



# CIFOR

**Science for Forests for People**

CENTER FOR INTERNATIONAL FORESTRY RESEARCH ANNUAL REPORT 1999

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### Forest Products and People

*China:* Research Institute of Subtropical Forestry, Chinese Academy of Forestry; *Indonesia:* Forest Products and Forestry Socioeconomic Research and Development Center, Centre for Social Forestry at Mulawarman University

### Research Impacts, Priorities and Capacity Evaluation

European Tropical Forestry Research Network, Asia Pacific Association of Forestry Research Institutes, CAB International, FAO, International Union of Forestry Research Organisations

### Policies, Technologies and Global Change

European Forest Institute, World Resources Institute, FAO, UNEP, World Bank, IUCN, WWF, various universities, multinational forest products corporations

**Cover** A man of minor royalty in Madagascar embraces a “sacred” tree he has selected to eventually provide the wood for his coffin.

1994 photo by Paul Spencer Sochaczewski

## Contents

2	<b>CIFOR at a Glance</b>
4	<b>Message from the Director General</b> Forestry Science As We Enter the New Millennium
5	<b>Message from the Director of Research</b> Adapting to Meet Strategic Research Needs
6	<b>1999 Highlights</b>
8	<b>Global and National Policy Influence</b> An Unexpected Downside of Frontier Agriculture Economic Crisis and Forest Clearing A Strong Voice for CIFOR in World Bank Policies Forests, Carbon Markets and Climate Change Mitigation Building a Record of Impact at CIFOR Knowledge to Aid Biodiversity Conservation Supporting Global Dialogue on Forest Issues Making Better Use of Forestry Assistance
14	<b>Scientific Knowledge and “Best Practices” for Sustainable Forests</b> Deeper Insight Into Forest Fires Good Prospects for Reduced-Impact Logging in Indonesia Degraded Forest Land: Recouping a Lost Resource Boosting Productivity of Tropical Plantations Exploring the Promise of Secondary Forests Managing Miombo Woodlands to Benefit African Communities Human Pressures, Biodiversity Loss
20	<b>Toward Improved Livelihoods and Local Management</b> Reducing the Guesswork in Forest Product Development Adaptive Co-Management and Devolution: Lessons From the Field Guarded Optimism About Common Resource Management Building Stronger Partners for Forestry Research
26	<b>Tools and Methodologies to Aid Forest Management</b> Kit for Building C&I Guidelines FLORES: A Dynamic Model for Forest and Land Use Decisions A Multidisciplinary Approach to Landscape Assessment Toward Integrated Ways of Managing Resources
30	<b>Building Regional Impact</b> Priority-Setting in Latin America Collaborative Problem-Solving in Sub-Saharan Africa Wide Network of Studies in Asia-Pacific Countries Bulungan Research Forest: Toward Model Practices
32	<b>Transforming CIFOR Into a Knowledge Organisation</b>
34	<b>Publications by CIFOR Staff and Partners</b>
37	<b>Financial Summary</b>
40	<b>CIFOR Staff</b>
41	<b>Board of Trustees</b>

CIFOR is a global knowledge organisation committed to enhancing the benefits of forests for people in the tropics.

# CIFOR

at a glance



- Established in 1993, CIFOR is the 16th and newest institute in the Consultative Group on International Agricultural Research (CGIAR), which works to end poverty and hunger in developing countries through science.
- CIFOR has headquarters in Bogor, Indonesia, and conducts research in the forests of more than two dozen countries in the tropics. There are regional offices in Belém, Brazil; Yaoundé, Cameroon; and Harare, Zimbabwe.
- Collaboration is crucial for CIFOR's broad reach and impact. Partners include national research institutes, universities, donor and development agencies, non-governmental organisations and other CGIAR centres.
- CIFOR research is interdisciplinary. The centre's internationally recruited staff of 60 scientists works to develop solutions to forest-related problems that integrate ecological, social and environmental concerns.
- CIFOR generates knowledge and tools to help policy makers, forest managers and others make sound decisions that safeguard the future of forests and the people who depend on them. The centre plays a central role in global dialogues on forests and environmental protection.
- People in forested areas benefit from CIFOR research designed to strengthen their role in the management of forests. Other research areas include sustainable forest management, tropical plantations,



rehabilitation of degraded forest land, biodiversity protection, non-timber forest products and underlying causes of deforestation.

- CIFOR's research impact can be felt in three broad categories: 1) a scientific underpinning to forest-related policies; 2) knowledge, tools and methodologies to aid forest management; and 3) improved well-being of and management participation by forest-dwelling people.

# Forestry Science As We Enter the New Millennium

## Message from the Director General



1999 was a historic year in Indonesia. Our host country became the world's third largest democracy; a new government took control, committed to eliminating the corruption and cronyism that not only had restricted the social development of the country but also was the root cause of the misuse of its forests. CIFOR welcomes these changes that will bring a liberal and progressive culture to the environment in which we work. But this progress has not come without cost. During the civil unrest associated with the democratisation process, three of our young Indonesian scientists working in the field in the Province of Aceh disappeared. Now, eight months later, we still have no reliable information on what happened to them, and hopes are fading for their safe return. We share the grief of their families at this tragic loss.

1999 was also an important year for forests. The work of the Intergovernmental Forum on Forests drew toward its climax. International opinion is converging around a vision of forests as having multiple functions, while the highly dichotomous views of the North and South are giving way to a mutual search for technical and institutional solutions at the national level. There is a growing recognition that a given area of forest can be managed to simultaneously meet the objectives of the IFF, the Convention on Biological Diversity, the Framework Convention on Climate Change and perhaps even the Convention to Combat Desertification. The Global Environment Facility has shown an awareness of the need to manage forests to provide for multiple functions. CIFOR contributed to these and other international policy-making processes by preparing a number of major papers. Moreover, a study we produced late in 1998 on the potential of using the World Heritage Convention as a mechanism for conserving biodiversity in forests led the UN Foundation to award a \$45 million grant to the World Heritage Convention Secretariat.

CIFOR's activities elsewhere in the world progressed well in 1999. Our office hosted by EMBRAPA at Belém in the Brazilian Amazon was the venue for a Board meeting, where staff and trustees got to know our Brazilian colleagues and we jointly reviewed our emerging research agenda in the region. Valuable results are emerging from studies of secondary forest management and improved silviculture, and CIFOR will initiate additional activities in Belém in the coming months.

In Africa our outposts in Harare and Yaoundé had good years. Although we have few staff members based at these locations, they are facilitating a considerable number of activities by our programmes, notably Adaptive Co-Management, Underlying Causes of Deforestation and Forest Products and People. We are grateful to our hosts, the International Institute for Tropical Agriculture in Yaoundé and the Institute for Environmental Studies at the University of Zimbabwe, for their hospitality. Our Biodiversity Conservation and Sustainable Forest Management Programmes will expand their activities in Africa next year.

Among the high-value products we produced in 1999, the Criteria and Indicators *Tool Box* has been widely acclaimed. It enables users to devise C&I tailor-made for any forest. The *Tool Box* marks a major conceptual breakthrough from the days when C&I were generated with a view to widespread and uniform application. CIFOR rejects this "one size fits all" view of forestry. We see sustainability as a matter of social choice and believe forests can be managed sustainably in a variety of ways that provide any balance of goods and services society chooses to derive.

A significant achievement in 1999 was having three areas of our research recognised by the journal *Science*. Douglas Sheil authored a paper attacking the myth that species counts represent a valid measure of the

value of biodiversity. A news article described the work of David Kaimowitz and Arild Angelsen questioning the widely held assumption that agricultural intensification automatically relieves pressure to clear more forest. *Science* also accepted a commentary by Bruce Campbell and his colleagues in Africa on the weaknesses and strengths of community-based natural resource management approaches.

Our Plantations Programme published a number of major studies in 1999 on sustainability and diseases of tropical plantations. We also advanced our work to improve forest harvesting, with experiments on reduced-impact harvesting at Bulungan Research Forest in East Kalimantan yielding initial results. Overall, the volume of research at Bulungan grew considerably, and we can now claim to have a critical mass of scientific activity in the field.

Meanwhile, the Consultative Group on International Agricultural Research renewed its interest in realigning its research programmes around integrated natural resource management approaches. CIFOR aided this dialogue by organising a system-wide meeting of INRM specialists in Holland in September. There is now wide acceptance within the CGIAR that crop improvement research must be integrated into its broader natural resource context and that managing for environmental outcomes is as important as managing for commodity crops.

We enter the new millenium with a strong scientific team and an excellent network of scientific partners in more than 40 countries. Our facilities in Bogor are excellent, and a renewed spirit of optimism pervades our host country. We have the resources and the opportunity to redouble our efforts to provide the science needed to sustain forests and forest-dependent people into the future.

*Professor Jeffrey A. Sayer*

# Adapting to Meet Strategic Research Needs

## Message from the Director of Research



If CIFOR were a forest, 1999 would have been the year of large-scale assisted natural regeneration. The departure of former Deputy Director General Dennis Dykstra and several senior scientists left large gaps that were only partially filled in 1999. But, just as regeneration generally occurs in gaps of a certain size, so has the process of regeneration begun in CIFOR's Research Division.

CIFOR's brief history has been marked by steady change and improvement. As CIFOR has grown, it has matured as an institution; a number of activities in 1999 represented a continuation of that maturation process. An influx of many new staff members and a number of process changes in 1999 have redirected the way in which research at CIFOR is planned, managed and reported.

In August we held a series of staff-wide reviews to aid in preparing proposals for the year 2000 Programme of Work and Budget. The meetings identified strategic, priority research topics deemed worthy of support from CIFOR's unrestricted collaborative research funds. In this first programme review of its kind at CIFOR, the proposals were written in summary form and distributed for comment by the full scientific staff, proving an opportunity for peer review of concepts and proposed plans.

In September tragedy struck when three CIFOR researchers were kidnapped in Indonesia's Aceh province. Their disappearance is a terrible loss, and we commiserate with their families.

In October during a week-long retreat in Ubud, Bali, the scientific staff identified ways of enhancing interdisciplinary research and proposed steps for reaching a better common understanding of research at CIFOR. A process that was suggested to help achieve a shared vision was devising a conceptual framework of research needs and CIFOR's niche, based on the centre's Strategic Plan. Development of a conceptual framework of forestry-related problems was initiated in November and will continue in the year 2000.

Bulungan Research Forest provides a unique opportunity for CIFOR's research programme to vertically integrate research to solve important problems at the forest frontier. Constraints that limit sustainable forest management in East Kalimantan, Indonesia, range from insufficient training of chain saw operators to conflicts between local stakeholders to national policies that encourage inefficient forest management practices. The Bulungan Research Forest Working Group met at the Malinau logging concession site in December to consider how the existing funding sources can address selected problems and what changes in the research infrastructure are needed.

The process of change at CIFOR in 1999 led to some shifts in research emphasis within programmes as assumptions that underpin the selection of research projects were re-examined. The challenge in 2000 will be to consolidate these processes of change.

*Dr. Ken MacDicken*

# 1999 Highlights

A pioneering project to develop performance indicators for sustainable forest management achieved a milestone with publication of the *Criteria and Indicators Tool Box*. The kit helps users build customised sets of C&I for measuring conditions that indicate whether a forest is likely to survive for the long term.

CIFOR research showed that increased agricultural productivity does not always discourage farmers in developing countries from cutting down more trees for shifting cultivation, as many experts believe. In fact, technological advances often increase deforestation by making farming on marginal lands more profitable.

A simulation tool to aid forest and land use management moved from concept to an operational prototype in January. Once completed, the Forest Land Oriented Resource Envisioning System (FLORES) will aid real-life decisions involving interactions between forests, agricultural land and communities.

Field work gathered momentum at Bulungan Research Forest in East Kalimantan, Indonesia, where a new base camp and other facilities improved conditions for research. Studies at the site by CIFOR and numerous partners are aimed at developing model practices for sustainable forest management.

CIFOR's analysis of the effects of the economic crisis in Indonesia on people in rural communities and the country's forests was posted on CIFOR's Web site and updated regularly. The research reports were read by policy makers, government officials, analysts and journalists during a period of sweeping economic and political changes.

Beefed-up "cyberspace" capabilities greatly improved communication between CIFOR scientists and their collaborators around the world. The centre's Web site began a facelift, and the launch of IntraCIFOR now provides an easy to use, centralised source of internal information.

At a September meeting in the Netherlands, CIFOR played a central role in discussions within the Consultative Group on International Agricultural Research on how to increase emphasis in research on integrated natural resource management.

The Forest Products and People Programme completed initial trials of a promising analytic technique to better determine whether certain non-timber forest products in tropical countries are good prospects for commercialisation.

CIFOR scientists contributed extensively to a review by the World Bank of its 1991 policy on forests. Ensuing Bank policies are likely to reflect greater awareness of how lending and development activities can unintentionally lead to greater deforestation.





Initial work to draft a strategic plan for CIFOR research in sub-Saharan Africa got underway. Due in 2000, the plan will spell out areas in which CIFOR expects to boost its assistance to Africa's forestry research community to help the continent meet pressing development needs.

Because most methods of biodiversity assessment ignore the needs and values of forest-dwelling people, CIFOR launched a pilot project to investigate a more broad-based approach.

At "Indonesia Day" in September, held in conjunction with a Board meeting, CIFOR briefed Indonesian officials and international donors on the impact of the centre's extensive research in its host country. Representatives of many partner research organisations in Indonesia also attended.

CIFOR and the International Union of Forest Research Organisations appealed to the Global Environment Facility to include logged forests in its support for biodiversity protection. Because only about 10 percent of all forests will be set aside for conservation, protecting biodiversity in the remaining 90 percent is crucial, CIFOR argues.

To herald the new millennium, CIFOR sponsored a calendar art competition among children in several countries where it does research. The drawings depicting "My Vision of the Forest" included an outstanding entry (shown here) by Xie Chao from China that was printed as CIFOR's new corporate poster.

Team-building among the scientific staff was strengthened at a September retreat in Ubud, Bali. Follow-up initiatives were planned to promote more interdisciplinary research and better common understanding of research at CIFOR.

The impact assessment programme began its first case study: an evaluation of the effects of CIFOR's criteria and indicators project.



During a Board meeting in Belém in June, CIFOR revitalised its cooperation with Brazil's national agency for agricultural research, EMBRAPA. More joint research is planned to address problems facing the Amazon, the world's largest remaining stretch of tropical rainforest.

The Adaptive Co-Management Programme brought together veterans of community forestry projects in several countries to seek ways of strengthening shared learning in ACM methods now being developed.

# Global and National Policy Influence



## An Unexpected Downside of Frontier Agriculture

Agricultural progress is a cornerstone of social and economic development in most tropical countries. Yet ground-breaking research by two CIFOR economists points out the danger of assuming that increased agricultural productivity will discourage farmers in developing countries from cutting down more trees for shifting cultivation, as many experts have assumed.

Based on case studies from around the world, Arild Angelsen and David Kaimowitz show that agricultural progress often increases deforestation by making farming on marginal lands more profitable. The introduction of better soybean varieties and mechanised production in southern Brazil, for example, led to a shift from more environmentally benign coffee production to large-scale soybean farming. Forest cover declined as a result. Similarly, tse-tse fly control efforts in Ethiopia have opened large areas to farming, sometimes at the loss of natural vegetation.

These and other case studies were examined at a 1999 meeting in Costa Rica sponsored by CIFOR and the Tropical Agricultural Centre for Research and Higher Education (CATIE), with major funding from Norway. The CIFOR scientists used the case studies and additional analysis to sort out the conditions that determine whether technological advances in agriculture are good or bad for forests. Key factors include the kind of technologies introduced, the

availability of local labour and whether the farm products are bound for domestic or global markets. The findings indicate that labour-saving and capital-intensive technologies are more likely to spur forest clearing than production systems requiring a large work force.

These findings relate specifically to technological progress in “frontier” farming – that is, on land adjacent to forests. In contrast, boosting the productivity of land already under intensive cultivation is likely to be benign, the CIFOR researchers concluded. A book due in 2000 will aid wide dissemination of this important work. Dr. Angelsen cautions: “It’s important to recognise that there may be trade-offs between poverty reduction and forest conservation goals unless countervailing measures are taken into account.”

In a 12 November news report in the journal *Science*, World Bank senior environmental adviser John Spears called this research “extraordinarily valuable”, adding that the Bank was taking the findings into account in its policies to insure forest protection.

## Economic Crisis and Forest Clearing

CIFOR research in two countries, Cameroon and Indonesia, offers an interesting look at how major economic crises can inadvertently spur deforestation. The results of this authoritative work have been widely consulted by government officials, policy makers and analysts in the two countries, as well as international donor and development programmes.

“The World Bank should acknowledge many situations are not ‘win-win’, help analyse the trade-offs and encourage debate on the appropriate balance between conflicting objectives.”

*CIFOR Report on Non-Sector Policies That Affect Forests*





The research in Cameroon focuses on the effects of economic turbulence resulting from an oil boom collapse in the mid-1980s and the loss of foreign exchange earnings from oil, cocoa and coffee. Studies led by CIFOR's William Sunderlin and his colleague Jacques Pokam showed that as urban incomes fell drastically, many city dwellers moved to the countryside to seek a livelihood from forest land and resources; others who had migrated to cities also returned home. As village populations grew more rapidly after 1986, households chopped down more trees to grow food, which also helped compensate for lower earnings from cocoa and coffee.

Related research by Ousseynou Ndoye and David Kaimowitz found that increased logging, extraction of fuelwood and collection of non-timber forest products have further degraded Cameroon's forests. A currency devaluation in 1994 encouraged a rise in these forest-based activities. Families partially compensated for lower incomes from tree crops by selling more fuelwood and non-timber forest products.

Results from these and related field studies support satellite imagery showing a dramatic loss of forest cover in Cameroon since the end of the oil boom and the introduction of corrective economic measures.

Better awareness of these links should help avert further loss of the nation's forests. Researchers from national and regional forestry institutions in Cameroon have been key partners in this research, better ensuring that the findings will be incorporated into policies and planning. Major funding for this work came from the UK's Department for International Development and the Central African Regional Program for the Environment (CARPE), supported by the U.S. Agency for International Development.

In Indonesia, an economic crisis that struck in 1997 gave scientists at CIFOR an opportunity to study first-hand the effects on the nation's forests and the people who inhabit them. Although no time-series satellite imagery data are available to compare pre- and post-crisis levels of forest cover, evidence from extensive field studies suggests that substantially more forest was cleared in the second year of the crisis (1998-99) compared with the year before the crisis began.

The initial phase of this research, completed in 1999, looked at how the crisis affected forest-based people and related patterns of farming and land use. CIFOR researchers interviewed households in 30 villages of six

outer island provinces of Indonesia about 18 months after the crisis began. Even though analysts had predicted that agriculture would cushion the blow of the economic crisis for rural Indonesians outside of crowded Java, the surveys showed that most of those interviewed were worse off during the second year of the crisis compared with their economic status in the year before *krisis moneter* (*krismon*) began.

The research, led by William Sunderlin, Ida Aju Pradnja Resosudarmo and Arild Angelsen, showed that the country's forests suffered from this decline in family incomes and welfare. Almost a third of the households in the CIFOR survey who reported being worse off during the crisis said they had expanded their area of cultivated land. As an added pressure, about 17 percent of those who said they were better off during the crisis – in large part because of income from export crops – said they had used increased earnings to buy additional land. The World Bank and the MacArthur Foundation, in arrangement with Centre for Strategic and International Studies in Jakarta, were the chief funders of this research.

Two additional studies sponsored by CIFOR provided insight into large-scale land use changes that have significantly altered Indonesia's forest landscape in recent years. Chris Barr, in an analysis done jointly with the World Wide Fund for Nature, showed how the commercial timber sector – a prime agent of forest degradation in recent years – has shifted its focus from the production of plywood to supplying raw material to a greatly expanded pulp and paper industry. One notable effect, compounded by the economic crisis, has been an acceleration of illegal logging. Meanwhile, Anne Casson examined the spread of oil palm estates that has caused rapid and widespread forest clearing in many regions of Indonesia. She found that the expansion slowed during the economic crisis, but the industry is poised for further growth down the road. With these trends apparently set to continue, CIFOR analysts and others warn that the demands on the nation's forests from commercial interests is reaching increasingly unsustainable levels.

## A Strong Voice for CIFOR in World Bank Policies

CIFOR provided considerable input into the World Bank's newest forest-related policies, which are likely to reflect a greater awareness of how lending and development activities can lead unintentionally but dramatically to increased deforestation.

When the Bank adopted a major strategy on forests in 1991, it vowed to take a multi-sectoral approach reflecting indirect causes of forest loss and degradation. But, as the Bank itself acknowledged, that did not happen. A review of the plan, concluded in 1999, follows the most comprehensive analysis of its forest-related activities the Bank has ever undertaken. In the review process and preparations to draft a new forest strategy, the World Bank sought CIFOR's expertise through several channels – a reflection of the centre's highly respected work in analysing underlying causes of deforestation.

William Sunderlin, David Kaimowitz, Arild Angelsen, Mafa Chipeta and Godwin Kowero participated in consultative meetings involving experts in the international forestry community. They provided critical insight on forest-related poverty, community forestry, carbon trading prospects and sustainable forest management. Experience from CIFOR's considerable research in Southern Africa helped reorient the Bank from a focus exclusively on rain forests to one that encompasses dry forests and woodlands, which are a critical part of the equation because they support the livelihood of many rural communities in Africa and elsewhere.

Also at the Bank's request, CIFOR prepared an analytical report in 1999 describing extra-sectoral factors that influence forests and forest-dependent people. It summarises what is known about forest-related effects of macroeconomic policies, agriculture and land tenure, transportation, energy and mining, lending and investment. The report further recommends "best practices" for Bank activities in these areas.

CIFOR was also asked to review case studies of forest developments in Brazil, Cameroon and Indonesia, where CIFOR has well-grounded research projects. The Indonesia analysis pointed out, for example, how World Bank attempts to promote oil palm development has increased pressure on forests. In the case of Cameroon, CIFOR concluded, among other things, that the Bank's forest policy reform efforts had failed largely because the Bank promoted its own agenda while giving short shrift to domestic concerns and debate.

## Forests, Carbon Markets and Climate Change Mitigation

Under the Kyoto Protocol, the UN Framework Convention on Climate Change agreed in 1997 to include forestry and land use change as "sinks" or "sources" of greenhouse gas emissions. In line with this, forestry and land use change may be included in climate change mitigation projects under the Clean Development Mechanism that would allow developed countries to purchase carbon credits from selected land use and forestry projects in developing countries.

CIFOR has been engaged in policy work on projects that might be possible under the Clean Development Mechanism as well as in field research to better understand forest carbon dynamics and forest carbon accounting methods. Funding for this work has come from the United States and the Nature Conservancy.

In a study done in the Peruvian Amazon, Joyotee Smith and her co-investigators from Peru and the Imperial College London examined whether trade in forest carbon

could induce improved land use in slash-and-burn agriculture. They concluded that farmers place a high value on forest products, and that small-holder carbon projects may be more competitive with large-scale forest protection projects if the land use change allows sustainable management for forest products, rather than outright protection. Thus, including sustainable forest management as an option among the provisions of the Kyoto Protocol may increase the opportunity for small holders to competitively supply forest carbon services.

Predicting how carbon stocks will change over time in tropical forests is important in establishing baseline conditions for climate change mitigation projects. CIFOR conducted a field study in the plantation forest on its Bogor campus to calibrate a model known as CENW, developed originally for coniferous forests in Australia by the Commonwealth Scientific and Industrial Research Organisation. Although the calibration is not yet complete, early results indicate that CENW can be used in tropical mixed hardwood forests with moderate levels of data collection, allowing the prediction of carbon flows over time.



# Building a Record of Impact at CIFOR

Impact is the aim of any strategic research that strives to solve existing problems. But how can you insure it happens? That's the challenge for Mike Spilsbury, a scientist who seeks ways of incorporating the likelihood of impact into every major research project at CIFOR.

Achieving impact requires knowing the needs and capabilities of target beneficiaries, including how they acquire research results and apply them. Dr. Spilsbury helps staff researchers identify "impact pathways" – avenues to on-the-ground changes that will translate into improved forest management or a better quality of life for forest-dependent people. CIFOR's strong policy-level focus and broad range of user groups offer many opportunities for "uptake" of results and research impact. In the bigger picture, impact planning and assessment are part of a larger institutional process of priority setting and capacity building.

In 1999 this programme, which derives support from the United Kingdom through the Department for International Development, began its first case study: looking at the effects of CIFOR's criteria and indicators project. Surveys and interviews with hundreds of actual and potential users of the C&I are being done to determine positive response as well as limitations that may be hindering broader acceptance. Among the preliminary findings, users say they find the approach scientifically credible and well thought out, but more and better training is needed and the project should have closer ties with the private sector.

*"Most research is focused on developing the product. We need to learn from the private sector and put more effort into understanding the market for that product."*

*CIFOR Scientist Mike Spilsbury*



## Knowledge to Aid Biodiversity Conservation

CIFOR and the International Union of Forestry Research Organisations (IUFRO) collaborated in 1999 to provide managers of the Global Environment Facility (GEF) with suggestions on how that mechanism could – and should – be used to promote biodiversity conservation in timber-producing forests of developing countries.

In arguing for a broader and more realistic approach by the GEF, the authors point out that even ardent proponents of biodiversity protection assume only about 10 percent of forests will be set aside for parks and reserves. “Obviously the fate of much biodiversity will depend upon what happens to the residual 90 percent of the forest estate,” say the authors of the report, written by Robert C. Szaro of IUFRO and, at CIFOR, Jeffrey A. Sayer, Douglas Sheil, Laura Snook and Andy Gillison, with contributions from Grahame Applegate, John Poulsen and Robert Nasi. Production forests are a critical component of that large forest inventory. They harbour a considerable amount of the world’s plant and animal species. Yet they are not likely to be shut down any time soon because tropical countries are heavily dependent on them for national revenue and local economic development.

Regardless of setting, biodiversity protection entails social choices and fair allocation of costs and benefits, combined with appropriate incentives and regulatory measures. To achieve that, the authors explain, management approaches are needed that can reconcile the many competing values and interests that different groups have in relation to a given forest. The report suggests that the GEF can strengthen its species protection efforts by promoting better management of production forests. It appeals to the GEF to leverage its authority and resources toward halting ecologically destructive logging practices in tropical forests around the world.

In other work on global biodiversity issues, CIFOR assisted the Secretariat of the Convention on Biological Diversity in preparing a summary report on “Forest Biological Diversity: Status and Trends and Identification of Options for Conservation and Sustainable Use”. Meanwhile, a Biodiversity Convention sub-group drew on CIFOR’s work in developing criteria and indicators (C&I) for sustainable forest management as the foundation for drafting a “universal” set of biodiversity-related C&I.

## Supporting Global Dialogue on Forest Issues

In 1999 CIFOR again contributed its expertise to the United Nations Intergovernmental Forum on Forests (IFF), which is seeking

agreement on ways to implement the “Forest Principles” and “Agenda 21” adopted at the 1992 Earth Summit in Rio de Janeiro.

At the third session of the IFF, a discussion of how to improve research priorities benefited from CIFOR’s participation in an International Expert Consultation on Research and Information Systems in Forestry, which was held in 1998. Among a number of recommendations, the IFF urged that consideration be given to developing a global forest information service. On another topic, the IFF called for further study of the causes of deforestation outside the forest sector, including the impacts of poverty and the relationship with land tenure. This interest is particularly relevant to CIFOR because Underlying Causes of Deforestation is one of the centre’s core research programmes.

A discussion of traditional forest-based knowledge proved contentious because of concerns about the intellectual property rights of indigenous people. CIFOR reinforced its commitment to recognising traditional knowledge and drawing on it to complement modern scientific knowledge about forests. CIFOR and the U.N. Food and Agriculture Organisation (FAO) were given the task of preparing a briefing on possible approaches to identifying, collecting and recording traditional forest-based knowledge, in preparation for resuming the dialogue at the fourth IFF session early in 2000.

Besides participating in the discussions, CIFOR and the FAO worked closely with a dozen countries to prepare a study for the IFF titled “Outlook for Plantations”.

## Making Better Use of Forestry Assistance

Funding to the international forestry community totals an estimated US\$1 billion annually. Still, there are frequent pleas in international forums for additional money. Arguing that the assistance provided so far has not always been successful, CIFOR’s Assistant Director General Reidar Persson initiated an international dialogue in 1999 aimed at looking at how available resources might be used more effectively. “If we don’t find ways of improving the use of funds we have, we may soon see that the aid money going to forestry will decrease,” he observes.

In an overview paper on the issue, which incorporates comments from an extensive on-line review, he lays out problems in donor organisations and recipient countries that have led to the present situation. One key problem is that donors often drive the nature of aid projects. Recent studies by the World Bank and other agencies, for example, have shown there is generally little relationship between assistance and growth – mainly because assistance is often given for political reasons rather than in response to clearly identified needs. This dominance by donors also means there is often limited local “ownership” and political commitment by recipient countries.

Dr. Persson says much could be learned from past experience about what works and what does not in assistance programmes, and urges the international forestry community to better heed these lessons. He suggests a number of “best bets” to improve the situation in the short term. These include giving greater attention to local and national capacity building, strategic research and improved analysis of forest-related problems through the use of modern technologies and other means.

This work, supported by the Swedish International Development Cooperation Agency, has been discussed at meetings of the Intergovernmental Forum on Forests, the International Forestry Advisors Group and the European Tropical Forestry Advisors Group, among others, and is the basis for a major report to the International Union of Forest Research Organisations.

# Scientific Knowledge and “Best Practices” for Sustainable Forests

## Deeper Insight Into Forest Fires

The recent fires that have ravaged large parts of Indonesia have spurred widespread demands for action to tackle the problem. In 1999 CIFOR and a partner CGIAR institute also based in Bogor, the International Centre for Research in Agroforestry (ICRAF), launched a joint research project that is taking a dramatically different approach from most fire-fighting efforts.

The scientists are working to get at the heart of the problem: Who is setting the fires, and why? Pinpointing the underlying causes will better enable national and regional policy makers to draft regulations and land use reforms aimed at curbing major outbreaks of fire, which often spread out of control as they did in 1997-98 and earlier years.

Field work for this research, funded largely by the U.S. Forest Service and coordinated by CIFOR's Graham Applegate, began in 1999 at eight sites in Sumatra and Kalimantan – the two hardest-hit areas in the 1997-98 fires. The methodology combines social science research with remote sensing and GIS to provide a comprehensive analysis of the origins of the fires, people's motives for setting them, and the social and environmental impacts. Ten sites for the in-depth studies were selected to represent different forest types and land uses, socio-economic settings and other possible contributing factors to major fires such as the prevailing land tenure systems.

Initial results indicate that the problem is indeed complex and varies significantly from province to province. “The research shows that fire may be used as a helpful tool or as a weapon in different scenarios,” notes Rona Dennis, the remote sensing/GIS coordinator for the project.

At one of the sites in Sumatra, for example, the studies revealed deep-seated conflicts between local people and companies establishing industrial plantations and oil palm estates – tensions that have been exacerbated by inadequate policies for land use planning. The research documented incidents in which local people deliberately set fires to retaliate for the takeover of land previously used for agriculture. In West Kalimantan, one of the study sites lies within a national park, where local people have used fire for hundreds of years to burn away patches of swampy forest for fishing. But today, the research shows, a growing influx of people and the severe dry conditions associated with El Niño, among other things, have made fire outbreaks a major problem in the area.

The CIFOR-ICRAF work draws on the findings of complementary fire research projects by several other organisations. The scientists will eventually integrate the site-specific studies and the island-wide assessments to provide a solid foundation for government-oriented policy analysis and recommendations.

The work is especially timely and relevant for Indonesia as democratisation and a move toward devolution of power offer a window of opportunity for policy changes. Such information will also aid institutions such as the Association of South East Asian Nations, which has pledged to curb trans-boundary haze emanating from the recurrent forest fires.

The research is set to continue with additional funding from the European Union. Later stages will include training and technical assistance to strengthen Indonesia's ability to carry out fire-related research and analysis.



“Experts agree that the 1997/1998 forest conflagration in Indonesia was a global environmental catastrophe.”

*The Jakarta Post, 29 June 1999*



## Good Prospects for Reduced-Impact Logging in Indonesia

Preliminary results from recent experiments at Bulungan Research Forest are highly encouraging for officials in Indonesia who want to adopt more environmentally sensitive logging practices throughout the country's forests. According to a cost-benefit analysis by Hariyatno Dwiprabowo, reduced-impact logging techniques are less costly and less destructive in comparison with conventional harvesting. "Although the trial suggested there is still room for improvement, it is a very promising approach for adoption by concessionaires in Indonesia," he concluded.

Reduced-impact logging consists of timber extraction methods designed to reduce the major ecological damage often caused by conventional logging practices. Studies of reduced-impact logging elsewhere have demonstrated its viability and cost-effectiveness. Results can vary, however, according to local conditions. Therefore, the Indonesian government requested the experiments to test the feasibility of the approach for forests in Indonesia. Major support for the research was provided by the International Tropical Timber Organisation.

In the past, logging in the nation's forests has caused excessive damage to residual stands of trees and left large amounts of residue. Such damage can wreck the ecology and resilience of forests. It reduces wildlife habitats, contributes to erosion and increases the risk of damage from forest fires. Yet timber concessionaires in Indonesia have been concerned that the use of reduced-impact techniques would increase logging costs because of the need for better planning and supervision of harvests.

CIFOR's chief partner in the field trials was Inhutani II, a government timber concession; forest ecologist Plinio Sist supervised implementation of the reduced-logging techniques. The experiments, done in 100-hectare blocks, were designed to compare conventional logging with reduced-impact harvesting in regard to productivity, amount of residue left in the forest and logging costs, among other things. The cost assessment was based on operational or technical costs, mainly related to pre-harvest planning and the felling and skidding operations.

The preliminary study showed that, compared with conventional harvesting, the reduced-impact approach improved productivity. Although planning costs were higher because of the need for more accurate inventory and more intensive training, the additional costs were offset by the lower cost of felling and skidding operations resulting from increased productivity in a better planned operation. The reduced-impact harvesting methods also produced a significantly lower volume of log waste (logs not recovered) as a result of proper road layout and correct felling. This translates into more potential revenue for the company. Finally, site damage was reduced in the form of significantly fewer land openings caused by skid trails and log landings. The damage to remaining trees was also found to be less.

### Degraded Forest Land: Recouping a Lost Resource

In a major project funded by Japan, CIFOR and its research partners in several countries are seeking the best methods to rehabilitate degraded forests and accelerate natural regeneration in forests that have been logged.

Scientific knowledge in this area is limited, but crucially needed. Every year the world loses an estimated 17 million hectares of tropical forest. The problem is compounded by damage to remaining forests from the effects of logging, erosion, poor management and other causes. Returning this land to productivity will help replenish forest stock and provide environmental protection and other benefits.

Field trials have been underway since 1995 at sites in Argentina, Brazil, Indonesia, Papua New Guinea, Malaysia, Peru and Thailand to investigate a variety of corrective measures. The Japan Forestry and Forest Products Research Institute in Tsukuba is CIFOR's main partner in this project, which has been coordinated by Shigeyo Kobayashi. Despite the long-term nature of these studies, they are already providing much practical information that can aid forest rehabilitation efforts. To facilitate dissemination, the grant from the Japan International Cooperation Agency is also funding the creation of a related information and database network.

In November, more than three dozen researchers from participating sites met at CIFOR to present some of their interim results. Researchers from Mulawarman University in East Kalimantan, Indonesia,





reported on a number of experiments in mixed dipterocarp forests that have been logged and heavily burnt by wild fires. One approach is seeking to return the forest to its multi-purpose function through a *taungya* system, in which farmers grow cash crops such as cocoa, soya beans, coffee, corn and cassava among the newly planted trees. The research is investigating planting methods to optimise production, thereby ensuring local support for the technique, which has strong potential for adoption in other developing countries. Other Mulawarman scientists are studying, among other things, post-fire biological changes in various tree species and the effect on wood quality, and whether logging and fire exposure make the remaining trees in a debilitated forest more susceptible to diseases.

Also in this project, the Instituto Nacional de Investigacion Agraria in Peru is conducting trials in the Ucayali region of the Amazon to identify native tree species that will perform well in the re-vegetation of abandoned farm fields where the soil is poor. Similarly, government scientists in Papua New Guinea are seeking the best species for rehabilitation of logged-over forests at high and low altitudes, along with the best

planting techniques to optimise growth. And at a forest reserve in Jempol, Malaysia, researchers from Universiti Putra Malaysia are studying soil problems that have hindered the growth of young seedlings planted in logged-over lowland forests.

### **Boosting Productivity of Tropical Plantations**

Fast-growing tropical plantations are an attractive prospect for many tropical countries because they help meet the demand for wood while easing pressures on natural forests. They also offer a way to recapture the benefits of degraded land. Yet planted forests in many tropical countries fail to meet performance expectations because of poor soil, long-time erosion and other conditions. Short-rotation harvesting adds to the problem by leaching nutrients and accelerating soil degradation.

New knowledge emerging from a set of international experiments coordinated by CIFOR offers managers of tropical plantations a highly promising strategy for managing plantations to improve long-term soil fertility and productivity. Trials at 14 sites in seven countries are investigating optimal methods for recycling the organic residue that is usually removed during clear-cut logging, as a strategy to enrich the soil over successive harvests. A monograph

published in 1999 describes some of the initial findings from this unique research project, which began in 1995.

An important discovery so far is that the alternative soil enrichment treatments being tested appear to offer a more sound fertilising approach for plantations than residue burning – currently the most commonly used site preparation practice after clear-felling. Residue burning provides a “starter effect” on a new tree crop by releasing the nutrients of organic ground litter into the soil. But these research results show that such benefits are relatively short lived. In experiments comparing residue burning with residue-retention methods, researchers found that most of the nutrients supplied to the young trees through burning did not last long because of leaching. In some cases, the increased amount of nutrients fell to pre-burn levels within one to two years later.

Furthermore, at several of the experimental sites where soil fertility was quite low, retention of the organic residue at the highest level tested was shown to significantly improve tree growth over time. “Our research shows that the slow release of the same amount of nutrients by decay is a much more efficient approach [than residue burning] in terms of tree nutrition,” said Christian Cossalter, a silviculture specialist who is coordinating the experiments. The methods under investigation also have fewer environmental consequences in terms of reduced fire risk and preventing the release of additional carbon into the atmosphere.

The encouraging results so far have led plantation managers for at least two of the experimental sites, in Queensland, Australia, and the Congo, to incorporate the findings into present management practices.

### **Exploring the Promise of Secondary Forests**

A growing body of research suggests that secondary forests, which grow up where native forest has been cleared for farming or ranching, can offer many of the same benefits that primary forests provide – from non-timber forest products to environmental services. Therefore, encouraging frontier farmers to retain large segments of secondary forest rather than returning it to farm land after a fallow period as they are inclined to do could help increase forest cover in many tropical countries.

Incentives are needed to promote that option. CIFOR scientists Joyotee Smith and Cesar Sabogal are working to identify ways that farmers might derive greater benefits from retaining larger areas of secondary forest. CATIE in Costa Rica and national research organisations in Brazil, Peru and Nicaragua are key partners in this research, which is funded by the Inter-American Development Bank, the Spanish Agency for International Cooperation and PRODETAB, a programme of the World Bank and EMBRAPA in Brazil.

In 1999, the researchers advanced their development of a dynamic model to explain the cycle of slash-and-burn agricultural production and the role of secondary forests in this process. Understanding this cycle should suggest opportunities for intervention to encourage farming households to retain more secondary forest as part of their land holdings. Most secondary forest is used as fallow to enrich soil for later farming. It may also provide some products that add to the value of agricultural crops and improve the quality of life for small-scale farmers. But patches of secondary forest may be maintained on a more permanent basis for commercial non-timber forest products or for environmental benefits, such as protecting water supplies for cattle.

The scientists concluded that secondary forest management strategies should be part of an integrated strategy that simultaneously improves the management of farmers' other natural resources, such as agricultural land and residual primary forests. Different strategies will be required for older and newer settlement areas. In older areas, the usefulness of secondary forests needs to be maintained by reducing pressures for shorter fallows. In newer areas, policies and technologies are required to prevent further conversion of residual forest to agriculture and to maintain fallow areas as permanent secondary forest.

In their investigation of factors that influence the size and use of secondary forest, the researchers found that secondary forest area declines when population density increases, particularly when combined with declines in agricultural productivity. Extensive cattle ranching has a negative effect on the retention of both forest fallows and residual primary forest.

One promising option being explored to increase the value of residual forests is paying farmers for the value of the carbon stored in the trees, as proposed under the Kyoto Protocol. This scheme might induce farmers to remove older secondary forest fallows from the agricultural cycle and maintain them as permanent secondary forest.

## Managing Miombo Woodlands to Benefit African Communities

In southern Africa, CIFOR is working with local institutions to improve the management of miombo woodlands, the most extensive dry forest formation in the world. These forests, which are important to the livelihood of millions of people, face threats from conversion to cropland and the commercialisation of a wide range of forest products.

Through studies in Tanzania, Malawi and Zimbabwe, supported by the European Union and the Southern Africa Development Community, scientists are studying the effects of national policies on local forest use, as well as local governance structures. The policy analysis is important because patterns of forest use change significantly in response to policies on agricultural pricing, land resettlement and structural adjustment. Simulation models are being developed to aid the analysis.

Recent findings show trends of increased reliance on the woodlands that have serious implications for their survival. Government policies have reduced support for agriculture; this combined with high inflation and devaluation of the local currency has increased the cost of agricultural production. As farming became too costly and less profitable, people in the area turned instead to products of the forest to make a living. In a survey of six communities in Tanzania, the researchers found that farmers were deriving an astonishing 58 percent of their cash income from the sale of honey, charcoal, fuelwood and wild fruits from the forests. Honey was the most significant product of trade for all the villages. This poses concerns in relation to the surrounding forests because Tanzania's bee keepers traditionally make their hives from tree bark. Charcoal production, which was higher in peri-urban areas nearer to markets, provided more than a third of total cash income for households – an average of US\$445 per family per year. There is evidence that charcoal harvesting is causing rapid deforestation and degradation in some areas.

On the positive side, notes Godwin Kowero, the coordinator of the miombo woodlands project, the newly emerging trade in forest products has the potential to expand the basis for local enterprise development and diversified livelihoods. This could reduce reliance on agriculture – and related clearing of trees for land – as the only means of survival. In related studies of local institutions and governance systems in the three countries, the researchers have documented successes and failures in the management of common property systems.

In Tanzania, for example, some remarkable successes have been achieved with community forestry reserves. Given that these successes are more the exception

than the rule, the next phase of the project aims to identify factors that contribute to success. The project is also investigating low-impact industrial harvesting, with trials being conducted in Zambia.

## Human Pressures, Biodiversity Loss

At a nature reserve in southern India, scientists from CIFOR's Biodiversity Programme are collaborating in research designed to support the creation of effective conservation strategies that protect local endemic species without putting the park off limits to human use. The Ashoka Trust for Research in Ecology and the Environment (ATREE) in Bangalore and Tata Energy Research Institute in New Delhi are key partners in this work.

The research site is the 540-square kilometre Biligiri Rangaswamy Temple Wildlife Sanctuary. It lies within the Western Ghats, renowned as one of the world's "biodiversity hotspots". Human-related activities in the park – tourism, commercial development, human settlement (by both tribal and non-tribal people), agriculture, non-timber forest product extraction and cattle grazing – are on the rise, posing an ever growing threat to the area's wildlife and the forest. The project is quantifying changes in biodiversity and in forest structure and composition that are occurring as a result of these activities.

Another major disturbance is from invasive plant species. Some are being increasingly harvested, especially by poor people, for fuelwood, to be processed for furniture making and other uses. The researchers are investigating the mechanism of this invasiveness and the associated costs and benefits of invasives to biodiversity and people, as the basis for appropriate mitigation strategies.

In 1999, scientists from this project and related studies in the area began synthesising their research results on forest condition and use done at several scales: species, landscape and ecosystem. This data will be used to construct a "holistic" simulation model of the area so managers can better decide where to allow development and other land use to minimise negative environmental and social impacts. According to CIFOR-based Danish ecologist John Poulsen, the analysis has pointed out, among other things, critical "stress zones" where more intensive conservation efforts are needed.

This approach has potentially wide relevance for many other regional governments and forest departments in India, where surging populations and related pressures on natural resources are raising grave concerns about the fate of the country's notably rich biodiversity.



“The role of traditional institutions and values in natural forest management has been undermined by present socio-economic policies.”

*Miombo Woodlands Research Briefs, August 1999*

# Toward Improved Livelihoods and Local Management



## Reducing the Guesswork in Forest Product Development

An innovative analytic approach now being tested and refined by CIFOR's Forest Products and People Programme should help take some of the guesswork out of whether certain forest products are good candidates for development. The results were highly encouraging when partner scientists applied the technique in 1999 to a study of 12 cases of forest product development in several regions of Indonesia. More extensive trials of the approach are underway in this project, which is supported by the development agencies of Switzerland, Canada and the United Kingdom.

Many development agencies, NGOs and "green marketing" proponents advocate non-timber forest product commercialisation as a way to boost income for indigenous people while minimising lasting damage to the forest. Yet commercial success, and even environmentally friendly results, is far from guaranteed. Decisions are usually made based on information from individual case studies, which may not be widely relevant.

The new method, developed by Manuel Ruiz-Perez and Neil Byron, offers a more systematic way to determine what forest products are most promising for development interventions – and which may not be good investments. After selecting a diverse set of cases, researchers use a variety of analytic techniques to detect common patterns and identify key variables that correlate with the outcome of development efforts.

In the Indonesian case study analysis, the researchers found that success or failure was influenced by, among other things, whether the development occurred in remote or developed areas and whether the products were gathered in the wild or domesticated. The case of sandalwood (*cendana*) development in West Timor demonstrated dramatically how restrictive government regulations can backfire. The Government of Indonesia had imposed policies to encourage sustainable management of the resource; instead, they led to a virtual exhaustion of sandalwood in the region.

Information like this is needed to guide policies and management decisions on forest product development. Once fully developed, the approach should be applicable in other settings. In the next step, researchers are set to analyse 45 diverse case studies from Latin America, Africa and Asia.



## **Adaptive Co-Management and Devolution: Lessons From the Field**

A focus of research for the Adaptive Co-Management (ACM) Programme in 1999 was a process known as “shared learning”. CIFOR scientists who are working to develop methods and models for joint local management of forests think shared learning could be a powerful ingredient.

Shared learning means that diverse groups working to solve a problem benefit from exposure to the collective experience and alternative viewpoints that different participants bring to the task. This is highly relevant to the process of negotiating strategies for forest use and conservation, which often entails reconciling competing interests among different groups of users.



Hosted by the East-West Centre in Honolulu, Hawaii, CIFOR researchers and veterans of community forestry programmes in several countries met to discuss what conditions are needed for collaboration and shared learning to occur. The case studies of joint forest management in Cameroon, Canada, China, Nepal, Pakistan, Tanzania and Zimbabwe offered practical lessons that will be useful in devising effective ACM tools.

Experience from the different sites indicated, for example, that who takes on the role of facilitation can significantly affect the outcome. Another key factor is whether the groups involved in the process are viewed as legitimate. In Yunnan, China, field practitioners found that because group harmony is such a strong cultural trait in their country, informal, behind-the-scenes consensus-building made a difference in achieving collaboration. A book on the findings this work, which is being done by Louise Buck, Lini Wollenberg and David Edmunds, will be published in 2000.







At the same time, similar lessons for ACM development come from a newly completed review that looks at what is happening on the ground in six countries – China, India, Mexico, Nepal, Nicaragua and the Philippines – where the management of community forests has been decentralised. Among the findings, the CIFOR researchers found that devolution works best when strong civil society organisations already exist.

CIFOR interacts closely with forest communities to test the soundness of various techniques that may be incorporated into ACM approaches. In November, for example, dozens of people from 26 villages in and around Bulungan Research Forest were introduced to a social science technique known as participatory mapping. It offers a way to help people reach agreement on how they believe the surrounding forest and landscape should be used and managed to meet their long-term needs. The villagers named protected forests and clean water as top priorities, and expressed interest in working together to achieve that. Based on the response, further training in this area is planned.

Funding for this CIFOR programme comes from donors that include the International Agency for Agricultural Development, the Asian Development Bank, the development agencies of Canada and the United Kingdom, the International Tropical Timber Organisation and a CGIAR partner institution, the International Centre for Tropical Agriculture.

### **Guarded Optimism About Common Resource Management**

As a growing number of countries around the world shift control of forests and other natural resources to the local level, there is a pressing need for new management systems that can make that happen on the ground. A widely favoured approach is common property resource management. After taking a closer look, however, CIFOR scientists concluded that this concept has fallen far short of expectations and merits a more critical analysis if it is to be successful.

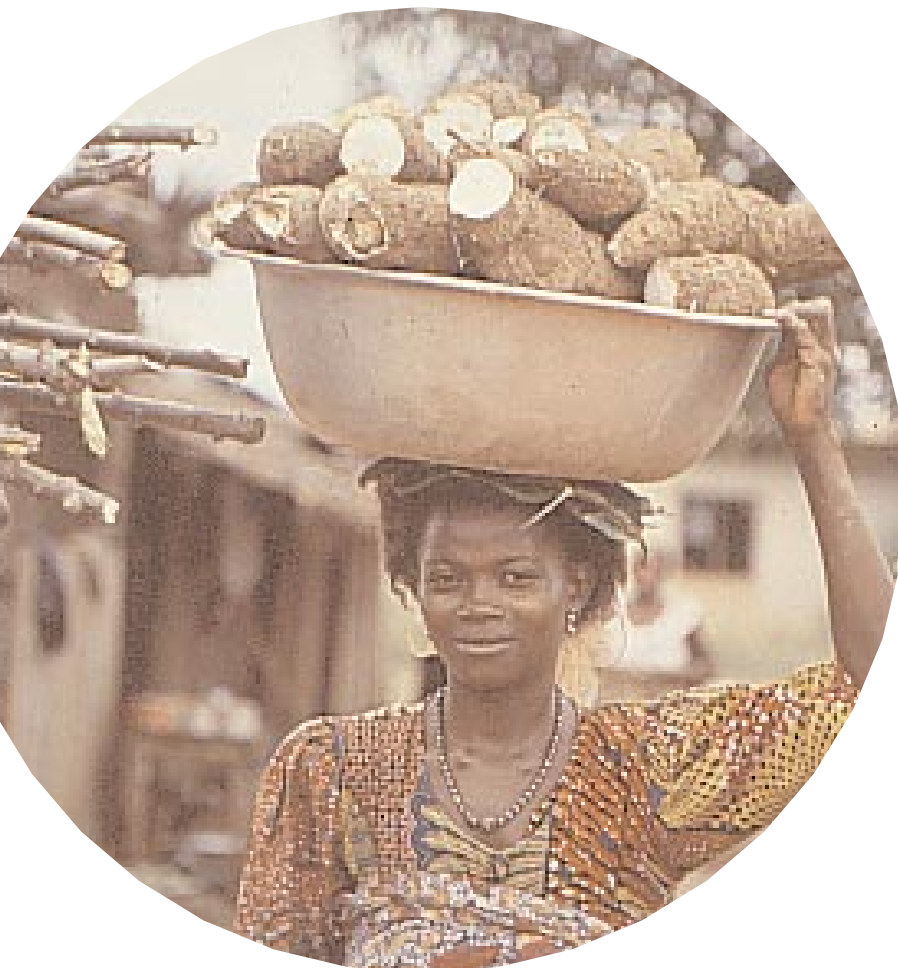


Bruce Campbell, Wil de Jong and their colleagues studied Communal Areas in Zimbabwe. These are made up of woodlands, grazing areas and other “pooled” resources that that are jointly used by the residents of a single village and, for some resources, by residents of neighbouring villages. But although rules exist that provide for collective management of these areas, the researchers found few instances where it worked in practice.

They identified a number of factors that have contributed to the failure of this approach to live up to the optimism surrounding it. The biggest problem is that most of the institutions charged with controlling woodland resources are weak. The researchers believe this situation exists because management schemes put in place to provide for community resource sharing and joint management are built on formal ideas about institutions; they fail to recognise the traditional methods of governance that predominate in African communities, which are based on informal rules and social norms.

Conflicting and non-supportive state policies compound the problem. The research in Zimbabwe revealed, for example, that although the government granted authority for collective control of resources at the local level, it subverted the system at the same time by reserving the right to give outsiders permits allowing access to the commons.

In this and similar work in other African countries, which has been funded by the Swiss Agency for Development and Cooperation and the U.K. Department for International Development, CIFOR scientists said they found few instances in which actual community management of joint resources was in effect. As such, they warn against over-selling the idea of common property resource management, and say a set of conditions (economic, social and ecological) needs to be in place if such management is to succeed. In addition, projects seeking to implement this approach will require an in-depth understanding of social processes within communities.





## Building Stronger Partners for Forestry Research

Capacity building is a two-way process that benefits both CIFOR and its research partners. CIFOR acquires important local insight and stronger collaborators; local scientists strengthen their ability to do forestry research that benefits their own countries and communities.

In 1999, CIFOR scientists specialising in non-timber forest product research embarked on joint research with researchers from the Centre for Social Forestry at the University of Mulawarman in East Kalimantan, Indonesia, and from a third institutional partner in Canada, the University of Manitoba's Centre for Earth Observation Science (CEOS). The scientists are using a variety of research approaches to determine how rapid social and political change and economic

development in the region are altering people's use of the surrounding forests, as the basis for possible policy interventions.

A young institution, Mulawarman's Centre for Social Forestry was established to design ways of improving community forest management in the region. Its mandate includes research and policy analysis, curriculum development and training, and extension and outreach. Research capability is the keystone on which to build these elements. "We feel that the best way to improve research capacity is to learn by doing research," says Brian Belcher, the team leader of CIFOR's Forest Products and People Programme.

The CEOS scientists, who are sponsored by the Canadian International Development Agency, have guided the local researchers in the use of technologies such as remote sensing, GIS and spatial analysis that

make it possible to "scale up" the findings from household and village surveys to the regional scale. In November, training organised by CIFOR helped the participants improve their ability to write effective scientific papers that meet the standards of international scientific journals. CIFOR is compiling the training materials for possible use in other settings.

Training like this is especially needed in Indonesia today. New forestry laws and a decentralisation of power requires skilled people who can produce authoritative information that local communities and government policy makers require to make sound decisions. The Mulawarman researchers are being sought out by a growing number of organisations working to address the interests of forest-based communities in Indonesia.

# Tools and Methodologies to Aid Forest Management



## Kit for Building C&I Guidelines

CIFOR's pioneering work in developing "criteria and indicators" for sustainable management of forests reached a milestone in 1999 with the publication of the *Criteria and Indicators Tool Box*. The computer-based kit offers step-by-step instructions for building sets of C&I that can be used in different types of forest settings.

Criteria and indicators are an innovative method for determining whether a forest is healthy and its management is sound, thereby indicating that its resource base is not likely to be permanently eroded. C&I measure a variety of conditions in relation to factors such as biological diversity, current management practices, and the quality of the soil, water and vegetation. Factors reflecting the social and economic well-being of indigenous people who inhabit the forest are also a critical element because these conditions influence whether local people use forest resources carefully or over-exploit them.

Criteria – or standards – are needed to indicate the desired conditions in these various categories; indicators are measures for judging whether those conditions are being met. What particular combination of C&I is suitable for measuring the conditions of any given forest varies according to different forest types and community priorities. The materials in the *Tool Box* guide users through the process of designing customised C&I.

C&I should work hand in hand with collaborative forest management approaches being developed by CIFOR's ACM Programme. ACM models will be "adaptive" rather than fixed; that is, adjustments in planning and implementation may be needed as circumstances change. C&I can aid this process by pointing out conditions that may hinder progress toward agreed-upon goals of sustainable forest use.

CIFOR's work in C&I development, which has been led by Ravi Prabhu and Carol Colfer, is helping to bring more consistency and agreement to the debate on what constitutes sustainable forest management. The issue is important not only for environmental reasons. Increasingly, consumers' willingness to buy forest-derived products and governments' decisions to allow timber companies to operate depends on whether the forests that various products came from are viewed as sustainable. Yet the Forest Stewardship Council, the International Timber Trade Organisation and many other organisations have established different criteria for sustainability.

In an earlier stage of this project, CIFOR took interdisciplinary teams of local and international experts to forests in Austria, Brazil, Cameroon, Cote d'Ivoire, Gabon, Germany, Indonesia and the United States. Their task was to evaluate whether individual C&I proposed by different groups seemed useful for judging whether the specific forests being analysed were sustainable. Additional studies on indicators for biodiversity and human well-being were also done.

“Ultimately, sustainability will only be achieved if the people and institutions concerned are prepared to act on the information they have and to seek continuous improvement.”

*CIFOR Scientist Ravi Prabhu*



“The harsh reality is that it is local, often poor, people who bear the cost of blanket biodiversity conservation programmes promoted by the West.”

*CIFOR Director General Jeffrey A. Sayer*



Despite the value-laden nature of the concept of sustainability, the results revealed a surprising level of general agreement about its main components. This allowed the team to identify six basic principles and about 25 criteria related to policy, ecology, social conditions and production that most experts felt were useful. These are the foundation of the *C&I Tool Box*. It is gradually being translated into several languages, and training workshops are widely in demand.

Key donors supporting this work have included the European Union, Deutsche Gesellschaft für Technische Zusammenarbeit GmbH, the African Timber Organisation, the Netherlands' Directorate General for International Cooperation, U.S. Agency for International Development, Ford Foundation, Swiss Development Corporation, MacArthur Foundation and Canada's International Development Research Centre.

### **FLORES: A Dynamic Model for Forest and Land Use Decisions**

CIFOR's project to develop a simulation tool for forest management and land use planning moved from the conceptual stage

to construction of an operational prototype in 1999. At an intensive week-long workshop in January, several dozen computer programmers, systems modellers, resource specialists and forestry experts met in Bukittinggi, North Sumatra, to construct a preliminary version of FLORES, the Forest Land Oriented Resource Envisioning System.

Once completed, FLORES will work somewhat like SimCity, the popular computer game in which users build an urban environment from the ground up. SimCity is a game, but FLORES is intended as a research and planning tool. By imitating real-life conditions and showing cause-and-effect relationships, it will enable a variety of people – from policy makers and resource managers to local farm organisations and villagers – to make better decisions about forest use and conservation. Where, for example, is the best place to locate a human settlement, carve out a park for wildlife conservation or expand farm land? If you upgrade a road, will it increase deforestation? Is present land use in a certain area causing unintended environmental damage, and if so, what is the best option for correcting the problem?

Because issues like these involve relationships between people and the landscape around them, FLORES will be dynamic and interactive. “We are not building a jigsaw where there is only one scenario and we can tell when we get it right,” says Dr. Jerry Vanclay, a systems modeller and forester who is coordinating the project. “We are building a mosaic, in which there are innumerable options, and groups of people who might be affected must decide on the ‘best’ solution.”

The University of Edinburgh's Institute of Ecological and Resource Management is a key partner in the project, which has received major funding from the UK's Department for International Development. Computer scientists from the university developed the original systems modelling package, known as AME, that is being used to create FLORES.

The hands-on session in January demonstrated that what the FLORES team is trying to do is technically feasible and suggested adaptations that were needed. The design team was set to meet in Zimbabwe early in 2000 for the next stage of development.

“If measures to improve yields of food crops and livestock are not based on a full understanding of the needs and options of the poor and do not take account the ecology of the systems being addressed, poverty will not be eradicated.”

*The Bilderberg Consensus*

## **A Multidisciplinary Approach to Landscape Assessment**

In tropical land use planning and management, what forests mean to the people who live there usually gets short shrift. As a result, local communities often suffer negative consequences from strategies for biodiversity protection, access to concessions, and other forest use and conservation. In 1999 CIFOR began a pilot project at Bulungan Research Forest that aims to turn this situation around by developing a new approach to biodiversity and landscape assessment that reflects the needs and preferences of forest-dependent people.

This exploratory work, headed by biologist Doug Sheil, is being done as part of broader studies funded by the International Tropical Forest Organisation. The results will contribute significantly to CIFOR's long-term research at Bulungan. Members of the survey team represent many disciplines, to insure that all the different values forests represent for communities are reflected in the evaluation. The project takes a landscape-scale approach because swidden agriculture, primary and secondary forests, rivers and other land and forest features are closely interrelated in providing communities' needs.

Guided by the residents of two Dayak villages, Paya Seturan and Long Rian, the researchers compiled a plot-based assessment of plants, animals, soil types, rivers and other aspects of the forest, and ranked these features according to the relative benefits they provided. Local people were found to value the forest most highly as a source of food – mainly meat, fish, sago and fruit – while plants for medicine and for crafts and building materials were also deemed important. “Insurance” was another highly valued benefit. Many people see the forest as a source of essential resources in the event of catastrophes such as crop failures – a major concern in this area where floods and droughts are frequent. Troublesome to many residents is

a perceived decline in the animals they hunt, as well as other forest products; for example, rattan has become scarcer in recent years. Concerns such as these are likely to grow as timber and coal companies and other outside interests gain control of more and more of the landscape.

## **Toward Integrated Ways of Managing Resources**

For nearly 30 years the CGIAR centres have been a powerful force in efforts to end poverty, feed hungry people and ensure long-term food security. Today, the complexity and growing interdependence of the world is forcing the CGIAR to rethink the way it does business. CIFOR has played a major role in promoting a shift away from the CGIAR's traditional emphasis on increased productivity of commodities and toward research that tackles development problems across ecosystems.

Support for such a change grew within the CGIAR over the past decade. But little follow-up occurred. A workshop in the Netherlands in September organised by the CGIAR Centre Directors Committee catalysed renewed commitment to pursuing a broad-based approach known as integrated natural resource management (INRM). CIFOR's Director General Jeffrey A. Sayer, chairman of the group's Committee on Sustainability and the Environment, headed the meeting, which was funded by the Netherlands and the UK's Department for International Development.

In a joint statement – called “The Bilderberg Consensus” for the location where the meeting was held – the group suggested ways the CGIAR centres and their partner institutions could apply INRM approaches to solving these and other problems. They urged, among other things, more interdisciplinary research, increased use of advanced technologies to improve understanding and analysis, better cooperation between organisations with complementary knowledge and skills, greater attention to the root causes of natural resource degradation, more direct links with development goals and stronger generalisability of findings.

The results were conveyed to the CGIAR's Technical Advisory Committee and presented at CGIAR's International Centers Week in Washington, D.C., in October. A follow-up meeting for 2000 is planned. Meanwhile, a Web site created by CIFOR's Information Services Group is aiding debate on this issue.



# Building Regional Impact



Through its leadership, expertise and strong networking with other forestry research institutions, CIFOR has left a mark of influence in all the major tropical regions of the world. This impact is expanding as CIFOR steadily decentralises its research operations – a move aided by the relocation of additional staff scientists to out-posted stations in several countries. The growing presence in key regions enables CIFOR and its partners to better address localised forest-related problems as well as broader concerns.

## Priority-Setting in Latin America

As one of the most richly forested tropical areas in the world, Latin America is a primary region for CIFOR's work. The scope and importance of the Amazon alone poses a special challenge for forestry research, yet forests throughout Central and South America offer a crucial "laboratory" for a wide range of studies relevant to many tropical countries. Among this work, for example, are comprehensive studies of devolution of forest management in several countries. This reflects a trend of decentralisation occurring today in the international forestry community, so the findings will be relevant well beyond this region.

To aid coordination of its extensive network of research in Latin America, CIFOR has a regional office in Belém, Brazil, hosted at a research complex of EMBRAPA, the Brazilian Agricultural Research Organisation. In May 1999, CIFOR's Board of Trustees and staff met in Belém and together with EMBRAPA worked to identify opportunities for collaborative research to address problems facing the Amazon. Cesar Sabogal, CIFOR's Regional Coordinator based in Belém, and his staff organised a day-long Belém Forum, "Research Challenges for Amazonian Forests", that featured an impressive array of scientists, forest managers and representatives of forest users. They discussed major threats and opportunities for the forests and people of Amazonia in the next two decades.

During these meetings, CIFOR and EMBRAPA pledged to strengthen their cooperation in research to help tackle problems in Amazonian forests related to growing threats from development, transmigration, agricultural expansion and resource extraction. One joint initiative that got underway in 1999 is a project to develop an effective management system for sustainable forest operations by Brazilian timber enterprises. Given the rapid changes now affecting the Amazon, another area of considerable attention will be policy issues.

## Collaborative Problem-Solving in Sub-Saharan Africa

Forestry research priorities in Africa are closely linked with wide-scale development needs required to support the continent's

large poor and rural population. In addition, the region's diversity – ranging from the humid forests of Central Africa to the dry woodlands in the south – requires different strategies for achieving sustainable forest management across ecosystems.

CIFOR already has a significant research portfolio in West-Central Africa, Southern Africa and Madagascar, and several core programmes are poised to expand activities in the region. Field offices in Yaoundé, Cameroon, under the leadership of CIFOR's Regional Coordinator Ousseynou Ndoye, and in Harare, Zimbabwe, headed by Godwin Kowero, will facilitate this greater outreach. Partnership with countries of the Southern African Development Community is another critical avenue for CIFOR research in this region.

In 1999 CIFOR began a review of its strategy for research in sub-Saharan Africa to determine the most effective ways of deploying its resources to help countries of the region protect their dwindling forests and promote sustainable use of natural resources. A final plan is forthcoming in 2000 centred around the following areas: 1) participating in priority-setting processes and initiatives concerning the CGIAR and African regional and sub-regional organisations; 2) investing further in the existing infrastructure in Yaoundé and Harare while expanding activities to neighbouring countries; 3) building capacity through professional development opportunities for African scientists; 4) reaching policy makers directly with CIFOR's research results to ensure adoption and policy results; and 5) cultivating relations with specialised institutions in OECD countries to help secure funding for research in the African region

## Wide Network of Studies in Asia-Pacific Countries

CIFOR research in Indonesia, Thailand, Malaysia, China, the Philippines, Nepal and other countries of the Asia-Pacific region spans a wide continuum of forest-related problems. This network offers an opportunity for comparative studies that can lead to more generalisable knowledge while also benefiting the individual countries and research sites.

China is a critical area of focus because it has one of the lowest ratios of forest per capita in the world, yet those forests provide income and sustenance to an estimated 80 million people, many of them among the country's poorest. The main areas of focus are non-timber forest products, plantations, improvement of livelihoods and policy development. A major ongoing study has been investigating the full cycle of bamboo production and marketing, with the aim of ensuring the continued viability of this critical sector for wide-scale employment. Research on plantation forestry is important



because major erosion associated with deforestation has led to a ban on logging in China's natural forests, thus making tree plantations the primary source of raw material for the timber industry. In May 1999, CIFOR along with the Chinese Academy of Forestry hosted a special seminar on "Forests and People in China: Partnerships and Perspectives" in Beijing during the CGIAR Mid-Term Meeting. Donors and partners attended the lunchtime event, which featured scientific presentations by researchers from CIFOR and collaborating institutions in China.

Studies in Indonesia make up a considerable part of CIFOR's research portfolio. This is fitting because Indonesia is not only CIFOR's host country, but its forests are remarkably rich in biological diversity; thousands of plant and animal species endemic to the region are found nowhere else. At the same time, the forestry situation in Indonesia is highly representative of the situation in many other countries today. Discovering ways to balance the intense competition for access to forests and their resources while protecting forest-based livelihoods, biodiversity and long-term survival of forests holds lessons that will be useful throughout the tropics.



## Bulungan Research Forest: Toward Model Practices

A 300,000-hectare area of forest in East Kalimantan's Bulungan Regency is a research site jointly operated by CIFOR and Indonesia's Ministry of Forestry and Estate Crops. The purpose of this project, which is headed by Kuswata Kartawinata, is to test ways of translating the concept of sustainable forest management into concrete practices.

Timber, mining and plantation ventures operate in the area, alongside protected forests, traditional (*adat*) forests, agriculture, hunting, and other subsistence and income-generating activities that are important to more than two dozen villages of Dayak people. This offers an ideal setting in which to investigate many aspects of integrated forest conservation and use. CIFOR is conducting a wide range of studies at Bulungan related to sustainable forest management, biodiversity conservation, non-timber forest product development and community management of forests. Numerous Indonesian and international researchers, as well as local villagers, collaborate with CIFOR in this work.

The International Tropical Timber Organisation has provided major support for research at Bulungan Forest. Other assistance has come from the Government of Indonesia, the John D. and Catherine T. MacArthur Foundation, CIRAD-Forêt of France and the United States Forest Service, while additional funders sponsor many individual projects.

# Transforming CIFOR into a Knowledge Organisation



## Stronger Interface Between Information and Communications

Finding effective ways of delivering and sharing information is crucial for CIFOR to meet its mission in the era of globalisation. This entails managing the centre's expert knowledge, data sources and communications to better serve both internal and external users. When this knowledge-sharing process is strengthened, the result will translate into the adoption of sound research-based policies and practices that benefit the world's forests and the people who use them.

Knowledge management is not just implementing new or different technology, although that is an essential tool. Instead, knowledge management requires the development of strategies for generating, acquiring, storing, sharing and disseminating the fundamental product that enables CIFOR to reach and influence target beneficiaries: knowledge and information.

CIFOR improved its knowledge management in 1999 through a variety of initiatives. The most directly useful and widely applicable was a revamping of the institute's two main channels for knowledge sharing: the internal electronic information system and the Web site.

IntraCIFOR, the centre's intranet, was launched to provide "one-stop shopping" for CIFOR-related information and resources. IntraCIFOR was spearheaded by Information Services Director Michael Hailu and a team from the Information Services Group and the Communications Unit. This new intranet browser-based tool offers much more efficient access to the wealth of electronic-based information that previously was housed at CIFOR in many different locations and formats. IntraCIFOR is based on a common platform that links multiple kinds of software seamlessly and speedily. As a result, CIFOR staff at headquarters and in regional offices can easily find information about programme developments, download full-text publications, refer to staff directories, track internal peer reviews and trip reports, consult policy manuals, and even obtain practical tips about working at CIFOR and living in Bogor. This convenience and increased efficiency was further enhanced by upgraded Internet capability that has made it easier for staff scientists to communicate with their out-posted colleagues as well as research partners around the world.

Also in 1999, the centre's World Wide Web site underwent a major redesign and restructuring. Besides giving the site a new look and changes in navigation devices to improve access, the redesign expanded and reorganised the user-targeted content. These changes will significantly strengthen CIFOR's outreach to external audiences, especially at a time when reliance on

electronic sources of information has grown exponentially. To better serve collaborators and other users in countries all around the world, the redesign allows faster down-loading on slow electronic connections. The new Web pages will debut in the first half of 2000.

## Variety of Products for Multiple Audiences

Among the major sources of information produced by CIFOR in 1999 were two dozen major new publications by staff scientists and their partners in the form of monographs, books, and technical papers and reports. In addition, research abstracts of published journal articles, workshop papers and other reports describing the results of about 75 CIFOR-sponsored projects were made available both as a published index and on the centre's Web site.

These major publications for 1999 were supplemented by a number of policy briefs, news releases and research updates on specific developments in CIFOR's research programme. In addition, corporate publications including the newsletter *CIFOR News* and the annual report continued to be produced in English, Spanish and French.

In observance of the new millennium, CIFOR organised a special activity for the production of its annual calendar. Dozens of school children in several countries where CIFOR conducts research were invited to contribute their drawings and paintings depicting "My Vision of the Forest". The entries selected by CIFOR's staff were featured in the institute's Year 2000 desk and wall calendars, distributed worldwide, and were showcased on the centre's Web site.

Members of CIFOR's Communications staff were heavily involved in three major public affairs events in 1999 that highlighted research in Brazil, China and Indonesia. These efforts entailed the planning and production of special information materials – including booklets, posters and exhibition panels in several languages (English, Portuguese, Chinese and Bahasa Indonesia) – for use in conjunction with scientific symposia organised by CIFOR staff. The events also featured attractive multimedia presentations designed by Yahya Sampurna of the Information Services Group.

## Key Technical Support

The Information Services Group also supported CIFOR's research programme in 1999 by providing a number of state-of-the-art technical services such as GIS and remote sensing assistance. In one project, for example, a spatial economic regression model was developed to reveal areas of deforestation in Santa Cruz, Bolivia, and analyse the potential role of factors such as land tenure, accessibility and ecological conditions. Scientists were able to see how various land uses led to different – and in some cases opposite – effects on forest cover in the sub-regions studied. This differential effect on spatial variables has direct practical implications for environmental management.

In 1999 CIFOR also helped distribute the first CD-ROM module of a new reference tool, the *Forestry Compendium*, to agricultural research agencies in several developing countries. CIFOR assisted with the development of the *Compendium*, which is published by CAB International. It provides information about more than 600 species of trees and shrubs relevant to forestry, particularly in the tropical Asia-Pacific region. A global version scheduled for completion in 2000 will cover more than 1,200 species. The interactive content includes text, pictures, maps, databases, bibliographic data, taxonomic information and statistics.

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# Financial Summary

## Statement of Financial Position

as at 31 December 1999 and 1998  
(US \$'000)

	1999	1998
<b>Current assets</b>		
Cash and cash equivalents	7,133	7,188
Accounts receivable:		
Donors	2,562	2,271
Employees	252	111
Others	616	644
Prepaid expenses	564	336
<b>Total current assets</b>	<b>11,127</b>	<b>10,550</b>
<b>Non-current asset</b>		
<b>Fixed assets – net</b>	<b>2,381</b>	<b>1,915</b>
<b>TOTAL ASSETS</b>	<b>13,508</b>	<b>12,465</b>
<b>Current liabilities</b>		
Accounts payable:		
Donors	3,577	1,948
Others	54	34
Accruals and provisions	2,365	2,215
<b>Total current liabilities</b>	<b>5,996</b>	<b>4,197</b>
<b>Net assets</b>		
Capital invested in fixed assets	2,381	1,915
Capital fund	622	1,088
Operating fund – unrestricted	4,509	5,265
<b>Total net assets</b>	<b>7,512</b>	<b>8,268</b>
<b>TOTAL LIABILITIES AND NET ASSETS</b>	<b>13,508</b>	<b>12,465</b>

## Statement of Activities

for the years ended 31 December 1999 and 1998  
(US \$'000)

	1999 Agreed Research Agenda			1998
	Unrestricted	Restricted	Total	Total
<b>Revenues</b>				
Grants	6,909	4,605	11,514	11,286
Indirect cost recovery	117	–	117	31
Other revenues	343	–	343	382
<b>Total revenues</b>	<b>7,369</b>	<b>4,605</b>	<b>11,974</b>	<b>11,699</b>
<b>Operating expenses</b>				
Research programs	4,418	4,605	9,023	7,461
Research support	1,126	–	1,126	899
General and administration	2,581	–	2,581	2,702
<b>Total operating expenses</b>	<b>8,125</b>	<b>4,605</b>	<b>12,730</b>	<b>11,062</b>
<b>Increase/(decrease) in operating fund</b>	<b>(756)</b>	<b>–</b>	<b>(756)</b>	<b>637</b>
<b>Operating expenses – by natural classification</b>				
Personnel costs	4,107	1,461	5,568	4,627
Supplies and services	2,153	247	2,400	2,404
Collaborative activities	822	2,704	3,526	2,824
Operational travel	549	193	742	727
Depreciation of fixed assets	494	–	494	480
<b>Total operating expenses</b>	<b>8,125</b>	<b>4,605</b>	<b>12,730</b>	<b>11,062</b>

## Statement of Changes in Net Assets

for the years ended 31 December 1999 and 1998  
(US \$'000)

	Capital invested in fixed assets	Capital fund	Operating fund – unrestricted	Total
<b>Balance at 1 January 1998</b>	1,848	1,155	4,628	7,631
Acquisition of fixed assets	628	(628)	–	–
Depreciation	(480)	480	–	–
Disposal of fixed assets – net	(81)	81	–	–
Increase in operating fund	–	–	637	637
<b>Balance at 31 December 1998</b>	<b>1,915</b>	<b>1,088</b>	<b>5,265</b>	<b>8,268</b>
<b>Balance at 1 January 1999</b>	1,915	1,088	5,265	8,268
Acquisition of fixed assets and construction in progress	960	(960)	–	–
Depreciation	(494)	494	–	–
Decrease in operating fund	–	–	(756)	(756)
<b>Balance at 31 December 1999</b>	<b>2,381</b>	<b>622</b>	<b>4,509</b>	<b>7,512</b>



## Schedule of Grant Revenue

for the years ended 31 December 1999 and 1998  
(US \$'000)

Donors	1999	1998
<b>Agreed Research Agenda (Unrestricted)</b>		
Australia	255	262
Austria	80	80
Belgium	121	–
Canada	267	232
Denmark	147	224
European Union	–	840
Finland	355	683
France	92	107
Germany	274	294
Indonesia	200	125
Japan	1,650	1,420
Netherlands	718	787
Norway	318	333
Philippines	14	13
Spain	25	25
Sweden	238	192
Switzerland	205	243
USA	550	500
World Bank	1,400	1,200
<b>Subtotal</b>	<b>6,909</b>	<b>7,560</b>
<b>Agreed Research Agenda (Restricted)</b>		
Asian Development Bank	91	–
Australian Centre for International Agricultural Research	71	86
Brazil (EMBRAPA)	(4)	34
Canada	123	–
CIAT (PRGA Program)	2	–
Denmark	111	126
European Commission	585	856
European Space Agency	67	–
Finland	22	–
Ford Foundation	13	34
France	385	303
Germany (GTZ/BMZ)	38	86
Inter-American Development Bank	25	84
International Centre for Research in Agroforestry	–	28
International Development Research Centre	64	58
International Fund for Agricultural Development	418	88
International Plant Genetic Resources Institute	5	–
International Tropical Timber Organisation	335	225
Japan	620	347
MacArthur Foundation	84	47
Netherlands	32	(19)
Norway	53	58
Overseas Development Institute	11	–
Pact International Incorporated	33	–
Protierra/Inifom	45	–
Rockefeller Foundation	62	91
Spain	13	80
Sweden	224	537
Switzerland	147	80
The Nature Conservancy	12	–
United Kingdom (DFID)	519	448
United Nations Environment Programme	–	8
United Nations Educational, Scientific and Cultural Organisation	1	29
United States Forest Service	110	41
USA	147	215
World Bank	96	–
World Wildlife Fund	45	31
<b>Subtotal</b>	<b>4,605</b>	<b>3,726</b>
<b>TOTAL AGREED RESEARCH AGENDA</b>	<b>11,514</b>	<b>11,286</b>

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