation to the capital city, Hanyang (the former name for Seoul). The sea route from Anmyeon-do to the Han River, flowing through Seoul, enabled much easier transport of the timber compared with the very poor road network that existed then.

During imperial times, a supervisory management office was located at Anmyeon-do, and as many as 16 forest rangers watched over the Bongsan forests. The chief forestry officer for Anmyeon-do was required to report directly to the Crown authority on a regular basis, describing cut-over areas, areas planted, methods of regeneration and forest conditions. Procedures for timber harvesting were very strict. The local government authority reported the harvesting plan to the Naval Commander, the highest post in the province at that time. The Naval Commander had to receive permission for timber harvesting from the Minister of Finance in the royal palace, who specified the exact harvest volume required to build a particular ship. According to historical records, illegal logging in Bongsan was almost unthinkable at the time, because of the respect people held for the emperor and his orders.

One of the most famous castles constructed using trees harvested from Anmyeon-do is Suwon castle, about 50 kilometres south of Seoul. According to the archives of the Chosun Dynasty, 9 680 logs, 2 300 boards and 14 212 poles were required just to construct the castle roof. Pine trees for pillars and props used inside the main castle are at least nine metres in length and 67 centimetres in diameter, requiring 344 pine trees (each with a volume of 4 cubic metres). Anmyeon-do forests were managed carefully to produce giant trees for such construction work, up till the end of the nineteenth century.

At the beginning of the twentieth century, Japan occupied the Korean peninsula. In 1909, the Japanese authority surveyed forests on Anmyeon-do. This inventory showed a total forested area of 7 156 hectares, of which 4 864 hectares were primarily pine forests. Subsequent records show that 6 400 hectares of forests were sold to Ma-Saeng-Sang-Jeom, a private Japanese company, in 1927. A significant proportion of the forests was cleared during the Japanese occupation; documentation reveals that 4.5 million kilograms of turpentine oil were extracted from harvested pine trees.

"Following the Korean War, further severe damage was done to the forests during a period of social turmoil," indicated Mr Bon-wook Ku, a forest officer at the local forestry station. "Illegal and careless logging was common. There was significant encroachment into the forest areas, and many trees were stolen for sale to sawmills or for use as woodfuel. This is why we have only 434 hectares of well-maintained pine forests remaining within the 3 902 hectares of provincial forests on Anmyeon-do."

However Mr Jae-noh Jo, Director of the Anmyeon Recreation Forest Management Office, emphasized the importance of public forests, and added: "If these forests were private, then they would likely be in worse shape. The

governmental authority has helped to save large portions of the forests by closely monitoring illegal harvesting activities by local people."

In 1965, the central government transferred the ownership of the Anmyeon-do forests to the Chung-Nam provincial government, and management responsibility was initially assigned to the Chung-Nam Provincial Forest Management Station in Dae-Chon, about a three-hour drive from Anmyeon-do. The Anmyeon Provincial Forest Field Station — a branch office assigned with direct management responsibilities for the forests — was established in 1966. To preserve the genetic values of the Anmyeon pine trees, the Provincial Forest Field Station designated 115 hectares as genetic conservation forest in 1988. There are only 2 128 hectares of forests designated for genetic conservation — at five locations — in all of Korea. A research station, under the control of the Korea Forest Research Institute, was also established in Anmyeon-do. Its main objective is to manage the pine seed orchard for breeding and cultivation of *Pinus densiflora.*

In 1992, the Anmyeon-do Recreation Forest Management Office was established by the Chung-Nam provincial government. The Anmyeon Provincial Forest Field Station merged with the management office to strengthen capacity for managing the area. Among the main functions of the management office are:

- proper control of stand densities in the forest;
- prevention of damage by forest pests and diseases;
- restricting timber harvesting to salvage and sanitation operations;
- ensuring regeneration, using both natural seeding and planting seedlings, to preserve the genetic characteristics of Anmyeon-do pine forests; and
- developing and expanding ecotourism.

Features of Anmyeon-do Recreation Forest

Facilities at Anmyeon-do Recreation Forest include a Forest Exhibition House (a forest museum and interactive centre), an arboretum, oriental gardens, play grounds and walking trails. On-site accommodation facilities include 18 log houses and a number of camp sites covering an area of 18 hectares. Three traditional Korean-style houses have also been constructed for guest accommodation. These various facilities were constructed between 1989 and 1992, at a cost of US$2.7 million.

The Forest Exhibition House displays 570 items covering the history, environment and multiple uses of the Anmyeon-do forests. The arboretum houses 555 species of trees and 260 species of wild flowers, occupying about 11 hectares. The Anmyeon-do Recreation Forest Management Office operates all of these facilities.

During the past decade, more than one million people have visited Anmyeon-do Recreation Forest generating earnings (from user fees) of more than US$1.9 million. These funds are contributed to the Chung-Nam Provincial Revenue Office, while the operational budget for the recreation forest is assigned separately from the provincial revenue office.

"The area is popular due to its scenic values," said Ms Hyo-soon Ahn, a forest guide. "The forest is easily accessible by a bridge connecting the island to the mainland."

"Anmyeon-do also gained a lot of publicity from the International Flower Expo held in 2002," she added. The arboretum was used as a part of the exhibition areas for this event. The island also contains an important stand of Golden-rain Tree (*Koelreuteria paniculata*).

The island has 14 beaches, with Tae-Ahn Seashore National Park — located on the northeastern part of the island — attracting many visitors, especially during summer.

"The major reason why people visit the area is absolutely the Anmyeon pine forests, which people really want to see. The second most important attraction is the beautiful beaches," Mr Jae-noh Jo noted.

Mr Sung-whan Kim from the Management Office added: "The local people of Anmyeon-do are extremely proud of their island and the pine forests." He cited a significant new publication, *Book of Anmyeon-do*, compiled and printed in 1990 by local people. The huge volume is a monograph detailing all aspects of Anmyeon-do life, including its history, culture, people and natural resources. This pride is a major reason why forests on the island are less degraded than in many other areas, and why Anmyeon-do forest, in particular, has been a conservation success story.

Forest management

Currently, the Anmyeon-do Recreation Forest Management Office employs 20 administrative staff. The Office also hires local people to carry out silvicultural work and other types of labour. The office has an overall objective to have Anmyeon-do recognized as one of the best conserved pine forests in Korea. It also aims to develop more opportunities for recreation and education in the natural pine forest area, and through the forest exhibition house and arboretum.

To support the rational management of the forest, the Management Office has developed a Decision Support System that includes attribute data for producing thematic maps showing forest cover, forest-use zones, topography, soil types and access roads. In addition, the Management Office uses a Digital Elevation Model (DEM) to determine elevations, slopes and directions of forest areas. The engines for the Decision Support System are ARC/Info□ and MapObject□ and MS-Visual

Basic,□ which facilitate data management, data queries and reporting. These systems utilize the results of a study conducted by Korea University and the Korea Tree Protection Association in 2000, which aimed at better understanding and management of the Anmyeon pine forests. The Chung-nam provincial government provided US$86 000 for this project.

Special management attention is paid to the pine forests, including the area allocated as genetic conservation forest. Fences have been erected around the genetic conservation forest to prevent encroachment.

Throughout the 1970s and 1980s, pine-leaf gall midge and gall diseases were the most severe threats to pine forests in Korea. The Anmyeon pines were no exception. "At that time we covered the ground under the pine trees with vinyl, to prevent gall midges coming in. This helped to save the pines in this area from infestation," reported Mr Jae-noh Jo. Protecting against the pine gall midge and controlling gall diseases — which have not been completely eradicated in Korea — are still high priorities for management.

The management office has spent more than US$660 000 on forest health activities since 1998, to carry out stem injections on individual trees, sanitary thinning and aerial spraying of 1 700 hectares. It also applied fertilizer and nutrient supplements to maintain forest health. Tree surgery to remedy external injuries is another important activity within Anmyeon-do Recreation Forest. The focus is intense, with the effort aimed at rescuing and maintaining individual trees. These technical activities are carried out under a contract with the Korea Tree Protection Association. To develop a method of ensuring successive forests, experiments have been conducted to investigate methods to assist natural regeneration by direct seeding and transplanting of seedlings in a five-hectare test site.

Forest management concentrates on optimizing forest density by thinning — especially in the oldest stands, many of which are heavily overstocked — and tending of young stands. Efforts are being made to replace about 460 hectares of pitch pine forests with native pines.

"The government made a mistake during the reforestation period in replanting the cut-over areas with pitch pine (*Pinus rigida*), an introduced species from North America," explained Mr Bon-wook Ku. "The pitch pine grew poorly so we are working to replace those areas with native pine species." The native pine trees are cultivated in a nursery from seeds collected from superior mother trees. By 2000, some 2.2 kilograms of seeds had been collected and about 15 000 seedlings are being grown from these seeds. A tree improvement programme for native pines is being implemented at the several nurseries operated by the Management Office.

Promoting tourism is an important way to ensure that the recreational benefits of the Anmyeon-do Recreation Forest are widely enjoyed. For example, the Management Office recently organized a traditional fingernail-tinting event (using the leaves of "touch-me-not," a garden balsam). About 6 500 people participated in this revival of an old custom.

"The Office does not presently run formal programmes for ecotourism and environmental education. However, when people arrive here, they go through trails in the arboretum and recreation forest observing trees, plants and wildlife," indicated Mr Bon-wook Ku, a local forest officer.

The Anmyeon-do Recreation Forest is administered solely by the provincial government, which collects revenues and assigns management responsibilities through the Anmyeon-do Recreation Forest Management Office. However, the indirect benefits of the forest contribute enormously to the local economy. Local people note that the attractions and surroundings at Anmyeon-do offer significant potential for ecotourism development.

One local person remarked: "In a sense, the forest is about recreation and eco-education, while at the same time continuing the tradition of people 'going to the mountain.'"

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About the author

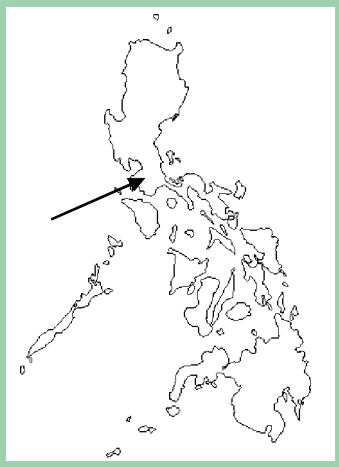
Dr Se-kyung Chong was born in the small town of Cheongju-si in Republic of Korea in 1957. He is married with three children. He has a doctoral degree in timber supply modelling from the University of Alberta, Canada. He currently works as a researcher at the Korea Forest Research Institute.

Acacia mangium *planted on degraded grasslands in Mindanao, Philippines (courtesy Masakazu Kashio).*

HISTORY OF A LEGEND: MANAGING THE MAKILING FOREST RESERVE

Juan M. Pulhin and Maricel A. Tapia

Name of forest:	Mt. Makiling Forest Reserve
Location:	Los Ba□os, Laguna Province
Area (hectares):	4 224
Managing entity:	University of the Philippines, Los Ba□os
Mgt. objectives:	Training laboratory, conservation of biodiversity, watershed protection, recreation, research
Country:	Philippines



According to legend, the goddess Maria Makiling lives at the top of Mt. Makiling, the highest mountain in Laguna, Philippines. The Tagalogs, the predominant ethnic group in the area, consider her to be the guardian and protector of the mountain. In the legend, she once walked with the lowland people and helped them to meet their needs. She was venerated for providing bountiful harvests and other divine gifts. However, some people abused this kindness, thus incurring her wrath, and she returned to the mountain peak, never to be seen again.

This legend is as much a part of the Tagalog culture as the mountain itself. But its cultural significance may become a thing of the past as degradation of the mountain becomes more serious over the years. The mountain's fragile resources are endangered by land development, conversion and infrastructure expansion by private landowners and developers, *kaingin* (shifting cultivation), illegal occupancy, poaching of wildlife and forest products, uncontrolled in-migration and a rapidly increasing population.

"I've seen a lot of activities on the mountain that endanger its beauty and reduce its resource value," said Shirley Satioquia, a 43-year-old resident, who

has lived near Mt. Makiling for the past 20 years. "These include illegal cutting of trees, littering inside the forest and dumping of garbage."

Fifty-one-year-old Alfredo Balagat, a native of the area, was anxious about the burgeoning subdivisions constructed on the lower slopes of the mountain. "Development of subdivisions for residential purposes has contributed to the degradation of the mountain," he observed. "The constructions not only clear the forest, but also cover the craters that emit the volcanic heat of the mountain. Aside from this, poaching of wildlife and forest products and charcoal-making occur in several areas of the reserve."

"Despite all these threats," noted Dr Edwino Fernando, Director of the Makiling Centre for Mountain Ecosystems, "Mt. Makiling remains one of the country's most important biodiversity areas and most significant forested watersheds. It is a living testimony to people and institutions working together to conserve the country's natural heritage for Filipinos and for the world."

The Makiling Centre for Mountain Ecosystems, a unit of the University of the Philippines Los Ba□os (UPLB), manages the forest directly.

Mt. Makiling Forest Reserve

Mt. Makiling's beauty and ecological importance have been recognized for a long time. In 1910, the government issued Proclamation 106, establishing the Mt. Makiling Forest Reserve. The reserve presently covers 4 224 hectares extending across 80 percent of the mountain. Mt. Makiling Forest Reserve straddles the municipalities of Los Ba□os, Bay and Calamba (all in Laguna Province) and the municipality of Sto. Tomas (in Batangas Province). The reserve's primary purpose is to serve as a training laboratory for the advancement of scientific and technical knowledge on the conservation and development of forests and associated ecosystems. The UPLB has been at the forefront of the reserve's management ever since it established the Philippines' first school of forestry in 1910.

Visitors to Mt. Makiling enjoy the well-maintained hiking trails (courtesy Patrick Durst).

Dr Emmanuel Abraham, head of the Makiling Centre for Mountain

Ecosystems Forest and Watershed Division, identifies five important roles of the forest reserve for human beings:

- protective services and influence;
- education and scientific services;
- psycho-physiological influence;
- consumption of plants, animals and derivatives; and
- source of land and living space.

Mt. Makiling Forest Reserve is particularly important as an educational and research resource, as it provides the setting for studies by many local and international researchers. It also has enormous biological diversity and genetic resources, being home to many plant and animal species — both indigenous and exotic. In 1983, for example, J.V. Pancho, a noted Filipino botanist, reported 949 genera and 2 038 species of flowering plants and ferns representing 225 families in Mt. Makiling and its environs.

Botanical references to Mt. Makiling describe an exceptional diversity of woody plant species, totalling more than the entire number of woody species found in the United States of America. In 1977, the late Dioscoro Rabor, an award-winning zoologist, reported at least 50 species of mammals, 120 bird species, six species of amphibians, 19 types of reptile and several varieties of fish inhabiting the reserve. The area also contains at least 7 000 insect species.

Mt. Makiling Forest Reserve is also a very important watershed, providing water for irrigation, as well as for industrial and domestic purposes. The Mt. Makiling watershed supplies water to five water district authorities, and an indeterminate number of business establishments, government offices and other institutions.

The forest reserve also contains resources supporting geothermal operations that have an electricity generating capacity of 370 megawatts. This constitutes about 17 percent of the generating capacity on the island of Luzon. Mt. Makiling — an inactive volcano — is endowed with numerous natural hot springs, which are the main attraction for local resorts and recreation facilities. About 200 private pools and resorts draw thermal water from the mountain.

The forest reserve's mysterious legends and captivating natural scenery, as well as the only intact forests within a 65-kilometre radius of Metro Manila, have made Mt. Makiling a favourite recreational site for tourists (local and foreign) and excursionists. Some 120 000 visitors flock to the forest reserve each year. Among the main tourist attractions are the Makiling Botanic Gardens, Mudsprings and Flatrocks.

Ecotourism helps to generate significant financial resources for the reserve. For example, in each of the past three years, the Makiling Botanic Gardens has earned more than US$20 000 from entrance fees. Other sources of income come from the rental of forest reserve facilities and the sale of forest products. These

revenues contribute significantly to the modest budget allocated by the national government for the reserve's management. However, the combined amount is still barely sufficient to sustain the regular monitoring work done in the forest reserve. As a result, other strategies are needed to protect and conserve the reserve.

Numerous challenges

Mt. Makiling Forest Reserve's protected area status is supposed to ensure that it is free from human occupancy, cultivation and private claims. However, residents within and around the forest reserve largely view the mountain area as an economic resource. Almost 1 000 people — mostly farmers — currently live inside the reserve boundaries, according to UPLB researchers. Farms, providing the main source of livelihood for these residents, now cover approximately 45 percent of the forest reserve's total area.

Urbanization along the fringes of the reserve further complicates the occupancy problem. The past several decades have seen the growth of various commercial establishments and infrastructure. Development of residential subdivisions on the lower slopes of the mountain puts added pressure on the forest reserve.

"Urbanization itself is not so bad, but the changes that come with it may cause damage to the reserve," explained Dr Abraham. "One example is the impact that urbanization has on upstream and downstream water resources, particularly related to wastewater disposal. Other physical impacts include soil disturbances and increased solid wastes. There are also detrimental social impacts such as when land development dislocates landless farmers who then move deeper into the reserve, clearing yet more forest to create new farms."

The dynamic processes within and around the reserve force its managers to contend with pressures from both agricultural and urban environments. Added to this complexity are the multiple interests of the resident farmers, local government units, people's organizations, government agencies, lessees, non-governmental organizations, schools, student organizations and the private sector. The differences in their perspectives, mandates, goals and interests can lead to conflict and competition for resources — adding to management challenges.

Transfer issues

The management of the forest reserve has been transferred several times since its establishment in 1910. Initially, responsibility for management was vested in the Bureau of Forestry. In 1952, Republic Act 826 re-assigned management responsibility to the Commission of Parks and Wildlife. In 1956, the UPLB's College of Forestry and Natural Resources sought jurisdiction over the forests to make the reserve a training laboratory for scientific and silvicultural studies. Four years later, in 1960, President Garcia designated the UPLB's Board of

Regents, as the official administrator of the forest reserve. The transfer was formalized in Proclamation No. 692, which stated that the forest reserve shall "be conserved and preserved as a national park." However, at the time of transfer, approximately one-third of the reserve's area had already been encroached by *kaingineros* (slash-and-burn farmers) and squatters.

A sudden change in the forest reserve's administration occurred in 1987 when jurisdiction was abruptly transferred to the National Power Corporation (NPC) through Executive Order No. 224 issued by President Aquino. The Order set aside a large parcel of land in the provinces of Quezon and Batangas, covering portions of Mt. Makiling and Mt. Banahaw — including the entire Makiling Forest Reserve — for energy generation.

The UPLB countered this administrative development by urging the House of Representatives to return the responsibility for management of the reserve to the university. The university's efforts were rewarded in 1990, when Republic Act 6967 was signed — giving the university exclusive control of the entire forest reserve.

These frequent changes in administration have inevitably resulted in policy inconsistencies and sometimes ineffective management. Unsurprisingly, only 53 percent of the total land area remained forested by 1989 — the rest had been converted to farms or other land uses.

Earlier approaches governing the forest reserve were highly regulatory and punitive. They did not provide opportunity for social development or for effectively involving stakeholders. For instance, in 1976, President Marcos ordered that farmers who lived in the forest reserve should be forcibly resettled to Quezon Province, some 100 kilometres away. However, without adequate resettlement assistance, and confronted with the infertile soils and the absence of employment opportunities in the resettlement area, most of the relocated people slipped back to Mt. Makiling in less than one year. The expelled farming community quickly re-established itself in the forest reserve and continued with its previous activities.

Multistakeholder approach

During the early 1990s, the failure of earlier management strategies triggered an urgent rethink of approaches and led to a multistakeholder or "participatory approach" to forest management — an approach that has since gained wide acceptance, not only in the Philippines, but also in other parts of the world.

The UPLB recognized that it alone could not conserve and protect the reserve. Its new strategy sought partnerships with people's organizations in the forest reserve. These included *Samahan ng Magsasaka sa Mataas na Lupa ng Lalakay sa Bundok Makiling* and *Samahan ng Bagong Pagasa ng Bagong Silang*. It also sought collaboration with private companies, local government units, non-governmental organizations (including the Laguna Tourism Association and the Rotary Club

of Los Ba□os) and schools. A variety of programmes were coordinated and implemented by the Makiling Centre for Mountain Ecosystems in collaboration with these and other institutions.

As a result of such partnerships, financial resources for development initiatives were seldom lacking. Each partner became a potential source of funds and non-monetary inputs.

"Collaborative partners usually implement activities themselves. For instance, they may bring their employees to plant trees, and staff from the university will simply coordinate and supervise them. The advantages of this approach are that complex fund transfers are avoided and the university does not have to use its own resources for rehabilitation projects. Furthermore, the people who take part in the activities gain experiences that they long value," said Dr Abraham.

Forest management measures

The 1990s were a good decade for the Mt. Makiling Forest Reserve in terms of collaborative work. During this period, a number of private organizations provided funds for reforestation projects, while local farmer organizations provided hired labour and forest protection services. Private sponsors included Novartis (a biological and chemical company based in Switzerland), Surigao Development Corporation, the Philippine Wood Producers Association and Sterling Health Incorporated. These organizations funded tree-planting and watershed rehabilitation projects in the forest reserve. To date, approximately 45 hectares have been replanted, with 70 to 90 percent survival rates. The choice of species has shifted from introduced to indigenous trees, especially species of dipterocarps that once dominated the original forests.

In addition to tree planting, Mt. Makiling stakeholders also engage in other forest management activities including land-use assessment and planning, watershed protection, biodiversity conservation and restoration, and protection and management of water sources and distribution systems.

The Makiling Centre for Mountain Ecosystems is tireless in its efforts to seek the participation of partners in the rehabilitation of denuded land. It has also made education a priority — especially to increase forestry expertise and the level of awareness of people concerning the importance of conserving the forest reserve. This is done mainly through various forestry certificate and degree programmes ranging up to doctoral level. The College of Forestry and Natural Resources implements these programmes.

Training laboratory

The College of Forestry and Natural Resources has trained 6 684 graduates in forestry since 1912. It is widely recognized as the premier forestry school in the Philippines, and as one of the leading institutions in the region.

"It was while doing practical fieldwork in the forest reserve that I first learned and appreciated the basic concepts and importance of watershed management," recollected Dr Rex Victor Cruz, a 1978 forestry graduate and now a leading national expert in watershed management. "This exposure encouraged me to pursue a higher degree in forestry and to build a professional specialization around forests and watersheds. It was also in the forest reserve that my eyes were first opened to the vast diversity of plants and animals in a humid tropical forest. At close range, I came to understand the real interactions between people and the forests."

Mt. Makiling Forest Reserve is set apart from many other forests by the sheer volume of research conducted within the reserve — by both local and international scientists. Aside from providing additional information and knowledge on various features of the reserve, these studies also impart insights on how to continuously improve management. Research has also led to the development of models for management that have subsequently been applied in forest ecosystems throughout the Philippines.

Outdoor recreation education

The primary purpose of the forest reserve, however, extends beyond the confines of academia, into extension efforts aimed at educating other sectors of society — and particularly young people.

As early as 1973, the College of Forestry and Natural Resources, through the Department of Forestry Extension, began implementing an Outdoor Recreation Education programme in collaboration with the Department of Education, Culture and Sports in the nearby provinces of Batangas and Laguna. Conducted during the summer months, the programme educated young people on the value of spending their vacation time outdoors and in natural environments, as well as the proper use of outdoor recreational areas. The programme provided schoolchildren with new perspectives and knowledge about the importance of the environment.

In 1998, the Makiling Centre for Mountain Ecosystems expanded the Outdoor Recreation Education programme (which ended in 1996) by launching the Environmental Education Program. The new programme expands coverage to elementary school administrators and teachers at Grades V and VI, as well as students.

The core components of the Environmental Education Program are:

- information;
- education;
- communication;
- curriculum development and integration of environmental concepts to other subjects taught in Grades V and VI;

- conservation of the Mt. Makiling Forest Reserve and other mountains;
- establishment of forest parks; and
- monitoring and evaluation.

The programme was initially run for 13 schools, but its success led to its expansion to cover 113 schools, with the participation of 130 school officials, 150 teachers and 20 000 pupils. More schools are eager to join the programme, and further expansion is anticipated.

In recognition of its exemplary performance, the College of Forestry and Natural Resources cited the Environmental Education Program as the Outstanding Extension Program of the College in 2003.

Monitoring and law enforcement system

To provide adequate protection to its forests, the Mt. Makiling Forest Reserve uses a progressive system of monitoring and law enforcement. Efforts are first made to resolve problems associated with illegal tree felling, poaching of wildlife and forest encroachment through dialogue and moral persuasion. Persistent violators, however, are arrested and prosecuted. "Some poachers are imprisoned, while other cases are settled more amicably," indicated Dr Abraham.

A number of laws and policies have been issued for the protection of the reserve. Presidential Decree 330, for instance, defines timber smuggling or illegal cutting of logs from public forests and forest reserves as qualified theft. Memorandum No. 080, S. 2000, prohibits the construction of huts, houses or similar structures inside the forest reserve. Forest officers are assigned within the reserve to enforce these rules and regulations and to conduct regular forest patrols.

Flaws

Although a multistakeholder approach has generally proven effective in managing Mt. Makiling Forest Reserve, it is not flawless. The implementation of participatory processes sometimes introduces problems that cannot be ignored. Identifying stakeholders and their "stakes" in the forest is a primary concern, since it is not only the benefits that are shared, but also responsibilities. The means and modes of participation also need to be made clear to all parties. To avoid conflicts, efforts are made to communicate with various stakeholders through meetings, workshops and other extension activities.

To formalize the partnerships between the UPLB and other stakeholders, several Memoranda of Agreement have also been signed. One example is a memorandum signed between the university and the Regional Office of the Department of Education Culture and Sports (signed on April 4, 2001). This

agreement governs the implementation of an Environmental Learning and Conservation Project designed to promote environmental awareness by conducting experiential learning activities for students. Recognizing the importance of conservation and protection of the watershed within the forest reserve, the university and the Laguna Tourism Association implemented an agreement (signed in January 2001) to regulate the erection of signs and to support a monitoring station along the boundaries of the forest reserve.

Conclusion

Not all efforts to conserve and protect the Mt. Makiling Forest Reserve have been successful. Nonetheless, the reserve has been maintained and improved for almost a century due to the commitment of its managers to uphold its primary objective, that is, to serve as a training laboratory for the advancement of scientific and technical knowledge on natural resources' conservation. This effort is strengthened by the participation of various stakeholders in conserving and rehabilitating the forest, and by the high level of awareness of local people concerning the importance of the reserve. Threats from encroachment, urbanization and surging populations have not deterred the pursuit of this primary objective. The management experiences at the forest reserve add to the Mt. Makiling legend.

In summarizing his perspectives, Dr Fernando said: "I would like to regard 'Makiling' as a brand name — not just for the mountain's beauty and the maiden lass of the legendary tale — but also for the quality of the forest reserve and its environment. The name 'Makiling' should evoke the reserve's many economic, aesthetic and ecological benefits, and its long academic and scientific tradition. Its conservation and protection are of the utmost importance, while its demise would be a great tragedy for us all."

About the authors

Dr Juan M. Pulhin is Associate Professor and Associate Dean of the College of Forestry and Natural Resources, University of the Philippines Los Ba□os. Prior to this, he was Departmental Chair of Social Forestry and Forest Governance in the same college. He has a doctorate in Geographical Sciences from the Australian National University, Canberra, Australia.

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Pre-harvest inventory and tree felling, Nakavu Forest, Fiji (courtesy SPC/GTZ Pacific-German Regional Forestry Project).

NAKAVU FOREST: RESEARCH MAKES THE DIFFERENCE

Lemeki Lenoa

Name of forest:	Nakavu Forest
Location:	Namosi Province, Viti Levu Island
Area (hectares):	315
Managing entity:	Fiji Forestry Department and Nakavu villagers
Mgt. objectives:	Sustainable timber production model, collaborative research
Country:	Fiji

"Nakavu Village holds a special place in the national effort to develop sustainable management of natural forests in the country," said Laiakini Jiko, Fiji's Conservator of Forests.

He knows what he is talking about. After all, in 1991 he was the Head of the Forestry Department's Silviculture Research Division, which was directly responsible for research activities on sustainable forest management, under the Fiji-German Forestry Project. Villagers in Nakavu are the landowners of the forests of the *Yavusa Nabukebuke* in the interior of Namosi Province. "Their cooperation, goodwill and trust in our request to lease part of their communally-owned forests for applied research into the complex issue of sustainable forest management will be long remembered in the history of the Forestry Department," Jiko added.

Land tenure in Fiji, and particularly issues perceived to be affecting Fijian native land, has been the subject of keen national debate over the years and has been a contentious issue during the recent national political elections. Differing views on the land issue, coupled with deliberate misinformation by certain politicians and interest groups, were among the causes of past political unrest, which led to the downfall of two elected Labour governments via military and civilian coup d'état in 1987 and 2000, respectively.

The British established the land tenure system in Fiji in the 1800s, during the period of colonial rule. Fiji is unlike most countries of the Pacific where the land was alienated or sold off by the native owners. Fiji had a Scottish governor, Sir Arthur Gordon, who was familiar with the system of land ownership because it was similar to the system in his native Scotland. Against the desires of early European settlers, he strongly supported the protection of indigenous ownership of land. He introduced a system that allowed Fijians to own the land outright, a system maintained to this day. The basis of the ownership is that land is owned by the *mataqali* (landowning unit or clan). It is not owned individually, but communally.

Fiji's Native Land Trust Act of 1940 established the Native Land Trust Board, a statutory authority, and gave it control of all native land to be managed for the benefit of indigenous Fijian owners.

"The sanctity of the trusteeship role given to the Native Land Trust Board by the indigenous landowners is unequalled in our time." Thus spoke the great Fijian politician, Ratu Sir Lala Sukuna, during the 1940 debate on the Native Land Trust Bill, and his words still ring true. The indigenous landowners unconditionally put their faith in the organization when they entrusted the administration of their land to the board. It is the board's duty to protect that trust and it plays the dual role of trustee and landlord in the development of native land in Fiji.

In Fiji, there are three classes of land ownership, namely:

- native land;
- Crown grants (commonly known as "freeholds"); and
- state lands.

The term "native land" is defined as land above the high water mark, not being freehold or owned by the state in accordance with the provisions of the Crown Lands Act (Cap. 135). Native land — which comprises 1 487 581 hectares or 84 percent of Fiji's total land area — is owned by indigenous Fijians in their collective groupings according to custom and tradition.

Both the government and the Native Land Trust Board are aware of the importance of the land issue to the indigenous Fijian population. The board has undergone major changes in the past few years to make it more commercial and customer-orientated in its outlook. In simple terms, the board's revised policy now focuses on maximizing revenues for indigenous Fijian landowners, promoting sound relationships with all stakeholders and securing benefits to the national economy.

Important economic contributions from forestry

The government's 2003 budget describes forestry as a "growth sector" in the economy. It has contributed, on average, about 0.9 percent to the gross domestic

product (GDP) over the last five years. At present, it ranks as Fiji's fifth most important export industry, after garments, sugar, gold and fish. Earnings from forest products (sawntimber, plywood, veneer and pine woodchips) are greatly influenced by the price of exports, production and weather patterns.

"The forestry sector is increasingly becoming a significant part of Fiji's economy as it encompasses the entire range of production processes from harvesting, milling and value-added operations, to production inputs in construction and other industries," announced the Minister of Finance, Ratu Jone Kubuabola, during his 2003 budget speech in parliament in November 2002. "Ensuring sustainability of the industry is therefore of paramount importance, whilst providing assistance and building the capacity of indigenous resource owners, thus, facilitating their participation in the industry," he added.

Harvesting of natural forests and landowners' involvement

Forestry development represents an area where indigenous Fijian landowners can widely and meaningfully participate in commercial business activities. The provision of seed funding in 2002 under the government's Affirmative Action Plan, has encouraged landowners to increase their involvement in the timber industry and to maximize the potential benefits accruable to them. In fact, the government believes that the immense potential of forestry, including that of the country's extensive pine and mahogany plantations, may be harnessed effectively only by dealing with landowners' desires and expectations successfully.

Log scaling using calipers at Nakavu forest (courtesy SPC/ GTZ Pacific-German Regional Forestry Project).

Landowner involvement in the activities related to the country's natural forests has, to date, been limited due to lack of capital, expertise and business acumen. The industry has been dominated by Indo-Fijian family businesses, which operate a number of small- to medium-sized sawmilling operations and a large veneer/plywood processing mill on the second largest island of Vanua Levu.

The involvement of landowners in the plantation-based pine industry is much more structured and more developed. However, there are also certain underlying factors that landowners still need to address if their own companies and the forest industry are to be successful in the future. These include changes in attitudes and perceptions about the forestry business, differentiation between ownership and management, competition, transparency and accountability, and capacity building.

The case for sustainable forest management

Over the years, there has been growing support for the sustainable management of Fiji's 740 000 hectares of natural forests. This point is now specifically spelled out in the current forestry and environmental policies of both the government and the Native Land Trust Board.

Fiji is fortunate in having substantial high-value natural timber resources, but in the past, forest exploitation has not been conducted sustainably. Now, however, the country is in the enviable position of being able to move towards sustainable management of its remaining natural forests, by relying more heavily on its extensive plantations of pine and mahogany. Almost five decades ago, the government invested substantial sums to establish industrial plantations of both softwood (pine) and hardwood (mahogany). Plantations now cover approximately 90 000 hectares on the two main islands of Viti Levu and Vanua Levu.

The current challenge is finding a workable mechanism for incorporating sustainable forest management guidelines into Fijian forest management — in a way that also satisfies the needs of the indigenous Fijian resource owners, the timber industry and government interests.

As part of the International Tropical Timber Organization's (ITTO) ongoing programme to promote the conservation and sustainable management of tropical forests, the following conditions have been identified as essential for sustainable timber production:

- long-term security of forestry operations;
- operational control;
- a suitable financial environment; and
- adequate information.

Furthermore, ITTO's efforts to promote and support sustainable forest management — to which Fiji subscribes — have shown that successful sustained yield management of natural tropical forests can only be achieved if management systems incorporate:

- protection of the forests;
- realistic assessments of annual harvests;
- orderly arrangement and demarcation of annual cutting coupes;
- preharvest inventory and allocation of silvicultural systems;
- marking of trees for retention or for felling;
- exploitation of harvesting coupes within acceptable damage limits;
- postfelling inventories;
- checks of annual coupes to ensure damage is kept within acceptable limits; and
- silvicultural treatments of residual stands, as needed.

"In Fiji's case, the official government approach towards the management of the nation's natural forests has improved considerably during the last decade," Jiko observed. "The introduction of the National Code of Logging Practice in June 1990, together with related training (for both Forestry Department officers and private timber industry operators) and field monitoring activities have led to a substantial improvement in the technical standard of the planning and implementation of logging," he added. The Australian Government-sponsored Fiji Forest Resource Tactical Planning Project (1993–1996) made important contributions towards strengthening capacities.

Nevertheless, until recently the silvicultural aspects of natural forest logging received little attention. There is still inadequate scientific data on the growth of Fiji's main commercial natural timber species. This is due to the lack of emphasis, in the past, by the Forestry Department on this area of silvicultural research.

The Natural Forest Management Pilot Project (NFMPP)

Seeking management prescriptions that would ensure sustainable yields of natural forest resources, the Forestry Department — with funding and technical support from the Government of the Federal Republic of Germany through the German Agency for Technical Cooperation (GTZ) — implemented a research programme on 315 hectares of natural forests in Nakavu, Namosi Province. The project's field activities, which ran from March 1991 to December 1994, were implemented by the Forestry Department's Silviculture Research Division, with support from the Fiji-German Forestry Project.

The research programme, entitled *Natural Forest Management Pilot Project* (NFMPP), was tasked with "developing improved silvicultural guidelines for natural forest management within the Fijian context of communal forest ownership and the need to involve forest owners more in management decisions and practices."

The"Nakavu Model": a new management approach

The resultant sustainable forest management guidelines, or prescriptions for management (commonly referred to as the "Nakavu Model") can, after due evaluation and refinement in larger scale operational trials under real commercial conditions, be adopted by the Forestry Department and the Native Land Trust Board for application throughout Fiji's natural forests.

The NFMPP embarked on research and testing to support nine operations under the Nakavu Model namely:

- demarcation of the logging area and compartments;
- implementation of a preharvest inventory;
- development of a "Diameter Limits Table;"

- decisions on logging and logging intensity;
- selection and marking of trees for controlled selection logging;
- design of appropriate road systems;
- preparation of the logging/management plan;
- implementation of controlled selection logging; and
- supervision and compartment closure after harvesting operations.

With this overall approach, a number of other specific technical outputs were expected from the NFMPP. These were related to:

- obtaining information on costs and benefits of harvest planning and controlled selection logging;
- assessing increment, mortality and regeneration behaviour of natural tree species under different logging intensities;
- developing accurate tree volume functions;
- determining optimal roading density and planning procedures;
- training Forestry Department staff and landowners in natural regeneration practices; and
- establishing a demonstration area available to the Forestry Department for continuing research throughout the 50-year duration of the lease.

"Selection logging" refers to harvesting whereby only a portion of the total merchantable volume is removed, and whereby emphasis is placed on the condition and structure of the remaining stand. Emphasis is given to natural regeneration and future timber production, as opposed to the immediate removal of the best quality timber trees. "Controlled selection logging" refers to the deliberate harvest of a predetermined volume of timber — normally much less than what would be taken using conventional logging practices.

Nakavu Forest project site

The Nakavu project site was selected by the Forestry Department and the Fiji-German Forestry Project team from a number of potential sites, on the basis of its forest characteristics, and sociocultural and accessibility factors. The area is located about 9 kilometres northwest of the small township of Navua, which is 45 kilometres from the capital Suva on the southeast coast of Viti Levu, the largest island in Fiji.

Nakavu Forest is on communally-owned native land belonging to members of the Yavusa Nabukebuke tribe, which comprises six distinct clans residing in nearby Nakavu Village. Being native land, negotiations were conducted with the Native Land Trust Board and the landowners, enabling the Forestry Department to formally acquire a 50-year lease over the 315-hectare project site — effective

from January 1991 — with provision for review of the lease agreement at 10-year intervals.

Nakavu Forest is a dense mixed-evergreen rain forest with an upper canopy height of about 27 metres. Dominant commercial tree species include kaudamu (*Myristica* spp.), yasiyasi (*Syzygium/Cleistocalyx* spp.), sacau (*Palaquim* spp.), damanu (*Calophyllum* spp.), laubu (*Garcinia* spp.), kaunicina (*Canarium* spp.), kaunigai (*Haplolobus* spp.) and mavota (*Gonystylus* spp.). Nakavu Forest is representative of the mixed-evergreen forest type found throughout much of Fiji.

The Natural Forest Management Pilot Project required a suitable tract of representative natural forest and landowners willing to cooperate with the project. The project also required the participation of a logging contractor and sawmiller prepared to be trained, and to work under supervision, in following the proposed sustainable forest management harvesting guidelines. The Forestry Department Research Division was designated to manage the project, with support from the Fiji-German Forestry Project.

Apart from consenting to the leasing of part of their forest for the project, the Nakavu landowners were firm in their acceptance and belief in the sustainable forest management concept throughout the four-year duration of the project's field activities.

"The landowners played a pivotal role in ensuring the entire project activities were implemented smoothly as planned and completed successfully," said Principal Forestry Officer Tevita Evo, who was then the Research Division officer directly in charge of the National Forest Management Pilot Project.

Project field activities

As part of the project's objectives, 12 landowners were selected and employed on a full-time basis. They were led by Mosese Moceyawa and Kasiano Duikoro, both of whom were appointed "charge-hands" (supervisors) of the landowner workforce, because of their supervisory capabilities, knowledge of local forest conditions and the respect they commanded. Following training, they were directly involved in undertaking various project field activities including:

- *Compartment demarcation.* The area was subdivided into 12 management units, averaging 26 hectares in size (ranging from 13 to 38 hectares). Boundaries followed natural features and cleared straight lines, and were marked clearly on maps and in the field.
- *Preharvest inventory.* A strip sampling system was used, with 25-metre-wide strips inventoried to determine numbers of trees, basal areas and standing volumes and for various diameter classes.

- *Development of diameter limit tables.* The inventory data was used to develop species-specific diameter limit tables for the different treatments (or logging intensities) used, and the selection of trees to be harvested under each treatment. Three levels of harvesting intensities were established:
  - light logging, or removal of 15 percent of the total standing volume of trees (≥35 centimetres diameter at breast height (dbh));
  - medium logging, or removal of 33 percent of total standing volume; and
  - heavy logging, or removal of 60 percent of the total standing volume.

In addition, a fourth treatment called "conventional" logging was included, whereby all commercial trees (≥35 centimetres dbh) were removed. This made it possible to compare the modified logging intensities with normal practices.

- *Permanent sample plots.* In each of the 12 compartments, four permanently demarcated sample plots were established — with an area of 2 500 m^2 each — in a systematic pattern following the slope. Tree diameters and height measurements were recorded, and a regeneration seedling count was conducted.
- *Tree selection.* Trees to be felled were selected and marked in the field prior to the start of harvesting operations, thus enabling strict control of harvesting intensities and improving planning and silviculture.
- *Logging planning.* Careful planning was carried out to achieve the objectives of controlled selection logging in an efficient, safe and environmentally sound manner.
- *Controlled selection logging.* Techniques were developed to implement the required logging intensities in line with the National Code of Logging Practice and sustainable forest management guidelines. The objective was to provide income to landowners and to the contractor, while at the same time minimizing damage to the residual forest and creating favourable, controlled conditions for forest growth, regeneration and further sustainable management.
- *Postfelling damage assessment.* The impacts of the various degrees of controlled selection felling were assessed in terms of numbers of damaged or dead trees, and remaining basal areas and volumes.

"The landowner employees were instrumental in promoting the sustainable forest management concept through 'Nakavu Day' — an annual celebration and fundraising event organized by the Nakavu landowners and surrounding communities. They also conducted landowner-awareness training for other forest owners interested in sustainable forest management including, for example, the Drawa landowners of Wailevu West, Vanua Levu," explained Tevita Evo.

Under the National Forest Management Pilot Project, Nur Ahmed & Company Ltd was selected as the logging contractor from a list of 10 interested parties. The company was selected because of its favourable location, the company's satisfactory harvesting record, and because its harvesting operations were integrated with a medium-sized sawmill at Yarawa (about 18 kilometres from Nakavu).

"The project's harvesting operation was a learning experience for our company, particularly in working with the three different logging intensities and following the approved logging plan," reported Tahir Ali, one of the logging company's directors.

The modified logging intensities, particularly the medium- and heavy-logging treatments, were not necessarily more expensive than conventional methods. In fact, cost comparisons indicated that the medium and heavy treatments were actually US$1.50 per cubic metre less than conventional logging costs (estimated at an average of US$42.50 per cubic metre in 1995).

Advanced tree selection was extremely important, enabling accurate forecasting of species' composition, volumes and location within the logging coupe or compartment. This resulted in better planning, and improved overall efficiency. "Thinking back, there were certainly some real benefits to us — most notably the overall lower costs at the end of the day," Tahir Ali smiled.

The modified logging intensities lead to higher average diameters of the timber felled, which lead to more efficient processing and increased profits. "Both the sawmilling and rotary veneer recovery rates are very much a function of the log diameter and form; the larger the log with good round cylindrical form, the better the recovery rates achieved," indicated Lepani Moce Sogovale, Resource Manager for Fiji Forest Industries Ltd, a pioneering institution in Fiji's timber industry, and an important sawmiller and veneer/plywood manufacturer.

Fijian landowners whose forests are being harvested by outside logging contractors or companies are presently awarded the following benefits:

- a standard log royalty payable directly to the Native Land Trust Board — ranging from US$20 per cubic metre for prime Class 1 logs down to US$4.65 per cubic metre for lower Class 3 logs — from which the Native Land Trust Board deducts 10 percent for administrative costs prior to distribution to landowners;
- negotiated average log premiums of around US$5–7 per cubic metre payable directly to landowners; and
- access to supplies of sawntimber at reduced concession prices.

However, the current harvesting system in Fiji allows for the removal of all trees greater than 35 centimetres dbh, which significantly alters the forest structure and composition, and is unsustainable in the long term.

Increased benefits from the Nakavu Model

The "Nakavu Model" has several advantages for the landowners. Key among these, as pointed out in the project's final report, is that landowners will have "a more stable income from royalties, logging jobs, and management jobs over shorter felling cycles."

"The Nakavu villagers have certainly benefited from their involvement in the project," related Tevita Evo. "Financial and other benefits have played a large part in raising the general living standard in the village. It has facilitated a regular electricity power supply and the construction of a community hall. The project was a 'unifying force' and galvanized the villagers into working together, and now they have a different and greater appreciation of their forests. And through all this, they still see their forests out there — without the major damage typical of areas where uncontrolled harvesting has taken place — regenerating and growing."

The project's final report adds: "Apart from the financial advantages, the active participation in the preharvest inventory, tree selection and logging, leads to an increased awareness about sustainable forest management and the activities required for achieving it. Landowners will only be prepared to protect their own forest if they perceive that it has value."

Importantly, the reduced volumes removed at the time of the first harvest and the improved silvicultural practices leave the original structure, composition and biodiversity of the forest intact. This in turn leads to improved supplies of culturally important non-timber forest products and to improved quality of streams and other water supplies.

Other advantages arising from the Nakavu Model include ensuring log supply security over time and potentially better export market access for timber products coming from sustainably managed forests. A recent consultants' report examining the issue of Fiji's efforts to improve forest management and move towards forest certification noted that:

"Log supply is guaranteed for the long term due to the fact that you are managing your forests in a truly sustainable manner. Implementation of the 'Nakavu Sustainable Forest Management Model' is a major step towards getting the forest certified.... While there is little or no pressure from Fiji's current timber export markets for certification and labeling of forest products generally, access to certain offshore markets (e.g. in Europe and the USA) is becoming dependent on being certified. Current international experience has been that price premiums may not result from certification and labeling; rather the prime motivation for undergoing what can be an expensive process is to obtain and protect market access."

The benefits to the government from the Nakavu Model can be seen from the perspective of the Forestry Department as the implementing agency, and from the perspective of the nation as a whole:

- The project-provided training, skills' development and equipment will enable the Forestry Department and its local counterpart officers to vastly improve forest management.
- Increased landowner involvement and awareness will ultimately lead to enhanced protection and conservation of Fiji's remaining natural forest resources. A more sustainable supply of timber for industry will help guarantee its long-term survival, continuing national economic benefits in the form of jobs, rural employment and foreign exchange earnings.
- Fiji will move closer toward fulfilling its international commitments related to sustainable forest management.

The development of the Nakavu Model has been a significant milestone in the effort to improve management of Fiji's remaining natural forest resources. "The Forestry Department Silvicultural Research Division continues to undertake regular monitoring of the Nakavu permanent sample plots, recording valuable tree-growth data every two years. We also see the value of Nakavu as a demonstration site, with increasing popularity for visits by university researchers, students and overseas visitors. Recently, we have started a number of studies on phenology and forest succession after logging on site," noted Inoke Wainiqolo, Principal Silviculturist of the Division.

The Nakavu Model is now in the process of being implemented on a larger operational scale, under commercial conditions, in a 6 500-hectare forest belonging to the Drawa landowners of Wailevu West on the island of Vanua Levu. This operation is expected to allay remaining scepticism harboured by the timber industry. Key local staff employed in the Nakavu project have participated in the initial training sessions for Drawa landowners.

The refined sustainable forest management guidelines resulting from this process have established a model and basis for nationwide adoption and implementation. A senior Forestry Department official explained: "Landowners are becoming more knowledgeable of the need for good forest management and are increasingly concerned about bad forest practices. This concern is motivating the Forestry Department to review the National Code of Logging Practice and to strengthen measures to enforce it. There is also an enhanced desire by landowners to become involved in decision making related to their forest resources, but many lack experience in dealing with the commercial sector. In the past, tensions and disputes have often ensued when expectations between landowners and commercial operators have not been met. The experience in Nakavu has demonstrated that such problems can be averted through careful planning, consultation with local people and management that makes long-term benefits to landowners a priority. Many people argue that if sustainable forest management

is to be implemented widely, it must be seen as beneficial to everyone involved or affected. In other words, the answer to the question 'what is in it for me or us?' must be positive for everyone concerned."

These are the underlying issues that are being addressed through the Nakavu Model, and the process of fine-tuning the model through the larger scale operational trials under actual commercial conditions.

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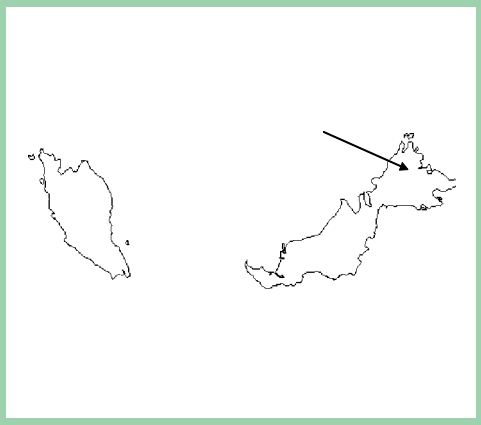
About the author

Lemeki Lenoa is a forester with over 22 years of experience in all aspects of Fijian forestry covering the government, timber industry and lately as an independent forestry consultant dealing with Fiji and other Pacific Island region countries. He graduated with a B.Sc. (Forestry) from the Australian National University in 1979 and entered government service under the Fiji Forestry Department in 1980. He spent the initial 13 years of his career with the government. In 1993, he resigned and joined the private timber sector as the Manager, Resource & Transport, of Fiji Forest Industries Ltd (FFI), Fiji's largest natural timber processor and exporter.

DERAMAKOT FOREST RESERVE: THE FUTURE IS NOW

John Tay and Kan Yaw Chong

Name of forest:	FMU19(a) Deramakot Forest Reserve
Location:	Sandakan, Sabah
Area (hectares):	55 083
Managing entity:	Sabah Forestry Department
Mgt. objectives:	Sustainable timber production
Country:	Malaysia



"Deramakot Forest Reserve is the site of Sabah's first major initiative towards sustainable management of logged forests," explained Frederick Kugan, Head of the International and External Assistance Division of the Sabah Forestry Department. "We recognized that if we were serious about implementing sustainable forest management in Sabah, then we needed to develop an overall approach, management systems and silviculture that would support sustainability. Deramakot was chosen as the project site for developing these model practices."

In fact, the Deramakot initiative is considered by many to be the first extensive test of comprehensive sustainable management in the moist tropical forests of Asia. The forest reserve is located in the district of Sandakan and comprises a single contiguous tract of 55 083 hectares of forest. Deramakot is a Class II forest reserve managed as part of the Permanent Forest Estate by the Sabah Forestry Department. It is one of 27 demarcated Forest Management Units (FMUs) — administrative districts into which all Class II forest reserves are allocated in Sabah.

Deramakot Forest Reserve and much of the surrounding area was virgin forest until the 1950s. Since then, in common with much of the lowland dipterocarp forest in Sabah, the reserve has been logged several times. It constitutes a typical example of logged forests and is, consequently, an ideal site for developing a model for improved forest management.

The Deramakot Sustainable Forest Management project started in 1989 with technical and financial assistance from the German Government via Deutsche Gesellschaft f□r Technische Zusammenarbeit (GTZ). The first phase of the project ran between 1988 and 1990, and concentrated on capacity building for research personnel. The second phase, from 1990 to 1995, focused on the development of the Deramakot Sustainable Forest Management Model.

The manually operated semi-mobile sawmill in Deramakot (courtesy Kan Yaw Chong).

The philosophy was to develop a sustainable forest management model that would enable multiple use, but with a central focus on timber sustainability. The model would have to allow for local communities, living in close proximity to forests, to utilize the forest for subsistence needs. The forest would be required to provide clean water, medicinal plants, building materials and tools as well as non-timber forest products for cash incomes.

Forestry in Sabah

Sabah is one of the two East Malaysian states on Borneo. With a land area of almost 7.4 million hectares, Sabah occupies about one-tenth of the island. It is the second largest state in Malaysia with a population of more than 2.6 million people. According to the most recent forest assessment in 1996, more than half of Sabah's total land area is covered by forests. Almost 3.6 million hectares — 49 percent of Sabah's land area — is designated by law as Permanent Forest Estate.

There are seven principal classes of forest reserves in Sabah. Class II forest reserves, covering an area of 2.73 million hectares, are designated for timber production. The bulk of Sabah's forest revenues come from Class II forest reserves. These comprise mainly mixed dipterocarp forest, which is rich in marketable timber species. Dipterocarp trees reach 45 metres, with tree diameters at breast height (dbh) of up to 150 centimetres. There are as many as 5 000 trees per hectare in undisturbed dipterocarp forests with many trees in the lower diameter classes. Climbing plants such as rattans, lianas, creepers and epiphytes co-exist in the forest.

Sabah is highly dependent on timber harvesting for foreign exchange and revenues (Box 1). The fundamental problem, however, lies in unsustainable and indiscriminate logging that causes disturbance to the forest environment, polluting

rivers and eroding the soil. Some of the major rivers in Sabah that provide the principal sources of drinking water — most notably the Padas River in Kota Kinabalu — remain murky all the time. However, logging is not the culprit *per se* as there are other more damaging practices such as unsustainable agricultural development, infrastructure development and illegal encroachment. Nonetheless, logging contributes to the problem and facilitates other destructive agents.

Box 1. Forestry's contribution to the Sabah economy

During the past five decades, the forestry sector has played a significant role in the socio-economic development of Sabah, by contributing (on average) 56 percent (equivalent to US$530 million) of annual state revenues. Since 1990, the forestry contribution has been declining and currently it is less than 40 percent of total revenues, but the sector is still the major foreign exchange earner.

State revenues from forestry are largely earned through royalties collected from the sale of logs from natural forests. Log production has increased radically during the past 35 years, from 6 million cubic metres in 1970 to 13 million cubic metres by 1978. During the 1980s, log production averaged 10 million cubic metres per year. In the 1990s, log production started to decline, falling to about 4 million cubic metres per year by the end of the decade. Since 2000, log production has fluctuated in the range of 2 to 4 million cubic metres per year. These volumes are still significantly higher than the official annual allowable cut (AAC) of 1.2 million cubic metres announced by the Sabah Forestry Department in 1991.

History of unsustainable harvests

During the peak harvest period from 1970 to 1990 it has been estimated that Sabah was harvesting, on average, four times the rate of sustainable yield (2.8 million cubic metres). It is estimated that the clearing of state forest land for agricultural expansion, in accordance with the National Agricultural Policy, contributed 9 million cubic metres of timber annually.

Sabah's heavy reliance on timber revenues for socio-economic development and weak regulatory capacity in the Sabah Forestry Department, prior to 1997, had a serious effect on the state forests. One assessment of forest management in Sabah, carried out in 1997, summed up the forestry situation as follows:

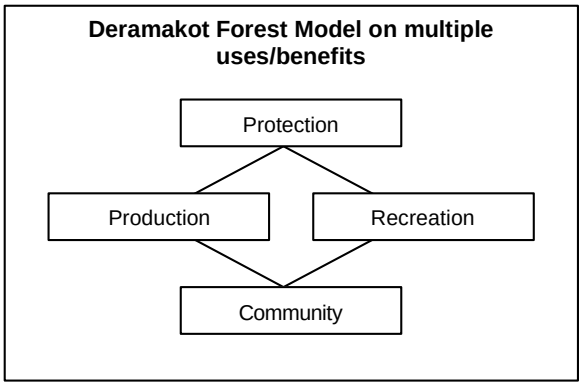
- harvesting was beyond the sustainable yield capacity of the forests;
- the harvesting cycle was insufficient to allow forests to recuperate adequately;
- excessive damage to residual stands due to poor logging practices;
- abandonment of silviculture and forest rehabilitation;
- rent seeking was given precedence over environmental considerations;
- frequent political changes; and
- inability of the forestry profession to exert influence on the authorities.

Today, most of the logged forests contain only remnant stands of dipterocarp species, with very few trees of commercial value. Climbing plants such as lianas are very common, as is bamboo. When climbers are not removed, the growth of young trees is retarded (or may even be smothered) and hence they require a longer time to mature. Furthermore, most of the naturally regenerating seedlings are not of preferred timber species, nor are they representative of the entire natural ecosystem that comprises mainly pioneer species. This situation is worsened when the logged areas are burned. The only option to restore commercial productivity in burned areas is to plant timber species.

In recognition of the seriousness of this situation and its severe impacts on environmental services and future raw material supplies for wood industries, the Sabah Forestry Department initiated the Deramakot Sustainable Forest Management Project to develop a management model that could be used to manage Sabah's 2.7 million hectares of logged forests sustainably.

The Deramakot Sustainable Forest Management Model

Historically, Deramakot was logged selectively as early as the 1950s. Of the lowland mixed-dipterocarp forest, 93 percent is classified as production forest, while the remainder is protection forest. Only 20 percent of the production forest is considered to be well-stocked — having at least 16 trees of harvestable size (larger than 60 centimetres dbh) per hectare. About 30 percent of the area has fewer than two harvestable trees per hectare.



The Deramakot Sustainable Forest Management Model was planned as an exemplary model of forest stewardship. The first step in developing the model focused on planning, which was carried out at two levels:

1) At the state and forestry sector level, overall socio-economic conditions and linkages are evaluated (sectoral analysis) and strategic plans are prepared. The planning horizon at this level is 10 to 20 years.
2) Planning is also executed at the FMU level. A medium-term forest management plan (5 to 10 years) and annual work plans are prepared in accordance with sustainability goals.

The management plan establishes prescriptions for implementing a number of operations including:

- harvesting of timber and non-timber forest products;
- silvicultural treatments;
- rehabilitation of degraded areas;
- protection;
- provisions for recreation; and
- research and development.

Only timber harvesting, silvicultural operations, rehabilitation, protection and research are fully operational at present. There are 58 field personnel at Deramakot who oversee major management activities.

Timber harvesting

One of the crucial factors in the Deramakot Model is the strict adherence of harvesting to the AAC. Initially this was set within the Deramakot Forest Management Unit at 20 000 cubic metres. This AAC was calculated using the Dipterocarp Forest Simulation Model — a software tool that can be used for modelling growth and yield. The AAC was reduced to 15 000 cubic metres during a mid-term review in 2001.

Currently, timber harvesting in Deramakot is based on guidelines for reduced impact logging that include: cutting of vines prior to harvest, reserving large trees (above 120 centimetres in diameter) as seed bearers, directional felling and leaving fruit-bearing trees. Prior to harvesting operations, forest rangers map designated skid trails to minimize bulldozer movements to reduce damage to remaining trees. Cable extraction is used on difficult terrain where skidding cannot be carried out. All activities are aimed at retaining a good stock of healthy young trees as a future crop.

Improved timber utilization

In most concessions, log recovery from felled trees is poor and many short and defective logs, often 10 to 20 percent of the tree volume, are left behind. To maximize timber recovery, a mobile sawmill has been introduced in Deramakot to utilize logs previously rejected at the stump or at intermediate landing sites. By improving utilization efficiency, fire hazards during drought periods are also minimized.

Ensuring regeneration

Where there are insufficient seedlings on the forest floor, enrichment planting is carried out with seedlings planted in the gaps created during logging or in artificially created gaps. Gap planting mimics the natural process of regeneration in forests by replicating the gap created when a tree falls. In Deramakot, each artificial gap is 10 square metres. A small cluster of up to five seedlings is planted in these gaps. In theory, this equates to a stocking rate of 300 trees per hectare — many more than the numbers of trees harvested (usually 10 to 20 mature trees per hectare). Gap planting is also relatively cheap compared with line planting. The latter requires creating openings of up to a width of three metres at systematic intervals, (normally about 10 metres apart) and planting these with seedlings.

Adequate protection

Forest protection is prioritized in Deramakot to prevent encroachment and poaching. Recently there have been many wildlife sightings including rare species such as elephant, orang utan and proboscis monkeys, as well as wild pigs, sambar deer, wild ox and avi-fauna. A survey of orang utan in Deramakot estimated a population of around 1 000 individuals. Deramakot also has highly significant conservation ecosystems and scenic landscapes including peat swamp forests, waterfalls, fishing sites, inundated limestone caves and wildlife observation sites.

Despite tight security measures, Deramakot has not been spared from illegal logging. In 2000, illegal felling is estimated to have accounted for approximately 3 000 cubic metres of wood. To curb illegal activities, the Sabah Forestry Department works with local communities to gain their assistance in protecting Deramakot Forest as well as educating them on fire prevention.

Certification

These intensive management efforts have enabled Deramakot to obtain Forest Stewardship Council (FSC) forest management certification. Deramakot attained this "green label" in 1997, for a five-year period (1997–2002), and is one of the few forests in the Asia–Pacific region to have received certification. Deramakot's certification is based on criteria and indicators under the Forest Stewardship Council initiative as well as the Malaysian criteria and indicators.

"Our initial motive in having Deramakot certified was to add prestige," noted Frederick Kugan — the prime mover for certification. "We were less concerned with getting a price premium for certified wood at that time, although it is now an important part of the exercise."

"There is a price premium of up to 30 percent on Deramakot logs compared with average log prices in Sabah," said Andurus Abi, the Forest Department's

Marketing Officer. "However, the price received for certified logs of some timber species is still low compared with non-certified logs in Peninsula Malaysia," he added. "This is peculiar to Sabah, because of the relatively longer distance to markets in Japan, Korea and China. There may also be an element of price restraint by other major producers in Sabah."

Deramakot has renewed its certification for another five years (2003–2008), even though the cost has doubled compared with the first certification.

"Even with the higher cost on the second certification, it is still worthwhile to certify Deramakot to maintain the correct image and credibility," Kugan explained.

Revenues and costs

Deramakot logs are sold by public auction to local and international buyers. Auctions are administered by the Sandakan District Office of the Sabah Forestry Department. The experience at Deramakot shows that, to a large extent, auction prices depend on whether buyers are locals or from overseas — and the product mix. Overseas buyers generally offer much higher prices than local buyers.

The average annual cost of implementing harvesting and silvicultural programmes at Deramakot is US$1.33 million. Most of this expenditure is for tending, planting, infrastructure development and administration activities. Currently, the only revenue-generating activity is timber harvesting, but this may be subsumed by other activities as the area allowed for logging becomes more limited. At current prices, Deramakot must sustain a cyclical harvesting intensity of at least 30 cubic metres per hectare to break even. This profitability challenge is compounded because 30 percent of all trees marked for harvesting in Deramakot contain hollow volume due to termite infestation.

Shortfalls in revenues from timber sales have forced the Sabah Forestry Department to provide financial support to implement the sustainable forest management programmes in Deramakot. The Forestry Department recognizes, however, the pioneering nature of the work being implemented and the financial shortfalls are seen as a necessary cost of moving up the sustainable forest management learning curve.

In recent years, the financial challenge at Deramakot has shown signs of easing. Deramakot showed a "profit" for the first time in 2002 — attributable to improvements in management, higher log prices and infrastructural improvements — and was expected to also turn a profit in 2003. This is a positive development that could help to convince other forest managers in Sabah that it is possible to adopt best management practices without sacrificing profits. Senior managers from the Forestry Department emphasize the importance of consultation with

staff to solve operational problems, reduction of administrative red tape and inculcating good management values to control and monitor costs. The Forestry Department also recognizes and supports infrastructural development, in particular road maintenance, as a crucial component in ensuring the efficient movement of timber and people.

Favourable international log prices, which have appreciated by 47 percent since 1995, contributed significantly to achieving profitability in recent years. In addition, planting costs declined in 2002 in comparison with previous years, because of abundant natural regeneration at logged sites. Silvicultural costs in 2002 were restricted largely to tending activities — especially removal of competing bamboos, vines and weeds. Average tending costs per hectare are US$93 compared with average planting costs of US$252 per hectare.

Success factors and challenges

Achieving sustainable forest management at Deramakot has not been easy. There are, however, a number of exceptional management features that have helped Deramakot to progress.

Willingness to change

The primary factor in successfully implementing sustainable practices at Deramakot has been the willingness of Forestry Department staff to accept change. The Director of the Forest Department was convinced forestry in Sabah would need to change, and a model FMU would help in convincing staff and private sector operators. The opportunity to start developing a model forest arose when GTZ sought such a possibility. Even then, it took quite some time to bring about an attitudinal change. The initial skepticism wore off as the project began to evolve. The development of the model was not easy, and required immense flexibility in developing and implementing new management approaches. But by the time the first review of criteria and indicators was conducted, the staff at Deramakot had acquired considerable experience and confidence. The results convinced them that developments at Deramakot were setting the direction for the future management for all of Sabah's forest estate.

Political endorsement

A visit to Deramakot by Prime Minister Dr Mahathir bin Mohamad in August 1997 instilled much-needed confidence in the project and may, in fact, have sparked the beginning of a real change in the mindset of skeptics. This was especially important because responsibilities to implement the programme lay with former skeptics in the Sabah Forestry Department. The visit of the Prime Minister provided political endorsement to the project.

Sam Mannan, Deputy Director of Operations at the Sabah Forestry Department, who has been involved extensively at Deramakot, presented a paper describing the Deramakot experience during a seminar on practising sustainable forest management. Mannan reported: "Without political commitment from state leaders, the concept of Deramakot could not have been expanded to other areas of Sabah. Therefore, get politically certified first. It is the most important certificate you will need."

Training

An important factor in the success of the Deramakot Model was the GTZ-assisted training that developed specific skills for Sabah Forestry Department staff in managing the forest reserve. A well-structured and coordinated training programme has maintained a clear focus on prescribed outcomes among senior management, supervisors, technicians and forest workers from the Sabah Forestry Department as well as the FMU holders.

Dialogue

The project had several setbacks in the early stages of its implementation including a high turnover of staff, lack of capable and experienced staff to carry out the demands of the sustainable forest management programmes and excessive bureaucracy. Several changes in management structures were made to address these bottlenecks and these were facilitated through dialogue and consultations with different stakeholders. These consultations helped to define the roles and functions of the respective stakeholders, as well as to allow expression of expectations and resolution of conflicts.

Perhaps the stakeholders whose cooperation was most needed at the beginning were the logging contractors. According to the thinking of conventional loggers, the main goal was to remove as much timber as possible; the method of extraction was not critical. To change the loggers' operational style was a major challenge. Over several consultations, however, the logging crew began to modify their practices. The head of the company posted himself in the forest to provide direct support for change. The head supervisor and logging crew met every evening to discuss problems and solutions. Eventually, the logging crew itself provided ideas on how best to minimize logging damage to the residual trees and to the soil and waterways.

"In spite of all the difficulties, 80 percent of the Deramakot programme is now in place," indicated Jeflus Sinagin, Head of the Forest Management Plan Division of the Sabah Forestry Department.

Multiple-use forest policy

Although Deramakot's management was directed principally at proving that timber management could be conducted sustainably, other conservation and social issues were not ignored. At the very start, when the project was formulated, one key feature was the adoption of a multiple-use policy. This policy was observed throughout the formulation and implementation of the model. One important early aspect of the project was implementation of a thorough survey of the forest's wildlife and the hunting and gathering practices of neighbouring villages. Various potential features for ecotourism were explored. Discussions were held with local villagers on their specific needs, such as gathering of fruits, nuts, resins and hunting activities. Segments of the forest area were identified for the continuation of such practices. The waterways were given substantial protection so that the water quality downstream would not be compromised. Besides management attention to production areas, green buffer areas were set aside. Biodiversity issues were heavily weighted during the planning process, and areas encompassing unique vegetation were demarcated for protection. Sociocultural and heritage issues were profiled during the planning stage. In addition, the logging company proactively attempted to ensure that jobs were allocated first to the people living in the adjacent villages.

Albert Radin, the newly appointed coordinator of the project, affirmed that the multiple-use policy could work because it had the potential to generate additional revenue from ecotourism. "Not least, it has provided employment to the general public," Radin explained. "The Sabah Forestry Department is here to provide technical support to all FMU holders based on the Deramakot experience to help make the model work."

The multiple-use management potential of the area was clearly and thoroughly explored, but the final decision was that under current demographic conditions, and given the remoteness of the area, it would be quite some time before the timber value of the forest would be superseded by the value of other services. But management has carefully charted the areas in Deramakot that could potentially be valuable for multiple-use management in future, such as for ecotourism or other non-timber uses. Management activities are planned carefully and implemented to ensure that these values are not negated by current management practices that emphasize timber harvesting.

Incentives

It is often said that managing forests on a sustainable basis will pay for itself. Longer term profitability and reductions in rehabilitation costs make sustainability a financially desirable objective, particularly when environmental and social values are properly accounted for. But to initialize the process, the Sabah Government has been experimenting with several approaches, including providing financial

incentives. In 2002, for example, it lowered the royalty rates on logs by US$2.65 per cubic metre to encourage FMU holders to adopt reduced impact logging techniques.

The Forestry Department is also working with other federal government departments to consider a Group Tax Relief incentive that would enable diversified companies to offset their group earnings against business investments in forestry.

Currently, no fiscal incentives have been offered by the government for managing forests using the principles developed at Deramakot. If, however, the Deramakot Model proves its long-term financial viability, and is attractive to consumer markets, then other FMUs are likely to follow the Deramakot example.

Changing mindsets

As Sam Mannan claimed: "The Deramakot Model must multiply in order for sustainable forest management to be truly accepted throughout Sabah." Importantly, the model is not merely about introducing changes in techniques of harvesting trees. It first requires a change in mindset — that sustainable forest management is the only way the forestry sector can remain productive in the long term. In Sabah, where many stakeholders remain complacent about forest resources, the Deramakot Model is nearly revolutionary. The planning, preparation and training required are substantial at all steps from preliminary planning, to fieldwork, and to the difficult task of getting private logging companies to comply with new rules. The entire process requires close scrutiny by professional certifying agencies, environmental non-governmental organizations and the general public.

Forest management continues to advance in Sabah. In 1997, the Forestry Department launched a programme of "smart partnership" with 10 private concessionaires to operate Sustainable Forest Management License Agreements (SFMLAs) covering a total area of approximately 1.6 million hectares. Under the programme, the Sabah Forestry Department trains employees of the licensee, provides technical advice, formulates policies and coordinates the overall work of the FMUs. The role of the SFMLA holders is to invest in, implement and safeguard sustainable forest management — similar to the role of FMU holders in the Deramakot Model. Although the "smart partnership" programme provided the basis for sustainable management, the initiative hit a minor snag when several of the concessionaires failed to perform. The Government of Sabah has subsequently recommended that the licenses of two of the ten SFMLA concessionaires should be revoked.

Conclusions

After 13 years of refinement, the Deramakot Model serves as a significant initiative — proof that with political support and institutional commitment, sustainable forest management can be attained. However, there are still uncertainties. Even though Deramakot has achieved ecological and social sustainability, it has not yet demonstrated financial sustainability. This is a difficult challenge in light of the runaway profits earned in the logging sector in the past. From an economic perspective, however, the Deramakot Model has proved effective by eliminating the high environmental costs associated with previous unsustainable logging.

More work is needed to refine the Deramakot Model to ensure long-term profitability. In the meantime, it is impossible to be certain that ultimately the Deramakot Model will be successfully translated to the whole of Sabah. The present sentiment and momentum lend confidence, however, that the Sabah Forestry Department will succeed and the hard work carried out in developing the Deramakot Model will yield a major pay-off.

About the authors

John Tay has a Ph.D. from the University of North Wales in Bangor, United Kingdom, having earlier completed a B.Sc. in Forest Resource Management at the University of New Brunswick in Canada. Currently, Dr Tay works at the School of International Tropical Forestry of the Universiti Malaysia Sabah. He lectures in tropical forest management and harvesting technologies. From 1987 to 2003, he was Principal Forest Officer for Innoprise Corporation, a semi-government organization that has forest concessions in Sabah. He has published and presented more than 20 forestry-related papers.

Kan Yaw Chong has a BA from the University of Queensland, Australia, where he majored in economics. In 1975, he returned to Sabah, where he taught economics at La Salle Secondary School in Kota Kinabalu for 10 years. In 1986, he switched to journalism and has since won numerous state and national journalism awards, including the Best Malaysian Sports Writer (1979), the Tourism Malaysia Gold Award (1997) and the Malaysian Environmental Journalism Grand Prize (2001–2002). In late 2002, he participated in a six-week training course on the Conservation and Management of Natural Terrestrial Environment for Malaysia, sponsored by the Japan International Co-operation Agency (JICA). Kan is a special writer with the *Daily Express*, a leading English newspaper in Sabah.

WOODSIDE FOREST: LEARNING AND ADAPTING

John Novis, Ian Platt and Alan Griffiths

Name of forest:	Woodside Forest
Location:	Mt. Oxford, Canterbury
Area (hectares):	114
Managing entity:	John and Rosalie Wardle
Mgt. objectives:	Adaptive ecosystem management
Country:	New Zealand

For 25 years, John Wardle worked as a scientist and senior forest ecologist for the New Zealand Forest Research Institute, with the ecology of beech (*Nothofagus* spp.) forests as his specialty. During this time, John and his wife Rosalie purchased Woodside Forest, 121 hectares of predominantly regenerating indigenous beech forest, and worked — as time permitted — on a strategy of conserving the forest through active and adaptive management. This coincided with the beginning of an intense, and deeply divided public debate over the future management of New Zealand's indigenous forests.

Dr Wardle is the author of the book, *The New Zealand beeches*, published in 1984, just before he left the Forest Research Institute to focus his energies on the management of Woodside Forest. The book is regarded as the definitive textbook on New Zealand beech forest ecology, so his change of focus to full-time forest manager put into practice the knowledge gained through those years of research — the ultimate test of his understanding of beech forest ecology.

But the management of Woodside Forest is a family effort. His wife Rosalie, and their younger son, Bruce, are very much part of the family management team. "Rosalie works with me on most forest operations," John explained, "and Bruce, who lives off site with his wife and family, manages the beech forest honeydew honey operation."

Living within their forest and relying solely on income from the forest for their livelihoods possibly makes the Wardle couple unique in New Zealand.

The job has not been easy, despite John's unrivalled research experience. He noted that some of the immediate ecological challenges relate to indigenous beech forests, which comprise a mosaic of age classes, primarily as a result of regular wind damage and windthrow, and the occasional heavy snowfall. Damaged trees are also prone to attack by pests and diseases, particularly pinhole borer (*Platypus* spp.) and the associated fungal pathogens of the genus *Sporothrix*.

The Wardles have learned, and continue to learn, how to adapt their forest management to these natural events. According to John, an additional challenge is the successful control of a variety of exotic pests that can cause significant damage to both the flora and the fauna of Woodside Forest.

Woodside Forest

Woodside Forest is now one of the most innovative in terms of forest management in New Zealand. But in the past, it was almost totally devoid of forests.

"Woodside Forest itself was logged between 1895 and 1909. Cut stumps remain today, scattered throughout the forest and pasture, indicating that all of the property was once under forest. Charred stumps show that the area was burned, probably by the 1898 fire," John stated.

Historical records show that the property was managed as a pasture for sheep between 1914 and the 1930s, when it was largely abandoned during the depression years. From 1940 to 1973, the land was managed for summer grazing of about 100 sheep. Pasture grasses were not adequately maintained and beech forest returned in three phases. The first phase began after the initial logging and the 1898 fire. The second phase occurred during the depression years (the early 1930s), and the third phase commenced after the Wardles purchased the property in 1973 and management shifted away from grazing and towards sustainable production forestry.

Today, the majority of Woodside Forest comprises indigenous black beech (*Nothofagus solandri* var. *solandri*), but the Wardles have planted a smaller area with exotic species (principally *Pinus radiata*), and some agricultural land remains. The land and forest are managed as follows: beech production forest (70 hectares), beech forest reserve (14 hectares), exotic plantation (29 hectares) and agricultural and residential areas (8 hectares).

The Forests Act 1949

The sustainable beech forest management of Woodside Forest falls under Part IIIA provisions of the Forests Act, 1949. Part IIIA is an amendment to the Act

that applies to privately owned indigenous forest (with a few exceptions), and was one of a number of government initiatives in the early 1990s that addressed sustainable indigenous forest management. Enacted in 1993, it provides for the milling of indigenous timber at registered sawmills as long as the timber is harvested under one of the following options: a Sustainable Forest Management plan; a Sustainable Forest Management permit; or so-called "other provisions" that cover salvage timber, windthrown or dead standing trees, timber felled for a "public work," for a mining operation, for building or maintaining an access way or water impoundment or for scientific research and timber for personal use.

Woodside Forest was the first property in New Zealand to have a Sustainable Forest Management Plan approved. "This occurred on May 18, 1994," John recalled. While this was a notable event, the Wardles have been committed to sustainable forest management since purchasing the property in 1973.

Adaptive ecosystem management

Indigenous forest management

Of the 84 hectares of black beech forest, 70 hectares are managed with timber production as an objective. The remaining 14 hectares are managed as a reserve with no timber harvesting. In addition to forest protection, this reserve provides a baseline against which the effects of silviculture and harvesting in the production area can be assessed.

"The management regime is adapted to work with the ecological processes that naturally determine the structure of the beech forest," John emphasized. Adaptations are refined continually on the basis of observation and experience. The emphasis of the management regime is improving the next generation of trees. "Our harvesting systems are designed to mimic natural stand replacement associated with wind disturbance and regeneration, the major driving force in the ecology of beech forests," John added.

Forest replacement is primarily through natural regeneration, which is usually prolific in harvested coupes and windthrown sites. Where crown fern (*Blechnum discolour)*, an indigenous ground fern that is often dense in shady areas, limits natural regeneration, the Wardles clear the area by hand grubbing small patches of up to one square metre to provide sites for seedling germination. This is usually carried out before the removal of the protective forest canopy. "Seedlings are planted only as a last resort in the event of regeneration failure," John noted.

Initial harvesting strategy

The strategy approved in 1994 under the Sustainable Forest Management plan involved the beech forest component of Woodside Forest being divided into six

working blocks. "Each working block was to be partially harvested under 'group-small coupe' management once every six years, over a rotation of 48 years," John elaborated. At that age the average tree diameter at breast height is 45 centimetres, which John considered to be the optimal size for milling and wood quality. Larger trees become vulnerable to pinhole borer and internal rot.

New harvesting approaches

The harvesting strategy, however, has changed over time. As John explained, "Because we've found that the sustainable harvest can be largely sourced from individual or small groups of trees that have been windthrown or are dying, rather than through programmed harvesting. This currently accounts for over 90 percent of the timber harvested."

Where programmed harvesting is undertaken, the Wardles now favour a continuous canopy selection system — a form of shelterwood management whereby the canopy trees are progressively thinned to promote advanced regeneration — over a group-small coupe selection system. As John put it, "Continuous canopy selection affords better protection to regeneration from winter desiccation, and promotes greater stability against wind in stands. It also protects the tree's cambium from the 'sunburn' effect of hot, dry winds." Sunburn is something that John learned about in discussions with Chilean foresters; it results in the death of the cambium with the tree becoming unstable and liable to suffer stem breakage.

Sawmilling and marketing

The Wardles mill the indigenous beech logs on the property using their own portable Varteg mill. With only a small volume of black beech sawn since the early 1900s, John remarked, "We had to learn how to read each log to efficiently cut the best timber, and establish effective drying and storage techniques prior to selling the timber to local manufacturers."

Black beech is not the most highly regarded (commercially) New Zealand beech species. However, the Wardles have established successfully local markets for the highly figured (i.e. with prominent colour and grain variation) timber, which is used for furniture, panelling, flooring, turnery and tool handles. Lower quality wood is sold as fuelwood for home heating in local markets and in Christchurch. In most instances the wood is burned in enclosed "woodburners," which are much more efficient than open fireplaces.

Exotic plantations

When the Wardles purchased Woodside Forest in 1973, a significant part of the property was unimproved pasture. "This land was economically marginal for agriculture and was mostly set aside for the establishment of exotic plantations," John indicated. Some 29 hectares have been planted, predominantly with *Pinus radiata*, which the Wardles planned to manage on a 30-year rotation. Some enrichment of these stands is being undertaken, especially in areas of poor initial establishment. "Our enrichment plantings are mostly with coastal redwood and Douglas fir, and to a lesser extent, with larch, Mexican cypress, deodar cedar and *Cryptomeria*," he said. Black beech also seeds naturally in these stands.

Just as the initial strategy for the beech forest has changed, so too has the strategy for the exotic plantations. "Our long-term aim now is to convert the *Pinus radiata* stands to mixed-aged, mixed-species stands, and to harvest them on a continuous canopy concept (like the indigenous beech forest) using size class, form and spacing as the major criteria for selection," John explained.

This management strategy is unique in New Zealand. The traditional New Zealand plantation forestry model is one of single-species (usually *Pinus radiata*) stands, and a single age class, clear-felled at maturity. The Wardles' approach reflects a desire to manage their forest in a way that is more consistent with natural ecological processes, albeit applied to exotic tree species.

Initial harvesting trials applying the continuous canopy concept were undertaken in the autumn of 2002. "Results indicate that harvesting costs and damage to the residual stand will be within acceptable levels," John reported. The Wardles predict that ultimately they will be able to harvest 1 100 to 1 200 cubic metres annually on a sustainable basis (about 40 cubic metres/hectare/year).

Beech forest honeydew honey

Associated with beech forests in this part of the country is an indigenous coccid insect (*Ultracoelostoma assimile*) that infests the bark of the trees. During the intermediate stage of its lifecycle, the insect exudes excess carbohydrate from the tree cell sap. "This is known as honeydew and provides an important food source for various birds, the brush-tailed possum, and the insects that inhabit the beech forests," John noted. "Honey bees use the carbohydrate as an alternative to flower nectar and produce beech honeydew honey, which is similar to maple syrup in texture and properties."

The beech honeydew honey operation on Woodside Forest is managed by John and Rosalie's son, Bruce, and provides valuable part-time employment. "Honeydew production varies from year to year in response to weather conditions, but is generally sufficient in Woodside Forest to support 300 beehives. We limit the number of beehives so there is sufficient surplus honeydew for the resident

nectivorous indigenous bird population," explained Bruce. Current production of beech honeydew honey from the property is about 15 000 kilograms/year, or 170 to 180 kilograms/hectare/year. This is exported mostly to Germany.

Pest management

A variety of pests also have a strong bearing on the Wardles' forest management. The pests of principal concern are red and fallow deer, the brush-tailed opossum, stoats, cats, rats and wasps. "All these pests have been introduced to New Zealand, and are not subject to natural control," John lamented. "Predation and competition by these animals and insects have caused a number of extinctions of indigenous birds, reptiles and insects, in and around Woodside Forest over the last 30 years. Deer, particularly, have a major destructive impact by rubbing their antlers on young trees, killing or damaging many trees each year," he added.

The Wardles can control most of these pests on Woodside Forest through their own trapping and well-designed and carefully located poison bait stations. The broadscale application of "10-80" poison (sodium fluoroacetate), commonly used for opossum control in the country, is no longer employed on Woodside Forest. When it was used in the past, even in close proximity to Woodside Forest, the Wardles observed marked reductions in insect and birdlife in the forest. Natural values are accorded high importance in the management of the Woodside Forest.

Recognition of achievements in sustainable management

The Wardles' achievements have not gone unnoticed by their peers. They have recently won the (New Zealand) 2003 Transpower-Landcare Trust Award for Innovation in Sustainable Farm Forestry, and in 1995 they won the Husqvarna South Island (of New Zealand) Farm Forester of the Year award.

Visitors also flock to the Woodside Forest. The Wardles estimate that they commit 15 to 20 days each year to hosting around 200 visitors at Woodside Forest, demonstrating and discussing their methods of indigenous beech and plantation forest management. The visitors have included forestry students from nearby Lincoln and Canterbury Universities, farm foresters and foresters from around the country, overseas groups, members and committees of Parliament, government bodies and the Minister of Forestry. "Recently, delegates attending a United Nations Forum on Forests (UNFF) meeting on forest plantations spent a day here," John smiled.

This is a substantial commitment, but their time is generously given to sharing their experiences at Woodside Forest and furthering people's understanding of sustainable forest management.

Meanwhile, Landcare Research Limited, a New Zealand Crown Research Institute, undertakes research projects on Woodside Forest. Current research is investigating site identification and classification based on physical and vegetative indicators. This information will be valuable in predicting forest composition and performance, and will assist forest managers in making site-specific management decisions.

John Wardle (far right) discussing sustainable beech forest management with UNFF delegates (courtesy Ian Platt).

Furthermore, a Lincoln University student is to visit soon to discuss establishing a research project concerning the growth of *Pinus radiata* under the Wardles' continuous canopy management strategy.

Conclusion

When the Wardles won the (New Zealand) Transpower-Landcare Trust Grants Award for Innovation in Sustainable Forest Management, the exceptional features of their enterprise were identified as *managing a natural New Zealand forest to preserve and enhance its intrinsic values whilst sustainably harvesting a special and limited timber resource; mirroring natural processes in their silviculture and harvesting techniques; adding value to the timber on-site; diversifying from an economic perspective by establishing a supplementary radiata pine plantation, and a range of other species grown for special purpose timbers, experimental and amenity purposes; and promoting and demonstrating conservation of environmental values as part of sustainable management and harvesting by hosting field days, visitors and research.*

These achievements, however, are not attained without vision, planning and commitment.

Indigenous forest management has been the subject of much public and political debate in New Zealand over the last 30 years. There has been a strong lobby (from some non-forest owners) against harvesting any indigenous forest. The Wardles, however, have always believed in conservation of indigenous forests through active and adaptive management. This vision was put into practice at Woodside Forest through the development of a long-term plan, dedicated commitment to the vision and plenty of hard work.

About the authors

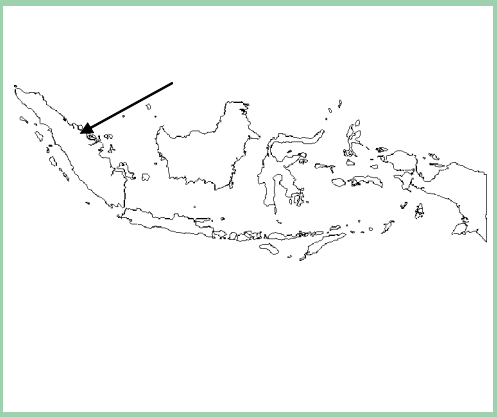
John Novis, Ian Platt and Alan Griffths are employed by the New Zealand Ministry of Agriculture and Forestry. John is a forest policy analyst, with one of his principal work areas being indigenous forestry. Ian and Alan work for the Ministry's Indigenous Forestry Unit, administering the indigenous forestry (sustainable forest management) provisions of the Forests Act, 1949.

The mini-skidder has minimal impact on the forest (courtesy Ian Platt).

DIAMOND RAYA TIMBER CONCESSION: DIAMONDS ARE FOREVER?

Bart Willem van Assen

Name of forest:	Bagan Siapiapa
Location:	Bagan Siapiapi, Riau Province
Area (hectares):	90 956
Managing entity:	PT Diamond Raya Timber
Mgt. objectives:	Sustainable timber production
Country:	Indonesia



"The Minister of Forestry should cancel the concession permit of PT Diamond Raya Timber and the Indonesian Ecolabelling Institute must revoke its certificate of sustainable production forest management." This demand was tabled in 2002 by the coordinating team of the Forest-Dependent Communities Development Program covering seven villages within PT Diamond Raya Timber's concession area.

Heiko Liedeker, Executive Director of the Forest Stewardship Council, disagreed with the proposition: "Diamond Raya Timber is understood to be one of the most progressive concessions in Indonesia, but there is no pretence that it is perfect."

These statements exemplify the controversy surrounding the certification of Diamond Raya's forest management practices. Several parties have contested the company's certification since the concession first received a stamp of approval from the Indonesian Ecolabelling Institute in 1999, while others laud Diamond Raya for its positive efforts toward forest management. The tension reflects the spectrum of management philosophies, ranging from preservationist perspectives to beliefs that forest conservation must necessarily encompass strong human interaction — including logging.

The forest concession

"The Diamond Raya forest concession is situated along the east coast of Riau Province, about 250 kilometres north of Pekanbaru (the provincial capital). The forest concession currently occupies more than 90 000 hectares of lowland tropical forest, almost all of which is at elevations less than eight metres above sea level," said Arus Mujijat, Production Director of Diamond Raya Timber. "The concession contains small areas of mangrove forest, but about 98 percent is classified as peat swamp forest. The most important timber species we harvest is ramin (*Gonystylus* spp.)."

Mr Mujijat's description succinctly encompasses two major controversies concerning the Diamond Raya concession. Sumatra's peat swamp forests and the ramin tree have both become endangered during the last decade due to logging (both legal and illegal). Other controversial environmental aspects relating to the concession are the presence of the nearly extinct Sumatran tiger and concerns about susceptibility and proximity to Sumatra's infamous forest fires.

Peat swamp forests

The World Wide Fund for Nature (WWF) classifies Sumatran peat swamp forests as a distinct forest type. Peat deposits were formed when rivers drained into the inland edges of mangrove forests and organic matter and sediments were trapped within the tangle of roots. Over time, the sediment deposits built up and the areas become less susceptible to flooding. Peat deposits may be as deep as 20 metres.

Most peat swamp forests lie along the eastern coast of Sumatra, where a thick layer of decomposed vegetable matter (peat) exists. Peat soils are strongly acidic (with a pH of usually less than 4) and they have a high sulphate content. The soils also have extremely low fertility due to leaching; this necessitates the forest to draw nutrients mainly from recently decomposed dead organic matter. The region's blackwater rivers — named for their cola-coloured waters — contain high levels of tannins and organic acids, and are characterized by their lack of aquatic plants. Peat swamp forests do not support a wealth of terrestrial wildlife and have few endemic species. The number of species and the absolute numbers of animals tend to be lower in peat swamp forests than in surrounding lowland rain forests. Moreover, there is no mammalian species that makes the peat swamp forest its exclusive habitat.

The flora in the forest concession has not been fully documented, but it contains around 40 tree species; among commercial species there are several types of meranti (*Shorea* spp.) and suntai (*Callophyllum macrocarpum*).

Large areas of peat swamp forest have been converted to agriculture by the government to support transmigration settlements and development projects,

especially in southern Sumatra. Less than half of Sumatra's peat swamp forests now remain, and logging concessions cover almost 80 percent of the remaining areas. Consequently, logging is perceived as a serious threat to habitat integrity and the conservation of sufficient areas representative of this distinctive ecosystem.

Ramin

Representatives of Forest Watch Indonesia contend that the area of Diamond Raya's concession is an important ecosystem for ramin, which should be protected rather then logged. Ramin (*Gonystylus* spp.) has historically been one of the major export timbers from Southeast Asia and commands premium prices, up to US$1 000 per cubic metre, making it the most valuable timber species found in Indonesia. The light-coloured timber is suitable for interior uses, including mouldings, construction of fine furniture, picture frames, futons, snooker cues and toys, among others.

Although ramin is found from the Malay Peninsula to the Solomon Islands, the main source of ramin timber is Indonesia. High prices for ramin have resulted in an explosion in illegal trade of the timber, mainly routed through Malaysia and Singapore. In August 2001 the Indonesian Government had the species listed in Appendix III of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to crack down on illegal harvesting and export. This resulted in a ban on exporting ramin from Indonesia — with the sole exception being ramin harvested from its only certified source: the Diamond Raya Timber concession.

According to a recent report released by the London-based Environmental Investigation Agency (EIA) and Telapak Indonesia, the "export ban" has been successful. Currently, illegal logging and trade of ramin have been reduced — but not halted — throughout the country. This contrasts with an EIA report, in 2001, that estimated around 5 million cubic metres of illegally harvested ramin were being smuggled into Malaysia annually. Various initiatives have been established to validate the legality of timber by certifying its origin and tracking its movement. "The Forest Stewardship Council provides a system to monitor the origin of timber through processing to retailing through a system known as *chain-of-custody certification*," explained Alistair Monument, Accreditation Officer at the Forest Stewardship Council.

Illegal logging

Illegal logging is widespread and systemic in many parts of Indonesia. Estimates of the volume of illegally logged timber run as high as 50 million cubic metres of timber each year, or more, supplying as much as 70 percent of Indonesia's industrial wood. The related economic losses have been estimated at some US$3.5 billion annually.

Some environmental organizations and local people have accused the Diamond Raya Timber concession of illegal logging. The company refutes these claims, asserting that illegal harvesting that is occurring in the area is being carried out by local residents beyond the control of the company.

A 2002 SGS Qualifor Forest Management Surveillance Report noted that Diamond Raya had "taken adequate actions to stop illegal activities in the forest concession. The company has committed to conduct regular surveillance using a helicopter and boats to monitor illegal activities." The same report noted, however, that Diamond Raya "has not developed a revised procedure and action plan for monitoring the concession for illegal activities by villages and staff based on accessibility."

Sumatran tiger

The Sumatran tiger (*Panthera tigris sumatrae*) is Indonesia's largest terrestrial predator but, as with other tiger species around the world, it is critically endangered. An estimated 400 Sumatran tigers live in the wild, mainly in the five national parks of Sumatra. The Sumatran tiger occupies a variety of habitats, provided these have sufficient food, water and cover. It mainly preys on barking deer, locally named *rusa* and *muncak*, and wild pigs. Its exact range is unknown, but the number of tigers in a particular locality strongly depends on the availability of prey.

The Rainforest Foundation, which supports indigenous people and traditional populations that live in rain forests, claimed some years ago that Diamond Raya's timber harvesting was endangering tiger habitat. Forests Organization, Inc., an environmental advocacy group, followed with a statement criticizing certification standards and arguing that logging of endangered tiger habitat was being glossed over as "green" forest management.

Arus Mujijat acknowledged that tigers have been sighted within the concession's boundaries. "But our certifiers concluded that tigers and other wildlife had actually moved into our forest as a result of improved forest management within the concession at the same time that surrounding forests were becoming more disturbed and degraded," he explained. The SGS Qualifor Main Assessment Report notes: "There are important arboreal primates such as gibbons and also Sumatran tigers that are moving into the concession area from the south where their habitat is being disturbed." Furthermore, it remains unclear whether the Diamond Raya Timber concession can sustain a healthy tiger population. Claims that it is a true habitat for the Sumatran tiger have not been scientifically established.

Forest fires

Forest fires have been a serious issue in Sumatra since the infamous smog and haze ("smaze" as some people called it) events of the late 1990s. Riau is one of the more fire-prone provinces of Sumatra, and forest fires occurring here are clearly linked to forest concessions, plantations and land conversion. Smaze disrupted Singapore, parts of Malaysia and even southern Thailand throughout much of the 1990s, with large peat fires in Riau being a major contributor. Most of the fires were deliberately set by land developers to clear forested areas for oil-palm plantations or other agricultural crops. To date, no serious forest fires have occurred within the concession of Diamond Raya Timber. But recently, surrounding concessions, including Diamond Raya's sister company (Sindora Seraya), have been sued for illegal use of fire related to land clearing and for failing to control forest fires. This underscores the need for improved forest fire prevention and management strategies that minimize fire risks.

Within the Diamond Raya concession itself, however, the risk of forest fires is very low. As Arus Mujijat clarified: "Fires in peat swamp forests occur only when groundwater levels are reduced, which allows the peat to dry. We are not undertaking any deliberate drainage in our concession, so fires are very unlikely — much of the forest is growing in swamp water up to a metre deep. Since its licensing in 1979, there have been no forest fires within the concession."

Forest management

The management of the forest concession is influenced by all of the aforementioned controversies. Arus Mujijat explained: "Logs are extracted by manual labour and light rail systems because the peat cannot support heavy motorized vehicles. A few permanent rails run into the forest, and temporary feeder lines are laid as cutting blocks are accessed. Additional investments are made to safeguard ramin and Sumatran tigers. Also, research and development is ongoing in cooperation with renowned institutes like Bogor Agricultural University, the Indonesian Research Institute and the Ministry of Forestry. For example, efforts are being made to develop effective practices for multiplying ramin through tissue culture."

Diamond Raya Timber's forest management is based on the Indonesian Selective Cutting and Replanting System, generally operating on a cutting cycle of 35 years. Harvesting in the Diamond Raya concession has extended the cutting rotation to 40 years, but has reduced the standard diameter[1] cutting limits to 40 centimetres for dipterocarp species, and 35 centimetres for ramin, as was authorized for swamp forests in 1996. The annual allowable cut (AAC) — the sustainable level of timber exploitation — is presently set at 79 000 cubic metres, with approximately 2 000 hectares targeted for harvesting each year.

[1] Diameter at breast height.

The company constantly reviews the AAC to ensure sustainability. "We have set up 30 permanent research plots throughout the concession, and are planning 30 more," clarified Arus Mujijat. "These plots provide us with information about the annual increment after selective felling, as well as enabling comparison with the dynamics of undisturbed plots. By contrasting these findings, we are able to estimate the impact of our activities." The SGS Qualifor Main Assessment Report (2000) noted that only about two-thirds of the trees allowed under government regulations for felling were actually felled by the concession under its conservative management approach.

Mujijat continued: "We harvest the trees in a designated block based on data obtained from the permanent research plots. An area is opened up for exploitation by installing temporary infrastructure, such as a rail track and the base camp. Then, teams of loggers are trained to conform to stringent logging rules. After felling, the logs are bucked at the felling site and skidded to collection points by manual labour; we cannot use mechanical extraction on peat soils. The logs are transported to the main log yard using the temporary railway. The majority of logs are sold to our sister company, PT Uniseraya, under Forest Stewardship Council/Lembaga Ekolabel Indonesia Chain of Custody certification."

Reforestation is carried out meticulously after logging. Seedlings of the six or seven logged species are grown in Diamond Raya's nurseries and planted in the logged areas. Reforested areas are monitored for their recovery after logging. "From the recovery of these reforested areas," said the production director, "we can conclude that our logging has very little impact on the ecosystem. Permanent damage due to logging and extraction is insignificant. And the long-term canopy opening due to logging is minimal." Vulnerable areas such as log landings are immediately replanted to prevent the invasion of aggressive palm species such as the salak palm (*Zalacca* spp.).

Arus Mujijat stressed the company's commitment to protecting the biodiversity of the concession: "Apart from the exploitation areas, we've set up various protected areas within the concession. Each year, we set aside 10 percent of the annual cutting block as conservation areas. Observations from these conservation areas and the logged areas indicate that the impact of forest harvesting and other management activities on the wildlife is minimal." Various monitoring efforts are being made to better understand the level of biodiversity and the various interactions of environmental components in the concession. The company recognizes that there is still plenty of work to be done in this respect, but it is working constructively to incorporate existing knowledge into its planning.

Certification

Diamond Raya Timber was sufficiently confident about the quality of its forest management that it applied for certification in 1998. "Certification can provide a guarantee that a product comes from a well-managed forest, as long as the certification is carried out in accordance with a credible system," indicated Daru Asycarya, head of the accreditation and certification office of the Indonesian Ecolabelling Institute.

Currently, two specialist forestry certification schemes are available in Indonesia: the national scheme of the Indonesian Ecolabelling Institute (Lembaga Ekolabel Indonesia) and the international scheme of the Forest Stewardship Council. There are considerable differences between the schemes, and comparisons are ambiguous. Under a Joint Certification Program now in place, both schemes aim to develop a "jointly agreed standard" for certification of natural production forests in Indonesia. Until such a standard is developed, forest concessions must meet both sets of certification criteria to obtain a joint certificate of sustainable forest management.

Arus Mujijat enumerated some of the principal advantages of certification: "The most important benefit is improved access to the timber markets of Europe and the United States of America. The protected status of ramin, under CITES, is also to our advantage," he said. "Diamond Raya is now the only legal producer of ramin timber in Indonesia. In addition, our annual management plans no longer need approval from the Department of Forestry. This is a significant bureaucratic hurdle we are now trusted to bypass." The Ministry of Forestry still requires that Diamond Raya submit the statutory 5- and 20-year plans.

The company had hoped to realize a price premium for certified timber. However, the reality has not met expectations. "When we applied for certification, there were promises and expectations of a premium of around 35 percent above prices for uncertified timber. In reality this premium is presently no more than five percent. This has been a disappointment and strongly reduces the incentive to invest in certification," Arus Mujijat stated.

Certification also encompasses a number of costs and disadvantages. "The environmental and social investments necessary to obtain certification are considerable, and the price premiums hardly justify these investments," explained Arus Mujijat. For instance, at present Diamond Raya Timber is required to employ local people with little knowledge of commercial forest management. This enables the company to meet the social criteria for certification, but does not enhance the economics of the company's operations.

Another significant disadvantage is the market's appetite for cheap illegally felled or exported timber. "The markets accepting illegal timber include Europe and the United States of America. Buyer groups should be more consistent in their demands for legal and certified timber to assure more stable markets for

certified products. On the other hand, Indonesian society provides little or no support to concessions that are aiming for certification," Arus Mujijat deplored.

Diamond Raya Timber obtained national certification from Lembaga Ekolabel Indonesia in 1999. Under the Joint Certification Program that followed, it failed its 2000 certification review due to shortcomings in its environmental and social programmes. Among the major areas requiring corrective action were:

- a failure to demarcate sufficient area for conservation of important and endangered species;
- a requirement to provide education on the forest ecosystem;
- a need to resolve disputes over community forest user rights and appropriate compensation;
- the number of locally recruited employees was considered too low; and
- insufficient training was provided to employees and local communities.

"Following this disappointment, we worked hard to improve our operations. In 2001, we were rewarded for our efforts with a new, international certificate," reported Arus Mujijat. "Currently, we are the only natural forest concession in Indonesia — out of almost 300 — to receive a stamp of approval from both certification schemes."

Controversy

However, the certification of Diamond Raya Timber remains controversial. Local non-governmental organizations that are considered the "leading voice" of local forest-dependent people, and advocates for sound ecological and social practices in forest management, disagree with the certification. They accuse the concession of inciting land tenure conflicts, provoking disputes over the employment and schooling of local people, implementing illegal logging and working with incomplete management plans for the environment and production. "The certifiers uncritically certified Diamond Raya Timber, meaning the system can be easily abused," said Arbi Valentinus, spokesperson of the investigating team from Forest Watch Indonesia. "This blunder left few incentives for further improvement by the company. It also makes white-washing of illegal timber very easy."

The principal objections to certification of Diamond Raya (illegal logging and social conflicts) result from disputes with local people from surrounding villages. These disputes, relating to the boundaries of the concession and the way the company has dealt with local communities, surfaced in the 1990s. Arus Mujijat stated: "There are no land tenure disputes in the Diamond Raya Timber concession according to the provincial governments." The SGS Qualifor Assessment notes that "the level of social impact on the local communities is low, there are no villages within the concession boundary and access to non-timber forest products is not restricted."

But many advocacy groups disagree. "As an organization concerned principally with the rights of indigenous forest people, we are particularly concerned about land tenure issues in the Diamond Raya concession area," announced Simon Counsell, Director of the Rainforest Foundation. The controversy is not limited to Diamond Raya operations, but rather is a national issue. A letter by 134 Indonesian non-governmental organizations in 2001 disputes the entire concept of forest concession certification in Indonesia, as it is "counterproductive to securing indigenous and community rights to forest land." The letter, therefore, "reiterates the call to Lembaga Ekolabel Indonesia and the Forest Stewardship Council for a halt to all (certification) activities with concessionaires."

Martua Sirait, a researcher from the World Agroforestry Centre, clarified the argument: "Due to incongruities in implementation of Indonesian legislation, the majority of forest lands have been improperly classified as state land. Also, concessions are granted for a period of 20 years, whereas at least 35 years are necessary for effective implementation of the Indonesian Selective Cutting and Replanting System. As a result, forest concessions granted by the department lack the necessary land tenure rights to properly implement sustainable forest management."

The reforms proposed by environmental and social advocates include delineation of indigenous lands, modification of the forest concession system and promotion of community-based forest management. In advocating the use of certification to achieve a more democratic system of land rights, yet another controversy has been added to forest management in the Diamond Raya concession.

Lately, the disputes among these long-term adversaries have subsided. However, new groups have gained prominence in the controversy. For instance, the Ministry of Forestry recently shut down a certified concession, which many believe has seriously undermined the certification movement. However, while the various roles the Indonesian Government plays in certification have yet to be fully analysed, it is clear that the actions of such a prominent stakeholder will add further uncertainty to the situation.

Future of certification

Meanwhile, Arus Mujijat compared certification to a difficult variation of *panjat pinang*. Pinang — the Indonesian equivalent of pole climbing, consisting of a 10-metre high, greased pole with generous gifts at the top. The normal version is staged during national festivities, and players aim to work together to reach the prizes at the top. Arus Mujijat wryly remarked that the certification variation did not include cooperation between the players: "Every time you almost reach the prize, someone will pull you down again."

Undoubtedly, this perception of certification is now common among forest concessionaires in Indonesia. In fact, most forest companies do not consider certification as an opportunity. "Certification is presently laden with disincentives for forest concessionaires in Indonesia," acknowledged Daru Asycarya from Lembaga Ekolabel Indonesia.

But despite myriad criticisms, accusations and distrust, Diamond Raya Timber continues to improve its management practices. As Arus Mujijat emphasized: "We have to uphold our long-term commitment to the management of the concession. Our first priority was to improve the production aspects up to certification standards. Now we focus on improving the environmental and, particularly, the social aspects of concession management. We actively cooperate with several NGOs to improve the social standing of our company."

Clearly, Arus Mujijat has little doubt that the company is capable of sustainable forest management in the concession, and will continue to be certified in the long term. "Diamonds are forever," he grinned.

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WWF: www.worldwildlife.org/wildworld/profiles/terrestrial/im/im0160_full.html

About the author

Bart W. van Assen studied tropical forestry at Larenstein International High School and Wageningen University. He was formerly the regional representative in Southeast Asia for the Dutch Institute for Agro-Technological Research (ATO). Later, he worked for various firms on long- and short-term assignments, including the Indonesian Ecolabelling Institute (Lembaga Ekolabel Indonesia), the Seram Development Corporation (Indonesia) and SBW Consultancy & Research (Netherlands). He is currently on assignment with Global Forest Watch, based at the World Agroforestry Centre in Bogor, Indonesia.

Low-impact timber harvesting in the PT Diamond Raya Timber concession (courtesy Herman Syah, Arus Mujijat).

High-technology approach to forest plantation characterizes the forest management of the Timbercorp Forestry (courtesy Ian Bail).

TIMBERCORP FORESTRY: ATTENTION TO DETAIL PAYS OFF

Jacki Schirmer

Name of forest:	Timbercorp Blue Gum Tree Farm Estate
Location:	States of Victoria / South Australia / West Australia
Area (hectares):	70 000
Managing entity:	Timbercorp Ltd.
Mgt. objectives:	Sustainable timber production
Country:	Australia

Aaron Soanes, Treefarm Operations Manager for Timbercorp Forestry, walked between rows of one-year-old blue gum (*Eucalyptus globulus*) trees while a strong wind blew overhead. "They're growing well," he said of the trees, most of which were already far taller than himself. He was visiting this property to examine the health and growth of the trees, and to discuss leasing further areas of land from the property owner for future tree farm expansion.

This tree farm is near the town of Hamilton in southwest Victoria, and there are many others like it nearby. They have been established on land previously used for other agricultural enterprises, primarily grazing. In both the "Green Triangle" region of southwest Victoria and southeast South Australia, and in the southern part of Western Australia, large areas of blue gum have been established over the past 10 years by a number of companies.

Plantation companies have had to develop many skills since tree farms began being established on a large scale in the early 1990s. As one of the leading plantation companies in Australia, Timbercorp has been continuously developing improved establishment and management methods, as well as learning how to be a good neighbour in the rural communities where it establishes tree farms. The seemingly innocuous rows of trees Mr Soanes was examining have been the subject of considerable controversy in many rural communities, where the introduction of tree farming has not always been viewed favourably.

"I guess that, before tree farming was introduced to agricultural landscapes, foresters in Australia didn't often interact with rural communities. We've had to learn a lot very quickly about being a good neighbour," Mr Soanes stated.

Timbercorp Ltd.

Timbercorp Ltd is currently Australia's largest agribusiness investment management company. It raises capital from investors through managed investment funds, and uses the money to establish and manage tree farms, olive groves and almond plantations on behalf of its investors. Timbercorp Forestry, a subsidiary of Timbercorp Ltd, establishes and manages blue gum tree farms in southwestern and southeastern Australia. Timbercorp has expanded rapidly from its first planting of 1 000 hectares of blue gums on farmland in 1991. The company currently manages over 70 000 hectares of blue gum plantations.

In January 2003, Timbercorp began harvesting its first eucalypt plantations, producing woodchips for export to Japanese customers. This first harvest was a milestone for the company.

"Our investors have long awaited this event," said Robert Hance, the Chief Executive Officer of Timbercorp. "It demonstrates in the most tangible way that Australian plantation hardwood chips are in demand and that projected investor returns can be achieved."

Since the early 1990s, the area of eucalypt plantations established by the private sector in Australia has expanded considerably. This has been a result of policies such as the 2020 Vision for Plantation Forestry — a joint agreement between Commonwealth and state governments and the forest industry launched in 1997 — which sets a goal of trebling the area of plantations in Australia by 2020. Plantations have also expanded because many view them as a "green" environmentally friendly investment which helps to revegetate previously cleared land.

Timbercorp has aimed to be a leader in the field of eucalypt plantation management in Australia, since it started planting trees in 1991. When AusIndustry — the Australian Government's business assistance agency — awarded Timbercorp an "Innovation Certificate" in 2002, this was recognition of the company's commitment to research and development. "This Innovation Certification acknowledges the multi-million dollar investment Timbercorp has made in research and development to improve the returns to our growers and shareholders," Mr Hance explained.

Best practice

Timbercorp promotes plantations as a sustainable investment option to prospective investors — and the company has to ensure it lives up to this promise.

It needs to produce an economically competitive product that provides investors with a financial return, as well as ensuring it does so in a sustainable manner. This requires that Timbercorp constantly updates its practices — to reflect changes in knowledge and understanding of what constitutes "best practice." Learning from experience, and changing practices when existing methods are shown to be outdated or inadequate, have been core parts of the company's approach to improving plantation management. The company's approach to achieving best practice is centred on sound and appropriate technology.

"New technology is something all our staff are involved in — and it's a key part of doing the best for our investors each day we're out on the farms," Mr Soanes said.

Timbercorp uses a combination of staff training, research and innovation, and independent certification of practices to achieve management improvement. The focus is on developing technological solutions to solve management challenges in an economically efficient, environmentally sustainable and socially acceptable manner.

In particular, Timbercorp's management strategies are based on the principles of precision farming. Precision tree farming can be defined as the matching of the application of resources and silvicultural practices with site attributes and the requirements of the tree crop, as these vary within and between farms. In other words, precision tree farming means applying the right management at the appropriate scale.

To understand Timbercorp's approach to best management practices, it is necessary to look at the practices employed at the various stages of growing and harvesting a tree farm.

Seed collection

The seed used to grow Timbercorp's trees is grown and collected in seed orchards owned and managed by the company. The Southern Tree Breeding Association (STBA), a cooperative research group of which Timbercorp has been a long-term member, produces the seed being used.

Timbercorp decided to own and manage its own seed orchards because of the importance of high-quality seed for overall operations. Ian Bail, project manager of Timbercorp Technologies, a division of Timbercorp, believes this degree of control is necessary. "This is an area that requires long-term investment and direct management, to make best use of advances in tree breeding and production," he stressed.

Once seed has been collected, cleaned and graded for size and specific gravity, it is delivered to nurseries that are contracted to grow the seeds into seedlings. The nurseries are provided with detailed specifications on how the seedlings are

to be grown. Regular quality assurance checks are carried out to ensure seedlings are being grown to specified standards. Plants are rejected if they do not meet defined standards for factors such as height, diameter, root development and nutritional status.

Timbercorp uses the latest research to improve the specifications given to nurseries. In 2000, for example, Timbercorp conducted a collaborative research trial with the Cooperative Research Centre for Sustainable Production Forestry on physical and nutritional aspects of blue gum seedlings. While all seedlings grown in the trial met current "industry standard" quality specifications, there was wide variability in actual seedling quality. The study examined the differences and found that initial nitrogen status and the container type used to grow seedlings significantly affected growth. Timbercorp decided to incorporate this knowledge into its seedling production.

"We incorporated the new specifications as part of our requirements for contracting nurseries," noted Mr Bail. "In the field, seedlings selected based on these new specifications showed a significant increase in growth — sometimes up to 40 percent volume growth over those planted previously."

Selection of sites for planting

Careful selection of appropriate land for its tree farms is one of Timbercorp's priorities. The company has developed a land selection process based on a combination of scientific knowledge, spatial mapping and flexibility.

To be eligible for use as a Timbercorp tree farm, land must have been cleared of native vegetation for at least five years. This restriction aims to ensure Timbercorp does not provide incentives for landowners to clear native vegetation. Timbercorp also has a policy of leasing land, rather than purchasing it outright, wherever possible. "It's better for us financially and better for the community," Mr Bail pointed out.

Members of some local communities have expressed concerns about new tree farms being established in their areas. These have ranged from concern over the social impacts of plantations replacing other agricultural enterprises, to apprehension over aerial spraying of chemicals on plantations. Concerns over loss of population have been expressed where land has been purchased, rather than leased, since it is common for previous owners to move off the land when it is sold for tree farming. When only part of a property is leased, the landowner often continues grazing or cropping on the remainder.

When landowners call Timbercorp, to enquire if their land might be suitable for tree farming, the company uses a careful screening process. Timbercorp has developed a spatial mapping system in which a range of characteristics relevant to tree farming — including climate, geology, topography, existing vegetation,

and distance to port — are mapped. These characteristics are used to determine a land-capability rating which identifies areas that meet Timbercorp's land criteria. The initial investment in developing this spatial system has rapidly resulted in savings by reducing the amount of time spent investigating land. Up to a third of enquiries are rejected immediately because the land is located in an area classed as unsuitable according to Timbercorp's criteria.

If the land is not rejected at the initial screening stage, Timbercorp sends staff to physically inspect the property. Timbercorp employs several soil scientists and they work to identify various soil types on the property. The productivity of different soil types is calculated and averaged across the property to determine whether overall productivity is sufficient, and whether the land is otherwise suitable for tree farming. This rigorous site-selection process ensures Timbercorp can grow the highest quality plantations and thereby maximize returns to its investors.

Once land has been chosen for tree farming, the operational planning for establishing the tree farm can begin. One of the first priorities for Timbercorp is to talk with the people who previously managed the land, to find out as much as possible about potential land management issues that may be faced. A simple conversation with the previous land manager can result in significant cost savings.

Plantable land

One of the first priorities is to identify the "plantable land" on each new tree farm. There are usually areas that will not be planted with blue gums. These may be areas where planting is not allowed under government legislation, or under voluntary management guidelines such as those established by the Forest Stewardship Council, an international organization that sets standards for certifying forest management practices. Non-plantable areas include remnant patches of vegetation, which the company protects and actively manages to preserve habitat and environmental attributes. Riparian zones must also be protected by establishing buffer zones between the edges of the tree farm and any waterways that pass through.

Once the plantable area has been identified, Timbercorp maps out individual "woodlots" (ranging from 1 to 1.2 hectares in size) that are identified as "belonging" to individual investors. The plantable area is identified on a map — with woodlots demarcated — to facilitate the process of obtaining necessary planning approval.

The types of activities for which permission is required vary between local governments. For example, in some regions Timbercorp might need to seek approval to establish the tree farm. In others, it may need only to have a fire management plan approved by relevant authorities.

Initially, Timbercorp had no formal policies or staff training for interacting with local government and other authorities. The company did not actively communicate with local governments about its activities until required to by planning processes. Over time, however, Timbercorp has learned a great deal about improving communication and interacting with local government, effectively turning the situation around.

Various concerns

A lack of effective communication initially contributed to a sometimes combative and aggressive atmosphere in which disagreements occurred between Timbercorp and local authorities. Local governments were hesitant to give approval to activities that were causing considerable concern in the local community, and believed Timbercorp was not adequately responding to community concerns.

Mr Bail reported that Timbercorp did not realize how difficult it was for local communities to get information about the plantation industry: "Ignoring people and assuming they know all about forestry is a really bad plan. We didn't realize it, but people didn't know or understand enough about what we were doing. If you want to be a long-term manager you need to invest in getting community understanding of forestry."

Bill Luke, a Shire Councillor for the Victorian Shire of Moyne, in western Victoria, when Timbercorp began establishing tree farms in the region, has first-hand experience of the problems. Members of his local community brought him many concerns about plantations, but he found it difficult to get information that would help him analyse and come to a decision about plantation impacts. Meanwhile the local government felt it was not adequately consulted about what constituted a major land-use change in the region. "Local government felt disadvantaged — we seemed to have little or no control," he explained.

As communities expressed concerns through the local media and at local meetings, Timbercorp became aware that its lack of adequate communication was contributing to poor community perceptions of its business. Since that realization, the company has actively incorporated a range of communications initiatives and actions into its management programme.

Improved communication

At the local government level Timbercorp has worked to build relationships with representatives that allow exchanges of views in a productive, rather than combative, manner. Timbercorp ensures it gives local government advanced information of activities and plans — inviting local government for discussion sessions to review its plans and answer questions about particular issues. By taking local government representatives and employees into the field and

explaining the rationale behind its tree-farming activities, Timbercorp is improving knowledge and understanding of its business. Local government, in turn, is enabled to make better-informed decisions about the tree farm industry.

Better communication has been effective in improving relations and has resulted in improved management. Mr Luke has seen this change clearly: "There are still a few ups and downs, but Timbercorp has been prepared to acknowledge and address issues and I think the community and local government have responded in kind."

Mr Bail agreed: "We tell people why we're here, we tell them what we're doing and we demonstrate that we're here to stay. Now that we're doing this, people are prepared to ask us questions first — rather than just criticize."

Timbercorp has learned that good management is not just about implementing the best practices in the field — it is about ensuring people are informed so they understand the company's business objectives and practices. This allows others to make informed decisions about Timbercorp's business, as well as to suggest areas for improvement.

"It's a two-way street," Mr Soanes noted. "We learn a lot of methods for improving our practices from other organizations, and opening ourselves up to that is very important."

Internal planning

Timbercorp's operating procedures are specified in a Standard Operating Manual (SOM) that prescribes best practice guidelines for all aspects of tree farm establishment and management. The SOM ensures that existing knowledge about best practices is communicated to all staff, and consistency of standards is achieved right across the company's plantation estate.

SOM procedures are applied to all of Timbercorp's operations nationally, and thus need to be flexible enough to adapt to the range of situations where Timbercorp establishes plantations. Every tree farm has unique management challenges and Timbercorp's plantation estate is spread across three different states — Victoria, South Australia and Western Australia. Each state has different land management legislation and regulations. Moreover, individual local governments also apply different planning regimes.

The SOM has been designed so it can be constantly updated to reflect the latest knowledge on best-management practices. Mr Bail is closely involved in ensuring that the SOM is adaptable. "The way that we carried out Quality Assurance checks three years ago was different to procedures two years ago — and different again, last year. We are constantly looking at new research and the results of our field practices, and changing systems where needed."

For every operation on every tree farm, a job-safety analysis and an environmental impact assessment (EIA) are undertaken. The job-safety analysis identifies all potential safety risks for operators on the property. The EIA identifies all the environmental sensitivities on the property that need to be taken into account in operations. All staff and contractors are made aware of — and are required to sign an agreement to manage the tree farm with regard to all health and safety hazards and environmentally sensitive areas on the property. Quality Assurance checks are used to ensure compliance.

Quality control

The company's Quality Assurance systems apply both to contractors and to activities undertaken directly by Timbercorp. Contractors are trained in Quality Assurance approaches and are required to self-check their own activities, while also being monitored by Timbercorp staff.

For example, Tony Roache and Mick Fallon are the owner-operators of Accurate Agriculture Pty Ltd, a company that currently derives approximately 75 percent of its revenue from contracts for weed control with Timbercorp. "Timbercorp is very demanding with its contractors," Mr Roache explained. "The company's quality control systems are first class, ensuring that we work to tight guidelines with a high-quality result."

Once site preparation activities are completed, it is time to plant. Planting is a critical moment, as Mr Soanes observed: "The 2 or 3 seconds it takes to plant a tree can make all the difference 10 years later."

Mr Bail agreed: "We spend a lot of time ensuring we have the highest quality seedlings and highest quality site preparation. The time when we bring these together — at planting — is critical."

Planting contractors are carefully trained in tree-planting techniques, and self-check their work. Timbercorp staff then conduct Quality Assurance on the tree planting. Timbercorp ensures it discusses with contractors not just *what* it wants them to do, but *why* it is important. Mr Soanes indicated that the best systems for Quality Assurance will not work unless all staff and contractors know why it is important to do things in a specified way.

"When people can see a better result from implementing a new practice, they are willing to keep doing it — and to keep looking for innovation. You have to make sure the people are the most important part of the system, not the technology," said Mr Soanes.

Once the tree farm is planted, it must still be managed for 10 years before being harvested for woodchips. A first task is to ensure that there is adequate seedling survival. The newly planted tree farm is inspected at a minimum of

every seven days after planting, and two months after planting a survival count is done. Any necessary replanting is undertaken.

To achieve a high quality final crop the trees must be monitored and, where necessary, treated to manage pests and nutrition during the 10-year rotation. Timbercorp has developed a system for monitoring and managing its plantations that combines the latest technology, research and development, and staff training.

To achieve maximum growth rates, the trees need correct nutrition. One year after planting, leaf samples are taken from farm stands and analysed to check if the trees have adequate levels of key nutrients such as copper. This nutritional sampling is a key component of Timbercorp's Quality Assurance process. It identifies any nutrient deficiencies at a point in the growing cycle where these can be easily treated with fertilizer applications, so that growth problems can be corrected.

Timbercorp has developed a highly innovative system for collecting and analysing nutrition information. This system has been so successful that Timbercorp has since expanded its use to a range of other field-based activities.

Geographic positioning system

Timbercorp staff are issued with hand-held Palm™ personal digital assistants (PDAs), which are linked to hand-held geographic positioning system (GPS) receivers that can provide spatial coordinates for any geographic location. Field staff locate sampling points with exact geographic coordinates given by the GPS receivers, and record these in the PDAs. Leaf samples are collected and taken for analysis. Back at the office, data are uploaded from the PDAs into the central computer system. The data are automatically entered into a database linked to a spatial mapping system. Once the results of the sampling are produced, it is possible to display on a map the nutrient status of all the sample points.

Intensive management of tree farms produces impressive yields (courtesy Ian Bail).

Box 1. Problem solving — using spatial mapping

When this system was initially used, the resulting spatial map showed some clear regional patterns of copper deficiency in one-year-old plantations. Clearly, some unknown factor was causing copper deficiency in certain areas. If Timbercorp could identify the problem, costs could be reduced by enabling prediction of where copper supplementation would be needed without having to wait for visible symptoms of deficiency.

The spatial mapping and database system enabled many variables (including geological data and soil profile information) to be included in the database and compared using mapping overlays. The results showed that copper deficiencies tend to be correlated with particular soil types. As a result of this analysis, Timbercorp can now predict with a high level of accuracy where it will have to overcome copper deficiency.

Mr Bail realized that Timbercorp had developed not just an efficient system for recording information, but a powerful tool for analysing data and enhancing the efficiency of plantation management. "What we thought would just automate our data management was letting us manage for particular problems at scales that hadn't previously been possible. Now we could see copper deficiency as a regional-scale phenomenon, not just as something that happened in odd patches on some of our tree farms," Mr Bail commented.

Pest management

Timbercorp has also made use of the new technology in its pest management programme. Using the PDAs, and results of the latest research on pest populations and management, Timbercorp has developed decision-support software to determine the type of pest management needed. Staff regularly carry out sampling surveys for particular pests. At each sample point, they enter any signs of pest activity into the PDAs. The software processes the information and provides instruction on whether more sampling should be carried out, or if management to reduce pest activity is needed. The system is very cost efficient and greatly reduces the time spent on pest management, both in the field and in the office. It also ensures pest control is undertaken only when necessary.

Methods of pest management in plantations have been a controversial issue in some regions, with local communities expressing concern about the use of aerial spraying of insecticides in particular. Timbercorp is responding to concerns about the use of chemicals by funding and undertaking research into alternative methods of pest control. Using systems that reduce or eliminate the need for chemicals is an important goal for the company for both environmental and economic reasons. Timbercorp is working towards certification of its operations by the Forest Stewardship Council, whose principles and criteria for sustainable forest management include an ultimate objective of no chemical use.

Timbercorp has had success in developing new pest control methods in conjunction with the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's main scientific research agency. For example, in Western Australia, the African black beetle is a common pest of young seedlings. The beetle, which effectively "ring barks" the seedling by eating away at its base, has caused hundreds of thousands of dollars of damage to young eucalypt plantations each year. Timbercorp originally applied insecticides to control the beetle. However, research trials undertaken by Timbercorp and CSIRO found that placing a small mesh sleeve around the base of each seedling prevented beetle damage in almost 100 percent of the seedlings.

"This is a very exciting outcome!" exclaimed Dr James Bulinski, a member of the Timbercorp Technologies group and one of the key researchers on the project. "It means we now have a very effective way of stopping beetle damage without having to use chemical insecticides."

He also believes using research partnerships is a valuable way of achieving practical research outcomes. "People often don't realize that commercial tree farming companies like Timbercorp are working with research organizations such as CSIRO and really putting a lot of effort into developing cost-effective alternative approaches to pest management."

Land management

While Timbercorp has improved consultation with local governments, it has also worked to improve its consultation and interaction with its neighbours. Timbercorp works collaboratively to ensure its activities do not have adverse impacts on neighbouring landholders. Timbercorp maintains a database of the types of land management activities undertaken on land neighbouring its tree farms. Where neighbouring enterprises may be sensitive to particular activities, Timbercorp tries to find mutually acceptable management solutions. For example, Timbercorp will use a different chemical regime on tree farms bordering aquaculture enterprises, because some chemicals have the potential to adversely affect the fish. Before any operations are undertaken, neighbouring landholders are informed, and given contact details of Timbercorp staff to call with any concerns or queries.

Timbercorp has found that early consultation and discussing the company's plans with neighbours has reduced concerns about its activities. For example, Timbercorp uses aerial topdressing to apply copper because young trees absorb the element more readily through leaves rather than roots. Timbercorp's consultation policies now inform neighbours ahead of time about planned aerial fertilization and it has noticed a sharp drop in the level of expressed concerns. Consulting and informing before activities are undertaken have helped the company build trust in the local community.

Linkages with other organizations

Timbercorp and Greening Australia, a revegetation organization, have joined forces on one tree farm in western Victoria. The Nigel Tree Farm has a large riparian zone, which had very little native vegetation cover when Timbercorp established the tree farm. Timbercorp and Greening Australia combined efforts to use direct seeding to achieve revegetation with a mix of native plant species in the riparian zone. This project allows Timbercorp to manage an area of land that might otherwise have become invaded by weeds; to develop the area to provide wildlife habitat and corridors; and to keep the waterway in good condition.

"The work forms part of the Greater Glenelg Biolink, a Natural Heritage Trust-funded project, which is connecting remnant vegetation across the landscape," explained Dave Warne, of Greening Australia. The Natural Heritage Trust is a government-funded trust that provides funding to help restore natural vegetation across the Australian landscape.

On another property, Timbercorp has restored a wetland area by rebuilding a natural dam in an area that was drained by the previous land manager and assisting regeneration of native vegetation.

Timbercorp is currently revegetating 300 hectares with native species in a number of areas. The company prefers to work on revegetation projects in partnership with other organizations. These include local Landcare groups, which are groups of land managers and members of the rural community that undertake environmental improvement.

Harvesting methods

After 10 years of growing and managing blue gums, the first harvesting began in January 2003. The company has placed a strong emphasis on the development of harvesting systems that are sustainable and that maximize returns to investors. An in-field processing system that has been co-developed by Timbercorp provides a good example of the use of research and development to address economic, environmental and social challenges in plantation harvesting.

Timbercorp faced two highly significant challenges in developing its harvesting system:

- Plantation growers have traditionally sold trees as unprocessed logs. Timbercorp recognized that if it developed a system to process logs into woodchips before sale, this would increase returns to investors. The challenge was to develop an economically efficient woodchipping system.

- Log transportation was another challenge. Establishing a network of roads within a tree farm to support harvesting is very expensive. It was, therefore, extremely important that the harvesting system minimize the extent of road construction within plantations, while also reducing impacts on external roads.

Timbercorp has developed an on-site woodchipping system to meet these challenges, as well as ensuring the entire harvesting system utilizes best practices to minimize negative environmental impacts.

When trees are harvested, the bark, leaves and small branches are left at the harvest site as slash. This allows recycling of the nutrients back into the soil. It also enhances soil stability and reduces post-harvest erosion risks.

Logs are left in whole-tree lengths and taken by a forwarder to the edge of the plantation, where a specially designed machine chips them directly into storage containers. The closed containers are transported by truck to port, ready for export. About 120 trees can be harvested and chipped every hour.

Tim Browning, General Manager of Forestry for Timbercorp, indicated that the efficiency gains are significant. "This harvesting system adds 40 percent to grower returns over conventional systems," he observed.

Robert Hance explained the advantages of a mobile in-field chipping system: "Each time we install a chipping machine it works flat out from day one. A million-tonne static mill takes many years to become efficient and over time gets further away from the forest. Our operation is efficient from day one."

By taking on the harvesting process itself, Timbercorp has captured another stream of revenue for its investors that otherwise would have gone to external contractors.

Timbercorp is committed to using external certification processes to achieve best practices. In 2001, its Forestry Division's environmental management system was accredited under ISO14001. ISO certification focuses on ensuring that the management processes used are appropriate, and Timbercorp was able to improve its Quality Assurance systems significantly through the accreditation process. The process also encouraged development of improved consultation and communication with the community.

Currently, Timbercorp is working towards achieving certification under the Forest Stewardship Council (FSC) programme. FSC certification is granted after an audit process to assess a company's ability to maintain a well-managed forest. A pre-certification "gap analysis" has been completed for Timbercorp's operations, and has identified areas needing improvement before FSC certification can be granted. The next stage entails an audit by an FSC-sanctioned certifier to determine that the identified improvements have occurred. Gaining FSC certification will be an important verification that Timbercorp is achieving sustainable outcomes in its tree farm management.

Future challenges

Timbercorp faces a number of challenges as it expands to harvesting operations. The issue of road maintenance and safety is becoming particularly challenging. Rural communities are worried about the increasing number of log trucks on the roads.

Bill Munro, the Mayor of Glenelg Shire in Victoria described community concerns: "They are worried about the potential for damage to the roads, their own safety on the road, and about the potential for noise and pollution. This is a problem faced not just by Timbercorp, but by the plantation industry in general."

The town of Portland, from which woodchips are exported overseas, is in Mr Munro's Shire and, as tree farm harvesting expands, he has to plan for increased truck movements on both major and minor roads.

Local government is also concerned that it has to allocate scarce funding to upgrade roads used by the plantation industry. Developing solutions to the challenges of road maintenance requires negotiations among local government, the plantation industry and other road users.

Similarly, there are other large-scale issues with the tree farming industry that are still to be resolved. These include ensuring that local government has the appropriate skills and resources to effectively monitor the management activities it is required to regulate on tree farms. These types of challenges cannot be solved by Timbercorp on its own, but require a consolidated approach from the entire industry and other stakeholders.

"For some of these issues there are no easy answers," said Mr Bail. "We need to work together to develop answers to some of the challenges that result when a new industry grows as rapidly as this one has."

Aaron Soanes, inspecting the one-year-old tree farm near Hamilton, is confident that Timbercorp will find solutions to existing and future challenges.

When asked what the key elements of Timbercorp's future success will be, he affirmed: "As long as we have the right processes in place, and we're willing to listen to people within and outside the organization — we'll keep on improving and changing when we need to."

About the author

Jacki Schirmer is a researcher at the School of Resources, Environment and Society of the Australian National University. She has worked for several years examining the ways in which improved processes can be developed to productively transform conflicts over the management of plantations in Australia, the United Kingdom and Ireland.

FOREVER BEECH LIMITED: FOREST MANAGEMENT AT THE CUTTING EDGE

Chas Perry

Name of forest:	Private properties in Murchison, Maruia, Matakitaki valleys
Location:	Districts of Tasman and Buller
Area (hectares):	5 470 (productive area 4 315)
Managing entity:	Forever Beech Ltd.
Mgt. objectives:	Sustainable timber production
Country:	New Zealand

How do people set about cutting and marketing indigenous timber when it seems nearly everyone in the country is opposed to the harvesting of natural forests? This is the challenge that has faced owners of natural forests in New Zealand since the 1990s.

Forever Beech Limited (FBL) was established as a private company in July 2000, on the West Coast of the South Island, specifically to tackle this daunting challenge.

"FBL was formed to provide the necessary infrastructure and knowledge to enable private landowners to manage their indigenous forests sustainably," explained Kit Richards, Forever Beech's business support manager and former director of the original company, Forever Ltd. "This was subsequent to the government's decision to halt all indigenous timber harvesting on publicly-owned (Crown) land," he added.

At present, more than 99 percent of New Zealand's timber harvest comes from exotic species plantations, with only very small volumes of indigenous timber such as beech (*Nothofagus* spp.) and rimu (*Dacrydium cupressinum)* being harvested from privately-owned natural forests. FBL was formed to ensure that private owners of natural forests could continue to cut and harvest indigenous timber by applying the highest standards of management.

Critical to the vision behind FBL was the recognition that the country would continue to consume high-value timber (for furniture, cabinetry, etc). Such wood would have to be imported unless a recognized and credible process — from the forest to market — could be established for the use of indigenous timber. FBL recognized that sustainable management of beech forests on private land was in its infancy; forest owners lacked the necessary skills and had little experience. There was also a general lack of understanding of the concepts and practices of sustainable selection forestry techniques in a nation where the focus of timber production has been on exotic plantation forestry for many years.

The founders of FBL wanted to create a leading-edge entity, specializing in high-quality beech timber produced from privately owned forests, under government-approved sustainable management systems. The idea was to establish a small pool of experts with proven experience and knowledge in managing beech forests to provide advice to forest owners who lacked knowledge, skills and the necessary capital to implement sustainable harvesting in their tracts of indigenous forests.

"When we went to the landowners initially, we had little more than a concept to offer them," said Mr Richards, who has 25 years of experience in both exotic and indigenous forestry on the West Coast — and the backing of other highly experienced colleagues with similar backgrounds.

Turning the concept into reality has not been an easy process and there are still major challenges, especially in the branding and marketing of the timber products. Despite these challenges, FBL has the potential to lead the rebirth of sustainable indigenous forestry in New Zealand.

Brief forest history

To understand fully the potential and size of Forever Beech operations, it is necessary to have some knowledge of the forest industry in New Zealand. During the 1920s and 1930s, the New Zealand Forest Service started planting large-scale forests of exotic trees to supplement indigenous timber supplies. Planting continued over the years — both by the government and the private sector — to the point that by 2000, more than 1.7 million hectares of exotic plantations had been established. Changing attitudes, increased environmental awareness and the presence of these substantial exotic forests led to increased public opposition to the commercial harvesting of publicly-owned indigenous forests.

The harvest from indigenous forests has declined from 1.6 million cubic metres of logs *per annum* in 1960[1] to about 41 000 cubic metres in 2003.[2] More than 82 percent of the country's 6.3 million hectares of indigenous natural forests are

[1] New Zealand Forestry Statistics 2000.
[2] Provisional figure for the year ending March 2003 — MAF Statistical Release 19/2003.

now in strict conservation reserves. Following major structural changes in the New Zealand forestry sector from 1987 onwards, the West Coast of the South Island was the only region of the country in which logging of publicly-owned indigenous forest was taking place. In September 1999, the government finalized its indigenous forest policy, which brought an end to all logging of publicly-owned indigenous forest, including the limited logging in the West Coast.

Consequently, FBL was established in a commercial environment in which the vast majority of forestry expertise and production was concentrated on plantation forestry. The pattern for the past 30 years was one of declining natural forest harvests and increasing regulation — eventually leading to the government's total withdrawal from commercial harvesting. The fledgling FBL had expertise, enthusiasm and a vision of sustainable and profitable indigenous forestry, but equally, it was short on capital and faced with the daunting challenge of re-igniting an industry that had been in decline for a long time. The new company was struggling when the West Coast Development Trust lent a helping hand.

West Coast Development Trust

In 2001, the government provided the West Coast region with a NZ$120 million (US$70 million) "Adjustment Package" in recognition of the loss the region would suffer as a result of the government's decision to stop timber production from publicly-owned indigenous forests.

From the package, NZ$92 million (US$53.5 million) was vested with the West Coast Development Trust, while NZ$7 million (US$4 million) was given to each of the region's four local authorities. New enterprises were invited to seek funding from the Trust for the establishment and development of businesses in the region.

The West Coast Development Trust invested NZ$3 million (US$1.7 million) into Forever Beech as one of its regional development initiatives and became the major shareholder. The company also has seven individual minority shareholders.

"The original company had been seriously undercapitalized from the outset," explained Frank Dooley, the West Coast Development Trust Chairperson. "Our investment injected enough capital to move forward, to hire experienced staff and to purchase a specialized mill for sawing beech logs. We are now confident that the industry has a real chance of succeeding on the West Coast."

The Trust appointed three outside directors to FBL, including its Chairperson — Auckland entrepreneur, Peter Coakley. FBL is expected to sustain heavy losses in 2003 before turning a profit in 2004.[3] This is because of the time required to dry and season beech timber, and a measure of the marketing challenges facing FBL.

[3] *The Press*, 22 January, 2003 page 4.

For many New Zealanders, beech timber is a new product and it will take time for it to gain acceptance in the market. Beech has long been recognized as a fine timber, but it is only with recent advances in technology and research in sawing, drying and finishing that beech has become competitive in the fine timber marketplace. A distinguishing feature of beech timber is its exceptional dimensional stability. The tightly grained wood is tough and durable, making it ideal for feature flooring, decorative applications and furniture.

Forever Beech performs key roles in bringing together interested stakeholders and coordinating forest management, harvesting, processing and marketing operations. Stakeholders include the landowners, government departments, local authorities, local communities, helicopter and transport operators, sawmillers, timber-drying companies, architects and the purchasing public.

The coordination of these numerous relationships and operational requirements by one company is a complicated task. Figure 1 shows the diverse spread of operators and stakeholders in relation to company operations.

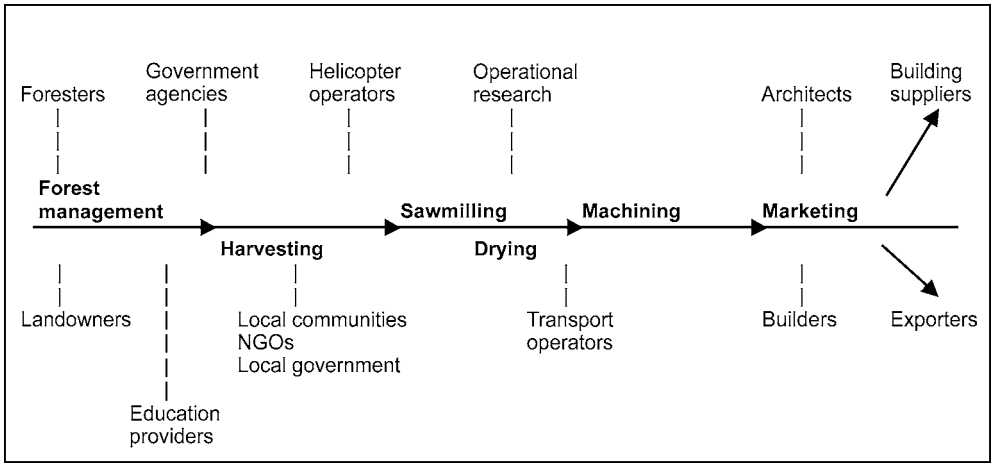

Figure 1. Forever Beech Ltd. operations and stakeholders

Forest resources

Selected landowners were approached by FBL after an extensive filtering process. Satellite imagery, combined with cadastral mapping and local knowledge, was used to develop a shortlist of landowners whose forests were believed to meet criteria considered important for successful management.

A fully documented proposal was then formulated and presented to the landowners individually to determine interest and support. The selection process took two years, during which time the top 10 percent of eligible landowners were identified. Various issues were discussed and resolved, legal agreements

concluded and landowners enlisted to ensure that adequate forest resources would be available to sustain the proposed enterprise. Most of the landowners who were approached to join the effort, eventually decided to participate.

Today, Forever Beech coordinates the management of a forest resource encompassing 22 landowners and a forested area of 5 600 hectares. About 80 percent of this area (4 500 hectares) will be used for wood production. The individual tracts of forest range in size from 48 to 580 hectares, with the average being about 250 hectares. As the concept has developed, several additional forest owners have expressed interest in becoming involved.

The forests are located in the districts of Buller and Tasman in the northern area of the South Island. They form a matrix of old growth and second growth beech forests strategically positioned between productive agricultural lands on the one side and large publicly-owned conservation (protected) areas on the other.

Important issues for landowners

Landowners stress that Forever Beech has provided them with an opportunity to add another dimension to their farming businesses and to earn additional financial returns. In an interview with *The Nelson Mail*, Russel Bailey of the Tutaki Valley near Murchison said the project would give him a chance to make a little bit of money out of land his family had been paying taxes on for 80 years.

Discussions with landowners highlight three key factors in building willingness to join the Forever Beech initiative. The first is the development of mutual trust between the staff of FBL and the landowners. This is extremely important, as the initiative entails long-term commitment by both parties, and the forest management, harvesting and marketing operations all require people with specific skills and experience. The second factor is assurance that the forest structure will be maintained with little or no visual change. This is achieved through helicopter logging and removal of only small volumes of logs. The final positive factor is that there is no up-front cost to the landowner. FBL provides all the inputs and expertise for preparing the requisite Sustainable Forest Management Plans, which include explicit prescriptions for managing landowners' forests.

Management plans

Each forest is managed individually under its own specific Sustainable Forest Management Plan, approved and registered in accordance with New Zealand's forest law (Part IIIA of the Forests Act, 1949). The plan specifies biodiversity conservation requirements, silvicultural approaches, harvesting plans and monitoring systems. These are all incorporated into a legal format and recorded with the District Land Registrar against the title of the property for a period of

50 years. This important measure demonstrates the long-term commitment of the landowners to sustainable management of the forest. FBL and the landowners also established "Registered Forestry Right" agreements covering 20 years. These agreements outline the rights of both parties with respect to management operations, access to forest areas, the level of royalty and timing of payments, reporting requirements and clauses relating to mediation and arbitration.

The landowner (not FBL) owns the plan, but it is developed by FBL staff who are experienced in the Part IIIA provisions of the Forests Act. The Act is administered by the Ministry of Agriculture and Forestry (MAF) and includes a requirement to consult with the Department of Conservation (the lead government agency responsible for conservation and biodiversity protection). FBL also consults with local authorities to ensure that all requirements for indigenous forest management activities under the Resource Management Act, 1991 are met.

Regional Department of Conservation staff in Nelson and Westland describe the management plans produced by FBL as detailed and demonstrating good understanding of ecological principles. Officials summarize that the FBL plans are of excellent quality and the best that the Department of Conservation has received; they set the standard.

The costs of all the initial management planning and forest assessment work add up to tens of thousands of dollars. The company recoups part of these costs at the time of the first harvesting operation.

Forest management

FBL forest management concepts arise from the experience gained by its staff as key participants in the development of sustainable forest management systems for the rimu and beech forests of the West Coast. As Kit Richards pointed out, "These management techniques, including helicopter harvesting, were developed and applied to publicly owned indigenous forests on the West Coast, prior to the decision to end indigenous logging on public lands."

The dominant forest species in the forests managed by FBL are red beech (*Nothofagus fusca*), silver beech (*N. menzeii*) and hard beech (*N. truncata*). FBL has focused on the red and silver beech forest associations, as they know from experience that seedlings of these species readily regenerate after harvesting and natural disturbance. Small proportions of podocarp species are also present, but landowners are being encouraged not to harvest these species for biodiversity reasons.

FBL's objective is to manage the forests using techniques and practices that retain the forest's natural structures, while at the same time producing a sustained annual yield of timber from the many landholdings involved. This will in turn provide a continuous flow of raw material for processing and marketing.

"Our approach is to mimic what happens in nature, where trees die singly or in small groups forming a naturally occurring gap in the canopy. This allows the new, light-demanding beech seedlings to grow," observed Jon Dronfield, Officer-in-Charge of Forest Operations for FBL. If the natural regeneration is judged to be insufficient, there is provision in the plans for planting seedlings to replace the harvested trees. Second-growth forests are usually simpler in composition and structure than old-growth forests.

Based on the forest structure data collected by FBL, experience and silvicultural objectives, decisions are made on which trees are to be retained and which are to be removed from within the harvest site. A specified number of old trees per hectare, especially those with dry cavities, are identified and reserved as "habitat trees." These are retained as an integral part of the forest structure and provide a crucial habitat for cavity-nesting birds. Trees hosting native mistletoe (*Peraxilla* spp.) are also retained and banded with sheet aluminium to protect this rare plant from browsing opossums.

Introduced pests such as opossums represent a major threat to the forest, so pest control programmes have been incorporated into several FBL plans.

The trees selected for harvest are all classified according to their reason for removal. For example, a tree may be harvested to create a gap ("a gapmaker") or selected as a harvest tree ("selection harvest"), or because it is already an "uprooted or windthrown" tree. Strict adherence to directional felling requirements for each tree harvested is protection against damage to existing seedlings and adjacent trees.

Only the marketable trunks of harvested trees are removed from the forest and these represent about 60 percent of the total biomass of the trees felled. The branches and foliage are left on the forest floor. Defective sections of logs are also left in the forest to provide valuable elevated sites that facilitate seedling establishment in areas of dense ground (fern) cover. On average, FBL removes 1.4 cubic metres of wood from the forest per hectare each year, while the total volume felled per hectare is approximately 2.3 cubic metres per year.

Helicopter harvesting

Helicopters are the primary harvesting tool of FBL and are also one of its key conservation tools. Helicopters have eliminated the need for roads within forest boundaries and their flexibility means non-target trees and reserve areas can be avoided. Reserve areas (not exceeding 20 percent of the total forest area) may be set aside as representative sites where logging is not permitted. With helicopter logging, there are almost no negative soil or water impacts, and the threat of pests entering forests along access roads is eliminated.

The use of helicopters and small-group-selection silviculture methods means that there is minimal visual change to the forest. This is because the helicopter enables very small areas to be harvested and allows the absence of access roads.

The average flying distance from the forest to landings in farmers' paddocks is only about 800 metres. Helicopter harvesting is, however, an operation where safety issues are always paramount. "It is critical that each log is accurately measured and the weight is correctly calculated," Jon Dronfield stressed. "The helicopters we use have a maximum lift of 1.5 tonnes, and we aim to consistently achieve 85 percent utilization or an average payload of 1.3 tonnes."

Mr Dronfield added that some helicopters have an electronic load cell to weigh each log, but it is still his job to ensure the logs are a safe weight. FBL has developed its own volume-to-weight conversion tables for the individual beech species, which relate to the areas they are harvesting. The use of pilot-operated grapples rather than ground-based attachment of strops has also increased safety during harvesting operations, as ground support staff do not have to be in close proximity to the logs being extracted.

To help pilots locate the felled logs to be transported, each log is painted with a large, bright red square. An experienced helicopter pilot can locate the logs and attach the grapple, while hovering as close as 10 metres above the tree canopy. The log can be extracted from the forest within a matter of minutes.

It took two years before landowners Brian and Marie Webby saw the first of their logs removed by helicopter. "At last we could see it all happening," recalled Mrs Webby. "We could not have gone through this long process ourselves and needed the experts to manage the forest and market the timber."

The couple describe themselves as semi-retired farmers who love their forest. They watched the Iroquois helicopter with its 30-metre wire strop and self-loading grapple pluck the prepared logs out of the small (0.03 hectare) clearing in the forest and deliver them onto the farmland below.

Every log sold can be traced back to its source tree and its location in the forest, because all logs are numbered and all stumps are tagged. The stumps are referenced carefully to a Global Positioning System (GPS) record.

FBL acknowledges that there is a range of views expressed by non-governmental organizations on their operations. Some are very supportive of FBL's management approach, methods and conservation efforts, while others continue to oppose all harvesting of indigenous forests under any circumstances.

Data collection and monitoring

As part of the development of a Sustainable Forest Management Plan, FBL establishes permanent sample plots.

"These plots initially provide baseline data on forest volume, species and structure to guide management of the forest; they will be monitored at regular intervals over the duration of the registered plan to provide an ongoing picture of the outcomes of management," indicated Jon Dronfield.

FBL has also developed a register system for *Flora Conservation Activity by Forest by Species*. FBL's register sheets identify the forest, the important species found, relevant GPS coordinates, conservation status, the dates of visits to the site and prescribed conservation activities.

Annual logging plans are submitted to MAF for approval before work in the forest commences. FBL provides annual harvest reports to MAF and the landowner. The reports elaborate the allowable harvest of each species of tree, actual harvest, statistics on the height and diameter of trees harvested, the presence and height of regeneration at the time of harvest and full details on the number of gaps created, their size and their combined area.

"FBL's aim is to set the standard for the detail and quality of data it collects and makes available to the landowners and MAF. This data is used as part of the auditing of our operations and will be used in the future to monitor the growth dynamics of the forest," Kit Richards explained.

Forever Beech perceives one of its roles as helping people to learn about and understand their approach to forest management. The company has hosted a number of visits to their operations. These have included ecology students from the United States of America and students from the Canterbury University School of Forestry in New Zealand.

As the administrator of forest law in New Zealand, MAF has the primary role in approving management and logging plans and monitoring all forest operations. All forests are inspected prior to their Sustainable Forest Management Plan being approved. Post-harvest auditing of reports on species and volumes removed — along with in-forest inspections — are completed to ensure that operations have complied with the requirements of the Forests' Act.

Processing and marketing

In late 2002, there were major changes in the processing operations of FBL. The company's new Board of Directors decided to close down an old sawmill and milling operations were consolidated at the Blue Spur Road sawmill on the outskirts of Hokitika. This second-hand re-sawing mill was built in February 2000 specifically to process beech timber. Fine kerf sawing enabled the achievement of conversion rates from log to sawntimber of about 47 percent.

The newly sawn timber is transported 260 kilometres over the Southern Alps to Belfast Kilns Limited, near Christchurch on the east coast of the South Island. Here, it is first air-dried then brought down to around 10 to 12 percent moisture content in kilns. This process takes around four-and-a-half months for 25-millimetre timber, and up to nine months for 40-millimetre timber. It is then further processed into a full range of products including veneers, a range of lumber grades, mouldings, flooring, edge-glued panels and outdoor landscape products. The lengthy drying period is a major financial challenge, because considerable resources are tied up in drying stocks. However, this process ensures the timber produced is extremely stable when it reaches the market and is therefore suitable for a wide range of high-value, precision uses.

Future vision, opportunities and obstacles

Forever Beech is now in a position whereby it has secured a viable forest area to enable it to achieve its vision.

The landowners express faith in the approach being taken and the quality of the FBL staff. One landowner, Gary Basher, has 400 hectares of beech forest under a Sustainable Forest Management Plan and has had his first harvest completed by FBL.

"I like the professional approach of FBL, the experience they offer and the concept of looking at the whole forest system," Mr Basher stated. He recognized that FBL is still at the stage of getting started and is satisfied with the long-term approach being taken. Landowners recognize that FBL needs time to develop its markets and therefore have accepted a lower level of harvest in the initial stages.

But, the company is fully aware of the risks involved in developing a "sunrise" industry. FBL needs to move quickly to develop and expand niche markets if its survival is to be ensured.

"There are three challenges for the future: marketing, marketing and more marketing. We're happy with the forest management side of our operations and now marketing is where we need to focus our efforts," Mr Richards claimed. FBL has already reached the stage where it has a full range of product lines available. This is a major milestone.

Recently, FBL has developed a comprehensive Web site[4] that provides details of their operations and products. The marketing team has demonstrated the products to architects, furniture manufacturers and building suppliers to promote awareness of the properties of beech compared with other species, and to reinforce the quality aspects of the timber.

[4] *http://foreverbeech.co.nz/*

The future is dependent on markets being aware of Forever Beech's products and having confidence in their use. The company's aim is to ensure the quality of the products is maintained and that the product will be available when required. The biggest obstacle is changing perceptions that beech is a low-quality, unstable timber — a legacy of the use of poorly dried beech timber in the past.

FBL is acutely aware of the challenges ahead. These include the high costs associated with helicopter logging (which are about eight times those for ground-based harvesting of plantations in New Zealand); transport costs; lengthy drying times; and the difficulties associated with marketing and promotion of a lesser-known timber. On the optimistic side, however, the company is producing a premium product derived from a natural resource with no establishment costs. Thus, the expectations of landowners regarding their returns reflect the early development stage of the operation.

The company's "search of excellence" includes forest management, environmental management, processing and marketing. All will need to reach a level of excellence for the business to be sustained "Forever."□

About the author

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Red beech (Nothofagus fusca) *(courtesy Ian Platt).*

APPENDIX 1

SELECTING THE CASE STUDY FORESTS

Patrick B. Durst and Chris Brown[1]

The motivational author J. Martin Kohe wrote: "The greatest power that a person possesses is the power to choose." Whether or not this is true everywhere, certainly in the context of the *In search of excellence* initiative the choice of case study forests was at the crux of the process. Recognizing the importance of selection decisions, and understanding that many nominees would be disappointed not to be chosen for in-depth case study, an extensive consultative process was used to select the case study forests.

It is important to note that the selection of case study forests from among the 172 nominations was never intended to choose the "best-managed" forests, nor even to assert that the forests selected for case studies are necessarily "well-managed." This would imply an element of "certification" that is well beyond the scope of the *In search of excellence* exercise. Rather, the objective in choosing forests for more detailed study was to have a wide range of conditions from which perceptions of excellence could be assessed. From these, it was hoped that analysts could draw out the full scope of perceptions of excellence in forest management, ideas that might contribute to better forest management and examples of innovations that forest managers might use or adapt to assist in meeting their own unique challenges. Thus, the central theme of the process was about collaborating to share ideas, rather than competing to find the "best" forests. A brief elaboration of the selection process is useful in emphasizing that the exercise was about a "search" for excellence, rather than a claim to have necessarily found it.

Nomination phase

An initial decision that had significant bearing on the outcome of the nomination process (and hence selection of case studies) was on the "openness" of the nomination process. A key question was whether nominations should be accepted only from third parties, or whether forest managers should be allowed to nominate their own forests. While emphasizing that the process was not a contest, the coordinators recognized that selection of a nomination as a case study forest would likely confer some measure of prestige to those selected. Consequently,

[1] This paper also draws text from an unpublished Consultant's Report (Steve Rhee, October 2002).

allowing principals to nominate their own forests would provide potential scope (and some incentive) for making exaggerated claims about the quality of management systems. Conversely, the aim was to capture the largest range of perceptions of excellence possible, through the nomination process. Thus, the fewer constraints placed on opportunities to nominate, the greater the number of nominations likely to be received.[2] To ensure accuracy and objectivity, however, it was decided that case studies should be prepared by independent authors with a good knowledge of the selected forest, and that these authors should carry out at least one extensive visit to the forest site to provide some element of ground truthing. Consequently, the decision was made to allow nominations from all interested parties, including forest owners and forest managers.

Screening phase

The nomination phase closed in May 2002, with 172 nominations received. The original intention was to convene a Technical Working Group to select approximately 20 forests for the preparation of more detailed case studies. However, the large number of nominations required an interim screening phase to enhance the efficiency of the working party. A consultant was therefore commissioned to review and summarize each of the nominations and to recommend approximately 40 nominations for the working party's closer scrutiny.

The initial screening process considered both pragmatic and substantive criteria. The overarching objective was to identify nominations that encompass broad diversity in geographic representation and management objectives, especially those that collectively demonstrate "aspects of excellence" common among the nominated forests.

To obtain a sense of geographic representation, the nominations were categorized into regions — South Asia, Southeast Asia, East Asia, and the Pacific — to determine the proportionate number of nominations that should ideally be selected from each region.

Similarly, the range of management objectives covered by the nominations was categorized into broad groupings to estimate a reasonably proportionate representation of nominations, according to management objectives, for selection as case studies. Nominated forests were grouped into four categories according to their primary management purpose:

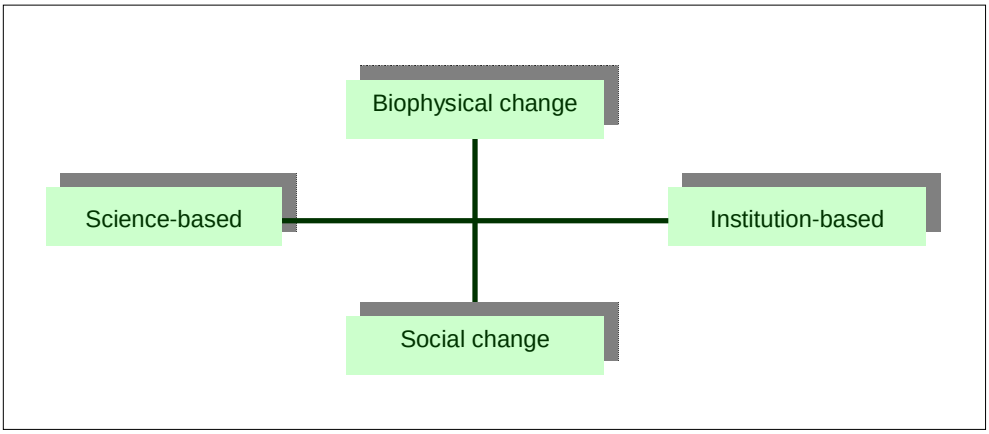
- community forestry and/or production of non-timber forest products and services;
- commercial timber production and forest plantations;
- biodiversity conservation, soil and water protection, and forest rehabilitation; and

[2] As one adviser to the initiative remarked, at the theoretical level, at least, it is not crucially important that the case studies be a completely accurate representation of reality, since for the purposes of the initiative it is the sharing of ideas and concepts about excellence that are important, rather than the actuality of forest management in the case study forests.

- research, education, recreation and tourism.

Common elements of management were also taken into consideration to ensure the selected case studies represented the diversity in perceptions of excellence found in most of the nominations. This diversity in perceptions was conceptualized and synthesized as shown in Figure 1.

Figure 1. Perceptions of excellence in nominations



The vertical and horizontal axes in Figure 1 are each a spectrum, along which nominations fall with respect to how they articulate excellence. Combining the two spectrums captures the broad range of perceptions, since most nominations articulated excellence in some combination of the four elements.

The screening of nominations was also influenced by the less tangible criteria of whether the nomination was "interesting." Nominations that provided compelling stories about forest management were given preference.

At the conclusion of the screening process, the consultant provided a list of 40 nominated forests for consideration by the panels that would carry out final selection. These 40 nominations were believed to provide a good cross-section of nominations according to the criteria stipulated above.

Final selection

The final selection of case studies was carried out in a two-phased process.

The first phase was the convening of a panel of Rome-based FAO staff to review all the nominations with a view to identifying any, additional to the 40 selected in the screening phase, which should be considered for case studies. The panel also made direct recommendations about forests that would make good case studies to the Technical Working Group that was convened to finalize the selection.

The second phase was the convening of a larger Technical Working Group (10 people), comprising Bangkok-based FAO and RECOFTC staff, as well as several knowledgeable people from other regional organizations, the private sector, environmental advocacy groups and independent consultants. The Technical Working Group was tasked with:

- identifying a final set of criteria for selecting case study forests;
- reviewing and amending the shortlist of 40 nominations identified during the screening phase; and
- selecting a final list of 20 case study sites.

The Group was asked to utilize their own experience and knowledge of case study forests, where applicable, in addition to information provided in the nomination forms.

Discussions on criteria for final selection of case study forests concluded that ensuring geographical and thematic diversity should be major factors. It was decided that nominations should be grouped into a similar set of categories as identified during the screening process to reflect primary management objectives, while also retaining an overview of geographic representation. Categories established for primary management objectives were:

- research and training;
- community benefit;
- watershed management and biodiversity conservation;
- multiple use;
- ecotourism; and
- industrial fibre and timber production.

Secondary selection criteria were also identified, to be applied within these groups:

- type of ownership (e.g. state, private, community-based, joint management);
- forest size and scale of management;
- duration of management and track record;
- replicability (i.e. potential for others to learn from the forest and apply the lessons learned; less weight was applied when nominated management strategies resulted from clearly unique conditions); and
- originality (i.e. more weight was given to lesser known examples).

A final criterion was that the case study should tell a "compelling story."

The Technical Working Group reviewed the complete list of nominations and the recommendations of the Rome panel, and added a further 20 nominated forests to the list of 40 identified during the screening process. This final "shortlist" of 60 nominations was assessed using the criteria developed above. Following extensive discussions, the list was narrowed to a final set of 30 nominations,[3] which the Technical Working Group agreed all warranted the preparation of case studies.

[3] Eventually, appropriate authors could be identified for only 28 case studies.

APPENDIX 2

SUMMARIES OF OTHER NOMINATIONS

The *In search of excellence* initiative uncovered an abundance of dazzling innovations, expertise and archetypes of exemplary forest management in the Asia–Pacific region. Among the 140 plus forests that were nominated for *In search of excellence*, but which are not documented as detailed case studies, there are countless examples of outstanding management that illustrate quality, creativity and dedication — all reflecting the immense commitment of the managers of these forests.

The following summaries introduce the exemplary aspects of forest management for all the forests that were nominated in the initiative, but not included as case studies in this book. The summary descriptions are drawn entirely from *In search of excellence* nomination forms and supporting documentation and there has been no attempt to validate the information provided. For some nominations, a wealth of information was made available, but for others only sketchy descriptions were provided and this is reflected in the relative lengths and complexity of the various abstracts.

Forests of South Australia

Location:	*South Australia*
Area:	*130 711 hectares*
Managing entity:	*Forestry South Australia*
Management objective:	*Multiple-use management, sustainable timber production*

Since 1873, these South Australian forests have been managed with a sound focus on innovation, and with a view towards intensive and profitable management of mature radiata pine plantations, extensive management of natural forest areas and multiple-use management in selected areas geared towards recreation, conservation and catchment protection. Plantations are managed using efficient scientific forestry practices; achieving timber growth rates about 20 times those in natural forests. Management is characterized by adaptiveness, long-term profitability, efficiency and effectiveness. A strong emphasis is placed on forest research and modelling, and sound fire management. The forests are owned by the Government of South Australia. Forestry South Australia is a newly formed commercial entity, overseen by a government-established board.

Tuan/Toolara/Wongi and Beerburrum Exotic Pine Plantations

Location:	*Tuan/Toolara/Wongi and Beerburrum, Queensland, Australia*
Area:	*100 000 hectares*
Managing entity:	*Department of Primary Industries*
Management objective:	*Sustainable timber production (plantation)*

This highly successful, large-scale, commercial plantation forestry venture integrates all operations from "seed to sawdust." The development of exotic pine plantations has led to a fully integrated processing industry minimizing wood wastes. The operations of the Department of Primary Industries employ about 10 000 people and provide a range of other benefits including nature corridors, large-scale carbon sinks and recreational opportunities. The Department of Primary Industries' Forestry Division is recognized as a world leader in subtropical and tropical plantation development and management, and is noted for its ability to maximize production within a sustainable development framework.

Dozam Community Forest

Location:	*Dozam, Monggar, Bhutan*
Area:	*300 hectares*
Managing entity:	*Drametse Community*
Management objective:	*Protection, multiple use*

Local communities manage the Dozam Community Forest, protecting it from wildfires and indiscriminate felling, and regenerating degraded areas. Silvicultural prescriptions are applied to local species, which are planted to ensure favourable timber production and high yields of fodder from leaves (important feed for local livestock). Non-timber forest products such as lemon grass are also harvested in a sustainable manner.

Sambo and Siem Bok Forest Concessions

Location:	*Sambo District, Kratie Province and Siem Bok District, Stung Treng Province, Cambodia*
Area:	*136 375 hectares*
Managing entity:	*Everbright C.I.G. Wood Co.*
Management objective:	*Sustainable timber production*

The concessionaire's long-term management plan and forest concession agreement are consistent with sustainable forest management principles. The main objectives of management are to ensure:

- sustainable industrial wood production;
- biodiversity conservation;
- local community usage;
- soil and watershed conservation; and
- sustainable production of non-timber forest products.

The condition of the primary forest is regarded as excellent. The company practices selective harvesting and implements conservation measures to protect biodiversity and overall forest values. The company takes a three-tiered approach to forest planning and harvests according to an inventory-determined annual available cut. The forest is zoned according to designated functions and planning is supported by an environmental and social impact assessment.

Sandan Forest Concession

Location:	*Sandan District, Kompong Thom Province, Cambodia*
Area:	*139 473 hectares*
Managing entity:	*Colexim Enterprise (joint venture between Cambodian and Japanese Governments)*
Management objective:	*Sustainable timber production*

The long-term forest management plan and harvesting agreement established by Colexim Enterprise reflect sustainable forest management principles. In addition to valuable commercial timber, the Sandan forest concession harbours many interesting and endangered species and has a high level of biodiversity. Management plans are produced at three levels (concession-, compartment- and coupe-levels) and harvesting is carried out according to an estimated annual available yield and annual available cut. Selective logging is implemented using reduced impact logging techniques that take into account directional felling. The forest is zoned according to designated functions and planning is supported by an environmental and social impact assessment.

Tum Ar Forest

Location:	*Tum Ar, Kompong Thom Province, Cambodia*
Area:	*>1 000 hectares*
Managing entity:	*Tum Ar villagers*
Management objective:	*Resin tapping, poverty alleviation*

Villagers tap *Dipterocarpus alatus* for oleoresin — an important market commodity — using traditional practices. Each tree can produce about 30 litres of resin per year, with a selling price of US$0.13 per litre, and each family owns 100 to 400 trees. Villagers own the resin trees individually, and the trees are passed on from generation to generation. The resin trees belonging to a particular family are generally all within a single patch, and community members recognize each other's tenure. Villagers do not extract timber from these forests, and hence the forest is in exceptionally good condition. This is all the more impressive given the extensive anarchic logging occurring throughout much of the country. One problem the community is facing, however, is that their forest lies within a timber concession and loggers sometimes cut their resin trees, even though such trees are protected under the country's main forestry law.

Baihuling Forest Farm

Location:	*Luliang District, Shanxi Province, China*
Area:	*377 hectares*
Managing entity:	*Baihuling Forest Farm*
Management objective:	*Multiple use, sustainable timber production*

Baihuling Forest Farm largely comprises forests of Chinese pine and East-Liaoning oak. After 10 years of scientific management, the forest has evolved into a mixed and multistorey coniferous and broadleaf forest, providing a wide range of ecological benefits and enhanced economic performance. Significant improvements in management have resulted in impressive increases in stand volumes, optimizing of stand densities, increased canopy closure and improved forest fire control.

Dabiangou Forest Farm

Location: *Liaoning Province, China*

Area: *<100 hectares*

Managing entity: *Dabiangou Forest Farm Cooperative*

Management objective: *Sustainable timber production (plantation)*

Exemplary management practices on Dabiangou Forest Farm include proper matching of species and sites, tree-growth enhancement and protection from fire and pests. The growth of selected trees, especially diameter growth, is enhanced by adjusting spacing according to site and age. Pruning of branches improves wood quality. The forest farm staff and workers manage the forest, with inputs and advice from the local government, district forest bureau and scientists. Seed production rights are sold to workers, while the forest farm retains timber production rights.

Datiantaoyuan Forest Farm

Location: *Fujian Province, China*

Area: *<100 hectares*

Managing entity: *Datiantaoyuan Forest Farm Cooperative*

Management objective: *Sustainable wood production (plantation)*

Plantation establishment at Datiantaoyuan Forest Farm commenced in 1981 and was completed in 1987. Intensive management of established plantations resulted in excellent results — the average timber volume is 242 cubic metres per hectare. Management practices include selection of high-quality seedlings, application of manure, proper tending and protection measures. The forest farm management involves a local countryside committee and knowledgeable forest scientists.

Jingouling Experimental Forest Farm

Location: *Jilin Province, China*

Area: *>1 000 hectares*

Managing entity: *Jingouling Experimental Forest Farm Cooperative*

Management objective: *Multiple use, sustainable timber production*

Jingouling Experimental Forest Farm is managed using low-intensity selective harvesting, which facilitates rapid tree growth and incurs minimal environmental impacts. Effective management has resulted in good growth of trees, maintenance of biodiversity and effective soil and water conservation.

Jinngu Experimental Forest Farm

Location: *Yunnan Province, China*

Area: *>1 000 hectares*

Managing entity: *Jinngu Experiment Forest Farm Cooperative*

Management objective: *Multiple use, sustainable timber production*

The primary objective at Jinngu Experimental Forest Farm is to produce high-quality timber through intensive management and utilizing efficient and scientific techniques. The application of technical measures and models are key aspects of increasing timber production and improving forest quality. Forest management also employs high-quality seedlings, symbiotic mycorrhizzae and rhizobia, scientific maintenance of plantations, fire and pest control. The forest farm is managed by a people's cooperative with advice and assistance from the local forest bureau and scientists.

Lingkuangshan Forest Farm

Location: *Qinyuan County, Shanxi Province, China*

Area: *148 hectares*

Managing entity: *Lingkuangshan Forest Farm*

Management objective: *Multiple use*

For decades, the Lingkuangshan Forest Farm has utilized careful harvesting practices and hence the forest retains excellent ecological and economic benefits. The key elements in management have been prevention of destructive practices and managing the forest to promote particular tree species and forest composition, as well as growing large volume trees of impressive diameter and height.

Linglongshan Forest Farm

Location: *Zhejiang Province, China*

Area: *From 100 to 500 hectares*

Managing entity: *Linglongshan Forest Farm Cooperative*

Management objective: *Multiple use, sustainable timber production*

The Linglongshan Forest Farm is managed for multiple uses, following an intensive scientific management regime. Plantation development is based on the use of high-quality planting materials, careful cultivation and selective replacement of low-yielding forests. Natural forests are enhanced and expanded through the practice of "hill closure" (temporary ban on extraction) and forest fire control.

Most harvesting is conducted using selective cutting systems, with clear-felling in limited areas according to regeneration needs. The forest is managed by a people's cooperative with advice from the local forest bureau and scientists.

Li Yincia Private Forest

Location: *Li Yincia, Gongdong Province, China*

Area: *1 000 hectares*

Managing entity: *Li Yincia*

Management objective: *Sustainable wood production*

Sound forest management in Li Yincia Private Forest is supported by a favourable national policy, strong support from the local government and the forest department, and application of proven scientific principles. Management incorporates advanced silvicultural techniques, application of manure, dedicated implementation and consistent protection. Timber harvesting is conducted using only highly conservative selective cutting systems. The forest is managed in collaboration with the local countryside committee, the district forest bureau and forest scientists.

Shang Gezi Pine Forests

Location: *Shang Gezi, Yunnan Province, China*

Area: *200 hectares*

Managing entity: *Shang Gezi natural village*

Management objective: *Sustainable timber production*

The local community has managed this 200-hectare village forest for more than 100 years, obtaining fuelwood, manure and timber in a sustainable manner. A community-based organization is responsible for management of the forest and for enforcing regulations. The community depends heavily on the forest for wood and non-timber forest products. About three to five hectares are clear-felled each year and a share of the harvested wood is allocated to every household based on household size. Households that do not need the wood products are allowed to sell their shares. No activities are permitted in clear-cut areas for three to five years to ensure adequate natural regeneration.

Tongzi Forest Farm

Location:	*Jiangxi Province, China*
Area:	*<500 hectares*
Managing entity:	*Tongzi Forest Farm Cooperative*
Management objective:	*Multiple use, sustainable timber production*

Tongzi Forest Farm is a relatively new enterprise, established in 1976. The farm comprises mixed species forest, and management emphasizes multiple uses associated with different species. Management activities include timber stand improvement, thinning, turpentine extraction (to obtain extra income) and protection from fire, pests and diseases. The farm is managed by a people's cooperative, with advice provided by the forest bureau and local scientists. The technical staff, management and workers are noted as being particularly motivated to achieve excellence.

Ananthagir II R.F. Block of Visakhapatnam District

Location:	*Visakhapatnam District, Andhra Pradesh, India*
Area:	*1 663 hectares*
Managing entity:	*Local Forest Protection Committees and the Andra Pradesh Forest Department (Joint Forest Management)*
Management objective:	*Rehabilitation, protection, sustainable livelihoods*

Severe soil erosion in many degraded forests in Andra Pradesh led the government to adopt a new conservation strategy to rehabilitate and protect the forests, through people's participation. The focus is on the welfare of forest-dwelling communities and involving them in the planning, implementation, execution, development and management of degraded forests. Local communities are organized into forest protection committees trained in silvicultural and social aspects of forest management. Ananthagir II Forest Block in Visakhapatnam District provides an outstanding example of success. Previously, communities over-exploited the forest, cutting fuelwood for their livelihoods, but now they are mainly working on forest restoration. Integral to this change has been:

- environmental education;
- identification and reforestation of degraded patches;
- building awareness and capacity; and
- training on technical and economic aspects.

Badataila Reserve Forest

Location:	*Badataila, Orissa, India*
Area:	*250 hectares*
Managing entity:	*Women's Group of Baghamunda Village*
Management objective:	*Forest protection, sustainable livelihoods*

The Badataila Reserve Forest highlights a unique forest management initiative by women from a small homogenous tribal community (Baghamunda village), who are protecting and regenerating a degraded forest in the face of tremendous odds. The women organized an independent forest protection and management committee after the efforts of local men had failed. Women were concerned with loss of forest cover, as well as the growing scarcity of fuelwood, timber, kendu (*Diospyros melanoxylon*) leaves and mahua (*Madhuca indica*) flowers, which provided villagers with cash income during difficult periods. The committee devised elaborate regulations and a schedule of fines. To keep a regular vigil over the forest and restrict access, five women patrol the forest every day on a rotational basis. Forest protection initiatives have resulted in at least two tangible benefits:

- secure supplies of fuelwood; and
- provision of mahua fruits and kendu leaves.

As the forest has grown healthier, the committee has gradually raised the allowable harvest of various forest products, while taking care to ensure that these uses are sustainable.

Bakku Village Forest

Location:	*Ushad, Uttaranchal, India*
Area:	*210 hectares*
Managing entity:	*Forest Panchayat, Bakku Village*
Management objective:	*Forest protection, sustainable livelihoods*

The local community manages Bakku Village Forest with modest support from the Forest Department. The main emphasis is on protecting forests from fires and meeting the livelihood needs of the community. A particular focus has been on reducing the drudgery of women in the collection of forest products. The local community appoints guards to maintain the forest and holds open meetings to make decisions. Strong action is taken against those who violate forest regulations. The forest is divided into compartments, and harvesting of forest products is strictly regulated. Neighbouring villagers are also allowed to collect forest produce in exchange for a collection levy, and some very poor villagers are allowed to collect forest products free of charge.

Banki Forest Block

Location:	*Banki, Rajasthan, India*
Area:	*300 hectares*
Managing entity:	*Forest Department of Rajasthan, with local villagers (Joint Forest Management)*
Management objective:	*Regeneration of degraded forests*

The Banki Forest Block has been regenerated through the active participation of local people. The villagers have implemented extensive soil and water conservation measures, biodiversity conservation practices and wildlife habitat improvements. Village development and natural resource use are viewed in a holistic manner that attempts to integrate people's needs into management of the environment. Improved management of the forest has enabled the local community to become economically self-sufficient.

Bhal Reserved Forest (Compartments 6B, 7, 7B)

Location:	*Bhal Reserved Forest, Uttaranchal, India*
Area:	*250 hectares*
Managing entity:	*Uttaranchal Department of Forests and Samiti Bhanswari (Joint Forest Management)*
Management objective:	*Multiple use, sustainable livelihoods*

Bhal Reserved Forest contributes more than 50 percent of local villagers' basic needs for fuelwood, fodder, leaf litter, dry grass and water on a sustainable basis — and its share of production is increasing. Wildlife populations have increased significantly in recent years. The local community managed this forest without any funds from external sources, until two years ago when a Joint Forest Management agreement was signed with the Forest Department. Villagers decide on rules and regulations for access through consensus at open village meetings. A sense of social responsibility and motivation for conservation pervades the entire community; this is demonstrated in a willingness to bear short-run economic hardships in protecting the forest and managing it sustainably.

Corbett Tiger Reserve

Location:	*Uttaranchal, India*
Area:	*128 800 hectares*
Managing entity:	*Uttaranchal Forest Department*
Management objective:	*Biodiversity conservation, watershed protection, tourism*

The Corbett Tiger Reserve was established in 1936 as India's first National Park. The forest area is the main source of water for a major hydro-electric power plant and irrigation system that greatly benefits farmers and towns in Uttaranchal. In addition to recharging aquifers, the forest helps prevent the widening of streams and the severity of downstream flooding. The buffer zone of the reserve provides for a multitude of uses and rights — timber, irrigation from water canals and grasses are explicitly allocated to local people. Project Tiger, launched at the Corbett Tiger Reserve in 1973, has led to a significant increase in the park's tiger population. Management plans for the reserve incorporate ways for people to enjoy and learn about the protected area, as well as providing for income generation for local people working as guides and other jobs related to habitat protection.

Coringa Mangrove Forests

Location:	*Coringa, Andhra Pradesh, India*
Area:	*33 263 hectares*
Managing entity:	*Andhra Pradesh Forest Department with participation of local communities*
Management objective:	*Mangrove rehabilitation, conservation, sustainable livelihoods*

The Coringa mangrove forests are managed not only to preserve a unique mangrove ecosystem and its rare biodiversity, but also to support the livelihoods of local coastal communities. Mangrove forests consist of a highly specialized and delicate community of plant species and associated fauna. The mangrove ecosystem has been an important economic resource for coastal people for centuries, providing a breeding ground and habitat for fish, prawns and crabs. The forests protect thousands of people and their property from the fury of cyclones and storm waves. Management activities include afforestation, assisted natural regeneration, maintenance, protection from grazing, encroachment and illegal felling, and draining and dredging. The local communities participate actively in the management of the forests.

Dhani Reserved Forest

Location:	*Dhani, Orissa, India*
Area:	*500 hectares*
Managing entity:	*Orissa Forest Department*
Management objective:	*Biodiversity conservation, multiple use*

Biodiversity and crown density have been restored at Dhani reserved forest, with the active involvement of five villages. A key to forest rehabilitation was agreeing on mutually acceptable and well-defined rights and responsibilities between the owner (Orissa Forestry Department) and forest users (local communities). Management plans are based on participatory rural appraisals and focus on several key dimensions including:

- meeting fuelwood needs;
- conserving soil and water with check dams;
- building a forest nursery;
- establishing a 20-hectare plantation; and
- harvesting of non-timber forest products.

Forests of Bankura District

Location:	*Bankura, West Bengal, India*
Area:	*219 300 hectares*
Managing entity:	*West Bengal Forest Directorate with forest protection committees (Joint Forest Management)*
Management objective:	*Multiple use, sustainable livelihoods*

Participatory management in the peninsular sal (*Shorea robusta*) forests of Bankura has led to the rehabilitation of large areas of forests. Initially, people's participation was spontaneous, but in recent years participation has become institutionalized and management practices more clearly defined. The forests are managed for multiple purposes based on scientific principles. The combination of scientific forestry and people's participation has provided tangible and sustainable benefits. Forest protection committees, with assistance from the Forest Department, prepare micro plans for forest management through participatory rural appraisals. Such plans include afforestation, harvesting of non-timber forest products, tending operations, and soil and water conservation measures. Revenues generated from marketing forest products are used for village development once financial commitments, such as government revenue targets and payments to forest protection committees, have been met.

Gadabanikilo Village Forest

Location: *Gadabanikilo, Orissa, India*

Area: *130 hectares*

Managing entity: *Gadabanikilo Village*

Management objective: *Forest protection, sustainable livelihoods*

Villagers in Gadabanikilo have established a well-structured and democratically elected forest protection committee that has formulated strict rules and regulations for forest management. The forest has been demarcated into "restricted" and "unrestricted" areas for utilization of forest products. Fuelwood harvesting is limited to a single period each year. Similarly, the collection of mahua (*Madhuca indica*) fruit, a locally important non-timber forest product, is carried out through an organized and collective effort such that each household receives an equal share of the harvest.

Gir Sanctuary and National Park

Location: *Gujarat, India*

Area: *188 235 hectares*

Managing entity: *Gujarat Forest Department*

Management objective: *Wildlife and biodiversity conservation*

Despite major external threats, the Gir Sanctuary and National Park has survived as one of the largest, undisturbed natural forests in India. Early demarcation of Gir Sanctuary as a protected area in 1964 and subsequent strengthening of legislative and on-the-ground protection have helped its survival. The flora and fauna, particularly the Asiatic lion (an endangered species), is well protected and wildlife populations have reached optimal levels. The environmental services of the forest help the agrarian economy in surrounding villages to prosper. People's cooperation is solicited by means of education and extension programmes such as regularly conducted nature education camps and the implementation of eco-development activities in adjoining villages.

Jameri Forest Block

Location:	*Jameri Forest, Rajasthan, India*
Area:	*300 hectares*
Managing entity:	*Forest Department of Rajasthan and local communities*
Management objective:	*Regeneration of degraded forests, protection*

Jameri Forest has been regenerated by local communities, which have planted trees and adopted soil and water conservation practices. The local community organization has a holistic development perspective that encourages participation by women and youth. The Forest Department encourages community participation and utilizes funds generated from the forest for village development. Community members collect fuelwood from dead or dying trees and also harvest non-timber forest products such as grasses, medicinal herbs and bamboo. The community is also actively involved in forest protection.

Janagarh Forest Block

Location:	*Pratapgarh, Rajasthan, India*
Area:	*1 150 hectares*
Managing entity:	*Forest Department of Rajasthan and local villagers*
Management objective:	*Protection, sustainable livelihoods*

In this region, local people are highly committed to rehabilitating the degraded teak forest and have replanted 520 hectares with local species. Local people now manage the forest with nominal assistance from the Forest Department. The village forest protection committee receives benefits from the forests and manages a village development fund, which is used for the improvement of crops and for developing village infrastructure. The village forest management institution has become a driver for social change and an advocate against various social evils. The efforts of local villagers to improve their biophysical and social environments have been so successful that they were awarded the *Amrita Devi Award* in 1997.

Kanhan–Jobandera Forest Block

Location: *Madhya Pradesh, India*

Area: *662 hectares*

Managing entity: *State Forest Enterprise (Joint Forest Management)*

Management objective: *Multiple use, sustainable timber production*

Prior to the introduction of Joint Forest Management in 1992, there was little community participation in the management of the Kanhan–Jobandera forest block. The management focus was geared mainly towards timber production. With the advent of Joint Forest Management, the area is now managed for multiple uses and protected more effectively. The Forest Department manages the forest in collaboration with a forest protection committee representing 145 stakeholder families. The forest protection committee protects the valuable teak forest from illicit felling, fire and grazing, while facilitating the regeneration of secondary tree species, grasses, and medicinal and other plants. Committee members harvest non-timber forest products, grasses and medicinal plants.

Kepasar Forest

Location: *Kepasar Van, Uttaranchal, India*

Area: *80 hectares*

Managing entity: *Gram Panchyat Keparas*

Management objective: *Forest protection, sustainable livelihoods*

The local village has managed Kepasar forest for more than 22 years, without financial support from the government or non-governmental organizations. The forest is healthy, landslides are contained, and biodiversity and environmental conditions have been improved. Fodder and wood are in adequate supply. The drudgery of women's work has been reduced, and opportunities for better livelihoods have been created. The village has appointed forest guards and makes forest-use decisions through open meetings. Violation of regulations is punished according to established guidelines and regulations. Each year the forest is opened for brief periods to allow women from each household to collect supplies of grasses, leaves and broken branches to support livelihoods.

Malekpur Village Forest

Location:	*Malekpur, Gujarat, India*
Area:	*167 hectares*
Managing entity:	*Jhanjharmata Vruksh Utpadan Sahkari Mandli Ltd. (Joint Forest Management)*
Management objective:	*Multiple use, protection, sustainable livelihoods*

The once degraded and barren hills that once surrounded Malekpur Village now stand regenerated and have good canopy cover. A community group was formed to carry out protection activities and create forest management regulations to ensure that people's needs, such as fodder, non-timber forest products and fuelwood, are met. Specific management plans have been prepared to ensure sustainable utilization of fuelwood and fodder. Water recharge ponds have been constructed to improve the water regime in the forest. The group has also established necessary organizational structures and administrative systems to ensure resources are used in a sustainable manner.

Mangrove Forests in Bhitarkanika

Location:	*Orissa, India*
Area:	*15 900 hectares*
Managing entity:	*Orissa Forest Department*
Management objective:	*Restoration of mangroves, conservation*

This is the second largest mangrove ecosystem in India, and houses the world's largest rookery for the Oliver Ridley turtle. During the 1950s, there was large-scale destruction due to leasing out to settlers and encroachment. In 1975, the area became a protected area and effective management practices have included: apprehending poachers, using the fishbone method of planting, establishing a nursery for rare mangrove species, seizing illegal fishing vessels, conducting a census of nesting Oliver Ridley turtles, constructing turtle hatcheries in four locations, demolishing illegal prawn *gherries*, and implementing ecotourism in the sanctuary portion of the forest. Ecodevelopment activities such as basket making, bee keeping and provision of solar cookers have been encouraged.

Mangroves in the Gulf of Kachchh

Location: *Gulf of Kachchh, Gujarat, India*

Area: *>100 000 hectares*

Managing entity: *Gujarat Forest Department*

Management objective: *Conservation, multiple use, marine biodiversity*

As late as the 1950s, tidal forests in the Gulf of Kachchh covered extensive areas with luxuriant growth. However, geomorphological changes and anthropogenic pressures, particularly the exploitation of the forests for fuelwood and fodder, and land leasing to the salt industry, severely reduced mangrove cover. Since 1980, and particularly in the last decade, management efforts have fostered consistent growth and recovery of the mangrove area, from 35 700 hectares in 1991 to 98 400 hectares in 1999. During the same period there has been severe degradation of mangroves in other parts of India — and around the world. As a result of the awareness and support of both the government and local people, the remaining mangrove areas have been protected and expanded. Much of this recovery has occurred in a marine protected area. The Department has also encouraged people's participation in planning and conservation. To further encourage the recovery of mangroves throughout the state, the Forest Department has moved from strict preservation to allowing sustainable use in selected areas, particularly by allowing collection of leaves for fodder.

Nanda Devi National Park

Location: *Chamoli, Uttaranchal, India*

Area: *63 000 hectares (core area)*

Managing entity: *Uttaranchal Forest Department*

Management objective: *Conservation, sustainable livelihoods*

The Nanda Devi area is reputedly one of the most spectacular wildernesses in the Himalayan region. The wide altitudinal range in the park supports a diversity of flora and a variety of large mammals, including rare and endangered species. The park is uninhabited but, until quite recently, people from nearby villages regularly brought more than 4 000 goats and sheep to the area to graze. Until the early 1980s, when trekking was restricted, mountaineering activities threatened the fragile ecosystems. To protect the park from further degradation, current management includes strict protection of the national park as a core area. A buffer zone that is nine times the size of the core area is allocated for limited-use purposes — with an emphasis on developing income-generating activities for local people as an alternative to overgrazing. Proactive management initiatives include:

- rehabilitation of degraded forests using local species;
- grassland management in the buffer zone;
- distribution of fruit trees to local communities to provide supplementary incomes; and
- provision of wool to poor villagers to make carpets and other items to sell to tourists.

By 1991, a survey showed all open forest areas had been restored to more than 40 percent crown cover. Sightings of some flagship species, such as the snow leopard and black bear, have increased appreciably since the early 1980s.

Nandan Kanan Forest

Location:	*Madhya Pradesh, India*
Area:	*26 329 hectares*
Managing entity:	*Wainganga Community Development Centre*
Management objective:	*Recreation*

Nandan Kanan forest is managed for recreational activities with voluntary help from horticulture, forestry and education experts. Local people have the lead in managing the forest through a Community Development Centre. They contribute cash, in-kind resources and labour in managing the forest.

Nistar and Reserved Forests within the boundary of Mendah–Lekha Village

Location:	*Maharashtra, India*
Area:	*1 800 hectares*
Managing entity:	*Gram Sabha and Van Suraksha Samiti of Mendha–Lekha Village (Joint Forest Management)*
Management objective:	*Conservation and sustainable forest use*

Until 1992, these forests were managed and protected solely by Mendha villagers. Subsequently the forests have been brought under the Maharastra government's Joint Forest Management scheme, but have retained their unique management practices. Commercial exploitation of the forests for timber has been banned and environmental education programmes enhanced. A ban has been placed on felling fruit trees as a practice for collecting fruit. Villagers have also implemented a complete ban on encroachment and lighting of forest fires.

Reserved Forest falling within the boundaries of Jarhargaon Village

Location:	*Jarhargaon, Uttaranchal, India*
Area:	*500 hectares*
Managing entity:	*Van Suraksha Samiti of Jarhargaon (Forest Protection Committee)*
Management objective:	*Watershed conservation, multiple use*

Overexploitation and acute scarcity of forests near Jarhargaon Village meant that, until about 20 years ago, negative ecological impacts were common. Around 1980, local leaders mobilized the entire village to reverse this trend. New and revived customary regulations were established to ensure forest protection, including employing a forest guard and forming a special committee to deal with offenders. The local people re-established a traditional system of irrigation that ensures equitable distribution of water to every household. The village linked with the *Save the Seeds Movement* that collects and experiments with traditional seed diversity. The once barren slopes surrounding Jarhargaon are now completely regenerated and wild animals such as bears and leopards have returned. A floristic study conducted by the G.B. Pant Institute indicates that these forests are among the most biologically rich in the Garhwal region. Perhaps the greatest benefit of this community initiative is the social empowerment and strengthening of collective spirit it has engendered. Although local people do not have any legally recognized rights of ownership, control or management, they have exercised *de facto* control through the forest protection committee and other institutions.

Reserved Forest of the Eastern and Western Ghats

Location:	*Eastern and Western Ghats, Tamil Nadu, India*
Area:	*350 000 hectares*
Managing entity:	*Tamil Nadu Forest Department and 1 000 villages (Joint Forest Management)*
Management objective:	*Watershed protection, poverty alleviation*

The Reserved Forest of the Eastern and Western Ghats form a catchment for more than 20 000 irrigation reservoirs and 20 river systems. Positive policy changes have been made to ensure these forests are managed to meet the ecological needs of the state and the basic needs of the local poor. All of the 1 000 villages and the associated watersheds are managed under micro plans prepared through a participatory process involving forest protection committees. The Joint Forest Management planning process ensures equal focus on forest conservation, watershed protection and rural development, thereby inducing human–habitat harmony. Women participate in more than 1 800 self-help groups to support village forest committees. Specific poverty alleviation programmes and basic infrastructure development have emphasized intersectoral linkages, particularly to agriculture and animal husbandry. A broad extension network has been established to assist villagers who want to grow trees on their lands.

River and Canal Bank Teak Plantations, Thanjavur

Location:	*Thiruvarur and Nagapattinam districts, Tamil Nadu, India*
Area:	*29 695 hectares*
Managing entity:	*Tamil Nadu Forest Department*
Management objective:	*Sustainable timber production, rehabilitation*

Until the middle of the twentieth century, large tracts of river and canal banks in Tamil Nadu were underutilized. In 1956, initial efforts aimed at planting teak trees in these riparian areas proved successful. Waterway banks were subject to heavy biotic pressures, mainly due to the agricultural activities of local people. The planting of teak trees provided an effective means of better protecting canal banks. Canal banks have proved to be excellent sites for teak growth due to their porous alluvial soils and the ready availability of water. Teak stumps are planted and managed effectively along most waterway banks in Thiruvarur and Nagapattinam districts, in order to meet the timber and fuelwood requirements of local people and industries. The Tamil Nadu Forest Department is the primary manager of these plantings, but other stakeholders such as the Tamil Nadu Public Works Department, non-governmental organizations, local people, industries and timber dealers are also involved in teak plantation management.

Rui Catchment

Location:	*Jammu Province, Jammu and Kashmir, India*
Area:	*2 500 hectares*
Managing entity:	*Jammu and Kashmir Forest Department*
Management objective:	*Rehabilitation of a denuded forest catchment*

The forest department employs a unique approach, with three groups of stakeholders — ex-servicemen, forest department staff and local people — developing plantations on the denuded hills of Rui Catchment. These three groups are involved in planning, implementing and managing the plantations. Over the years, an increase in both human and cattle populations exerted pressure on the Rui Catchment resulting in the gradual disappearance of forests. By the mid-1990s the catchment was completely denuded. Several attempts to rehabilitate the area by the forest department, working alone, failed. The unique collaborative approach was launched in 1988 and has been successful. The local communities now manage the established plantations and the roles of ex-servicemen and the government have decreased. Collection of fuelwood and non-timber products (especially fodder) by local people is restricted to subsistence needs.

Rukhal Village Forest

Location:	*Rukhal Village, Ahmedabad, India*
Area:	*385 hectares*
Managing entity:	*Aga Khan Rural Support Program, Rukhal Village*
Management objective:	*Rehabilitation, sustainable livelihoods*

The Aga Khan Rural Support Program has assisted Rukhal Village in reforesting local areas. The restored forest areas are now contributing to fuelwood supplies, helping to protect against soil erosion, and increasing areas available for cropping. Villagers have constructed wells for irrigation and drinking water, and also have begun to use biogas. Villagers have organized themselves into a village development committee that attends to repairing bunds throughout the village. They have also established a successful micro-credit programme. Participatory Resource Appraisals have been used to identify and address primary factors contributing to poverty and resource degradation.

Shimla Catchment Forest Area

Location:	*Himachal Pradesh, India*
Area:	*500 hectares*
Managing entity:	*Government of Himachal Pradesh, Forest Department*
Management objective:	*Watershed management*

The Shimla Catchment Forest has been managed to protect the watershed that supplies water to the town of Shimla since 1896. In 1964, the whole forest was organized into a "water catchment and conservation working circle". Much of the forest is planted with deodar cedar (*Cedrus deodar*) and trees are strictly protected against felling. The only felling allowed is carried out to enhance regeneration. The forest also serves as a recreational facility and wildlife sanctuary, with strong elements of biodiversity conservation included in its management plans.

Shri Chandgiram Agro Forest

Location:	*Chhattisgarh, India*
Area:	*20 hectares*
Managing entity:	*O.P. Agrawal*
Management objective:	*Multiple use, soil and water protection*

Since 1978, O.P. Agrawal has established and managed this 20-hectare area as a highly successful and innovative agroforest. Initially, the fields at Shri Chandgiram were prone to soil erosion, but by planting tree species on bunds, channels and wastelands, soils have been stabilized. To increase income, improved varieties of mango and lychee are intercropped with soybean and groundnuts. This system provides fruit, fuel, fodder, timber and agricultural crops, all from one small parcel of land. The forest is managed intensively on rotations of up to 30 years, depending on species, and pruning, thinning and other silviculture is applied as necessary. In 1990, O.P. Agrawal received the prestigious *Indira Priyadarshini Vriksha Mitra* national award for pioneering and exemplary works in the field of afforestation and wasteland development.

State Forests of Madhya Pradesh and Chhattisgarh

Location:	*State Forests of Madhya Pradesh and Chhattisgarh, India*
Area:	*1 004 820 hectares*
Managing entity:	*Indian Institute of Forest Management and Madhya Pradesh and Chhattisgarh Forest Departments (Joint Forest Management).*
Management objective:	*Multiple-use management*

The teak, sal and mixed forests that comprise the State Forests of Madhya Pradesh and Chhattisgarh are managed sustainably for conservation of biodiversity, ecological integrity and commercial and livelihood purposes. The forestry departments harvest timber from the forests, while local communities have rights to collect non-timber forest products and fuelwood. The states own the forests, but they are co-managed with communities under Joint Forest Management mechanisms. The implementation of the ITTO-sponsored project, *Operational Strategy for Sustainable Forestry Development with Community Participation in India*, has further enhanced effective, collaborative management. Dialogue on sustainable forest management, among stakeholders, has facilitated the use of criteria and indicators as a mechanism to monitor sustainability. Criteria and indicators have been developed in a participatory manner that builds on local capacities and indigenous knowledge.

Teliamura Reserve Forest

Location:	*Teliamura, Khasiamangal, Tripura, India*
Area:	*850 hectares*
Managing entity:	*Tripura Forest Department with the Eco-Park Joint Forest Management Committee (Joint Forest Management)*
Management objective:	*Forest rehabilitation, multiple use, sustainable livelihoods*

Khasiamangal is one of the poorest villages in Tripura and local people depend almost entirely on the forest for livelihoods. Increasing human and cattle populations over the past few decades caused severe depletion in the natural resource base. The area was brought under Joint Forest Management as realization grew that involving local people was necessary to protect the remaining forest and to halt degradation. An Eco-Park Committee has been formed, involving a local youth club, to help build trust between the Forest Department and local people. The main objective of the committee is to motivate local people to design and implement innovative activities. Activities include *in situ* and *ex situ* conservation of medicinal plants. A forest garden has been established to generate awareness about the importance of medicinal plants and to spread traditional knowledge of their usage. The garden has more than 220 species of medicinal importance. The committee has initiated a bamboo propagation programme to rehabilitate degraded bamboo resources. This activity is particularly important since bamboo is used extensively by tribal groups and by the rural poor for housing, sustenance and household incomes. In Tripura, tribal groups can collect bamboo from the forests, free of cost, for their use and for sale in the nearby market.

Tibna Sand Dunes

Location:	*Tibna, Rajasthan, India*
Area:	*380 hectares*
Managing entity:	*Poorva Sainik Bahu Dheshiya Sahakari Samiti*
Management objective:	*Sand dune stabilization*

The local community has been motivated not only to preserve 10 hectares of forest planted by the Forest Department in 1992, but also to preserve and sustain areas of forest planted since 1998, covering an additional 380 hectares. A beautiful nursery, which was developed by an ex-servicemen's association in 1998, has been managed to provide seedlings for planting on sand dunes near the village. The successful rehabilitation of this area is in part due to the involvement of ex-servicemen, whose sense of dedication, coupled with perseverance, has helped to create, develop and sustain positive environmental and social changes. Key

management activities include soil conservation, sand dune stabilization, water harvesting, livestock development and awareness campaigns among local villagers.

Vazhachal Forests

Location:	*Thrissur District, Kerala, India*
Area:	*788 hectares*
Managing entity:	*Kerala Forest Department*
Management objective:	*Conservation, tourism, recreation*

The forests of Vazhachal region are managed for conservation and tourism, offering spectacular natural attractions and an abundance of indigenous flora and fauna. The management of the forests involves local tribal people who are employed as tour guides and who sell handicrafts made from sustainably managed non-timber forest products such as bamboo and reeds. Fees collected from tourists are used to conserve the forests, make the tourism infrastructure more environmentally friendly and to build awareness of conservation issues. Fees are also used to fund social services for villagers, training for guides, handicraft production and to establish medical clinics. The Kerala Forest Department and local forest protection committees jointly formulate management plans for the forests.

Village Commonlands in the Aravalli Hills

Location:	*Aravalli Hills, Haryana, India*
Area:	*38 000 hectares*
Managing entity:	*Village Forest Committees under the supervision of the Haryana Forest Department*
Management objective:	*Rehabilitation, multiple use*

The Aravalli Hills contain some of the largest rehabilitated forest areas in India, owned and managed entirely by local communities. Over the last decade, the forest area has increased three-fold while also meeting the multiple needs of communities. The forest is managed mainly under an agroforestry model, which utilizes thinning to prevent canopy closure and thus permitting valuable fodder grasses to grow. Gender-balanced Village Forest Committees provide a link between the community and the Forest Department in implementing activities and resolving conflicts. The Department provides incentive funds to villages that have achieved excellent rehabilitation. These funds are used by the Village Forest Committees for local development projects such as the construction of water tanks and school infrastructure.

Bali Barat National Park

Location: *Bali, Indonesia*

Area: *19 002 hectares*

Managing entity: *Directorate General of Forest Protection and Nature Conservation*

Management objective: *Conservation, tourism*

Bali Barat National Park occupies approximately 10 percent of the island of Bali. The park supports the development of regional tourism, especially diving and snorkelling, and is spiritually important for local people, whose traditional beliefs strongly support conservation. The park was originally established primarily as a means of protecting the Bali starling *(Leucopsar rothschildi)*, and continues to provide the only remaining natural habitat for this endangered bird. Special measures are pursued to ensure the conservation of the Bali starling and its habitat. Over 200 species of plants are found in Bali Barat National Park, including a number that have special religious significance.

Bukit Bangkirai Forest

Location: *Balikpapan District, East Kalimantan, Indonesia*

Area: *1 500 hectares*

Managing entity: *PT Inhutani I*

Management objective: *Ecotourism and research*

Easily accessible from nearby Balikpapan city, this tropical rain forest, rich in biodiversity, is dominated by bangkirai (*Shorea laevis*). Bukit Bangkirai forest is an ideal ecotourism and outdoor adventure recreation area receiving approximately 1 000 visitors each month. It has a canopy bridge, cottage facilities, jungle trails, bird-watching facilities and a natural orchid garden.

Gunung Gede Pangrango National Park

Location: *West Java, Indonesia*

Area: *15 196 hectares*

Managing entity: *Directorate General of Forest Protection and Nature Conservation*

Management objective: *Biodiversity conservation*

Gunung Gede Pangrango National Park contains representative areas of montane swamp and tropical mountain forests. Gunung Gede Pangrango is one

of the smallest national parks in Indonesia, but is particularly important because it is relatively close to Jakarta. In addition to providing a natural habitat for the Javan leaf monkey and ebony leaf monkey, the park is an important source of clean water for the province of West Java and Jakarta, while also positively affecting the microclimate. The park supports regional tourism, and park management collaborates with local and national non-governmental organizations and other volunteers to protect against littering and illegal activities.

Jambi Forest Concession

Location:	*Jambi, Indonesia*
Area:	*251 218 hectares*
Managing entity:	*PT Wirakaraya Sakti (concession)*
Management objective:	*Chipwood production*

The management of Jambi Forest Concession takes into consideration the forest environment, the sustainability of wood supplies, and the socio-economic contributions of the forest. The concession holder uses both manual and mechanical harvesting to reduce impacts on the environment. PT Wirakaraya Sakti attempts to achieve overall sustainable management by converting degraded, logged-over forests to highly productive plantations. Currently a 10-year wood supply plan is in place and a network of conservation forests is retained to protect biodiversity.

Kalok–Nahiang Rivers Forest Complex

Location:	*Central Kalimantan, Indonesia*
Area:	*204 200 hectares*
Managing entity:	*PT Sarmeinto Prakantja Timber (concession)*
Management objective:	*Sustainable timber production*

The Kalok–Nahiang Rivers Forest Complex is managed to ensure that adequate safeguards are provided in all operations for environmental functions, including watershed stability and conservation of biological resources. Forest planning and management incorporate concepts of sustained-yield production of forest products, based on local forest ecology. Management activities have positive impacts on the well-being and prosperity of local communities. Sustainable production, conservation and the socio-economic well-being of local communities are incorporated into the company's management plans. Timber harvesting is carried out through selective logging with replanting, and biodiversity is protected by delineating areas for protection of genetic resources and biodiversity. The company believes that achieving long-term sustainability of forest resources involves the development of partnerships involving the concessionaire,

government and forest communities. Regular consultations with stakeholders take place and their views are incorporated into management and operational plans. Local communities are given preference in employment in logging and other forest management activities.

Ketapang Timber Concession

Location:	*West Kalimantan, Indonesia*
Area:	*294 000 hectares*
Managing entity:	*PT Suka Jaya Makmur (concession)*
Management objective:	*Sustainable wood production*

PT Suka Jaya Makmur has developed conflict resolution mechanisms and established co-management with local communities to improve relationships with local people. The company has also established an arboretum to help protect biological diversity. Timber is harvested using reduced impact logging practices, and silviculture follows the Indonesian selective cutting system.

Komodo National Park

Location:	*Flores, Indonesia*
Area:	*219 322 hectares*
Managing entity:	*Directorate General of Forest Protection and Nature Conservation and The Nature Conservancy*
Management objective:	*Conservation, tourism*

PKA Balai Taman Nasional Komodo and The Nature Conservancy currently collaborate to protect Komodo National Park's unique biodiversity (both marine and terrestrial). The main challenge is to reduce both threats to the resources and conflicts between incompatible activities. The Komodo dragon (*Varanus komodoensis*) population is relatively stable and its natural habitat is being maintained. Under an innovative — but controversial — initiative, a private company is being given tourism concession rights in exchange for financing park conservation. The park supports regional tourism and collaborates well with the local government and local communities. In 1992, the park was declared a World Heritage Site.

Labanan Timber Concession

Location:	*Berau, East Kalimantan, Indonesia*
Area:	*83 240 hectares*
Managing entity:	*PT Inhutani I (concession)*
Management objective:	*Sustainable timber production*

Labanan Timber Concession utilizes reduced impact logging techniques and provides a site for training and research on sustainable forest management. Between 1989 and 1995, the French Government and the Indonesian Ministry of Forestry established permanent sample plots at Berau to study natural regeneration. Since 1996, the Berau Forest Management Project — a joint EU and Indonesia initiative — has developed appropriate tools and systems for implementing sustainable forest management. There is on-site training on planning for forest management using Global Information Systems, as well as a herbarium with over 10 000 specimens. Inhutani I has developed a "model forest" concept through multistakeholder consultations. A management joint venture between Inhutani I, local government and local communities has been proposed.

Long Bagun Timber Concession

Location:	*Long Bagun, Kutai Barat, East Kalimantan, Indonesia*
Area:	*269 000 hectares*
Managing entity:	*PT Sumalindo Lestari Jaya (concession)*
Management objective:	*Sustainable timber production*

The Long Bagun Timber Concession is notable for maintaining smooth relations with local communities, and for preserving areas of high conservation value. PT Sumalindo uses cable logging and has adopted reduced impact logging techniques to minimize adverse environmental impacts. The concession maintains a good relationship with indigenous people and consults with them to identify boundaries of villages and their traditional forests and fields during the process of forest zoning, prior to timber harvesting operations.

Mount Rinjani National Park

Location:	*West Nusa Tenggara, Indonesia*
Area:	*41 330 hectares*
Managing entity:	*Directorate General of Forest Protection and Nature Conservation*
Management objective:	*Conservation, watershed management, tourism*

Mount Rinjani National Park provides a model for ecotourism development in Indonesia, with community-based activities focused on the Rinjani trek. The park provides an important source of water for communities in the surrounding area. The park authorities have good relations with local government, universities, communities and local and national non-governmental organizations, particularly with respect to ecotourism development. In addition to supporting regional tourism, the park is a unique place for education and research since it lies in the Wallacea transitional zone, containing both Asian and Australian vegetation types.

Musi Rawa Plantations

Location:	*South Sumatra, Indonesia*
Area:	*10 000 hectares*
Managing entity:	*PT Xylo Indah Pratama*
Management objective:	*Sustainable wood production (plantation)*

The Musi Rawa forest plantations are managed to involve local people in the wood-processing industry in a sustainable manner. Xylo Indah Pratama is responsible for planning, infrastructure and facility development, species selection, harvesting and marketing; with input and participation from local people and local government. Local people are employed as office and field workers, and local government officials are involved as supervisors and facilitators.

Protection Forest of Mt. Semuang

Location:	*West Kalimantan, Indonesia*
Area:	*3 000 hectares*
Managing entity:	*Community of the Dayak Hibun*
Management objective:	*Watershed protection, ecotourism*

Mt. Semuang is an important watershed area, as well as providing habitat for a range of rare and endangered animals. The Dayak Hibun community is attempting to protect the forest around Mt. Semuang from logging and to develop it as an ecotourism area. The key objectives of management are protection and biodiversity conservation.

PT Ratah Timber Concession

Location:	*Long Hubung, Kutai Barat, East Kalimantan, Indonesia*
Area:	*97 690 hectares*
Managing entity:	*PT Ratah Timber (concession)*
Management objective:	*Sustainable wood production*

The PT Rayah Timber Concession is managed for wood production using the Indonesian selective cutting system and applying reduced impact logging methods. The concessionaire is committed to management through a multi-stakeholder approach that includes inputs from the government, the private sector and local communities. The concessionaire implements village development activities in conjunction with local communities.

Rawa Aopa Watumohai National Park

Location:	*Southeast Sulawesi, Indonesia*
Area:	*105 194 hectares*
Managing entity:	*Directorate General of Forest Protection and Nature Conservation*
Management objective:	*Biodiversity conservation, research, education, tourism*

Rawa Aopa Watumohai National Park supports significant populations of endemic, rare, and vulnerable fauna. The park contains several diverse ecosystems including coastal mangrove swamps, tropical savannah grasslands and extensive lowland rain forests. The park is the natural habitat for 32 species of rare birds, 37 species of birds endemic to Sulawesi and several endemic mammals. The park is an important site for education and research activities, provides good bird watching and supports the development of regional tourism.

Rimba Berseri Forest Cooperative

Location:	*Sanggau, West Kalimantan, Indonesia*
Area:	*16 490 hectares*
Managing entity:	*Forest Cooperative "Rimba Berseri"*
Management objective:	*Sustainable timber production*

Rimba Berseri Forest Cooperative provides a unique case in Indonesia where communities bordering the forest have been granted timber concessions in the natural forest. The aim is to implement improved silviculture and harvesting through community management of concessions. A subsidiary requirement is to minimize capital expenditure by processing harvested timber on site with mobile sawmills, thereby eliminating the use of heavy machinery. Forest management is integrated with village development plans based on participatory land-use planning of the overall area. The land-use planning process and the institutional set-up reflect both the traditional rights' system and the national legal system, thereby integrating the interests of both local communities and the government. The management system has been developed as part of a project of technical cooperation between the Indonesian Ministry of Forestry and Deutsche Gesellschaft f□r Technische Zusammenarbeit (GTZ), in close cooperation with local governments and local communities. It is based on long-term field testing together with communities and other partners. Due to recent political, social and economic uncertainties in Indonesia, the project has had difficulties in producing immediate and visible impacts on a large scale. Nevertheless, local governments and communities have started to view it as an opportunity to positively address issues of concession management.

Sanggau Forest

Location:	*West Kalimantan, Indonesia*
Area:	*Approximately 135 hectares*
Managing entity:	*Institution of Participative Forest Area Management (LKAD)*
Management objective:	*Multiple use, sustainable livelihoods*

Sanggau forest is owned by the government, but has been declared a "Forest Area with a Special Purpose," which gives local people defined user rights. LKAD has established a project that allows people to use and sell forest resources, but without destroying the forest. The project aims to combine timber extraction, farming and collection of non-timber forest products. The project uses an integrated approach that works to improve local livelihoods through participatory forest management that is sensitive to both traditional and state laws. Local people's participation is emphasized to ensure sustainability, as well as providing a holistic perspective on forest resource use. Land-use plans integrate forest

reserves with dryland rice fields and home gardens to improve productivity and maintain sustainability. Activities are carefully controlled to preserve the forest environment. The local communities elect stewards who monitor what is happening throughout the forest.

Subanjeriji and Benakat Forest Region

Location: *South Sumatra, Indonesia*

Area: *193 500 hectares*

Managing entity: *PT Musi Hutan Persada*

Management objective: *Sustainable wood production (plantation)*

Subanjeriji and Benakat plantation forests are part of a forest concession licensed to PT Musi Hutan Persada. The areas of the concession were largely scrub, heavily degraded forests and grasslands and these areas are being converted to forest plantations. The main species planted is *Acacia mangium*, a legume with a good growth rate that enriches poor soils through nitrogen fixation. PT Musi Hutan Persada established species trials prior to large-scale plantation development and invested in all-weather roads, bridges, schools and clinics to benefit local communities. The primary focus is on intensive management of forest plantations, but the company also operates a social forestry programme that allows local farmers to plant agricultural crops between rows of plantation trees. The company also awards school and university scholarships to local students. Twelve transmigration sites (4 580 families) have been developed and each family has been allocated two hectares of rubber plantations. Some transmigrants also work in the forest plantation as contractors or employees.

Teak Forest of Blora

Location: *Central Java, Indonesia*

Area: *1 384 hectares*

Managing entity: *PT Perhutani*

Management objective: *Sustainable timber production, watershed protection*

The management of teak forests in Blora District dates back to 1874, when sustainable-yield principles were first applied as part of the first National Forest Management Plan. This teak plantation is considered to be well managed because production is in line with targets, the rate of soil loss is relatively low and the quality of water arising in the plantation is good. The teak trees are grown on an 80-year rotation. After felling, replacement trees are planted. PT Perhutani has established a teak forest tourism enterprise, using a three-wagon train pulled by an antique locomotive.

Ujung Kulon National Park

Location:	*West Java, Indonesia*
Area:	*120 551 hectares*
Managing entity:	*Directorate General of Forest Protection and Nature Conservation*
Management objective:	*Conservation, tourism*

Ujung Kulon was Indonesia's first national park. Habitats in the park consist of lowland rain forest, swamp, mangrove and beach forest, including the largest remaining area of lowland rain forests in the Java plain. The park maintains a stable population of the Javan rhinoceros. The population of these extremely endangered animals in Ujung Kulon is estimated to be 50 to 60 head. The park provides an important site for education and research and supports regional tourism. It was declared a World Heritage site in 1992.

Wanabdurahman Forest

Location:	*Lampung, Indonesia*
Area:	*350 hectares*
Managing entity:	*Wana Karya Farmer Group*
Management objective:	*Multipurpose, plantation establishment*

In the 1970s, local people settled inside Wanabdurahman forest area and established a coffee plantation. However, from 1983 to 1986, these people were resettled and reforestation was attempted. These initial reforestation efforts were unsuccessful and community-based forest management was introduced in 1998, after certain preconditions were met. Local people responded positively and a self-funding, multipurpose tree plantation was established. Plantation activities provide long-term economic and ecological benefits, as well as a learning process for farmer groups interested in applying sustained-yield principles.

Kyrgyz Ata Juniper Forest

Location:	*Naukat, Kyrgyz Republic*
Area:	*11 172 hectares*
Managing entity:	*Ministry of Environment and Emergency and Kyrgyz Republic Forest Institute*
Management objective:	*Juniper forest rehabilitation*

The Kyrgyz Ata Juniper Forest was created between 1964 and 1996, primarily by Alexander Choub, who dedicated most of his life to its establishment and management. The primary species planted is mountain juniper (*archa*). Choub set up nurseries that produced more than 10 million seedlings, which were planted and checked regularly to ensure that the juniper berries were not infected. In the past, the trees were used for fuelwood and as construction materials. Located in the remote Kyrgyz-Ata Valley, this forest was placed under government protection in 1992.

Sangthong District Model Forest

Location:	*Sangthong District, Vientiane, Lao PDR*
Area:	*4 680 hectares*
Managing entity:	*National University of Laos, district government and communities*
Management objective:	*Training, research and rehabilitation*

Sangthong District Model Forest provides a prototype for sustainable forest management in Lao PDR. The forest is managed under multistakeholder partnerships among local communities, government authorities and the National University of Laos. Forest management aims at developing a model that is ecologically sound, economically viable, technically feasible and socially acceptable. High priority is afforded to capacity building for villagers, university forestry staff, and district forestry staff as well as research to meet the challenges of forest management. The model forest stimulates innovation and best practices through the pooling of human and financial resources, and promotes positive interaction among forest resources, development and conservation, human resource development and research. These innovative practices are promoted at the national level through information exchange, training courses and technology transfer. The Faculty of Forestry of the National University plays a dominant role in management of the model forest, but a multi-stakeholder arrangement ensures the participation of communities in planning, managing and protecting forest resources.

FMU No. 1 Tama Abu and Suling-Selaan Protected Forests

Location: *Baram District, Sarawak, Malaysia*

Area: *169 440 hectares*

Managing entity: *Forest Department, Sarawak*

Management objective: *Multiple use, sustainable timber production*

Forests in this region, bordering Kalimantan, are characterized mainly by logged-over forests and forests affected by shifting cultivation carried out by the indigenous Penan people. At Tama Abu and Suling-Selaan Protected Forests, sustainable management practices are implemented as part of a pilot project that follows established environmental, social and economic standards. A community development programme has been initiated that emphasizes sustained wet rice cultivation; it is hoped this will gradually replace inefficient and environmentally less desirable slash-and-burn methods of agriculture. Other aspects of the community development programme include water supply systems, solar and hydropower generation, handicraft production and tourism.

Pekan and Nenasi Forest Reserve

Location: *Pahang Darul Makmur, Malaysia*

Area: *16 676 hectares*

Managing entity: *Rimbaka Forestry Corporation (concession)*

Management objective: *Sustainable timber production*

In moving towards Forest Stewardship Council certification, the Rimbaka Corporation manages the Pekan and Nenasi Forest Reserve for commercial timber production as an environmentally responsible production forest that meets community standards and needs. Rimbaka carefully plans all forestry activities, uses specialized equipment to minimize damage to residual trees and other resources, and properly monitors and measures operational performance. Rimbaka not only applies reduced impact logging techniques, but has also invented a timber-harvesting machine that operates as a mobile highlead yarding system. The innovative yarder has an extendable arm that allows control when winching logs and keeps the leading end of the log above the ground, thereby minimizing damage. This harvesting machine reduces the need for forest roads and for heavy machinery. Additional conservation measures help to keep harvesting damage to less than 15 percent of the total forest area. A training programme — for staff of all levels — is an important part of maintaining a high standard of operations.

Temenggor Forest Reserve

Location:	*Perak, Malaysia*
Area:	*9 000 hectares*
Managing entity:	*Perak ITC (concession)*
Management objective:	*Sustainable timber production*

Temenggor Forest Reserve is managed to develop a sustainable timber industry in the state of Perak. To this end, forest management is moving towards fulfilling the principles and criteria for Forest Stewardship Council certification. Management emphasizes environmental monitoring systems, detailed documentation of forest activities, frequent monitoring and auditing, periodic review of management plan implementation and an annual management review involving all forest staff. Management provides a strong focus on:

- environmental impacts by practicing reduced impact logging; and
- issues related to high-conservation-value forests.

Perak ITC manages the forest on a 30-year harvest cycle with stakeholder involvement in planning and decision-making processes. Stakeholders include government agencies, non-governmental organizations and local communities (*orang asli*).

Pine Forest of Khodood

Location:	*Khodood, Selinge Aimag Province, Mongolia*
Area:	*2 895 hectares*
Managing entity:	*Nakhia Community*
Management objective:	*Forest rehabilitation, protection, sustainable livelihoods*

The members of the local community forestry group utilize forest resources sustainably including implementation of conservation and reforestation activities. They have organized themselves to stop illegal felling and to prevent fires, and have also established a tree nursery. Community involvement in forest management has also helped to alleviate poverty. Community members annually reforest 30 to 70 hectares, collecting 30 kilograms of pine seeds, and planting up to 400 000 seedlings.

Pine Forest of Sang River

Location: *Selenge Aimang Province, Mongolia*

Area: *11 800 hectares*

Managing entity: *Bugant Company*

Management objective: *Sustainable wood production*

Bugant is a privately-owned, forest-harvesting and wood-processing company. In addition to harvesting and processing merchantable timber for commercial purposes, the company also collects seeds, raises seedlings and carries out reforestation at the Sang River Forest. All of the company's operations are guided by a five-year management plan, which requires government approval. Fire protection activities and prevention of illegal logging are key elements of the forest management plan. The company is presently reforesting approximately 150 hectares each year.

Tujin Nars Pine Forest

Location: *Tujin Nars, Selenge Aimag Province, Mongolia*

Area: *46 000 hectares*

Managing entity: *Forest and Wildlife Centre, Selenge Aimag*

Management objective: *Rehabilitation*

Wildfires are prevalent in Mongolia and 25 700 hectares of burned areas in Tujin Nars forest currently require reforestation. The Forest and Wildlife Centre has reforested 350 to 450 hectares and has produced one million seedlings from seeds collected locally. In addition to replanting, the Centre has organized measures to stop illegal logging and prevent forest fires.

Alungdaw Kathapa National Park

Location: *Alungdaw Kathapa, National Park, Myanmar*

Area: *160 670 hectares*

Managing entity: *Forest Department*

Management objective: *Biodiversity conservation and ecotourism*

Alungdaw Kathapa National Park is located in a mountainous area approximately 100 miles west of Mandalay. It was classified as reserved forest as early as 1893, and although it was logged selectively for teak in the past, it remains largely undisturbed. Large mammals living in the park include elephants, gaur, banteng, sambar and a relatively large population of tigers. The exceptional management features include conservation of natural forests and wildlife, including tigers, ongoing research, environmental education and development of ecotourism.

Meinmahla Kyun Wildlife Sanctuary

Location:	*Ayewaddy Delta, Bogaly, Myanmar*
Area:	*13 670 hectares*
Managing entity:	*Forest Department, Ministry of Forestry*
Management objective:	*Protection and conservation*

Conserving the Meinmahla Kyun mangrove forest is important because of the large number (29) of tree species adapted to the brackish water delta area, as well as the habitat it provides for crocodiles, turtles and tortoises. A number of conservation measures have been implemented, such as:

- the reintroduction of the estuarine crocodile;
- establishment of a crocodile-breeding centre;
- environmental education;
- construction of wooden walkways in the forest; and
- facilitation of natural regeneration of mangroves.

Paukkhaung Model Forest

Location:	*Bago Division, Myanmar*
Area:	*129 965 hectares*
Managing entity:	*Forestry Department and the local community*
Management objective:	*Sustai*nable timber production

Management of Paukkhaung Model Forest focuses on people's participation in forestry operations and activities, and their influence over forest management decision making through frequent partnership meetings. Stakeholder partnership groups develop specific forest management plans for the model forest area. Management practices include timber harvesting in accordance with the national Code of Forest Harvesting, adherence to the prescribed annual allowable cut, demonstrations of agroforestry and community forestry, rehabilitation of degraded forest areas and training related to income-generating activities. Timber harvesting is carried out under a selective felling regime, with adoption of reduced impact logging practices. Skidding is mainly done using elephants, thereby minimizing environmental damage. The Forest Department is responsible for protection, conservation and sustainable management, while the Myanma Timber Enterprise is responsible for timber harvesting, milling, downstream processing and marketing. Model forest partnership groups are involved in decision making. Their leadership role is significant — as is demonstrated by the active participation of local communities in model forest activities.

Badaharamal Community Forest

Location: *Badaharamal, Siraha, Nepal*

Area: *235 hectares*

Managing entity: *Badaharamal Community Forest User Group*

Management objective: *Forest protection, multiple use*

The Badaharamal Community Forest User Group manages this forest using systematic coupe harvesting based on resource inventories and verified growth rates. Since management responsibilities were handed to the group, the condition of the forest — including levels of biodiversity and its contribution to flood control — has improved.

Basanta–Hariyali Community Forest

Location: *Basanta–Hariyali, Dang, Nepal*

Area: *141 hectares*

Managing entity: *Basanta–Hariyali Community Forest User Group*

Management objective: *Multiple use, sustainable livelihoods*

Community participation in forest management is the key aspect in the Basanta–Hariyali Community Forest. Every household knows the plans for forest use and is aware of all forest-related activities. With the active participation of women, the Forest User Group has improved the quality of the forest stands. The community now has readily accessible forest products and has generated funds for community buildings, roads and other community development activities. These include initiatives such as literacy classes for women, which have led to increased participation by women in village decision making.

Bharkhore Forest

Location: *Bharkhore, Parbat, Nepal*

Area: *57 hectares*

Managing entity: *Bharkhore Community Forest User Group*

Management objective: *Soil and water conservation, sustainable livelihoods*

The Bharkhore Forest User Group applies a wide range of silvicultural operations through the adoption of a learning cycle and experiments to study growth and yield. There is a high level of participation among all users, who have developed a strong coordination system among themselves and with other user groups. This Forest User Group has earned about US$25 000 over the past six years. Management has been so successful that their systems have been copied by neighbouring Forest User Groups.

Bhitteri Community Forest

Location:	*Bhitteri, Dolakha, Nepal*
Area:	*378 hectares*
Managing entity:	*Bhitteri Community Forest User Group*
Management objective:	*Multiple use, sustainable livelihoods*

Management of the Bhitteri Community Forest includes the commercial harvesting of non-timber forest products such as medicinal plants, argeli (*Edgeworthia gardeneri*) and lokta (*Daphne* spp.), both being shrubs that produce fibre for high-value hand-made paper. The forest management plan is based on detailed surveys and resource assessments and incorporate modern and traditional management techniques such as zonation and site-specific prescriptions. The communities have successfully afforested considerable areas utilizing mainly blue pine (*Pinus wallichiana*) and argeli shrubs. The Forest User Group contributes to a number of non-forestry issues such as financial support for schools, trail improvements and bridge construction. These activities are funded by the profits generated from sales of non-timber forest products, as well as revenues from a cardamom enterprise and an argeli "white-skin" enterprise.

Gagankhola Community Forest

Location:	*Gagankhola, Siraha, Nepal*
Area:	*33 hectares*
Managing entity:	*Gagankhola Community Forest User Group*
Management objective:	*Soil and water conservation, sustainable livelihoods*

Gagankhola Community Forest has been used to revitalize Lal Pur Village in Siraha District. The community has taken steps to prevent flash floods by establishing plantations along the riverbanks, while at the same time gaining economic benefits by cultivating medicinal plants in the community forest. The Forest User Group also operates an herbal processing plant. Herbal farming in the forest started in 1997, initiated by *Save the Children*, a charitable aid agency, as a means of raising the standard of living for economically-crippled families in the village. Thirteen hectares of the community forest (about one-third) are allocated for herbal farming. Revenues from herbal farming have helped to provide clean drinking water facilities in the village.

Gurase Community Forest

Location:	*Gurase, Udayapur, Nepal*
Area:	*148 hectares*
Managing entity:	*Gurase Community Forest User Group*
Management objective:	*Multiple use, soil and water conservation, sustainable livelihoods*

The Gurase Community Forest User Group plans harvesting and management operations and generates community development funds by selling forest products. The Forest User Group promotes natural regeneration and has constructed a reservoir to provide water to forest areas.

Jadikausi Community Forest

Location:	*Humla, Nepal*
Area:	*2 142 hectares*
Managing entity:	*Jadikausi Community Forest User Group*
Management objective:	*Multiple use, sustainable livelihoods*

Jadikausi Community Forest is of global significance for conservation of rare plants and is managed by the local community as a primary source of livelihoods. The forest is managed to produce timber and high-value medicinal plants that provide sizeable revenues for the Forest User Group and to individual household incomes. The Forest User Group fund is used for innovative investments such as the establishment of a micro-hydropower plant for electricity, and benefits are distributed equitably. The community's forest management plan is based on detailed surveys and resource inventories, even for remote and difficult terrain.

Kankali Forest

Location:	*Kankali, Chitwan, Nepal*
Area:	*737 hectares*
Managing entity:	*Kankali Community Forest User Group*
Management objective:	*Sustainable livelihoods, biodiversity conservation, tourism*

The Kankali Forest User Group has an active role in forest management, ranging from fulfilling subsistence needs by harvesting forest resources to developing the forest for tourism related to the conservation and renovation of the Kankali Temple. The community has initiated many activities related to biodiversity conservation and has an increased focus on efficient utilization of non-timber forest products — including 294 species of medicinal and aromatic plants — for community development purposes.

Kumrose Community Forest

Location:	*Chitwan, Nepal*
Area:	*1 050 hectares*
Managing entity:	*Kumrose Community Forest User Group*
Management objective:	*Conservation, tourism*

Fifteen years ago, the land now covered by Kumrose Community Forest was mostly barren; the forest had been cleared by loggers and was under a government resettlement campaign. In the late 1980s, the community united to plant trees and to recreate the once lush jungles of the area. Today, the area generates significant revenues from tourists who visit for elephant rides and nature walks. Nearly 1 200 households in the vicinity benefit directly from the forest, which helps meet their fuelwood, timber, fodder and thatch needs. The forest also helps reduce the severity of floods, while attracting wildlife such as rhinoceros and tigers. Entry fees from tourists are used to fund conservation activities. The fences that demarcate the forest area from the village are regularly maintained and repaired, rhinoceros trenches are dug and money is invested in various development activities in Kumrose Village. Biogas plants have been installed in many households as an alternative source of energy, and villagers are encouraged to use less fuelwood from the forest. In 1995, Kumrose forest was registered as a community forest and it continues to operate according to the government's community forestry regulations. Decision making related to protection and management has been devolved to Forest User Groups set up by Village Development Committees.

Malati Community Forest

Location:	*Malati, Saptari, Nepal*
Area:	*80 hectares*
Managing entity:	*Malati Community Forest User Group*
Management objective:	*Multiple use, soil and erosion control*

In addition to increasing forest production and improving soil erosion control, community management of Malati Community Forest has also included the establishment of demonstration plots. Community management has increased income generated from the forest and has also promoted a livestock-based enterprise. Participatory decision making, with the active participation of women, has been institutionalized in the Forest User Group.

Pipledi Ban Community Forest

Location: *Mugu, Nepal*

Area: *124 hectares*

Managing entity: *Pipledi Forest User Group*

Management objective: *Sustainable timber production*

Pipledi Ban forest has been allocated to a Forest User Group as part of Nepal's community forestry programme. The Forest User Group has promoted forest regeneration in high-priority areas closest to the village. This has been accomplished with nominal support from District Forest Rangers and no direct support from foreign donors. The community takes its role as forest steward seriously, carefully protecting against wildfires, and conducting pruning and thinning operations. The community has also demonstrated its ability to work together to protect its forest from incursions by outside groups. The forest is managed primarily for timber production, but will soon shift to a multiple-use management strategy. A committee selected by local users manages the forest with assistance and oversight from District Forest Rangers.

Raktamala Community Forest

Location: *Raktamala, Saptari, Nepal*

Area: *590 hectares*

Managing entity: *Raktamala Community Forest User Group*

Management objective: *Soil and water conservation, sustainable livelihoods*

Sustainable forest management is carried out at Raktamala Community Forest with a focus on meeting community needs. Community management has resulted in a dramatic improvement in the condition of the forest, with tangible economic, ecological and social benefits. The local community regulates forest use by providing clearly defined annual yield estimates and recommendations for forest product harvesting.

Brooklands, Wangaro and Ruakiwi Forests

Location: *Waikato, New Zealand*

Area: *1 610 hectares*

Managing entity: *New Zealand Forestry Group*

Management objective: *Sustainable wood production*

The New Zealand Forestry Group has established plantations of radiata pine (*Pinus radiata*), applying up-to-date research findings through a carefully

controlled system. Initial growth rates have been strong and uniform with high survival rates — up to 100 percent in many planted areas. Planting and monitoring of growth using Quality Assurance Indicator Plots have proven invaluable in gauging the quality of establishment. This reliable gauge allows the identification of defects in early plantings for subsequent attention. Success has also been due to training of nursery and field staff in strict quality assurance procedures. The growth of tree stocks in supply nurseries is monitored carefully, and planting sites are prepared thoroughly with attention to pest control. During outplanting, care is taken to maintain the vigour of planting stocks by minimizing handling and exposure. Workers and supervisors who maintain high standards are paid incentive bonuses and are recognized with award certificates.

Esk, Gwavas, Kaweka, Mohaka and Tangoio Forests

Location:	*Hawke's Bay, New Zealand*
Area:	*43 100 hectares*
Managing entity:	*Pan Pac Forest Products Ltd.*
Management objective:	*Sustainable wood production (plantation)*

Pan Pac Forest Products has achieved Forest Stewardship Council certification of its forests, recognizing the company's excellent management systems. These include robust policies, procedures and plans, as well as operational control and review mechanisms for worker safety and health, forest productivity and environmental outcomes. The company has strong economic, social and environmental commitments to the people and resources of Hawke's Bay. Pan Pac plantations — totalling about 43 100 hectares, mostly of radiata pine — are managed mainly for timber production. Recreational opportunities and non-timber forest products are available to the wider community. The company maintains a high standard of environmental management and monitoring.

Flagstaff Forest and Ross Creek Forest

Location:	*Dunedin, Otago, New Zealand*
Area:	*1 290 hectares*
Managing entity:	*City Forests Ltd.*
Management objective:	*Multiple use, commercial, recreation, aesthetics*

Forest management planning at Flagstaff Forest and Ross Creek Forest is sensitive to many issues, including recreational demands, aesthetics, and historic and natural values. Operations are also highly sensitive to soil and water conditions, particularly since the soils of Flagstaff Forest are heavy clay and prone to compaction. Biodiversity is an important issue so the forests are maintained in a

complex mosaic of age classes, with a more diverse range of species than in most New Zealand commercial forests, while patches of indigenous forest are protected. City Forests operates environmental management systems to provide clarity of management purposes and the inclusion of community stakeholders into management planning, where social and environmental values are involved. For example, City Forests and the New Zealand Forest & Bird Society jointly encourage healthy indigenous forest regeneration. The high quality of management applied by City Forests has been recognized by Forest Stewardship Council certification.

Fletcher Challenge Forest Estate

Location:	*North Island, New Zealand*
Area:	*300 000 hectares*
Managing entity:	*Fletcher Challenge Forests*
Management objective:	*Sustainable wood production (plantations)*

Fletcher Challenge Forests' management has successfully encompassed a range of land tenures, including 132 joint venture forests on both Maori-owned and freehold land. The Fletcher forest estate encompasses 47 000 hectares of joint-venture forests and 181 000 hectares of forests established on crown lands. Each of these forests requires that specific contractual obligations and commitments be met, as well as managing to meet requisite environmental outcomes and to complement site conditions. The forests also provide recreational opportunities, community employment, habitat for flora and fauna and protection of archaeological sites. The principal species planted is radiata pine. The Fletcher Challenge Forests' estate has been the location for many planting trials and much research that has supported the development of plantation forest management in New Zealand. Application of research results has resulted in a high-quality forest estate that reflects tremendous advances in tree breeding, propagation and silvicultural practices.

Private Forest owned by Nick and Pat Seymour

Location:	*Wensleydale, Gisborne, New Zealand*
Area:	*170 hectares out of an 811-hectare property*
Managing entity:	*Nick and Pat Seymour*
Management objective:	*Multiple use, erosion control, pastoral farming, agroforestry*

The Seymour family practices a system of agroforestry using willows and poplars to control erosion, which complements pastoral farming and provides aesthetic benefits. Widely-spaced plantings stabilize erosion-prone mudstone soils and provide emergency forage for livestock during droughts. The family maintains

radiata pine plantations for both production and protection of water quality. They also manage 30 hectares of native forest reserves, set aside under a Queen Elizabeth II National Trust covenant to preserve habitats for indigenous flora and fauna.

Private Forest owned by Phillip and Robyn Holt

Location:	*Maraetara, Hawke's Bay, New Zealand*
Area:	*160-hectare production forest, 20 hectares for conservation, 960-hectare total property*
Managing entity:	*Phillip and Robyn Holt*
Management objective:	*Multiple use, conservation, livestock, recreation, plantations*

The Holt family closely integrates livestock farming and forestry. The family practices innovative planting and management of native trees and shrubs that demonstrates the economic viability of recreational planting and sustainable management of indigenous forests. The family's forest plantation of radiata pine is managed to take account of land-use suitability, as well as to provide financial returns. Goats are introduced into these plantations once the bark is hard enough to withstand their presence, usually when the trees are eight years old. The goats help to control weeds in the plantation, while the trees provide supplementary fodder. This innovative integration of plantations and livestock has the added environmental benefit of helping to minimize the use of chemical herbicides.

Rabbit Island Forest

Location:	*Nelson, New Zealand*
Area:	*1 100 hectares*
Managing entity:	*PF Olsen Ltd.*
Management objective:	*Sustainable wood production (plantation), recreation, protection*

Rabbit Island Forest is managed for wood production as well as providing strong recreational values. The forest is owned by local government and managed for multiple uses. Harvesting in the forest is carried out on a 30-year rotation. Rabbit Island encompasses a popular beach, which is visited by over 100 000 people each year. The forest greatly assists in protection from wind and sea erosion. Processed sewage has been sprayed on 500 hectares of the island's forests, excluding recreational, beach and local Maori tribal areas, and has improved tree growth.

Raumati Private Forest

Location: *Hawke's Bay, New Zealand*

Area: *450 hectares*

Managing entity: *Michael and Helen Halliday*

Management objective: *Sustainable wood production, conservation, fodder*

A part of Raumati farm-forest has been planted with willows to reclaim and stabilize excessively wet areas, while also doubling as emergency drought fodder for livestock. Since 1973, the Halliday family has systematically planted blocks of eroding land with radiata pine. The proceeds from the first radiata pine harvest have been used to fence all significant waterways on the farm, which has benefitted downstream water quality. Converting land that is least suitable for pastoral farming into forest has led to an intensification of livestock farming — 30 percent of the farm area has been reseeded with high-production pasture species during the last ten years.

South Eastern Ruahine River Management Scheme

Location: *Tararua, New Zealand*

Area: *452 hectares*

Managing entity: *Manawatu–Wanganui Regional Council*

Management objective: *Erosion control, habitat improvement*

The area covered by the South Eastern Ruahine River Management Scheme is managed to achieve diverse objectives working with multiple landowners. These objectives centre on "community benefit" over a large area. Specific benefits include reduced soil erosion, more stable river channel alignment, enhanced landscape values, shelter, improved water quality, a denitrification zone (an area of riparian vegetation that helps to remove nitrogen from waterways) and enhanced habitat for improving biodiversity. Erosion control of river channels and riparian zones is one of the primary management objectives. Planting of trees such as willows on the outer banks of the meandering river course, combined with permeable groynes, are key elements in meeting this objective.

Stoney Creek Soil Conservation Reserve

Location: *Wairarapa, New Zealand*

Area: *1 100 hectares*

Managing entity: *Wellington Regional Council*

Management objective: *Soil and watershed protection, recreation, education*

Reforestation at the Stoney Creek Soil Conservation Reserve has stabilized eroded lands significantly, particularly in gullies and streambeds. Erosion in this area resulted from clearing land for farming in the 1870s. Since the creation of the conservation reserve, all scrub and native remnant vegetation has been retained, while areas of pastureland have been planted with radiata pine. This has increased land stability by reducing the impacts of heavy rainfall and storm runoff. Slip margins have been seeded with lupins and grasses, and erosion debris in streambeds has been stabilized with willow and poplar poles. There are significant opportunities within the site for education on all aspects of soil and water conservation.

Stringer Farm Forest

Location: *Nelson, New Zealand*

Area: *108 hectares*

Managing entity: *Ian and Rachel Stringer*

Management objective: *Sustainable wood production (plantation)*

Stringer Farm Forest is managed to produce good clearwood timber, while maintaining environmental and safety standards. The main species planted is *Pinus radiata*, which is complemented by recent plantings of *Cupressus* and *Sequoia* species. The Stringer family plants the latest available genetic material to maximize production. Recently, oaks were planted in front of radiata pine blocks to minimize the visual "cliff effect" on the edge of pastureland. An area of natural forest has been conserved under a Queen Elizabeth II Trust covenant. The farm forest hosts various education and extension programmes for farm foresters and interested members of the public.

Weyerhaeuser Forests in Nelson and Marlborough

Location:	*Nelson and Marlborough, New Zealand*
Area:	*78 000 hectares*
Managing entity:	*Weyerhaeuser New Zealand Inc.*
Management objective:	*Sustainable wood production (plantation)*

Weyerhaeuser has a strong focus on sustainable management, balancing the requirements of industrial wood production with health, safety and environmental requirements and stakeholders' expectations. Managers are committed to an open management style, while at the same time implementing sophisticated management systems with a hierarchy of objectives, policies procedures and plans. Improvement committees allow stakeholders to have input into the direction of management. With this management structure and style, each operation follows a process that includes a commitment to achieving standards that often exceed legal requirements, consultation with people who may be affected by the operation, regular monitoring of environmental effects and careful management of native forest reserves and historic sites.

Woodhill Forest

Location:	*Auckland, New Zealand*
Area:	*9 890 hectares*
Managing entity:	*Carter Holt Harvey Ltd.*
Management objective:	*Sustainable wood production (plantation), recreation, education*

Woodhill Forest is managed for multiple objectives to meet the respective needs of its owner, the community of Auckland, and the environment. The forest is managed to provide a sustainable source of wood to sawmills in the local area. Carter Holt Harvey also generates income from alternative uses such as recreation and has begun to address future land ownership issues. Presently the government owns the land on which the forest stands, but ownership is expected to change in the future as a result of ownership claims by local Maori tribal groups. The company has worked successfully with new landowners in the past and the current process of meeting with local Maori has built a relationship of trust and understanding. The company has built an education centre to encourage students and community groups to learn about the history, wildlife, native plants, forest trees, social and environmental influences and commercial activities that occur in and around the forest. To address environmental interests of the local community, harvesting is controlled along the western edge of the forest which borders local farms. An important management goal is to prevent the drifting of sand dunes and, especially, to protect the nearby farmland from the threat of windblown sand covering pastures.

Batangan and Tayan Traditional Forests

Location:	*Batangan and Tayan, Mountain Province, Philippines*
Area:	*8 337 hectares*
Managing entity:	*Indigenous communities of Mountain Province*
Management objective:	*Sustainable resource use*

The indigenous communities within the Cordillera Mountain Range, in the northern part of Luzon, have a rich cultural heritage. Through experience and learning, the different tribal groups have developed management strategies to sustain their resources in a rugged mountainous environment. Common property ownership and management by families, clans and villages militates against land conversion, while community-initiated management practices have led to the establishment of pine plantations and the natural regeneration of pine and mossy vegetation. Strong indigenous socio-political institutions at the village level facilitate decision making and conflict resolution.

Buenavista Community Forest

Location:	*Barangay Buenavista, Bayombong, Philippines*
Area:	*3 000 hectares*
Managing entity:	*Local community/Department of Environment and Natural Resources*
Management objective:	*Rehabilitation, multiple use*

Barangay Buenavista is the site of the *Developing Tropical Forest Resources Through Community-Based Forest Management* project, supported by the International Tropical Timber Organization (ITTO) and the Philippine Department of Environment and Natural Resources (DENR). The entire community is involved in the development and management of the forest area. Securing land tenure has been a key to successful management. Degraded lands are developed into plantations and agroforestry farms. The community promotes natural regeneration to enhance biodiversity, and also development of non-timber forest products.

Buhisan Watershed Forest Reserve

Location:	*Cebu, Philippines*
Area:	*631 hectares*
Managing entity:	*Department of Environment and Natural Resources and Cebu City partners*
Management objective:	*Watershed management, recreation*

The Buhisan Watershed Forest Reserve is protected and managed to provide vegetative cover to sustain water yields and quality. The area is almost fully covered with mature forest plantation. Developing the reserve as an ecotourism destination is envisaged. Presently, transportation facilities to the area are adequate, and there are plans to construct facilities for outdoor recreation consistent with the ecology and biodiversity of the area. A viewing deck, campsites and butterfly farms are envisaged. Activities that are consistent with the sustainable management of the watershed will be developed to enhance the livelihoods of local people. These activities will alleviate the current harvesting of fuelwood from the reserve by local people.

Cienda San-Vicente Forests

Location:	*Baybay, Leyte, Philippines*
Area:	*2 236 hectares*
Managing entity:	*Cienda San-Vicente Farmers' Association*
Management objective:	*Watershed preservation and conservation*

The Cienda San-Vicente Farmers' Association manages this natural forest area under a Community-Based Forest Management Agreement, for conservation purposes. This is unusual given that the forest does not have protected-area status. However, because the community depends on the forest for irrigation water, a "no-felling" policy and other watershed protection measures such as reforestation with indigenous species and forest zonation have been implemented. The community is especially motivated to protect their forests because of the memory of a flashflood, in 1991, that killed 6 000 people in a neighbouring town. The community is able to manage this forest area for conservation because they have developed sustainable livelihoods that are not dependent on forest destruction. These livelihoods include marketing indigenous tree seedlings, ecotourism and providing hands-on training in forest ecology, taxonomy and phenology. Community members harvest wildings and seeds of trees, which are then raised in a community nursery for reforestation or for sale.

Martinez Gmelina and Mahogany Plantation

Location:	*Quezon, Philippines*
Area:	*35 hectares*
Managing entity:	*George Gilbert Martinez*
Management objective:	*Sustainable wood production*

This family-owned forest plantation is now 7 years old and fully established. It will be harvested when the plantation is 15 years old, in line with the forest plan. The forest plantation is maintained by hired labourers, who carry out pruning and silviculture and also patrol the perimeter of the plantation to protect against encroachment.

Mt. Pangasugan

Location:	*Mt. Pangasugan, Visca, Baybay, Leyte, Philippines*
Area:	*594 hectares*
Managing entity:	*Leyte State University*
Management objective:	*Protection, rehabilitation and education*

Primary forests at Mt. Pangasugan have been protected, and disturbed areas rehabilitated through the planting of indigenous trees and the development of agroforestry systems on hillside farms. There have also been efforts to preserve Mt. Pangasugan's biodiversity through the rehabilitation of *kaingin* (shifting cultivation) areas to create buffer zones, while also protecting water cycles and providing farmers with stable, improved incomes. These rehabilitation efforts have created habitats for several endangered animals such as the Philippine tarsier (*Tarsius syricta*), flying lemur (*Cynociphalus volans*) and Fischer's pygmy fruit bat (*Haplonycterus fischeri*). Management has been facilitated through:

- education and communication campaigns;
- the creation of field laboratory sites for instruction, research and extension; and
- field surveys and monitoring.

The university also coordinates management with local people and organizations.

SUDECOR Forest Concession

Location:	*Surigao del Sur Province, Philippines*
Area:	*75 671 hectares*
Managing entity:	*Surigao Development Corp.*
Management objective:	*Sustainable wood production*

SUDECOR has been implementing sound forest management and development practices for more than 40 years. The concessionaire maintains one of the best growing stocks of naturally regenerated dipterocarp forests in the Philippines. By closely adhering to prescribed forestry laws, rules and regulations, SUDECOR has been able to maintain a green mantle of tropical forest vegetation, which covers approximately 92 percent of the concession. The company has adapted to the 1992 government policy banning logging of old-growth forests, and has maintained profitability by harvesting well-stocked secondary forests, under careful silvicultural prescriptions. The concession was chosen as an experimental site for special foreign-assisted research projects during the last decade and has also hosted field observations and study tours.

Terani–San Isidro Community Forest

Location:	*Terani and San Isidro, Paranas, Samar, Philippines*
Area:	*6 500 hectares*
Managing entity:	*Katatapuran nga Pederasyon han Parag-uma ha Samar, Inc. (KAPPAS Inc.)*
Management objective:	*Multiple use (community forestry)*

In this upland forest region, where timber poaching and *kaingin* (shifting cultivation) farming are major sources of livelihood, KAPPAS, a local people's organization, has been awarded a government-sanctioned Community-Based Forest Management Agreement for the area. The agreement stipulates that protection, rehabilitation and conservation are to be key aspects of forest management. To these ends, KAPPAS coordinates with agencies such as the Department of Environment and Natural Resources (DENR) to implement four core components of the agreement:

- community capacity building and institutional strengthening to better implement sustainable resource management;
- alternative livelihood strategies such as developing rattan processing for furniture, and implementing new agroforestry practices;
- proactive resource management such as participatory inventories, assisted natural regeneration and nursery establishment; and
- building alliances and networks with relevant agencies.

Daegwallyeong Special Plantations

Location: *Gangwo-do, Republic of Korea*

Area: *Approximately 1 000 hectares*

Managing entity: *Pyeongchang National Forest Management Station*

Management objective: *Soil and watershed protection*

Daegwallyeong Special Plantations are located in the eastern mountains, where strong winds and snows prevail, and thus even grasses and shrubs have difficulty growing along ridges. However, these areas have been successfully planted with native firs, by using windbreak structures to protect seedlings. This has enabled the successful reforestation of this extremely harsh mountain environment.

Gwangneung Forest

Location: *Gwangneung, Gyeonggi-do, Republic of Korea*

Area: *2 340 hectares*

Managing entity: *National Arboretum*

Management objective: *Biodiversity conservation*

Since its establishment (in 1987) as the National Arboretum, Gwangneung Forest has been managed for *in-situ* and *ex-situ* conservation of genetic resources. The arboretum has been well managed with about half of the total forest area regenerated through plantations, yet it maintains a high level of biological diversity and is an important bird-watching destination. This forest has deep historical importance, having been designated as a Royal Forest in 1468 during the Yi Dynasty.

Jang-Seong Japanese Red Cedar and Hinoki Cypress Model Forest

Location: *Jeonranam-do, Republic of Korea*

Area: *Approximately 500 hectares*

Managing entity: *Seobu Regional Forest Office*

Management objective: *Sustainable timber production*

A pioneering forester, Mr Im Jong-Guk, established the Jang-Seong plantations over a period of 20 years, beginning in 1956. The forests are famous in Korea, and provide a model for management of Japanese red cedar and Hinoki cypress plantations. In recent years, a decline in the forest industry has seen most private forest owners reluctant to invest further in the forestry sector. In 2002, the Korean Government opted to purchase part of these forests and commissioned a group of forestry experts to craft a sustainable forest management plan.

Uljin Keumgang Pine Forest

Location:	*Uljin Keumgang, Republic of Korea*
Area:	*>1 000 hectares*
Managing entity:	*Uljin National Forest Management Station*
Management objective:	*Biodiversity conservation*

During the decades of colonial occupation and the Korean War, illegal felling and over-cutting were prevalent in Uljin Keumgang Pine Forest. However, the relative remoteness of the forest meant that it was less affected than many other areas. In 1982, the Korean Government formally recognized its value and moved to conserve its genetic resources. The average height of Uljin pine trees is 23 metres, with an average diameter at breast height of 38 centimetres. The average age of the trees is 150 years.

Unduryeong Economic Forest

Location:	*Unduryeong, Gangwon-do, Republic of Korea*
Area:	*1 000 hectares*
Managing entity:	*Hongcheon National Forest Management Station*
Management objective:	*Sustainable wood production, education*

Unduryeong Economic Forest contains 24 hectares of natural pine forest for timber production and cultural restoration, 123 hectares of coniferous plantation, 833 hectares of deciduous trees (170 hectares being plantation), and a 30-hectare seed orchard for *Betula platyphylla* and *Abies holophylla* Max. The area integrates natural deciduous trees with conifers and is being managed to produce large-diameter trees. The forests are being used for educational purposes with an emphasis on rehabilitation and silivicultural treatments to add economic value.

Forests managed by Chiang Rai Forestry Training Center

Location:	*Doi Nang Non, Pong Salee, Maelao Fang Sai, Phamae Kham-Mae Salong, Mae Chan Fang Sai, Chiang Rai Province, Thailand*
Area:	*160 000 hectares*
Managing entity:	*Chiang Rai Forestry Training Center*
Management objective:	*Watershed protection and sustainable production of non-timber forest products*

The management of these Northern Thailand forests focuses on watershed protection and sustainable harvesting of non-timber forest products. Bamboo is produced for income generation — young shoots are grown for food, while stems are used for handicrafts and construction materials. A rattan and bamboo extension programme focuses on management and sustainable use of undergrowth and climbing plants to provide cash incomes for villagers. These programmes integrate research, technology transfer, demonstration plots and extension. The various programmes are undertaken by working groups comprising staff of the training centre, community members and forestry officials.

Tung Yao Community Forest

Location:	*Tung Yao, Lumphun Province, Thailand*
Area:	*400 hectares*
Managing entity:	*Community forestry committee*
Management objective:	*Watershed conservation, biodiversity, non-timber forest products*

The local community has managed Tung Yao forest for more than 70 years. The forest area has been expanded and the quality and diversity of the forest have improved. The community forest committee has established rules for managing the forest. This work has been completed by the community without the assistance of any externally-funded project and without any initial support from the government or non-governmental organizations.

Vathe Conservation Area

Location:	*Vathe, Sanma Province, Vanuatu*
Area:	*4 000 hectares*
Managing entity:	*Matantas Community*
Management objective:	*Conservation and ecotourism*

The Vathe Conservation Area was managed initially by a conservation project funded by the South Pacific Regional Environment Program. Since the phasing out of funding, in 2001, the local community has managed the conservation area. The community has established a management committee to operate an ecotourism project. Ecotourism activities include construction of accommodation facilities and opening bush-trekking trails. The management committee is presently developing a management plan that will incorporate conservation measures with traditional practices such as hunting for bushmeat, gathering of non-timber forest products and the collection of fuelwood and building materials.

Thon Sau

Location:	*Thon Sau, Dak Lak Province, Viet Nam*
Area:	*850 hectares*
Managing entity:	*Eight households of the M'Nong ethnic group*
Management objective:	*Forest protection, sustainable livelihoods*

Thon Sau offers an innovative example of forest land allocation to household groups, based on new policies of the Vietnamese Government. The forest and forest land have been allocated to farmers for long-term (50 years) use. A participatory technology-development process has been initiated to identify community-based forest management options for improving livelihoods and forest protection. This process combines local and scientific knowledge to explore various options. Promising possibilities include:

- thinning and tending timber trees;
- collection of non-timber forest products; and
- intercropping *Dipterocarpus alatus* and *Hopea odorata* in degraded forests.

The central manager is the village forest management board, which represents the eight households. The board receives technical support from the Quang Tan State Forest Enterprise and the district agriculture and forestry extension station. The social forestry group of Tay Nguyen University plays an advisory role in determining forest land allocation and developing the forest management plan.

Forests of Luc Nam District

Location:	*Bac Giang Province, Viet Nam*
Area:	*>1 000 hectares*
Managing entity:	*Department of Agriculture and Rural Development and local people*
Management objective:	*Forest rehabilitation*

A number of forest owners in the Luc Nam District have chosen to plant *Castanopsis boisii* and *Alnus camus* because these are multipurpose species that require low financial input, but provide a relatively quick harvest of wood, fodder and fruit. Forest management throughout the District is based on assisted natural forest regeneration, with the participation of farmers and community members.

Dong Bu Forest

Location:	*Dong Bu, Vinh Phuc Province, Viet Nam*
Area:	*250 hectares*
Managing entity:	*Managing Board of Cooperative Dong Bu*
Management objective:	*Forest protection, sustainable livelihoods*

The management board for Dong Bu forest is well-organized and has established a strong relationship with local people. The board provides training to locals in forest cultivation and protection methods. After training, families are given rights to use the forest and land, but are also required to sign a forest protection commitment with local authorities. The authorities provide support to the families to ensure the forest is effectively managed.

Ba Ren Forestry Enterprise Forest Plots

Location:	*Forest Plots 264, 278, 313 and 334, Bo Track District, Quang Binh, Viet Nam*
Area:	*5 285 hectares*
Managing entity:	*Ba Ren Forestry Enterprise*
Management objective:	*Sustainable timber production*

Ba Ren Forestry Enterprise has developed a 35-year forest management plan for this concession, to outline a clear management path and to help protect the forest against illegal logging. The forests have been certified for land-use rights, mapped and clearly demarcated. The company has established a good relationship with local people, who are contracted for forest protection work.

Forest Plots 65 and 68: Ho Thac Ba, Ha Bac Province

Location:	*Ho Thac Ba, Ha Bac Province, Viet Nam*
Area:	*200 hectares*
Managing entity:	*Do Thap Forestry Service*
Management objective:	*Pulp plantation establishment, poverty alleviation*

Do Thap Forestry Service has established a successful pulp (*Acacia mangium*) and cinnamon (*Cinnamomum cassia*) plantation in a region with no land tenure conflicts. The business is profitable and it also contributes to poverty alleviation by employing local people. The company has a good relationship with local authorities and people.

Xuyen Moc Plantation

Location: *Xuyen Moc, Ba Ria Vung Tau Province, Viet Nam*

Area: *5 000 hectares*

Managing entity: *Xuyen Moc Forestry Enterprise*

Management objective: *Plantation establishment*

This mixed pulp and fruit tree plantation has been established on lands cleared long ago. There are no land tenure conflicts, and the company hires local people as much as possible. Local households are involved in forest protection, seed and seedling production, and planting operations. The company develops forest management plans through a participatory approach that also takes environmental issues into consideration.

Rao An and Nga Doi Forests

Location: *Rao An and Nga Doi, Ha Tinh Province, Viet Nam*

Area: *17 004 hectares*

Managing entity: *Huoung Son Forestry Service and Company*

Management objective: *Sustainable timber production, protection*

Rao An and Nga Doi Forests are well-mapped, with clear demarcation of boundaries. The Huoung Son Forestry Service and Company has full legal status and operates without conflicts with local communities. Wood production is stable and incomes are increasing. There is no illegal harvesting in the concession. The company takes a participatory approach to planning and decision making and uses a benefit-sharing mechanism to assist local people. Locals are also contracted to protect the forests from illegal logging and fires.

Dinh Lap Forest

Location:	*Dinh Lap, Lang Son, Viet Nam*
Area:	*7 000 hectares*
Managing entity:	*Dinh Lap Forestry Enterprise*
Management objective:	*Timber and resin production*

The land-use rights of Dinh Lap Forestry Enterprise are fully certified, and the concession has been mapped and demarcated in the field. The concession is a highly profitable timber and pine resin production enterprise. The company develops mid-term and long-term plans with clear objectives and actions using a participatory approach and takes into consideration market access and environmental protection. Local people are contracted to carry out forest protection, planting and seedling production.

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