ITTO

TROPICAL FOREST U·P·D·A·T·E

A Newsletter from the International Tropical Timber Organization to Promote Conservation and Sustainable Development of Tropical Forests

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Oiling the Trade Chain

The International Tropical Timber Organization operates on the premise that promoting the international trade in tropical forest products is essential not only for the development of tropical countries but for the conservation of their forests. Open access to markets, in turn, is fundamental to a successful trade, yet it remains a controversial issue.

Tropical timber exporters must deal with all sorts of barriers to their products on a daily basis: a changing resource base; rising costs of labour and raw materials; rising shipping costs; tariffs that escalate as value is added (see *TFU* 7:4); sanitary requirements that can often be met more easily by temperate timbers (see *TFU* 9:1); and environmental concern about tropical forest harvesting. A range of alternative products can now substitute for many of the uses to which tropical timbers have traditionally been put. And the recent financial crisis in Asia precipitated dramatic declines in demand for tropical timber in such important markets as Japan, Thailand and Korea.

The net result is that tropical timber consumption is falling in many markets. At the last session of the International Tropical Timber Council, a lively Annual Market Discussion examined the issue in detail, the results of which we report here (pp 13–18). Consultants delivered two reports on related topics, and traders had their say on the role that ITTO should play in strengthening the trade. It was agreed that more should be done in both producer and consumer countries to bring down the barriers to market access. Council agreed that ITTO should do more to promote the role of the tropical timber trade in contributing towards sustainable forest management.

Perhaps part of the problem is that some member countries and their constituencies have not yet placed their faith in the link between trade and conservation and are therefore reluctant to promote it. Nevertheless, this newsletter has always put forward the view that forests will only be conserved if they have greater value as forests than the land they occupy has for agriculture or other non-forest land uses. Other forest products and services such as carbon credits, biodiversity and tourism are all growing in value and must be encouraged. But the trade in tropical timber products is still the single biggest employer of labour, generator of domestic tax revenues and producer of hard currency from forests – so the need for a healthy, sustainable timber trade to release this value for development is irrefutable.

We can't simply rely on the tropical timber trade to bring about sustainable development. We must free it to do what it does best – market its products, and find new and more valuable markets where old markets are in decline. But we must also continue to help it adopt sustainable practices at every link in the trade chain, from the forest to the shop floor. If we do this, then promoting the positive links between trade and conservation by ITTO and others will become a much more fruitful task.

Link in the chain: this tropical plywood will be trucked to construction sites in downtown Tokyo. The market for tropical timber is changing dramatically – new practices, for example, are reducing the need for plywood in concrete formwork. We look at some of the barriers to trade in this edition. *Photo: A. Sarre*

Alistair Sarre
Guest editor

Inside this issue

Manual Labour Serves Wider Purpose

Interview with Duncan Poore

Dr Duncan Poore has had a long association with ITTO and the management of tropical forests. He was the primary author of ITTO's landmark 1989 publication 'No Timber Without Trees', which reported on the level of sustainable forest management in ITTO member countries. Recently he collaborated with Malaysia's Thang Hooi Chiew to prepare an updated version of ITTO's 'Criteria and Indicators for Sustainable Management of Natural Tropical Forests', which was published last year. Now he and Mr Thang have combined again to produce a 'Manual for the Application of Criteria and Indicators for Sustainable Management of Natural Tropical Forests'. In the following interview with Dr Poore, we find out why.

TFU: *Describe the manual, in a nutshell.*

Duncan Poore: The manual is designed as a simple guide to enable forest departments to measure and describe indicators at the national level and, in the case of forest managers, to describe the indicators at the forest management unit level. It's really a guide.

Is it a manual for state-of-the-forest reporting?

Yes, I think it is fair to call it that. It is a manual to make it easier to measure ITTO's indicators. These indicators, in turn, provide a tool for assessing changes and trends in tropical forest conditions and management systems. So if one measures the indicators periodically one will quite automatically get an assessment of the way the state of the forest is improving or, one hopes not, deteriorating over time.

Why is it needed?

Three reasons. First, as already mentioned, the manual is designed to make ITTO's indicators easier to use. Second, in some instances it actually clarifies what is meant by the indicators, where there is doubt about what is intended. And third, it should standardise the responses that are received between one recording and another. If the country or forest manager wishes to know what the trend is, it's very important that the same method and units of measurement are used consistently over time.

Was the manual conceived partly to encourage uptake of the criteria and indicators?

A number of countries were using the old criteria and indicators and there seems to be a certain amount of enthusiasm for the new ones, which are certainly very much more comprehensive and rigorous than the earlier ones. The main purpose of ITTO's criteria and indicators is to help countries in assessing their own progress towards sustainable forest management. If countries find that the manual is useful in this respect, then I hope they will be encouraged to take them up enthusiastically. So I think the answer to that is yes.

How did you and your co-author, Mr Thang, go about compiling the manual?

We had previously worked together on the criteria and indicators, so we knew that we could work harmoniously together. We took the indicators that had been published last year as given, because they had been the subject of a lot of negotiation which had resolved most of the semi-political problems associated with the whole exercise.

We then discussed between ourselves the sorts of procedures we'd follow and then we divided the parts up; Thang took some of the criteria and I took the remainder, and we produced a first draft around those, which we then exchanged and criticised. By this means we produced a further agreed draft, and then we looked through very carefully and tried to correct and refine. In each case I think we put ourselves in the position of the person who is going to have to use the manual and tried to identify exactly the steps that would have to be taken: what sources to go for, what you needed to measure, and so forth. It was really a question of putting ourselves in the 'hot seat' and then throwing it backwards and forwards between us so that we got something that satisfied us both. It went through several revisions.

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Then it went to an expert panel at ITTO headquarters?

Yes, then it went to the expert panel. On the whole, the expert panel was fairly kind to our draft and we had a very harmonious meeting. There were of course a number of points which weren't clear or which could be improved, so the document that came out at the end of the process was certainly better than the document that went in.

Could the manual serve as a template for non-tropical forests?

Yes, I think largely it could. One would have to look at it carefully just to ensure there weren't things that didn't fit, but on the whole I think that almost everything would apply equally to all kinds of natural or semi-natural forests. If one were looking at plantations, then quite a few modifications would be required – some additions and probably some subtractions.

How big a task is it to complete a state-of-the-forest report using the manual?

I think the first time it would be done it would be a very considerable task, because the first report on the indicators would need to set a baseline against which subsequent reports would be judged. Therefore, one requires in the first report a great deal of baseline information. This would involve, for example, copies of the relevant laws and regulations, and quite a lot of information, such as the national classification of forest types that would be used and the precise methods that might be used to measure various indicators.

In addition, countries or forest managers might find that the data were not available at all for the first report. This shouldn't matter; the first is almost bound to be incomplete. But subsequently, once that baseline has been laid and once the methods for measuring indicators have been settled and described, I would think that subsequent reports would be very much easier and could quite readily become a matter of routine.

To make it easier for countries, as far as possible we have made it consistent with the Forest Resource Assessment of FAO, so that the same information in the same form will be suitable for both.

Is sufficient information and capacity available in ITTO member countries to compile a report based on the manual?

That will vary enormously between countries. There are a few, I think, who could go quite a considerable way to meeting all of the information requirements. There are some who will have great problems – there will be big gaps. I don't think there's any doubt about that.

> *'Many countries have made considerable progress over the last five or ten years in moving their forest management forward … It is very important that countries should be able to demonstrate that they have made some progress, but I hope that this won't be done at the expense of glossing over the deficiencies …'*

The point really is that everyone should do as much as they possibly can when they start off; they should recognise where the deficiencies are and gradually improve when they come to report for the second or subsequent times.

One of the functions of this process is to identify where more capacity is needed. Should it also serve as a means for the international community to identify where it should put its resources?

Yes, I think so. This is really at two levels. Countries may require more resources actually to measure and report on the indicators. But the importance of the indicators is really to assess progress towards sustainable forest management, so that at the same time it should identify deficiencies in the process itself. In a sense, providing assistance to make forest management more sustainable is more important than being able to fill in the indicators. But I think training will probably be necessary. In considering the manual, the International Tropical Timber Council recommended that training might indeed be linked to the general support needed to bring about sustainable forest management.

What role does reporting on criteria and indicators play in the achievement of the ITTO Year 2000 Objective?

I very much hope that it will contribute to that. The identification of the indicators and finding out whether they can be measured will have a knock-on effect for seeing whether you're actually doing the things that the indicators measure. So I believe it should play a part in reporting about the Year 2000 Objective, but there is an additional point which I think is important. In each country, whether sustainable management is or is not taking place depends not only on the indicators but on setting standards related to the indicators: what is the value of a particular indicator that must be reached if management is to be deemed sustainable? I think the question of where those standards should lie is for each country to decide. But the very fact that one has criteria and indicators implies that there are in the backs of people's minds some standards to which they should attain.

Many countries have made considerable progress over the last five or ten years in moving their forest management forward from the rather parlous state it was in when *No Timber Without Trees* was published in 1989. I believe things are in a considerably better state now. It is very important that countries should be able to demonstrate that they have made some progress, but I hope that this won't be done at the expense of glossing over the deficiencies that still exist and the progress that must still be made. ■

Sustainable Forest Management in Africa – Contraints, Costs and Conditions

Can progress towards sustainability be accelerated?

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Although many African countries recognise the need to apply the principles of sustainable forest management, there remains a lack of implementation of such principles in the region. The continuation of poor logging practices generates both biological and socio-economic risks, begging several questions: why is the development of sustainable forest management so slow, how can these handicaps be overcome, and what are the conditions necessary for the development of sustainable forest management models in Africa?

Current Knowledge and Constraints

The current constraints on sustainable forest management in Africa are basically of three types, which are discussed below.

The heterogeneous nature of the African forests and the limited knowledge on stand dynamics: contrary to the Asian forests, which are relatively homogeneous due to their majority composition of dipterocarps, the African forests are heterogeneous and complex. Although the basic elements of sustainable forest management seem to be generally understood, the complexity of the forest ecosystem in Africa and our poor understanding of it make it difficult to define sustainable harvesting models. In any event, there is no one single model of forest management that can be applied universally.

The marketing structure of African timber, which cannot stimulate sustainable management: because of the heterogeneous nature of the African forests and the high transportation costs involved, the timber volumes extracted per hectare are generally relatively low. These utilisation and marketing conditions do not harm the trade in high-value logs. But they do hinder the development of sustainable management models because logging excludes or sometimes damages lesser quality species. Furthermore, the perennial problem of forestry whereby demands for quick financial returns are not conducive to investment in the protection and regeneration of forests also acts against the development of sustainable forest management practices.

'… authorities must motivate businesses to participate in sustainable management throught the adoption of appropriate legislation and by exploring the incentive dimension of economic instruments.'

The malfunctioning of institutions and the flawed application of legislation: the poor functioning of administrative structures compounds the situation. Regulations do not always take into account local realities and cultures, but also very little effort is made to make them applicable or to integrate forestry policy with rural development policies. The management of economic instruments (pricing policy and the tax system) is often limited to budgetary concerns, thus ignoring their significance as an incentive for sustainable forest management. Land appropriation policies have led to the State taking exclusive control of the forest resources, the denial of customary forms of forest tenure, taxation policies that provide inadequate resources for the management of forest concessions, and predatory behaviour by some interest groups with regard to resources of uncertain status.

Towards Sustainable Forest Management in Africa

Given these kinds of difficulties, the implementation of sustainable forest management in Africa is far from easy. What is required is a participatory approach coupled with systems of forest management that are compatible with market requirements and that preserve the silvicultural integrity of the forest. The forest must be managed, on the one hand, for those who live in it and, on the other, for those who utilise and control it. This makes it necessary to involve local populations and rural authorities. Regional economies must be improved in ways that promote forest development.

In addition, authorities must motivate businesses to participate in sustainable management through the adoption of appropriate legislation and by exploring the incentive dimension of economic instruments. This can be done by empowering local populations and businesses: for example, concessions should only be granted after consultations with local communities, and part of the revenues earned from the concessions should be earmarked to provide monitoring and incentives for the protection of the forests. Incentives may be provided in various ways. Introducing a system of taxation for non-conformity (to be paid by concessionaires if they fail to meet sustainable forest management guidelines) and a graduated tax system (depending on the surface area managed and the remoteness of the forests) on the added value created, are interesting possibilities. The incentive system should aim to influence both the volume of timber extracted and the way the extraction is done, favouring those operations that cause least environmental damage.

Such actions to be undertaken in favour of sustainable forest management must be accompanied and supported by the development of appropriate criteria and indicators. These should aim to simplify complex processes (in order to make them quantifiable), so that communication is encouraged and management facilitated. The new ITTO Criteria and Indicators for Sustainable Management of Natural Tropical Forests and the ITTO Manual for the Application of Criteria and Indicators for Sustainable Management of Natural Tropical Forests (see interview on page 2) are steps in the right direction, providing management agencies with the basis to develop approaches that suit local conditions.

The management of forests implies that a number of costs be borne, amongst which are the costs associated with establishing a

Table 1: Cost elements of forest management

1.	**Development cost** *(calculated on 120,000 hectares)*	**'000 US $**
	Organisation of the work	72.0
	Reconnaissance of the forest	4.8
	Mapping	90.4
	Management inventory	61.0
	Logging inventory	84.0
	Geographic information system	60.4
	Personnel training	433.6
	Total/120,000 hectares	**806.2**
	Total/hectare	**0.0067**
2.	**Annual implementation cost** *(calculated on 3,000 hectares)*	**'000 US $**
	Logging inventory	1.44
	Silvicultural work	2.64
	Follow-up team	26.00
	Annual total/3000 hectares	**30.08**
	Annual total/hectare	**0.01**

At an average conversion rate of 1 US$ = 500 FCFA

sustainable management regime (called 'development costs' here), and the ongoing costs of carrying out the regime (called 'implementation costs' here; the opportunity costs are difficult to quantify and are not discussed). The estimates of development and implementation costs given in Table 1 are drawn from data collected in Gabon in 1998. Undoubtedly they will vary depending on the planning method used and the nature of the forests, so should be viewed only as rough estimates. Expenditure on equipment and miscellaneous supplies is not taken into account; this might increase costs by about 20 per cent. Therefore, it may be concluded that the cost of development would be in the range 6.7–8 US dollars per hectare, while the cost of implementation probably lies between 10 and 12 US dollars per hectare per year. The latter item is currently the greater, because the follow-up operations over a rotation (that is, calculating annual sustainable yield, logging preparation, opening roads, forestry works etc; see Bakouma 1999, p 59) require expensive international technical assistance in African countries. It is to be hoped that this cost will decrease in the medium term as more qualified African foresters become available.

General Conditions for Sustainable Forest Management in Africa

The sustainable management of African forests requires certain conditions to be met. First, the forests must be managed in accordance with current knowledge about their ecology, but in a manner compatible with the market. Second, the need to involve all stakeholders implies that they are given responsibilities in the management and protection of the resource. The new forest policies to be developed in African countries must take account of the informal sector, and try to incorporate it. Such policies must also be integrated into overall rural development activities. Any management standard that is imposed from outside and is irrelevant to local concerns is doomed to fail. Third, incentives provided by a graduated tax system must be accompanied by improved effectiveness of supervisory services and therefore by the strengthening of institutions, but also by communication. And, finally, involvement in the planning and adoption of management systems requires authorities to bear a number of costs, in particular those associated with initial development. Implementation costs would be met by those businesses with management plans capable of satisfying both the authorities and the banking sector, and the latter could then contribute to financing.

The development of sustainable forest management in Africa is therefore dependent on the existence of a range of management methods, the adoption of new policies, and important reforms. African countries should speed up their consultations so as to adopt joint approaches to sustainable forest management plans and, following the example of Gabon (see box), rapidly develop national plans for the sustainable management of forests. ITTO should continue to play a part in this by supporting such initiatives.

Reference

Bakouma J. (1999). *Aspects économiques et institutionnels de la gestion durable des forêts en Afrique*. Report for the OIBT, INRA-Nancy, 86p.

This article arose from work funded by the ITTO Fellowship Program. It was translated from the French by Yvonne Cunnington.

Gabon's Forestry Master Plan

In 1997, the Gabonese Ministry of Forests, with assistance from ITTO, conducted a nation-wide consultation with stakeholders with the aim of developing a forestry master plan. This scheme was intended to: delineate a permanent forest area; promote the sustainable forest management concept; form partnerships between public and private stakeholders at all stages; train forestry personnel; and implement an efficient approach given constraints of time and resources.

Aspects of the master plan include:

- **Land allocation:** a permanent forest area of 12 million hectares has been delineated, of which 8 million hectares are allocated for production and 4 million for protection;
- **Management planning:** All production forests to be logged must have a sustainable management plan produced by foresters and agreed to by the Ministry of Forests. The management plan is the official document applicable during the whole cutting cycle. The territory covered by the management plan is the 'management unit', which is called the 'forest concession under sustainable management' in the new Forest Law. The plan must take into account biophysical data and will be based on management inventory data. The management plan will involve: specific studies aimed at improving understanding of forest ecology in the management area; a socio-economic diagnosis of the territory concerned; feasibility studies linked to the development of the timber chain; and accurate mapping of the forest, including all the basic forest information. Lastly, this document will define the implementation strategy for the unit to be managed;
- **Work plan:** In application of the management plan, operators are required to draw up and submit a work plan to the forest administration on how they propose to manage and work the forest in accordance with the overall sustainable management plan. It will involve a detailed description of the work to be carried out during the following year, including logging inventories, felling plans, layout of skidding roads, role of operators, as well as the associated costs and operating budgets.

The Gabonese government will phase in these changes to forest administration over more than ten years. This will involve: the formulation of management plans and the establishment of standards (1998–2000); and the implementation at the national level of sustainable management plans (2000–2010).

Sky is the Limit for Forest Management Tool

An easy-to-use methodology for satellite image analysis is now available on CD-ROM

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The recent development of a powerful yet easy-to-use planning tool will enable forest managers to make greater use of satellite image data analysis to plan forest rehabilitation and other operations.

Produced by a team coordinated by the Japan Overseas Forestry Consultants Association (JOFCA) with funding from ITTO (Project PD13/97), this new 'semi-expert' system for analysing satellite imagery – called the FCD Mapper – is available in CD-ROM format compatible with Windows-type personal computers. It should prove useful for a broad range of forest-planning exercises including monitoring, mapping, environmental assessment and watershed management.

The impetus for development of the system arose from a desire to make the methodology easily accessible to planners. The system's utility was clearly demonstrated to senior decision-makers in the Asia-Pacific region at an ITTO seminar held in Kuala Lumpur, Malaysia in June this year. Planners with minimal skills in image analysis showed that they could accomplish tasks that were formerly impossible without the help of highly trained experts.

The system builds on the results of two earlier ITTO projects (PD 2/87 and PD 32/93), which focused on planning for the rehabilitation of logged-over forests by analysing satellite imagery data, assessing forest conditions as derived from the analysis, and then identifying appropriate rehabilitation treatment options based on those conditions. The two projects also developed relevant assessment criteria and methods. PD 32/93 developed an analysis methodology through which an accurate appraisal of conditions could be obtained without having to carry out the expensive and time-consuming process of ground-truthing. Access to the software for the new methodology on CD-ROM in a semi-expert system provides a 'user friendly' means to facilitate application.

Basis and Benefits of the System

Central to the methodology incorporated in the semi-expert system is the relationship between canopy density and the dynamics of forest ecology. Simply stated, dense canopies are a feature of healthy forests while sparse or no canopies indicate the opposite. From a planning and monitoring perspective, the principal features of the methodology include:

1) rapid stratification of forests into canopy density categories (ie 0–100 per cent);

2) production of tables showing the number of hectares in each category; and

3) a print-out of coloured maps that clearly illustrate forest conditions.

The information thus derived assists forest managers to:

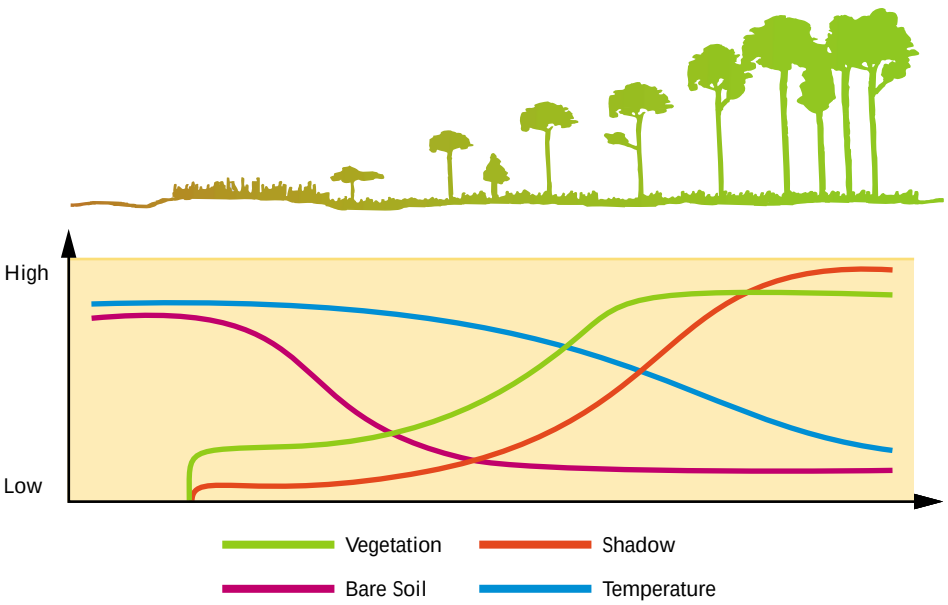
- prioritise sites in need of rehabilitation;
- prepare budgets and cost estimates depending on the type of rehabilitation treatments to be applied; and
- determine the area of healthy, partially-degraded, or severely-degraded forests within a forest management unit.

Coloured maps make it possible to share this information with all concerned sectors in a manner that is readily understood. The whole process can be completed in hours or a few days, depending on the number of satellite images to be analysed.

Technical Features of the Methodology

The methodology contained in the system improves upon the conventional physical approach to satellite imagery analysis using new formulas (algorithms) specifically developed for application in forestry. Detailed information on formulas and procedures is presented in Rikimaru (1996), which describes the ITTO/JOFCA/Rikimaru Forest Canopy Density Mapping and Monitoring Model (in short – the FCD Model). Principal features are summarised below.

Figure 1: The characteristics of four indices of forest conditions



Four indices from R/S TM data

The FCD Model combines data from four indices – a vegetation index (VI), a bare soil index (BI), a shadow index (SI) and a thermal index (TI) – with three new indices developed by the project: an advanced vegetation index (AVI); an advanced shadow index (ASI); and a scaled shadow index (SSI). Figure 1 illustrates the relationship between forest conditions and the first four indices. VI values respond to all vegetation items such as forest and grass. SI values increase as forest density increases. TI values increase as VI values decrease. Being exposed to the sun, black-coloured soils have a relatively high temperature: thus, BI values increase in proportion to the extent of bare soil exposed. Index values are calculated for every pixel of the satellite image.

Differentiation Between Two Forest Types

Normally, two types of forest floor condition are encountered in satellite image analysis of logged-over forests (Figure 2). In Type-1 conditions, canopy density is low, understorey vegetation is sparse and bare soil can be detected from space. In Type-2 situations, canopy density is also low but understorey vegetation is rich and bare soil cannot be detected. In Type-1 situations, forest canopy density (FCD) is obtained mainly from vegetation density, which is expressed in VI values. In Type-2 situations, FCD is obtained mainly from SI values. But without access to ground-truthing data, vegetation on the forest floor can be confused with vegetation in the canopy. The new methodology either eliminates or significantly minimises this problem.

Figure 3 uses Nepalese deciduous forests to demonstrate the process of integrating the indices: the BI and VI indices are integrated to produce a vegetation density map, while the BI and TI are integrated to produce the SSI. The vegetation density map and the SSI are then integrated to produce a forest canopy density map.

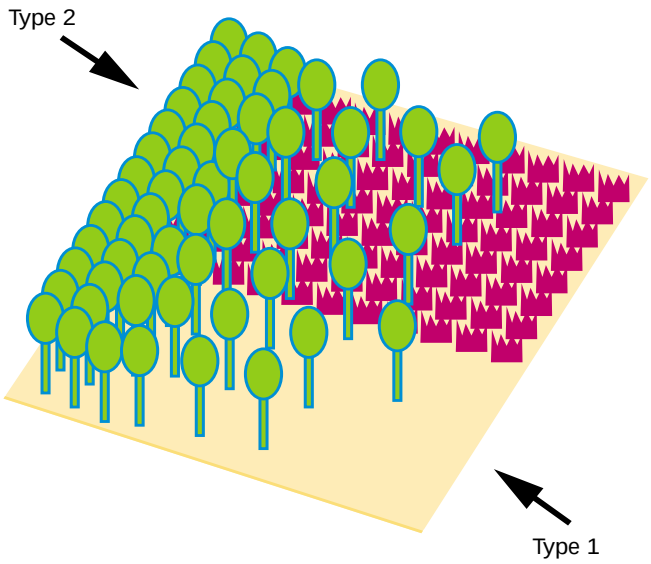
Advanced vegetation index

The advanced vegetation index (AVI) assesses the vegetation status of forests by examining the characteristics of chlorophyll-a. In application tests conducted by the project, the AVI index reacted to vegetation quantity with more sensitivity than the Normalized Difference Vegetation Index (NDVI) developed by the US-based NOAA-NESS Research Institute.

Advanced shadow index

When the forest canopy is dense, it is often impossible to accurately determine the relative intensity of shadow values based on satellite data. Consequently, crown density might be underestimated. The ASI was developed to deal with this problem (see Rikimaru 1996).

Figure 2: Ground conditions
Type 1 and Type 2 situations



Scaled shadow index

The shadow index mentioned above is a relative value. Its normalised value can be utilised for calculation with other parameters. For instance, amongst the shadow areas in the forest the darkest shadow area is assigned 100 per cent while the lightest area is assigned 0 per cent. Development of the scaled shadow index (SSI) enhances accuracy of the analysis under conditions that go beyond the capacity of the SI. Using the SSI, it is now possible to clearly differentiate between vegetation in the canopy and vegetation on the ground, thus helping overcome difficulties posed by the Type-2 condition. This is one of the major advantages of the new methodology and significantly improves the accuracy of satellite data analysis.

Practical Applications

Development of the semi-expert system represents a major improvement in tools available to forest management planners. It is easy to use and therefore puts the advantages of satellite imagery analysis within reach of day-to-day practitioners.

Canopy density is the principal feature of forests that can be assessed from satellite data. It is also a basic factor to consider in plan formulation and in monitoring the results of forest management regimes including timber extraction. For example, information on canopy density facilitates decision-making with respect to forest management options, all of which relate in one way or another to the health of the canopy. Thus, by first assessing canopy density it becomes feasible to determine, at the macro level, the different rehabilitation measures that ought to be considered. This in turn can inform the preparation of cost estimates which, invariably, relate to the types of treatment that may be applied. Canopy density information can also indicate if agroforestry initiatives are required, thus helping to pinpoint regions where ground surveys are needed to generate data on other important factors such as population density, land use practices and so on.

Development and Future Directions

Principal responsibility for development of the semi-expert system was entrusted to JOFCA under an ITTO contract approved by the International Tropical Timber Council at Santa Cruz, Bolivia in May 1997. Experts from India, Indonesia, the Philippines and Thailand shared this responsibility and collaborated in the testing and refinement essential for creating a system able to respond to the many variables in forest condition. A training program will be conducted through the project in November/December 1999 in Dehradun, India with support from the Indian Institute of Remote Sensing. Under this program, many trainees from the Asia-Pacific

region will acquire the skills needed to use the system for the assessment of forest status in real time without the need for external assistance.

In its present form, the system can use data from LANDSAT-TM, IRS-1C (India) and SPOT 4. As recommended by senior decision-makers at the meeting in June, plans are now under way to incorporate the analysis of radar satellite data in an upgraded system, thus taking advantage of information available from other remote sensing platforms such as ERS (Europe), RADAR-SAT (Canada) and JERS (Japan). Plans also include the potential to incorporate data from several new high-resolution satellites already launched or in process.

With these increased resolution capabilities, it will be possible to determine forest types and perhaps even some tree species that have unique, easily recognised canopy features. All of these options will help provide more accurate information on forest conditions, thereby increasing capacity to meet the demands of forest management and the challenges of forest rehabilitation in the new millennium.

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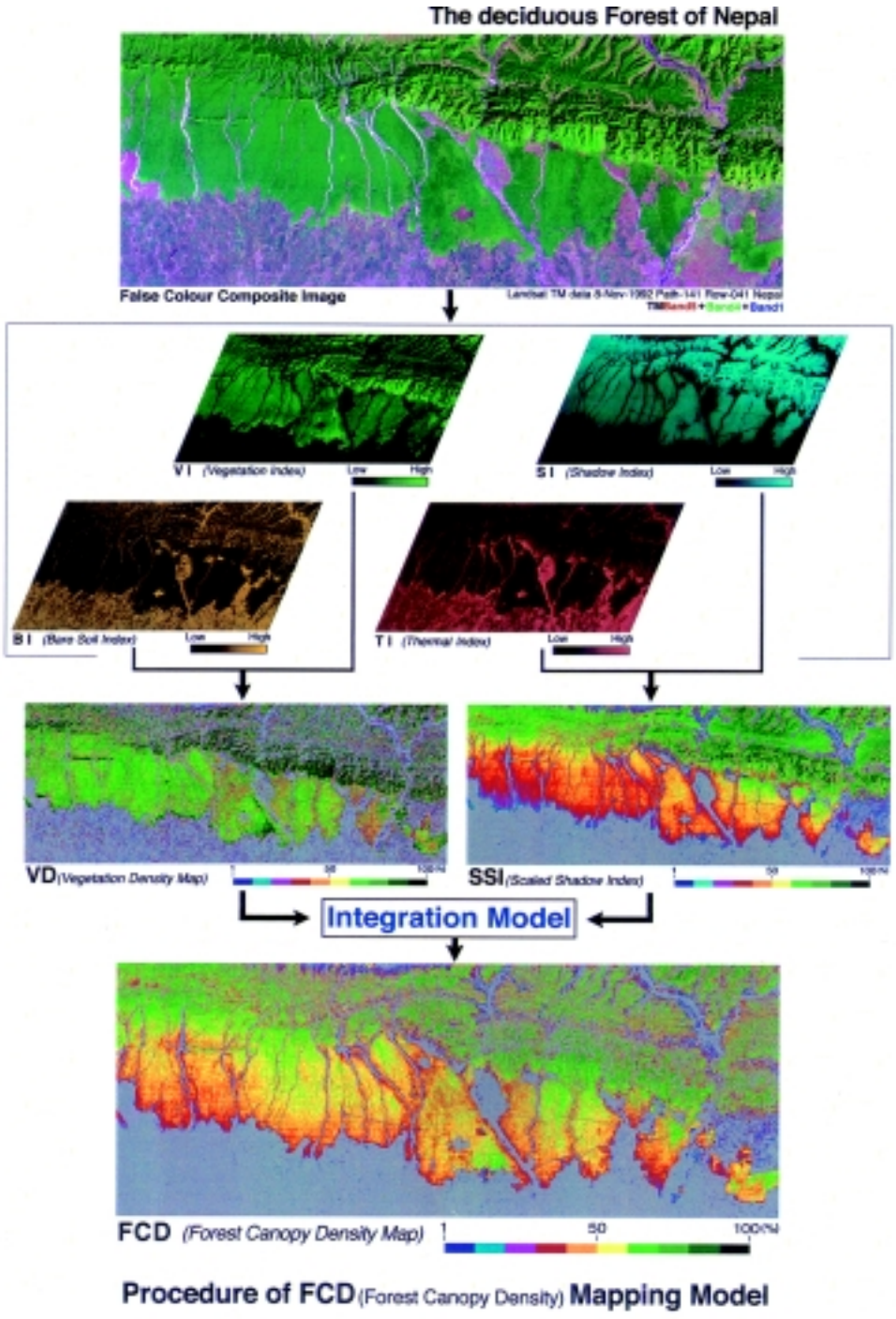

Figure 3: An illustration of the Forest Canopy Density Mapping Model procedure.
Courtesy ITTO/JOFCA/Rikimaru 1997

ITTO's Project Work: a Briefing

The projects described below were all financed at the 26th Session of the International Tropical Timber Council held in Chiang Mai, Thailand last May. About US$9 million were pledged at the session

Division of Reforestation and Forest Management

Preparatory studies to install a continuous monitoring system for the sustainable management of Thailand's forest resources (Thailand; PD 2/99 Rev.2 (F))

Budget: ITTO contribution: US$681,034
Government of Thailand US$90,000
Total: US$771,034
Executing agency: Royal Forest Department, Thailand
Funding countries: Australia, USA, Switzerland, Japan

The objective of this 3-year project is to install an effective and efficient continuous forest resource monitoring system for Thailand.

An assessment of the status of conservation areas in Sabah, Malaysia (Malaysia; PD 3/99 Rev.2 (F))

Budget: ITTO contribution: US$391,616
Government of Malaysia: US$402,200
Total: US$793,816
Executing agency: Sabah Forestry Department, Malaysia
Funding countries: Japan, USA

The objective of this 3-year project is to assess conservation areas within the permanent forest estate for their vegetation quality, conservation values and management, with the ultimate aim of ensuring that an effective statewide forest conservation strategy is put in place.

East New Britain balsa industry strengthening project – Phase II (PNG; PD 7/99 Rev.1 (F))

Budget: ITTO contribution: US$325,468
Government of PNG: US$46,000
Total: US$371,468
Executing agency: Papua New Guinea Forest Authority
Funding countries: Japan, Switzerland

The objectives of this 2-year project are to continue and finalise the work successfully initiated under Phase I in order to improve the institutional and organisational effectiveness of the expanding balsa industry, and to improve local farmer incomes through balsa plantations.

Sustainable management of Missahoé Reserved Forest forestry resource with the participation of the local rural communities for an optimal timber production (Togo; PD 9/99 Rev.2 (F))

Budget: ITTO contribution: US$384,524
Govt. of Togo and Population of Missahoé: US$124,470
Total: US$508,994
Executing agency: Direction de la Protection et du Controle de l'Exploitation de la Flore (DPCEF)
Funding countries: Korea, Japan

The main objective of this 3-year project is to rehabilitate the Missahoé Reserved Forest (1,057 hectares) and restore its production, protection and ecological functions with the involvement of local communities.

Selection and cultivation of fast-growing and high-yielding strains of rubber trees for timber production in Hainan, China (China; PD 10/99 Rev.3 (F))

Budget: ITTO contribution: US$385,138
Government of China: US$107,500
Total: US$492,638
Executing agency: Forestry Bureau of Hainan Province
Funding country: Japan

The objective of this 3-year project is to select a few strains of fast-growing and high-yielding timber-oriented rubber tree species and to use this genetic stock to establish 20 hectares of demonstration rubber plantations.

Development of Lanjak-Entimau Wildlife Sanctuary as a totally protected area – Phase III (Malaysia; PD 16/99 Rev.2 (F))

Budget: ITTO contribution: US$743,775
Government of Malaysia: US$935,000
Total: US$1,678,775
Executing agency: Sarawak Forest Department
Funding countries: Switzerland, Japan

The outputs of this third phase will emphasise conservation through use of timber and non-timber resources, and will help develop the full potential of the Trans-boundary Bentuang-Karimun Lanjak/ Entimau Biodiversity Conservation Area between Indonesia and Malaysia.

International conference on timber plantation development (Philippines; PD 21/99 Rev.1 (F))

Budget: ITTO contribution: US$98,203
Govt. of the Philippines: US$67,100
Total: US$165,303
Executing agency: Forest Management Bureau, Philippines
Funding country: Japan

The main objective of this conference is to disseminate technical information on various timber plantation development technologies and investment opportunities.

Testing of ITTO revised criteria and indicators and dissemination of results applying to Cameroon (Cameroon; PD 23/99 Rev.2 (F))

Budget: ITTO contribution: US$172,136
Government of Cameroon: US$21,932
Total: US$194,068
Executing agency: Office National de Développement des Forêts (ONADEF)
Funding country: Japan

The project aims to (i) test the applicability of the ITTO criteria and indicators for sustainable forest management with a view to producing a specific set of criteria and indicators for Cameroon; and (ii) disseminate these new criteria and indicators to forest stakeholders in the southern part of Cameroon, and train them in their application.

Pilot project for the sustained management of the So'o Lala Forest – Phase II (Cameroon; PD 27/99 Rev.2 (F))

Budget: ITTO contribution: US$246,304
Government of Cameroon: US$372,000
Total: US$618,304
Executing agency: Office National de Développement des Forêts (ONADEF)
Funding country: Japan

The objective of this 30-month project is to address shortcomings in the management of the So'o Lala Forest identified in Phase I and to consolidate the results so that management in the forest can serve as a model of forest management in Cameroon.

A scientific and technical workshop for Southeast Asia on forest restoration for wildlife conservation (Thailand; PD 28/99 Rev.2 (F))

Budget: ITTO contribution: US$36,514
Government of Thailand: US$1,600
FORRU: US$2,700
Other: US$5,650
Total: US$46,464
Executing agency: Forest Restoration Research Unit, Thailand
Funding countries: Australia, USA, Japan

The aim of this workshop is to bring together researchers and practitioners in forest restoration and rehabilitation to produce a research agenda that will most effectively progress the rehabilitation of complex forest ecosystems.

Demonstration community forest management in the natural cloud forests of the Urumba Basin, San Ignacio (Peru; PD 38/99 Rev.1 (F,I))

Budget: ITTO contribution: US$443,100
Government of Peru: US$180,000
Total: US$623,100
Executing agency: National Institute for Natural Resources (INRENA), Peru
Funding country: Japan

The aim of this 2-year project is to increase the standard of living of the rural population in the Urumba Basin through their organisation and participation in the sustainable management of renewable natural resources.

Development of a model forest for sustainable forest management in Thailand (Thailand; PPD 5/99 Rev.1 (F))

Budget: ITTO contribution: US$82,079
Government of Thailand: US$50,600
Total: US$132,679
Executing agency: Forest Research Office, Thailand
Funding country: Japan

This 10-month pre-project aims to promote sustainable forest management in Thailand by providing information and a management plan for establishing a model forest using sustainable management practices.

Initiative to develop a conservation project for the Condor Range region (Ecuador and Peru; PPD 7/99 Rev.1 (F))

Budget: ITTO contribution: US$177,367
Ministry for the Environment (Ecuador) US$12,300
INRENA: US$12,300
Conservation International: US$24,600
Total: US$226,567
Executing agency: Conservation International in cooperation with the Ministry for the Environment of Ecuador and the National Institute for Natural Resources (INRENA) of Peru
Funding countries: USA, Switzerland, Japan

This 6-month project will facilitate development of a management plan to establish an integrated system of protected natural areas along the eastern and western slopes of the Condor Mountain Range, including the ecological protection area established during the peace process (Heads of State of Guarantor Countries' Charter and Brasilia Presidential Act).

Identifying an indigenous forest plantation strategy for fast-growing tropical species in the Nyong Valley (Cameroon; PPD 8/99 (F))

Budget: ITTO contribution: US$31,125

Government of Cameroon: US$17,250
Total: US$48,375
Executing agency: Office National de Développement des Forêts
Funding country: USA

This pre-project will elaborate on results from previous extension work in the Nyong Valley forest area in order to facilitate development of a project proposal to promote private indigenous forest plantations under a new type of partnership between target communities and government forest authorities.

Sustainable tropical forest management through community participation in India (PPD 12/99 (F))

Budget: ITTO contribution: US$59,186
Executing Agency (in kind) US$10,000
Total: US$69,186
Executing agency: Indian Institute of Forest Management
Funding countries: Korea, Japan

This 6-month pre-project aims to identify key management issues required to ensure sustainable forest management in Madhya Pradesh, using the ITTO criteria for sustainable forest management.

Development of Bentuang Karimun Nature Reserve as a national park – Phase I (Indonesia & Malaysia; PD 26/93 Rev.1 (F)) – additional funds

Budget: ITTO contribution: US$37,100
Funding country: Japan

These additional funds will enable publication of a scientific report.

Teak-based multistoried agroforestry system: an integrated approach towards sustainable development of forests (Myanmar; PD 3/98 Rev.1 (F))

Budget: ITTO contribution: US$229,315
Government of Myanmar: US$219,000
Total: US$448,315
Executing agency: Forest Department, Myanmar
Funding country: Japan

This 2-year project in the Myayabinkyaw Reserve Forest in Bago Yoma will establish a teak-based multistoried agroforestry system with the objectives of rehabilitating degraded forests, evaluating the best approach for maximum possible economic returns from planted forests, cash crops and fruit trees, improving soil status and promoting people participation and partnership.

Silviculture and economics of improved natural forest management in Ghana (Ghana; PD 4/98 Rev.1 (F))

Budget: ITTO contribution: US$428,006
Government of Ghana: US$97,200
Total: US$525,206
Executing agency: Forestry Research Institute of Ghana
Funding countries: Japan

This 3-year project aims to increase sustainable timber production in forest reserves by developing improvements to the selection system of natural forest management as practised in Ghana.

First conference of Andean forestry chambers for the sustainable management of natural tropical forests in the region (Ecuador; PD 31/98 Rev.1 (F))

Budget: ITTO contribution: US$105,500
AIMA: US$45,100
Forestry Chambers: US$14,400
Total: US$165,000
Executing agency: Ecuador Timber Industrialists Association (AIMA)
Funding countries: Switzerland, Japan

This conference will discuss the recently revised 'ITTO Criteria and Indicators for the Sustainable Management of Natural Tropical Forests' along with other mechanisms such as forest certification, analyse their performance and promote their application amongst timber industrialists, government forest agencies and NGOs from the Andean Community.

Participatory tropical forest development by women in indigenous communities (Ghana; PD 49/98 Rev.1 (F))

Budget: ITTO contribution: US$589,543
Government of Ghana: US$243,800
Total: US$833,343
Executing agency: 31st December Women's Movement in collaboration with the Ghanaian Forestry Department
Funding countries: USA, Japan

This 3-year project will support the 31st December Women's Movement (an NGO) and indigenous communities in Worobong South of the Eastern Region of Ghana to develop 1,200 hectares of community plantation of teak integrated with indigenous timber species.

Forest fire management in Côte d'Ivoire on an experimental basis (Côte d'Ivoire; PD 51/98 Rev.1 (F))

Budget: ITTO contribution: US$490,966
Govt. of Côte d'Ivoire: US$65,860
Total: US$556,826
Executing agency: Société de Developpement des Forêts (SODEFOR)
Funding country: Japan

The objective of this 3-year project is to contribute to the protection, development and sustainable management of Côte d'Ivoire forests through the establishment of both human resources and equipment systems likely to contain the harmful effects of wildfire.

Division of Forest Industry

Development and implementation of stress-grading rules for tropical timber in the Philippines (Philippines; PD 34/99 Rev.2 (I))

Budget: ITTO contribution: US$577,909
Govt. of the Philippines: US$122,400
Total: US$700,309
Executing agency: Forest Products and Research and Development Institute
Funding country: Japan, USA, Switzerland

The objective of this project is to develop and implement stress-grading rules for timber used for construction in the Philippines (see box below).

IV plywood and tropical timber international congress (Brazil; PD 40/99 (I))

Budget: ITTO contribution: US$175,658
ABIMCI/AIMEX: US$100,000
Total: US$285.658
Executing agency: Brazilian Plywood and Industrialized Timber Association (ABIMCI) and the Timber Exporters Industry Association of Para State (AIMEX)
Funding country: Japan

This project will organise and convene an international congress on plywood and tropical timber in November 1999 in Belem, Brazil.

Human resources development for the improvement of forest industry in Cambodia (Cambodia; PPD 1/99 Rev.2 (I))

Budget: ITTO contribution: US$58,363
Govt. of the Philippines: US$9,400
Total: US$67,763
Executing agency: Cambodian Department of Forestry and Wildlife
Funding country: Japan, Korea, Australia

This 4-month pre-project will provide a detailed analysis of the training needs of the forest industry in Cambodia.

Development of the rubberwood industry in Côte d'Ivoire (Côte d'Ivoire; PPD 11/99 Rev.1 (I))

Budget: ITTO contribution: US$130,504
Govt. of Côte d'Ivoire: US$122,400
Total: US$252,904
Executing agency: Société de Developpement des Forêts (SODEFOR)
Funding country: Japan, Switzerland

This project aims to promote the rubberwood industry of Côte d'Ivoire and assist in the introduction of significant volumes into domestic and international markets.

Division of Economic Analysis and Market Intelligence

Research on value accounting of tropical forest environmental resources and bringing of it in line with the national economic accounting system in China (China; PD 39/98 Rev.2 (M))

Budget: ITTO contribution: US$340,774
Government of the China: US$76,000
Total: US$416,774

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Stress-grading in the Philippines

Grading timber for structural use involves the sorting of sawn timber products into grades with pre-assigned strength values. Uniform grading rules for tropical timbers have the potential to enhance international acceptance of species groups for construction.

In a recent ITTO study, the Philippines' Forest Products Research and Development Institute examined the feasibility of developing and implementing a unified timber stress-grading system in the Philippines. The idea received an overwhelming positive reaction from the timber and construction trades.

With this in mind, the International Tropical Timber Council approved a US$700,000 project last May (PD 34/99 Rev.2 (I)) to develop and implement stress-grading rules for tropical timber in the Philippines. It will be carried out by the Forest Products and Research and Development Institute with funding from Japan, the USA and Switzerland.

For more information contact: Forest Products Research & Development Institute (FPRDI), Department of Science and Technology, College, Laguna 4031, the Philippines; Fax 63–94–536 3630; Tel 63–94–536 3630; Attention: Mr Arnaldo P. Mosteiro

Privatising Sustainable Forestry – a Global Trend

Forest privatisation is proceeding rapidly around the globe. Can non-market values be safeguarded?

by Natasha Landell-Mills

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In this era of economic rationalism and its accompanying trend towards smaller government, the forestry sector initially managed to resist demands for privatisation. Allowing the private sector free reign over the use of forest resources, it was argued, would end in devastation and the disappearance of valuable sources of biodiversity, carbon sequestration, timber and other forest products and services.

Nevertheless, over the last ten years not even forestry has been left untouched. Indeed, the pace of reform has reached unprecedented levels as forestry sectors around the world are being transformed by moves to increase private sector participation.

Working at the International Institute of Environment and Development in London, Jason Ford and I, with help from colleagues in the Forestry and Land Use Programme, recently completed a review of this phenomenon. We drew on information gathered from a survey covering 76 countries and administered to over 330 forestry officials and country specialists, personal interviews, literature and internet searches to compile profiles for 23 countries. These profiles examined reforms aimed at increasing private sector participation and considered the consequences for forestry administrations. We also reviewed a range of market-based instruments being adopted by authorities as tools to control and guide private sector activities.

Increased Private Sector Participation

The evidence we unearthed shows that private entities are indeed becoming dominant players in forestry sectors around the world, with increased private sector participation in all of the countries examined. Governments are encouraging both increased private forest ownership and private involvement in forest utilisation and management.

'… where governments have turned to the private sector to take on new responsibilities for forest ownership, utilisation and management, they have often also attached new requirements aimed at ensuring that extraction is ecologically and culturally sustainable.'

As production functions are privatised, there is a clear trend for governments to privatise management. Where the private sector already controls production, new requirements for private forest management have also been introduced. In Ghana, for instance, the government passed a Forestry Code in 1994 which requires all private operators who receive timber concessions to undertake a variety of new field-level forest management activities, including inventories, the preparation of forest management plans, and silvicultural treatments.

In other cases, authorities have handed forest management tasks to specialised individuals or firms. This occurred in Bolivia with the passing of its 1996 Forest Law, which specifies that forestry operators are required to hire an officially registered professional to prepare forest management plans. These professionals are also responsible for supervising the implementation of the plans.

A Continued Role for Governments

Despite this rapid shift towards private sector participation, governments are not completely abandoning their influence and control in the sector. They are, for the most part, aware of the social and environmental benefits of forest resources such as watershed protection, carbon sequestration and biodiversity preservation. In contrast, because they are often not sold in markets and do not earn revenue, such benefits tend to be ignored by private operators.

So, where governments have turned to the private sector to take on new responsibilities for forest ownership, utilisation and management, they have often also attached new requirements aimed at ensuring that extraction is ecologically and culturally sustainable. Ghana's policy to hand forest management responsibilities to private operators noted above was, in fact, part of a broader strategy to introduce stricter environmental requirements. Additional conditions attached to concession or lease agreements in state forests have also been introduced in Cameroon, Indonesia, Malaysia, Honduras, Bolivia and Papua New Guinea.

Table 1: Market-based instruments introduced to encourage sustainable forest management

Country	Market-based instrument	Details
Cameroon	Revenue system linked to forest stumpage value	In 1996 the government introduced an auction-based area tax to raise revenues and ensure they more closely reflect the resource stumpage value.
Malaysia	Performance bond	Applied to forest harvesting and plantation establishment. In Sarawak, bank bonds are required by companies engaged in harvesting activities in order to guarantee royalty payments.
Brazil	Compensation payments	Three states (Panama, Rio de Janeiro and São Paulo) link payments to municipalities to their performance in environmental protection.
Indonesia	Trade liberalisation	Abolished the log export ban and dismantled body controlling plywood exports in 1998. In addition, export taxes were reduced from 200% to 30% and there are plans to further lower taxes to 10% by 2000.
Bolivia	Certification	National FSC-approved standards are being developed; third party certification has been incorporated into 1996 Forest Law as an official alternative to 5-yearly audits required by government.
Honduras	Global transfers	A United States Initiative on Joint Implementation-approved project exists between the Edison Electric Institute's International Utility Efficiency Partnership, the government and processors to recycle wood waste to produce energy while cutting carbon emissions.

Market-based Instruments

The imposition of new controls over private forestry is only one way in which authorities have attempted to ensure minimum standards of forest management. More interesting has been the increased attention given to market-based instruments to complement, and in some instances substitute for, 'command and control' measures. The market-based instrument approach aims to alter the market signals facing the private sector in such a way as to make sustainable forest management more profitable, and thus more attractive, than unsustainable practices. It includes efforts to reform forest revenue systems, the introduction of explicit financial incentives, changes in the conditions attached to forest use rights, trade liberalisation, promotion of markets for non-timber benefits, forest certification, and global transfers for forest conservation.

Of the countries considered in our review, all have introduced at least one of these market-based instruments in the last ten years. Table 1 provides examples for ITTO member countries.

Forest Authority Restructuring

Transformations in the forestry sector have not stopped there. In handing over public sector responsibilities to private entities, the functions of forest authorities have been altered. In many cases governments have taken the opportunity to restructure authorities to fit their new role and to improve efficiency. Not only have governments sought to increase contracting out, some have created new autonomous entities both inside and outside the public sector. Contracting out, corporatisation and/or privatisation of (all or specific) functions undertaken by forestry authorities characterise 70 per cent of the countries considered in our review.

Conclusion

Perhaps the clearest message from our review is that, far from petering out, forestry reforms aimed at increasing the role of forest users in managing and maintaining the resource are gaining momentum. Increasingly, forestry sectors around the world will exhibit a number of common features. These include:

- stricter requirements for forest management supplemented by market-based instruments;
- a growth in the use of certification;
- increased involvement by private operators in conservation through options to exploit non-timber products such as biodiversity and ecotourism;
- increased requirements for companies to involve local communities in planning, forest use and management; and
- new opportunities for private entities to take on forestry authority functions as contractors to the government.

This article reports some of the findings of Privatising sustainable forestry – a global review of trends and challenges *by Natasha Landell-Mills and Jason Ford (1999). It is available from the International Institute for Environment and Development's bookshop in London: Tel 44–171–388 2117;Fax 44–171–388 2826; Email bookshop@iied.org*

ITTO's Project Work: a Briefing
Continued from page 10

Executing agency: Chinese Academy of Forestry
Funding countries: Japan, Switzerland

This project will accomplish the current stock and value accounting of China's tropical forest environmental resources; enumerate tropical forest values; and form a theory and methodological system for the accounting of tropical forests. It will also propose scenarios for bringing such accounting into line with the national economic accounting system.

Development and installation of a computer management system for the control of forest production in Gabon (Gabon; PD 15/98 Rev.2 (M))

Budget:	ITTO contribution:	US$471,691
	Government of the Gabon:	US$248,400
	Total:	**US$720,091**

Executing agency: Directorate for Forest Inventories, Management and Regeneration
Funding country: Japan

This project aims to establish a management information system contributing to the acquisition of reliable and up-to-date information concerning forest production activities, and integrating it with the different technologies and computer systems already set up within the Ministry of Waters & Forests.

Establishment of a national statistical information system for imported timber and timber products (Egypt; PD 40/96 Rev.5 (M))

Budget:	ITTO contribution:	US$274,300
	Government of the Egypt:	US$230,000
	Total:	**US$504,300**

Executing agency: Central Administration for Afforestation
Funding country: Japan

This project will establish a national statistical information system to collect, process, analyse and disseminate information relating to the timber sector.

Development and implementation of an educational program to inform the wood products distribution chain of the value of using tropical timbers from all ITTO member countries (Ghana; PD52/97 Rev.2 (M))

Budget:	ITTO contribution:	US$120,000
	Total:	**US$120,000**

Executing agency: Ghana Timber Export Development Board
Funding country: USA

This project will undertake a literature development and distribution program to disseminate the view that buying tropical timber products can improve tropical forest management.

Other Activities

Council provided funding for a number of other activities of the Organization. For example, Japan and the USA provided funds for the ITTO Fellowship Program (see box p 21) and the 18th Meeting of the Expert Panel for the Technical Appraisal of Project Proposals. Switzerland, Japan and the USA provided funds to publish and distribute the recently prepared 'Manual for the application of criteria and indicators for sustainable management of natural tropical forests' (see story p 2).

IUFRO On-line

Proceedings of IUFRO meetings are kept in a reference library at the IUFRO Secretariat. They can be obtained on-line at: http://iufro.boku.ac.at

IFF Addresses Market Access

The Intergovernmental Forum on Forests and other institutions stress the link between sustainable development and market access for timber

by Amha bin Buang

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At the historic Earth Summit held in Rio de Janeiro in 1992, the principles of sustainable development were adopted as the foundation for integrating environment and development. In essence, these principles proclaim that development is an inalienable right but that it should be accompanied by protection for the environment. Agenda 21 was also adopted at the Earth Summit as the blueprint for achieving global sustainable development.

International cooperation was identified in Agenda 21 as a critical part of efforts to achieve sustainable development, particularly in developing countries. Specifically, Chapter 2 of the Agenda stresses that the international economy should provide a supportive international climate for achieving both environmental and development goals by, among other things, promoting sustainable development through trade and making trade and the environment mutually supportive. Under the specific program area of promoting sustainable development through trade, the salient objectives to be attained include:

a) to promote an open, non-discriminatory and equitable multilateral trading system that will enable all countries, particularly developing countries, to improve their economic structures and the standard of living of their populations through sustained economic development;

b) to improve access to markets for the exports of developing countries; and

c) to improve the functions of commodity markets and achieve sound, compatible and consistent commodity policies at the national and international levels with a view to optimising the contribution of the commodity sector to sustainable development.

Within this framework, the relevance of market access to sustainable development lies in the fact that market access is a critical aspect of trade, which, in turn, is an integral component of development. Improved market access will facilitate international trade, enabling economies to grow, strengthen, create wealth and generate foreign exchange and export earnings. These benefits will help countries to combat poverty and other pressing development issues, and enhance their capacity to protect the environment. To the extent that sustainable development can be promoted through trade, efforts should therefore be directed towards promoting trade liberalisation and expansion and improving market access on the one hand, and addressing protectionism, trade restrictions, tariff escalation and trade discrimination on the other.

'Improved market access will facilitate international trade, enabling economies to grow, strengthen, create wealth and generate foreign exchange and export earnings. These benefits will help countries to combat poverty and other pressing development issues, and enhance their capacity to protect the environment.'

What Progress has been Made?

In 1995, the United Nations Commission on Sustainable Development (UNCSD) reviewed the progress that had been made towards implementing those parts of Agenda 21 relevant to forests. This led to the establishment of an ad hoc open-ended Intergovernmental Panel on Forests (IPF), which was to facilitate an intergovernmental policy dialogue on forests. It was asked to pursue a consensus and formulate options for further actions to combat deforestation and forest degradation and to promote the management, conservation and sustainable development of all types of forests. On trade and environment, the IPF was requested to, among other things, identify opportunities and recommend measures for improving market access for forest products on a non-discriminatory basis and to consider factors that might distort the trade in and the value of forest products.

In July 1995, an informal high-level Inter-Agency Task Force on Forests was formed to coordinate the inputs of international organisations into the IPF process. As a member of this taskforce, ITTO was requested to act as lead agency and facilitator for IPF Programme Element IV: Trade and Environment in Relation to Forest Products and Services. One of ITTO's contributions in this regard was the commissioning of a background document on trade and environment undertaken by Edward B. Barbier, which was duly considered by the IPF. On market access and trade barriers, the paper noted that international market access will be a key factor in determining the long-term success of a global policy to encourage sustainable forest management through trade. The Uruguay Round Agreement was seen as an important and positive step towards encouraging sustainable forest management globally, having achieved further reductions in most tariff barriers for forest products and reduced uncertainty by the binding of tariffs in major importing markets and by reducing the degree of tariff escalation. However, the value of these changes could be overshadowed by 'new' barriers in the form of export restrictions imposed by developing countries to encourage domestic processing of tropical timber for export. And they could be further diminished by environmental and trade restrictions on production and exports in developed countries, such as quantitative restrictions on imports of 'unsustainably produced' timber products. The report highlighted the possible use of these restrictions as a way of gaining unfair competitive advantages or of limiting access by imports into consumer markets.

On the basis of the outcomes of its four sessions, the IPF finalised and presented its report to the UNCSD at its fifth session in April 1997. Of more than 100 substantive conclusions and negotiated proposals, 12 conclusions and 27 proposals for action were made under

Programme Element IV. Some proposals for action on market access were discussed without reaching a consensus.

The consensual proposals for action adopted by the IPF on market access included:

- urging the study of environmental, social and economic impacts of trade-related measures affecting forest products and services;
- requesting countries to undertake the reduction of tariff and non-tariff barriers to trade in accordance with existing international obligations and commitments; and
- urging countries to formulate and implement voluntary codes of conduct for promoting sustainable forest management for relevant target groups involved in forestry.

Consensus was not reached on:

- options to ensure that forest products from all types of forests are subject to non-discriminatory rules and multilaterally agreed procedures; and
- the relationship between obligations under international agreements and national measures, including actions imposed by subnational jurisdictions.

Forum on Forests Deliberates

The United Nations General Assembly decided in June 1997 to continue the intergovernmental policy dialogue on forests through the establishment of the ad hoc, open-ended Intergovernmental Forum on Forests (IFF) under the aegis of the UNCSD. One of the IFF's tasks is to consider matters left pending when the IPF was dissolved, including those related to trade and environment. The Report of the IFF is expected to be submitted for the consideration of the UNCSD next year.

At its first session in October 1997, the IFF decided to consider a number of market access issues. These included:

- non-discriminatory international trade in forest products from all types of forests;
- the role of tariff and non-tariff barriers in relation to sustainable forest management;
- relevant certification issues;
- improved market access;
- the relationship between obligations under international agreements and national measures including actions by subnational jurisdictions;
- the relative competitiveness of wood versus substitutes;
- valuation;
- market transparency; and
- illegal trade in wood and non-wood products.

At its second session, the IFF dicussed an updated report by Edward Barbier on trade and the environment. This document reiterated that export restrictions to encourage domestic processing of tropical timber, environmental and trade restrictions on production and exports that affect international trade patterns, and quantitative restrictions on imports of timber products still pose a potential threat to market access. It also raised other issues, including the growth of illegal activities in the timber trade, and the listing of commercially important tropical timber species in the appendices of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) as a means to control or limit the global forest products trade.

The task now facing the IFF is the negotiation of a draft report prepared by the co-chairmen on this program element. The issues involved are contentious, and negotiations have been necessarily slow; nevertheless, substantial progress was made during the third session last May. Of the conclusions agreed to so far, those related to market access include:

- achieving trade in wood and non-wood forest products and services from sustainably managed forests;
- avoiding policies that have adverse effects on trade or sustainable management of all types of forests;
- ensuring that trade liberalisation must not be a vehicle for undermining domestic environmental and health standards;
- paying attention to remaining and emerging trade restrictions which constrain market access, particularly for value-added products; and
- ensuring that trade measures intended to promote sustainable forest management should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

Consensus has yet to be reached on: the notion that increased market transparency is essential to improve market access for forest products and services, including those coming from sustainably managed forests; and the nature and extent of illegal trade in wood and non-wood forest products, including forest biological resources.

Proposals for action

The IFF has agreed on proposals to urge countries to contribute to achieving trade in wood and non-wood products and services from sustainably managed forests, and to call upon countries to consider appropriate national-level actions and promote international cooperation to reduce the illegal trade in wood and non-wood forest products. But consensus has yet to be reached on the proposal to support continued efforts by the World Trade Organization towards trade liberalisation with special attention to removing remaining and emerging trade restrictions which constrain market access, particularly for value-added products. Nor has consensus been reached on the proposal relating to ensuring that certification and/or voluntary labelling schemes do not lead to unjustified obstacles to market access.

The fourth and final session of the IFF will be held from 31 January to 11 February 2000. It will be the last opportunity for outstanding matters to be resolved within the IFF; there is guarded optimism that the remaining issues related to market access for timber products will be resolved.

Can ITTO Find an Up-side to the Downturn?

At the Annual Market Discussion held during the May 1999 session of the International Tropical Timber Council, trade representatives suggested action that ITTO could take to address the downturn in the international tropical timber trade

Mr Barney Chan, General Manager of the Sarawak Timber Association chaired the Market Discussion. This informal forum comprised an overview of trends in the trade by the Secretariat, presentations by consultants undertaking the market access and market downturn studies, and an industry panel presentation. The general theme was 'The downturn in the world tropical timber market and the positive contributions that ITTO should make'.

Council Members have clearly grasped the seriousness of the downturn affecting the industry; the consultants' reports alerted everyone to the longer-term downturn in the consumption of tropical timber and the need for action.

During the discussion, trade representatives called on ITTO to play a more active role in tropical timber market development. Recommendations for action fell broadly into three main areas:

1. the need for more balanced project work to correct an over-emphasis on forestry issues to the neglect of trade and industry;
2. promotion and educational activities to address the many misconceptions in the tropical timber marketplace; and
3. the need to explore prospects for mutual recognition of certification and verification schemes in order to reduce confusion over the various schemes being developed.

These are discussed in more detail below.

A Balanced Work Plan for ITTO

Several producer and consumer trade members highlighted the imbalance in the funding and work of the three ITTO divisions: the Division of Reforestation and Forest Management attracts a far greater proportion of funds than do the divisions of Forest Industry and Economic Information and Market Intelligence. Calls were made for a more balanced distribution of the work of the Organization. For example, several speakers requested that in addition to current activities to investigate the reasons for the downturn in trade, ITTO could fund studies to analyse the competitiveness of tropical timber products versus alternatives and substitute products.

'The forum strongly recommended that ITTO develop its promotional and public relations activities to address negative perceptions of the tropical timber trade. ITTO should also be working to further develop its own image.'

Promotion and Education

There was almost unanimous agreement among attendees of the Market Discussion that ITTO could contribute significantly to the promotion of the tropical timber trade. While it was agreed that market promotion should be left to private companies and national promotion bodies, ITTO does have the opportunity, and indeed the responsibility, to contribute positively.

The forum strongly recommended that ITTO develop its promotional and public relations activities to address negative perceptions of the tropical timber trade. ITTO should also be working to further develop its own image. In addition to highly recommended sector studies and trend analyses, a call was made for ITTO to develop a mechanism for identifying, packaging and disseminating more information useful for the trade. Trade representatives expressed a willingness to offer advice and support to ITTO in any activities to establish a mechanism for identifying and packaging information destined for the trade.

Participants in the Market Discussion also noted the need for improved statistical capability in member countries to facilitate forest sector planning. ITTO should undertake long-term sector studies in collaboration with other relevant organisations to provide members with market information and forecasts.

Certification

The issue of certification and assessment of forest products is clearly here to stay; many countries have their own certification or assessment initiatives under way. In the consumer countries, particularly in Europe, there is a growing expectancy on the part of consumers that the wood products they buy meet certain environmental standards.

ITTO members have accepted the pioneering ITTO Criteria and Indicators for the Sustainable Management of Tropical Forests as the foundation for sustainable forest management. What is needed now is for ITTO to promote the adopted criteria and indicators in a more pro-active way. Further, it should encourage increased awareness of the currently available certification and verification schemes. Alarm bells have already sounded in the trade over confusion in the marketplace regarding the various certification and verification schemes that are being developed and promoted.

ITTO as Information Broker

The Market Discussion brought forward many positive and constructive suggestions and generated considerable consensus among participants. Novel proposals for action by ITTO included forming a trade working group and holding a special 'timber day'. But, clearly, participants expect ITTO to play a key role as a provider of information that increases transparency in the trade, minimises confusion in the marketplace, and promotes the message that a tropical timber trade based on sustainable forest management is critical for the well-being of the tropical forests. ■

Characterising the Downturn

What impact has the downturn had, and what lessons can be learned?

by Geoffrey Pleydell[1] and Ivan Tomaselli[2]

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A downturn in the tropical timber trade can be observed for some tropical timber products and some regions over at least the last decade, for all sorts of reasons including changing consumer preferences, environmental concerns and wood supply. But the task of our current ITTO study concerns more recent economic events, collectively labelled the 'Asian crisis'. This refers to a collapse of confidence in 1997 on the part of the international financial sector in the value of local currencies.

The crisis manifested itself technically on 2 July 1997 when the Government of Thailand released its currency, the baht, from loose association with the US dollar, triggering an immediate fall in value of more than 20 per cent. Among the worst-hit countries were some of the world's biggest tropical wood exporters – Indonesia, Malaysia and Papua New Guinea – along with three big importers – Thailand, the Philippines and South Korea.

As the magnitude of the crisis became apparent, concerns were raised in ITTO and elsewhere about its impacts on the tropical timber trade. We were subsequently engaged by ITTO to investigate these impacts; here we report some of our interim findings, which were also delivered to the 26th Session of the International Tropical Timber Council last May. A final report will be completed later this year.

Tropical Timber Downturn

For our interim report, we decided to limit visits to Japan and Malaysia, these countries being logistically convenient. For the final report, information is being sought from other countries and regions; nevertheless, the focus will remain strongly on Asia, because it has the biggest share of world trade in tropical wood and was also the centre of the 1997 financial crisis.

Extent of Changes in Trade in Selected Countries

Figure 1 shows change in the value of 'all timber trade', per cent change in the tropical timber trade, and change in gross domestic product (GDP) of selected countries for 1998 relative to 1997. From the data presented it is clear that both the crisis and a timber market downturn started in 1997 and became worse in 1998.

The largest reductions in tropical timber imports were observed in Thailand with a reduction of 70 per cent and in Korea with 40 per cent. Japan showed a 30 per cent reduction in trade values of imported timber products; since it is the largest importer by far, this drop constituted the biggest overall.

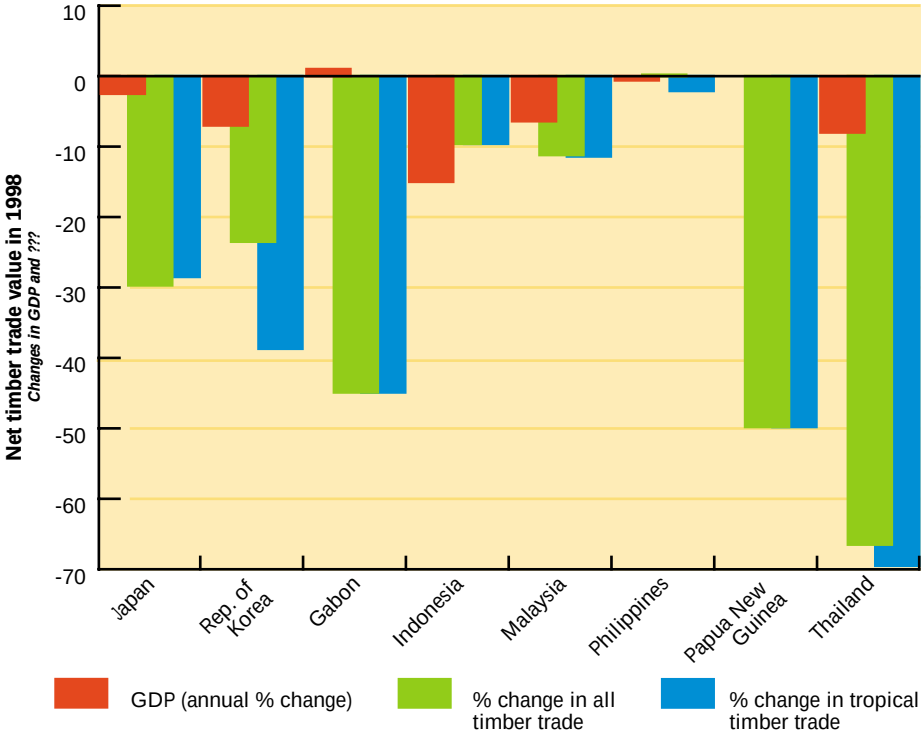
The market downturn in the tropical timber trade appears to have affected all exporting countries but predominantly Asian ones, with a stronger effect evident in countries exporting logs (such as Gabon and Papua New Guinea) than in those exporting processed/value-added wood products (such as Malaysia and Indonesia).

Price Downturn

Price indices are presented in Figure 2. The data show that prices for logs, sawnwood and plywood followed basically similar patterns: price falls started during the last months of the first semester of 1997 and accelerated during the second semester. The lowest level was in August 1998.

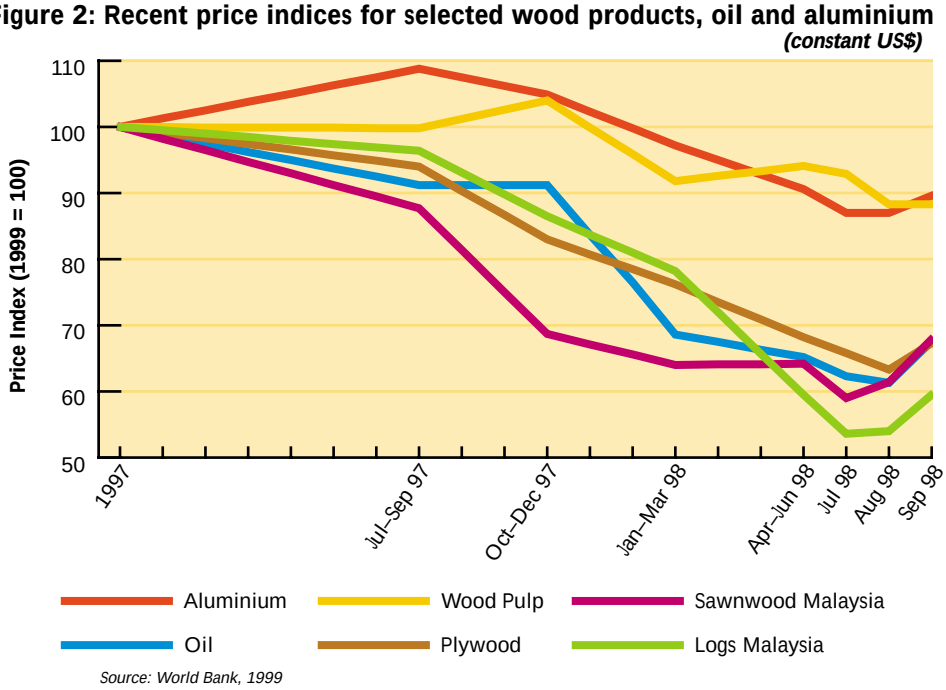
Tropical logs were the most affected. At the lowest level (June 1998), prices were 46 per cent lower than the average for 1996. Tropical plywood and sawnwood achieved their lowest level at about the same time, with a reduction of around 40 per cent.

Figure 1: Changes in timber trade value and GDP of selected countries in 1998



Sources: GDP estimates – IMF 1998; Trade values – ITTO estimates

Figure 2: Recent price indices for selected wood products, oil and aluminium



Source: World Bank, 1999

Figure 2 also shows that for aluminium, a product competing with wood in some markets for some applications, price movements were much smaller over the period than were those for tropical wood. This requires further analysis: it could be that tropical timber products, especially primary products, are more susceptible to changes in the international economy than are other timber products or competing products.

The fall in log prices over the last two years was not equal for all species and sources of supply. For example:

- it was mainly concentrated in Asia. Although logs from different sources in the region demonstrated much the same price performance over the last two years, the most severe price reduction was for *Calophyllum* logs (from the Solomon Islands). They were already at very low price levels in January 1998 (47 per cent reduction over January 1997), but by May 1998 had fallen by 55 per cent;
- African log prices remained relatively stable over the period.

Data collection is still in progress, and details at country level will be included in the final report. However, at this stage, most of the information for Malaysia has been gathered (see Figure 3), enabling the following comments to be made:

- the value of tropical timber exports from Malaysia in 1998 declined to 1991 levels, erasing the considerable gains made in the intervening period;
- reductions in exports were not uniform for all products, with plywood most affected; and
- value-added products were less affected (furniture dropped by only three per cent), and for some products there was even an increase in export value.

Preliminary Conclusions

In 1999, trade and prices in tropical timber appear to have staged a considerable recovery. Indeed, initial discussions in Asian countries preceding this interim report showed as much, if not more, concern about tropical wood supply and product substitution than about the impact of the crisis. But it is important to see if lessons from the crisis can be learnt by the tropical timber trade in order to safeguard against future shocks.

We know now that the timber industry is very much at the mercy of macro-economic events. In a major financial crisis the industry suffers heavily and so do its employees and their families. In countries where the timber industry forms a significant part of the economy, any failures and weaknesses in the industry only add to national problems.

A harsher view holds that the crisis may have served to rationalise the industry. For example, it may have led to improvements in the balance between industrial and forest capacity and removed some of the more inefficient units. However, we suggest that a financial crisis is not the best way to tidy up an industry.

The financial crisis in parts of Asia in 1997 created problems within the forestry sector at policy, production and trade levels. For example, tropical timber-exporting countries came under pressure to increase exports to counteract a loss in value of local currency. But any proposals to this end must be examined to ensure that they do not, in the short term, cause greater depression of prices or, in the longer term, damage progress towards sustainable forest management.

The crisis created a situation whereby some key wood-importing Asian countries could not finance imports to meet even residual demand from their depressed economies. This was a reflection of pressures on credit systems and on the banking sector. The stability and existence of the timber industry and trade are dependent on access to financial machinery. The banking sector in the hard-hit Asian economies has come in for severe criticism; it is to be hoped that lessons will be learned which will enable the financial sector to maintain services to assist the timber trade in terms of productivity and marketing.

The value of local currencies was severely depressed during the crisis. International financial interests removed capital from high-risk countries and exacerbated the situation. Endeavours to protect the exchange value of local currencies created a period of uncertainty that saw dramatic fluctuations in the exchange rate. This meant that even if other conditions had permitted, confidence in taking on new business was undermined because it was not possible to be sure of costs. Exchange rate stability is a key factor in international trade: the work of international institutions concerned with such matters should be encouraged.

Timber companies should put themselves in a position to manage foreign exchange risks. Perhaps the responsible use of hedging mechanisms should be explored. The possibility

of a futures market for tropical wood products has been raised from time to time, but so far the range of products, specifications, species and volumes traded has been a disincentive.

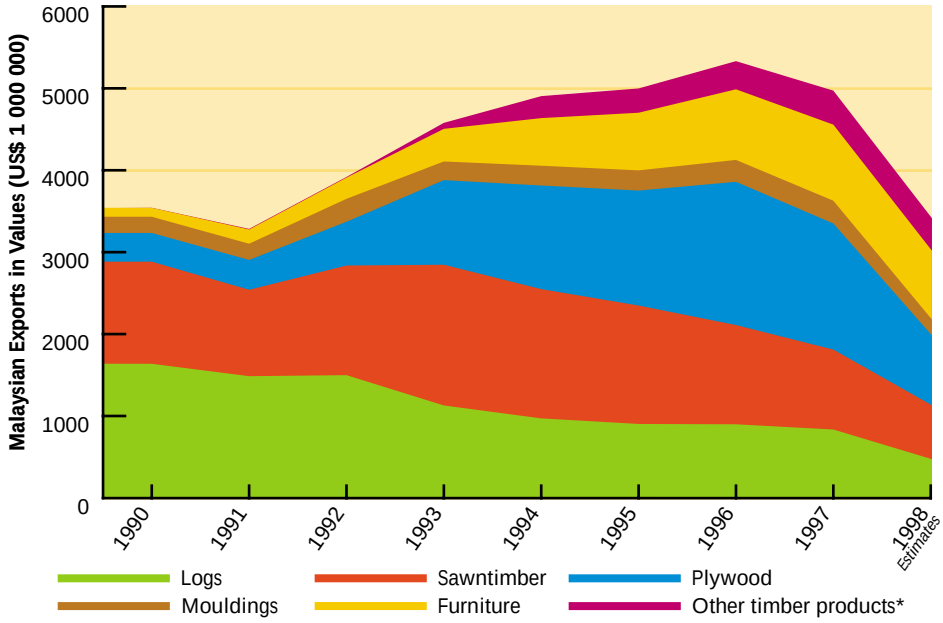
Timber companies are increasingly trading internationally in major hard currencies. This has the added advantage of assisting price comparison and transparency. Intergovernmental financial institutions, dismayed by the crisis and concerned about its global effects, have even discussed the somewhat distant concept of a global currency, and reference has been made to the encouragement of 'dollarisation'.

The tropical timber sector has no direct influence at that level, but its voice should be added to calls for internationally accepted processes that iron out sudden large movements of uncommitted capital. There is perhaps a greater role for ITTO in establishing links with the World Trade Organization and other bodies.

At the trading level, the crisis may have reminded timber companies of strategic and tactical marketing actions which, whilst not removing the dangers, may help ameliorate the situation. Diversification of markets and products may help iron out fluctuations in demand, even at the risk of sacrificing some profitability. The creation of good relations in business also seems key: it may mean that a buyer continues with one company's product in preference to that of competitors who have invested less in such aspects as reliability, punctuality, quality, and prompt and fair dealings over claims.

Timber companies need to be aware of the overall economic health of and risks associated with the countries they are selling to. Trade associations might improve their efforts to forecast future market conditions for their members – particularly the smaller companies.

Figure 3: Trends in Malaysian tropical log and tropical timber products, 1990–98



*Other timber products include Particleboard, Chipwood and Builders Carpentry and Joinery

Source: MTIB

Better communication to the wider public needed

The tropical timber trade continues to be the subject of criticism on environmental grounds; although non-tropical wood sources have also come under fire, the tropical industry has lost some markets as a result. ITTO should help communicate positive messages about tropical forests and tropical wood, directed towards the broader range of non-timber specialists and the world's media. ITTO might also look to see how it can function more strongly in the field of improving conditions of trade in the stabilisation and security of markets for tropical wood – both as a forum for discussion and as an active communicator to other international institutions.

Market Access Study

In May 1998, the International Tropical Timber Organization commissioned two consultants, Tan Sri Dato' Wong Kum Choon and Mr Michael Ginnings, to determine impediments to market access of tropical timber in exporting and importing member countries. The two consultants duly presented their report to the International Tropical Timber Council last May. They concluded that there were a number of such impediments in importing countries, including the availability of low-cost timber and non-timber substitutes and the presence of tariffs in some product categories. The consultants also found that environmental concerns about tropical deforestation restricted market access to tropical timber, particularly in countries such as the UK, Germany, the Netherlands and Belgium. They made a series of recommendations, including the dissemination of more factual and balanced information on the causes of tropical deforestation and the role of trade in promoting sustainable forest management.

With this in mind, the Council requested ITTO member countries to present information at the 28th Session next May on measures they are undertaking to eliminate possible obstacles to market access for tropical timber "as a possible means to facilitate sustainable forest management". It also requested ITTO's Executive Director to foster better understanding of the role and activities of ITTO in member countries as well as the role of the tropical timber trade in contributing towards sustainable forest management. And it requested the Executive Director to undertake a survey and analysis of existing auditing systems for demonstrating sustainable tropical forest management and to identify options for further ways of improving market opportunities for tropical timber. This report will be presented to the Council next May.

Data Sources

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World Bank 1999. *Global Commodity Markets: a Comprehensive Review and Price Forecast.* Washington, DC. 7:1, 42 pp.

The authors express their debt of gratitude to the many people and organisations who went out of their way to assist in this study.

Optimism amongst tropical timber exporters at last seems justified

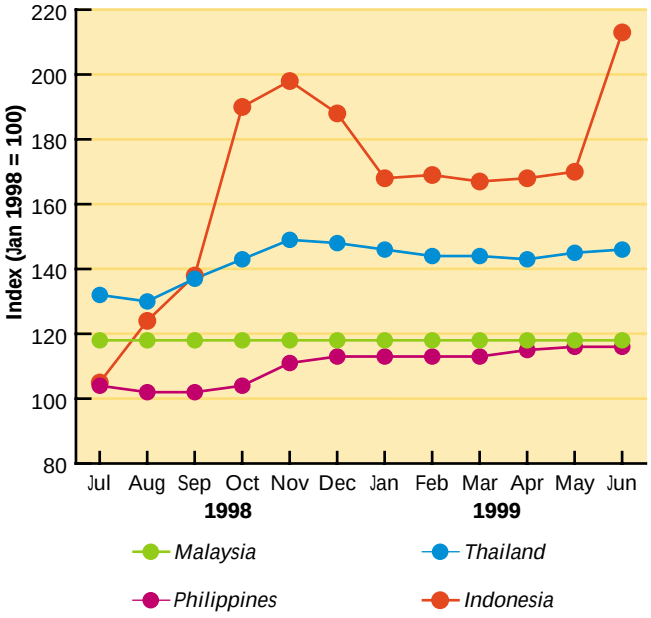
By Michael Adams
ITTO Secretariat

July1999 was the second anniversary of the beginning of the Asian crisis: it was in July 1997 that the Thai baht was floated, triggering a round of currency devaluations throughout Asia. The situation today is much improved.

Strengthening Asian Currencies

Over the past 12 months, currencies in the Asian producer countries have strengthened considerably from the lows experienced during the worst of the crisis, as can be seen in Figure 1. There now seems to be real momentum in the strengthening of the currencies and, over the past six months, some of the wide fluctuations, a feature of the trends in early 1999, are now under control.

Figure 1: Trends in exchange rates for Asian currencies



> *'The managed stability of the yen has encouraged Japanese buyers to risk longer-term commitments and there is an encouraging stability in the market as a result.'*

Between January and June 1998 the Thai baht strengthened by around 35 per cent against the US dollar, while the Philippine peso and the Indonesian rupiah posted more modest gains of between five and ten per cent. The Malaysian ringgit fell to below 4.5 to the dollar in 1998 but was taken out of trade at a fixed rate of 3.8 to the dollar in late 1998. At the present time, 3.8 to the dollar is considered undervalued (in relation to the baht and peso) and an adjustment of the fixed rate of exchange is anticipated.

Between January and June 1999 the Asian currencies maintained their strengthened positions and, with the exception of the Indonesian rupiah, traded against the dollar in fairly narrow bands. The Indonesian rupiah, the worst-affected currency during the crisis in late 1997 and early 1998, has moved rapidly from a low of Rph 14,750 to the dollar in January 1998 to around 8,500 to the dollar in mid 1999. In July 1999 the rupiah was at a high of 6,900 to the dollar, but still well below the 2,500 level of before the crisis.

In the main Asian consumer countries, Japan, Korea and China, the fortunes of the currencies have been mixed, as indicated in Figure 2. To the relief of suppliers, the yuan has been maintained at around 8.27 to the dollar despite periodic rumours of devaluation. The Korean won has staged a welcome comeback, moving from a low of 1,750 to a level of 1,150–1,160 in July 1999. As imports have grown cheaper, Korean buyers have become a welcome sight in the market.

In Japan, after erratic swings in the value of the yen in the range 140–120 to the dollar, the currency was held in a narrower range of 115–120, with the Bank of Japan intervening to sell yen whenever it strengthens too much. The managed stability of the yen has

Figure 2: Currency rate fluctuations in East Asian consumer countries

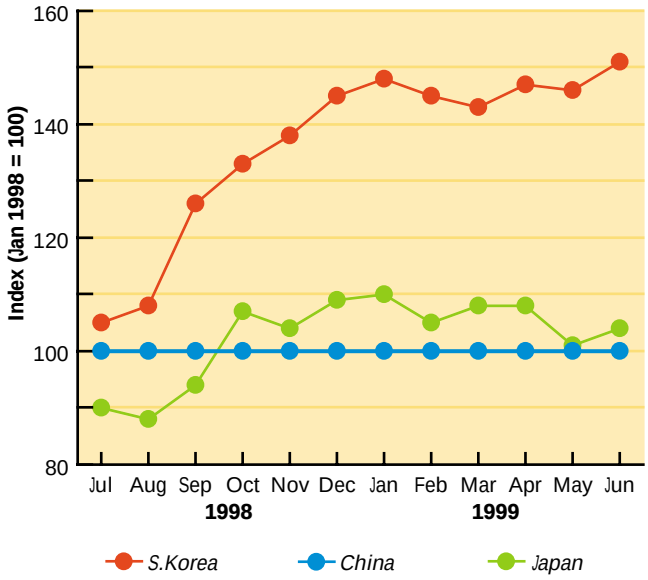
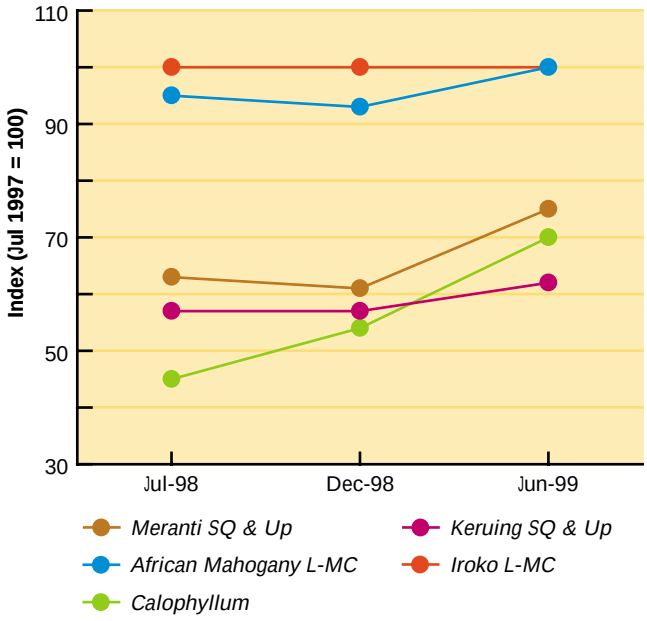


Figure 3: Trends in tropical log FOB prices



encouraged Japanese buyers to risk longer-term commitments and there is an encouraging stability in the market as a result.

All of the currencies have strengthened against the dollar. Capital flows are improving and, most of all, some stability and confidence is returning. All this is welcome news for exporters.

Adding to the good news are some clear signs of improvement in FOB prices in Southeast Asia for tropical logs, plywood and sawnwood. However, Latin American exporters, notably Brazil and Bolivia, continue to suffer currency instability. This has affected the export trade: buyers are adopting a wait-and-see attitude, suspecting that currencies may weaken further.

Log Price Trends

The trends in prices for some tropical logs are shown in Figure 3. Countries in Southeast Asia and the Pacific continue to be the major log suppliers, although West African suppliers are now topping the list of log suppliers to China. Meranti, keruing and PNG *Calophyllum* log prices have all improved over the past 12 months. However, all are still off their highs of mid 1997 prior to the Asian crisis. The greatest improvement has been seen since the beginning of the year.

From around US$120–125 FOB per m^3 in mid 1998, prices for meranti and keruing had moved up by about 15 per cent as of June 1999. Prices for both species had been flat in the last half of 1998 and it was largely concern in the market about a weakening supply of logs that allowed prices to move up. The poor logging conditions and resultant low log stocks in supply countries came at a time when both Japan and Korea began to see an improvement in demand, which further fuelled price movements.

In West Africa, log prices have remained very stable throughout the past turbulent months. African suppliers are more closely aligned to the European and Chinese markets and have benefited from strong demand in China and steady demand in Europe. By way of example, prices for iroko logs, as shown in Figure 3, have remained steady; they are currently around CFA Franc 1,650 per m^3, much the same as in mid 1997.

'Perhaps the most severely hit of ITTO's log producer countries during the crisis period was Papua New Guinea … Nevertheless, prices for PNG logs are improving and are now up more than 25 per cent compared to the end of 1998.'

Perhaps the most severely hit of ITTO's log producer countries during the crisis period was Papua New Guinea, where log prices fell to a low of 45 per cent of the price received in mid 1997. At less than US$75 per m^3, sometimes less for log stock disposal, producers have suffered and many companies stopped operations. Nevertheless, prices for PNG logs are improving and are now up more than 25 per cent compared to the end of 1998.

Sawnwood Price Trends

As of June 1999, prices for sawnwood shown in Figure 4 are all off the levels seen in mid 1997, some by as much as 25 per cent. But this is a dramatic improvement compared to levels of 12 months earlier, when falls of as much as about 50 per cent were recorded – especially for Southeast Asian species.

Sawn dark red meranti, select and better, was traded at between US$350–375 in June 1999, still some US$90–100 below prices seen 12 months earlier. One serious consequence of the currency turmoil in Asia has been the reluctance of predominantly European buyers to commit to purchases, having been caught with high-priced stocks and falling FOB price structures. The small orders and short delivery demands have proved costly to suppliers.

Low stock levels in Europe combined with continued negative environmental perceptions about tropical sawnwood have further weakened the market position of this product. Competitive suppliers of mainly temperate hardwood alternative species have capitalised on this and gained market share.

African and Latin American sawnwood prices have fared better. Figure 4 shows that both iroko and Brazilian mahogany have

Figure 4: Tropical sawnwood FOB price trends

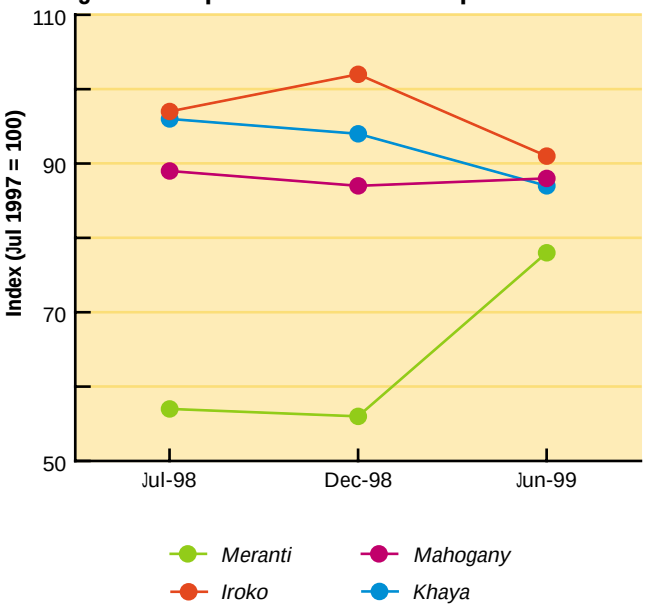
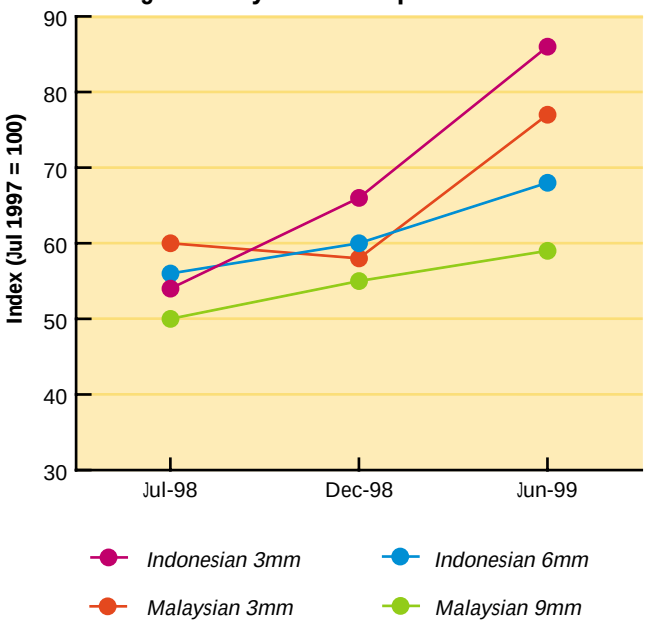


Figure 5: Plywood FOB price trends



managed to sustain price levels close to those of mid 1997. Both species have a fairly diversified market spread over Europe and, especially for Brazilian mahogany, the US, which has shielded these species from the free-fall in prices seen for some Southeast Asian timbers. In the case of Brazil, price declines in US dollar terms can be explained largely by the short sharp devaluation and the equally fast strengthening of the real.

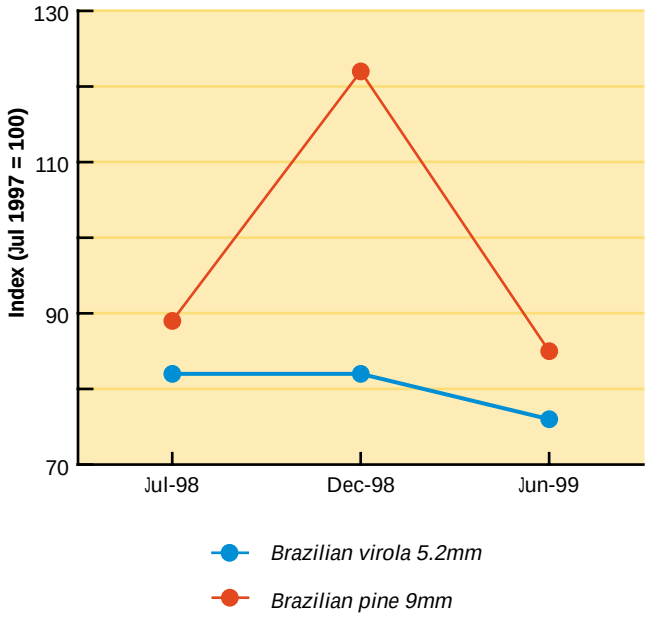
Tropical Plywood Price Movements

Stability in exchange rates in the producer countries and some improved demand from major consumers have combined to generate some optimism in the plywood markets. Prices for Southeast Asian production have firmed as log stocks fell due to poor logging conditions and greater market demand, especially in China and, more recently, in Japan and Korea.

Figure 5 illustrates the price trends for Indonesian and Malaysian production. June 1999 prices for thin panels, at around US$380–385 per m^3, are off the level seen in mid 1997 by about US$50 but are well up over the past 12 months, rising from the low of US$235 in July 1998. In Europe, importers are talking seriously about a price level of Indo 96 par in the next few months, which if achieved will be a major improvement.

The data for Brazilian panels shown in Figure 6 are based on US dollar FOB prices. As the exchange rate for the real has fallen, so too have quoted FOB prices. Importers in Europe are quoting K14–16–18 per cent. With virola panel prices remaining largely unchanged, its competitive position relative to Asian production has improved. If Asian prices continue to rise, virola panels are likely to gain market share. Prices for pine plywood have continued to fall from the position achieved at the beginning of the year. FOB levels of US$230–240 per m^3 were quoted in June 1999, compared to asking prices in the region of US$330 in December 1998. ■

Figure 6: Brazilian plywood FOB price trends



ITTO Fellowships

ITTO offers fellowships to promote human resource development and institutional strengthening in the forestry sectors of member countries. The priority areas are: Forest Industry; Economic Information and Market Intelligence; and Reforestation and Forest Management. Fellowship funds are provided for the following activities: (1) study tours to forests, mills and research institutions; (2) participation in conferences, workshops and training courses; (3) postgraduate programs (partial tuition grants), not including PhDs; (4) short-term research; (5) technology transfer to producer member countries; and (6) preparation of technical documents.

Applications are required to conform to ITTO's general objectives in respect of sustainable forest management, utilisation and trade and, in particular, the Year 2000 Objective. The average award is US$6,500 with a maximum of US$12,000. Only nationals of ITTO member countries are eligible to apply.

The Fellowship Selection Committee appraises applications at the ITTO Council Sessions in May and November each year. Applicants are advised that fellowship activities may not commence until at least one month after the relevant Council Session. The next deadline for applications is **24 March 2000**.

Further details and application forms (in English, French or Spanish) are available from Dr Chisato Aoki, Fellowship Programme, ITTO; Fax 8–45–223 1111; Email itto@mail.itto-unet.ocn.ne.jp (see page 31 for ITTO address).

Market Developments in Producer Countries – Asia and the Pacific

A series of brief summaries of trade impediments, industrial development plans and general economic conditions in ITTO's producing regions*

by Steven Johnson

ITTO Secretariat
Yokohama, Japan

Cambodia

Cambodia has a ban on both log and rough sawntimber exports. Low royalties/taxes have been introduced to act as incentives for the wood industry to promote export of processed timber products. It is intended that forestry taxes will be increased through the country's forest policy reform plans. The uncertainty of the political situation in the country has affected the pace of construction and reduced domestic demand for timber products.

The International Monetary Fund (IMF) suspended a three-year US$120 million loan program to Cambodia in late 1997 due to its inability to meet economic conditions, including accounting for logging revenues. According to the IMF, the government lost US$100 million to illegal logging and log smuggling (primarily to neighbouring Thailand) in 1996. The World Bank estimated that Cambodia's log harvest reached 4.3 million m^3 in 1997 (compared with the official harvest level reported by Cambodia of less than one million m^3) and that its forests would be depleted in less than five years if such a rate continues.

Fiji

A proposal has been made for a ban on green sawnwood exports to encourage further processing in the country. Disincentives to forest industry development in Fiji include the lack of qualified technical expertise in the industry, uncertainty about forest certification (eg cost of certification, acceptability of certification to stakeholders, market for certified products) and the country's system of communal land ownership/tenure. Incentives include the lack of export duties on wood products and the availability of duty concessions on the import of sawmilling machinery.

Fiji's housing market is stagnant with high interest rates. Some of the country's sawmills and wood-processing industries are jointly owned by foreign investors and locals. Most of the foreign investors are from Australia and Asia.

India

Citing the need to conserve local wood supplies, the Government of India announced in early 1997 that duties on imports of logs, firewood and charcoal (HS 4401–4403) would be cut from ten per cent to zero. Duties on all other wood products remain high, between 32 and 56 per cent. India has lifted virtually all non-tariff barriers on wood products in recent years.

In an effort to preserve dwindling forest resources, India's Supreme Court on 12 December 1996 prohibited the Forest Department from harvesting wood in 'non-plan' areas (areas which have not been targeted for managed culling and replanting). In addition, the court banned the shipment of logs from India's northeastern states where most forest resources are located, requiring all wood to leave in at least sawn form. In March 1997, the court ordered the closure of all unlicensed sawmills and wood processing plants, and forbade states from licensing new operations. Many wood manufacturers are located in southern and western areas of India and are accustomed to sourcing logs and other inputs from the northeast. Companies in these areas have been hit hard by the Supreme Court decisions, with some plywood manufacturers closing their operations, while others have had to diversify operations. One trade source estimates that the decisions have resulted in reduced wood and log shipments of over 90,000 m^3 per month from the northeast.

Indonesia

In 1996, and again in 1997, import duties of certain forest products decreased by 5–10 percent, leaving import duties for forest products ranging from zero to 25 per cent. Current economic reforms have also resulted in forest policy changes. For instance, export tariff rates applied to logs, lumber and rattans will be gradually decreased to a final percentage tax of ten per cent as follows: 30 per cent from April 1998; 20 per cent from December 1998; 15 per cent from December 1999; and 10 per cent from December 2000. Other changes such as the introduction of resource rent tax will also affect the production and trade of forest products in Indonesia. The Minister of Forestry has suggested that Indonesia might import logs from countries like Myanmar, the Solomon Islands and Vietnam as a short-term means of coping with a shortage of raw material for the wood-based industries. To avoid illegal wood trading, logs will not be imported from neighbouring states (Malaysia and Papua New Guinea).

Due to increased domestic demand for pulp, paper and wood composites, a policy to expand the capacity of these processing industries is being promoted. Plantations of fast-growing hardwood species are being established by the Ministry of Forestry to help meet the resulting increase in demand for raw materials.

Indonesia's current economic situation has affected aspects of state development, including timber consumption. The economy declined by almost twelve per cent in the fiscal year 1998–99 after growing rapidly in the previous decade. Timber demand by the wood-based industry has decreased significantly. In March 1998, forest concession areas and the forest industry had an accumulated over-supply of tropical logs of almost 14 million m^3. Current economic uncertainty is also affecting construction activities.

Nevertheless, the forest products trade remains a significant contributor to the Indonesian economy, with exports worth over US$4 billion in 1997–98. Foreign currency obtained from timber products has been essential in overcoming current economic uncertainties.

Malaysia

Log and sawnwood imports to Malaysia are duty-free, as are imports of face veneer. Core veneer and mouldings have an import tariff of 25 per cent, while the tariff on plywood imports is 45 per cent. Peninsular Malaysia prohibits the export of logs. The reduction of export duty by Indonesia to 20 per cent of export value may be an incentive to local producers who will now be

able to procure logs and sawntimber from Indonesia at cheaper prices. Also, the suspension of export levies on selected sawnwood products by Peninsular Malaysia, which took effect in May 1998, will affect the flow of exports of such products.

Malaysia has reacted strongly against the so-called 'Vos initiative' passed by the Dutch Parliament in 1998. This initiative will result in government-backed labels being attached to timber from sustainable sources. Malaysia has pointed out to the European Union that timber substitutes such as PVC, aluminum and steel are not subject to such environmental constraints.

The Malaysian government has emphasised the need to promote further processing of tropical timber products. The Second Industrial Master Plan (1996–05) outlines strategies for the further development of the resource-based industries. The future development of the industry group focuses on producing more products with high added value such as furniture, builder's carpentry/joinery products and MDF for export. While there are no plans to further expand Sabah's forest industry, several projects are planned in Sarawak. That state's first MDF mill is being built by a Japanese joint venture with the Sarawak Timber Development Corporation and other local investors. In early 1997 a joint venture with China was announced that will result in a $1 billion MDF mill in Malaysia. Malaysia is also involved in several joint venture projects in other countries, with several companies having logging operations in Africa and Latin America as well as other Asian countries. Most of these slowed or stopped operations with the economic crisis in 1998.

Building activity in Malaysia is likely to be slow after the completion of several mega-projects (eg the new airport at Sepang, the Kuala Lumpur City Complex and infrastructure development projects prepared for the Commonwealth Games in 1998 in Kuala Lumpur), though building of low and medium-cost houses will continue. Investments, both local and foreign, are being encouraged to hasten the development of downstream processing activities. The total capital expenditure on approved projects in 1997 in the wood-based sector was RM3.1 billion, of which 34.6 per cent was from foreign investors. Investments will be further encouraged to improve existing production lines, especially for modern technology, and to increase productivity and efficiency in order to produce better quality value-added products. The currency controls imposed in 1998 will, however, have an effect on foreign investments.

Myanmar

The Myanma Timber Enterprise (MTE), a state owned enterprise under the Ministry of Forestry, is introducing lesser-used tropical timber species to export markets to diversify from traditional teak exports. Species such as taungthayet (*Swintonia floribunda*) are being exported in increasing volumes, with almost 17,000 m^3 of logs and 4,000 m^3 of plywood exported in 1998.

Privatisation of the sawmilling industry is proceeding, with MTE mills now accounting for only about 70 per cent of the more than 100 sawmills in Myanmar. Foreign companies have established twelve timber sector enterprises in joint venture or cooperation with MTE and/or the Myanma Investment Commission.

Domestic building activity in Myanmar has been undergoing a gradual downward trend in recent years. Sawnwood consumption by government departments has dropped from over 45,000 m^3 in 1996 to less than 32,000 m^3 in 1998. The decline in domestic consumption of teak has been notable, from eight per cent of domestic sawnwood consumption in 1996 to four per cent in 1998.

Papua New Guinea

PNG reported that import tariff levels of 30 per cent on logs and sawnwood and 55 per cent on plywood and veneer took effect in 1998. The reduction of tariffs on plywood and veneer from 100 per cent will result in more competition for the small local industry. Under current policy, the government hopes to reduce log exports by ten per cent each year over the period 1995–2000, following which log export restrictions are proposed. Log export tax changes are being considered by the government (eg setting taxes in US$ vs the PNG kina which has been badly devalued) to provide relief to the forest industry, which was hit hard by the Asian crisis. The logging industry closed uneconomical operations in late 1997 and throughout 1998 due to falling log prices, depressed log export market conditions, high stock levels and the high log export taxes. Sawnwood exports have grown, however, from a low level.

In terms of industrial development, the national forest plan proposes to establish one or two plymills and two medium-scale sawmills, although this will not occur in the short term. PNG's lesser known species have had increasing pre-eminence in the marketplace. The lesser known species in Groups 4 and 5 (lower quality) comprised almost 13 per cent of the total log export volume in 1997. The current economic crisis in the PNG economy has caused a major

Japanese sawmillers cut keruing boards for use in Tokyo houses. The sawmilling of tropical logs in Japan has shrunk to almost nothing in recent years as the log supply from Southeast Asia has dwindled. *Photo: A. Sarre*

setback in the building sector, which utilises a very small portion of the output from the fragmented sawmilling industry. Building activities in urban areas have also been affected. Any recovery in the timber industry will depend entirely on the recovery of trade partners in the Asian region, especially Japan and Korea.

Philippines

The Philippines imposes import tariffs of zero per cent on logs, three per cent/15 per cent on coniferous/non-coniferous sawnwood and veneer, and 25 per cent on plywood. Log and sawnwood exports are restricted to those arising from plantation forests.

The following will, in future, significantly affect production and trade of tropical timber products:

- the shift of logging operations from the virgin forest to the residual forests, drastically reducing the annual allowable cut;
- the Industrial Forest Plantation Program – under this program, several incentives are being granted to forest plantation developers. These include the non-payment of forest charges, relaxation of restrictions on the export of plantation products, income tax relief for five years, duty-free importation of capital equipment, etc;
- the Community Based Program, which promotes sustainability through community efforts; and
- logging moratoria in some provinces of the country forced by over-cutting in the past.

Other factors which have already significantly affected the forest products trade are:

- a log export ban, which restricts the export of logs except those coming from forest plantations;
- tariff reductions on imported wood products, with more to come in the future; and
- demand for certification of forest products in importing countries.

Capacity expansions for processing tropical timber are not expected in the next few years due to the imposition of a logging ban in the remaining virgin forests and the shift of logging operations to the residual forests. Moreover, there is presently an excess of mill capacity such that the major concern of the government now is the retooling or infusion of new machines/ equipment to increase the efficiency and competitiveness of local wood processors in the world market.

The Philippine government's development program for the 1990s focused on achieving human development through the provision of basic services like shelter, livelihood, land tenure and other economic and social services. Thus, local government construction projects have expanded. From 1992 to 1995, the number of buildings constructed by local governments registered an average annual growth rate of 32 per cent. Private construction also increased, with the number of buildings constructed by the private sector posting an average growth rate of 15 per cent per annum during the period. There is increasing substitution of tropical timber by non-wood products due to the scarce supply of wood as a result of logging bans in virgin forests. Among the non-wood products now being utilised for housing construction are coconut lumber, bamboo and, lately, steel.

Thailand

Thailand has reduced tariffs for products (including timber) originating from founding member countries of the World Trade Organization since 1 January 1995. Due to the participation of Thailand in the Agreement on the Common Effective Preferential Tariff (CEPT) Scheme for the ASEAN Free Trade Area (AFTA), Thailand has also reduced or removed tariffs for products with certificates of origin from ASEAN countries since 1 January 1996. Tariffs on imports of forest products from non-ASEAN countries remain as follows: logs – five per cent, sawnwood – ten per cent, veneer and plywood – 20 per cent.

Since logging was prohibited in 1989, sawmills in the country have relied on raw materials both in the form of logs and processed wood from abroad, particularly Malaysia, Myanmar, Cambodia and Laos. The products made are for domestic consumption and also for export.

Most existing mills are running at partial capacity or have stopped working. Licences for new sawmills are no longer issued except for those that utilise rubberwood, since this resource is not from natural forests but a by-product of the rubber industry.

As Thailand's population increases, so too does demand for buildings and housing. However, due to scarcity and higher wood prices in the past few years, the construction industry has shifted away from utilising all-wooden materials to mainly reinforced concrete and steel beams in the construction of houses and office buildings. Wood (increasingly, cheaper eucalyptus or rubberwood) is now only used for door and window frames in many projects. Compounding this trend, Thailand's construction industry collapsed in 1997–98 due to the economic crisis and is recovering only slowly this year.

** These are edited and updated 'Country notes' extracted from ITTO's* Annual Review and Assessment of the World Timber Situation 1998. *They are based on country responses and other sources where available. Similar notes for Africa and Latin America and the Caribbean will be presented in the next edition. The* Annual Review *is available from the Secretariat or ITTO's homepage (see page 31 for address details).*

Country Profile: Trinidad and Tobago

By Alistair Sarre

Trinidad and Tobago is located in the Carribean, its two constituent islands having united politically in 1888. It is small: Trinidad is about 80 km long and covers an area of 480,000 hectares, while Tobago is 42 km long and covers an area of 30,000 hectares. By comparison, nearby Venezuela is some 172 times larger, with a land area of 88 million hectares.

The population was estimated to be 1.3 million in 1997, of which 95 per cent was resident on Trinidad; the population growth rate is estimated to be about 0.8 per cent per year. Gross domestic product was US$5.9 billion in 1997 and is expected to grow at 3.5 per cent per year between 1998 and 2002. The economy has been underpinned by oil for many years, but the input of industries based on natural gas, tourism and other services is growing: in 1996, for example, the petroleum sector grew by 1.7 per cent while the non-oil sector grew by 3.5 per cent. Gross national product per capita was US$4,230 in 1997; about one-fifth of the population lives below the national poverty line. Some 73 per cent of the population is urban, 82 per cent has access to safe water and 98 per cent of people aged 15 or over are literate (World Bank 1999).

Terrain and Forest Resources

Trinidad has three mountain ranges; Cerro del Aripo in the northernmost range is the highest point, standing 914 m above sea level. In Tobago, a central main ridge runs the length of the island, the highest point of which is 576 m (Harcourt and Sayer 1996).

Just under a third of Trinidad and Tobago is covered by forest. The two islands combined had an estimated 148,000 hectares of natural forest in 1995 and an additional 13,000 hectares of plantation, mainly teak (*Tectona grandis*) and Caribbean pine (*Pinus caribbea*; FAO 1999). The majority of the natural forest is classed as semi-evergreen seasonal forest, while there are also significant areas of edaphic swamp forest, montane forest and semi-evergreen forest (Synnott 1989).

Biodiversity and Conservation

Trinidad and Tobago has surprising diversity given its small size. Harcourt and Sayer (1996) reported that 2,281 flowering plants have been recorded in the country, of which 215 species are endemic. The country also contains over 100 species of mammal (making it the most diverse in the Caribbean for this class of animal), 420 bird species and 70 reptile species.

Conservation areas conforming to IUCN's reserve categories I–IV cover about 17,600 hectares (3.5 per cent) of the country (Harcourt and Sayer 1996); these are managed by the Ministry of the Environment and National Service.

Table 1: Timber production, imports, exports and consumption ('000 m^3), 1992–96

	92	93	94	95	96
Production					
Logs	59	36	46	51	50
Sawn	27	25	25	30	30
Veneer	0	0	0	0	0
Plywood	0	0	0	0	0
Imports					
Logs	0	4	3	2	2
Sawn	0	2	2	1	1
Veneer	0	0	0	0	0
Plywood	9	10	8	10	10
Exports					
Logs	3	0	2	0	1
Sawn	1	8	1	0	0
Veneer	0	0	0	0	0
Plywood	0	1	1	1	0
Consumption					
Logs	56	40	47	53	51
Sawn	26	19	26	31	31
Veneer	0	0	0	0	0
Plywood	9	9	7	9	10

Source: ITTO 1997

Forest Ownership and Management

The majority of Trinidad and Tobago's forested land is owned and administered by the State. Synnott (1989) reported that the estimated 75,000 hectares of natural 'production' forest could be regarded as being "managed for sustainable timber production" because they were "protected to a degree by resident forest guards, their objectives of management have been defined, most of them are covered by working plans (albeit due for revision and not fully implemented), and logging is subject to some control." Management responsibility for the State-owned forests rests with the Forestry Division of the Ministry of the Environment and National Service.

Deforestation

FAO (1999) reported an average annual deforestation rate of 1.5 per cent over the period 1990–95, equating to a loss of some 3,000 hectares per year.

ITTO Membership

Trinidad and Tobago was a member of the original International Tropical Timber Agreement, 1983. Its membership lapsed with the introduction of the ITTA, 1994, but was resumed in December 1998. To date, no ITTO projects have been undertaken in the country.

Production and Trade

Few reliable data on forest production are available for Trinidad and Tobago. Due to the lapsing of the country's ITTO membership, data were not compiled for the previous two editions of ITTO's *Annual Review and Assessment of the World Timber Situation*. The data in Table 1 are extracted from an earlier edition.

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Introducing a manual on reduced impact timber harvesting in the Indonesian selective cutting and planting system

by Elias

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I was granted an ITTO Fellowship in 1998–99 to write a reference book titled 'Reduced impact timber harvesting in the Indonesian selective cutting and planting system'. In writing the book I took into account local, national and international findings and experiences through a literature survey and discussions with colleagues. I also made field visits to forest concession areas in Sumatra and Kalimantan and attended several local and national workshops on related subjects.

The book has now been completed: it consists of five chapters, namely: Introduction; Timber harvesting planning; Reduced impact timber harvesting technique; Reduced impact timber harvesting in the TPTI system; and Improvements to the payment system. It is 76 pages long and includes 31 full colour illustrations and 12 tables. Below I address some of its key points.

Conventional Timber Harvesting

Timber harvesting in the tropical natural forests of Indonesia is carried out under a silvicultural system known as the Indonesian selective cutting and planting system (Tebang Pilih Tanam Indonesia – TPTI). Conventional timber harvesting under this system is often considered to cause forest degradation. Concession holders and timber harvesting contractors usually carry out their logging operations without sufficiently detailed timber harvesting plans and proper work instructions, using improper techniques and without adequate control.

Reduced Impact Timber Harvesting

On the other hand, reduced impact timber harvesting (RITH) employs the following:

1. forest surveys prior to harvesting to generate the data required to design the layout of felling compartments and inventory units and to plan the timber harvesting operation;
2. a tree location and topographic map as a basis for designing timber harvesting plans, which serve as a guide for felling and skidding;
3. liana-cutting prior to felling;
4. regular training, monitoring, supervision and block inspection;
5. routine briefing on procedures and techniques; and
6. adoption of a base-pay and incentive-pay system based on quality of production, quantity of work and level of terrain difficulty.

Aspects to be Considered in RITH

RITH planning

RITH planning is part of overall forest management planning. It should be completed long before the loggers enter the site and must be developed comprehensively – both strategically and operationally – to ensure that planning mechanisms protect all forest values at all times during timber harvesting. Therefore, RITH planning should consist of three tiers: (1) strategic plans; (2) tactical/operational plans; and (3) task plans.

RITH technique guidelines

Guidelines that specify and describe RITH techniques are also important. For the TPTI system they should consist of: **a.** RITH planning techniques; **b.** controlled felling; **c.** felling techniques for 'normal' trees, leaning trees and trees with buttresses; **d.** controlled skidding; **e.** skidtrail construction techniques; **f.** winching techniques; **g.** skidding techniques; and **h.** techniques for preventing post-harvest environmental damage.

RITH training

One of the best strategies for improving the skills and motivation of timber-harvesting crews is through training in technical matters as well as in environmental awareness.

RITH payment system

To maintain high work motivation and discipline among timber-harvesting crews, one useful strategy that can be implemented is to apply a payment system based on productivity and work quality influenced by physical field conditions. Base-pay and premium-pay should be determined transparently.

Organisational structure and job description

Smooth implementation of RITH also requires the provision of clear, detailed and

Continued on ☛ page 30

Reduced impact timber harvesting requires the employment of reduced impact felling techniques. *Photo: Elias.*

On the Conference Circuit

Strengthening the Rule of Law in the Mekong

Regional Symposium on Strengthening Cooperation for Forest Law Enforcement in the Mekong Basin Countries

14–16 June 1999
Phnom Penh, Cambodia

This World Bank-sponsored symposium was attended by around 200 people and was billed as the first of its kind. It addressed a significant and often ignored problem of regional significance: illegal activities in forests. The Mekong Basin, which is shared between Thailand, Vietnam, Myanmar, Laos and Cambodia, is particularly prone to such activities.

In his report of the symposium, His Excellency Chhea Song, the Cambodian Minister of Agriculture, Forestry and Fisheries, detailed the strategies proposed at the symposium to address the issue. These included the establishment of bilateral agreements between neighbouring countries for trans-boundary law enforcement, the monitoring of cross-boundary trade in wildlife and timber, forest crime monitoring, forest development, conservation, and timber certification. H.E. Chhea Song committed the Royal Government of Cambodia to initiating requests for bilateral cooperation with Vietnam, Laos and Thailand by the end of 1999.

Some 13 recommendations were put forward by H.E. Chhea Song on the basis of symposium discussions. For example:

- governments of the region should ensure the full participation of local communities in the drafting of any regulations related to natural resource management;
- to have full and effective participation it is necessary to include the following:
  - education and awareness-raising of issues related to natural resources and sustainable use
  - mechanisms for community participation in policy-making, implementation and review
  - governments should be proactive in involving communities in policy development
  - local communities should have full access to information and data;
- governments should recognise people's rights to use, manage and gain benefit from natural resources. Laws and policies should reflect those rights;
- government policies should encourage multiple use of forests, including ecotourism, sustainable natural resource management and non-wood forest products;
- governments should establish channels in order to allow people to participate in forest crime monitoring as reporters of information from within their areas;
- governments should develop forest certification policies to encourage the certifying of forest operations;
- international forest management guidelines must be followed. Forest harvesting operations should be monitored and evaluated;
- government and investors should establish a dialogue to develop a cost and pricing system conducive to sustainable and equitable forest management in Cambodia;
- the Royal Government of Cambodia's roles and responsibilities, duties and functions relating to forest management must be clearly defined in its proposed forest management rules and regulations. In the same manner, the government's roles and responsibilities, duties and functions related to protected areas must be clearly defined in the forthcoming relevant prescriptions and legislation;
- symposium delegates strongly support good relations between government, business and civil society, including forest communities in the Mekong River basin countries.

The symposium requested the governments of Cambodia, Laos, Vietnam and Thailand, as well as donors such as the World Bank and the Asian Development Bank, to fully support the main recommendations and to further the establishment of forestry bilateral cooperation.

Long-term Experiments Discussed

International Symposium on Long-term Observations and Research in Forestry

23–27 February 1999
Turrialba, Costa Rica

This International Union of Forestry Research Organisations (IUFRO) symposium was attended by about 40 researchers from Latin America, North America, Europe and Asia. It took place in tandem with another IUFRO conference – *Symposium on Multistrata Agroforestry Systems* – and an interdisciplinary exchange of ideas was facilitated by the sharing of a number of technical and social events. The program consisted of three days of technical presentations arranged in four sessions – modelling, data management and analysis, growth studies, and local experiences and case studies – followed by a two-day field trip to agroforestry research sites in Costa Rica and Panamà.

Presentations covered a wide range of aspects related to long-term research in forestry, showing that the planning and administration of long-term observation plots and their data are among the greatest challenges of forestry research, particularly in the tropics. Many institutions are not in a position to maintain and manage their plots and data adequately, although cooperation between forestry and other natural resources-related institutions might improve the situation. A number of data analysis and management issues were addressed, showing that proper management of long-term observations requires an interdisciplinary approach between experts in forestry, computers and data management, and statistics. Modelling is widely accepted as a research and management tool, but it must be based on data from long-term observations.

The experiment of holding two IUFRO meetings at the same time was successful from both a technical and organisational point of view and is certainly recommended for future events. Proceedings containing the keynote paper (presented by Boris Zeide) and the 23 technical papers will be available when published from: Orton Library – Book Sales; CATIE 7170, Costa Rica; Tel 506–556 0501; Fax 506–556 0508; Email bibliot@catie.ac.cr

Adapted from a report by Christoph Kleinn and Michael Köhl published in IUFRO News, *Vol 28, 1999, Issue 2.*

Current Literature

Watson, V., Cervantes, S., Castro, C., Mora, L., Solis, M., Porras, I. and Cornejo, B. 1998. **Making Space for Better Forestry. Policy that Works for Forests and People Series No. 6.**

Available from: Centro Cientifico Tropical and International Institute for Environment and Development, San José and London

Review by A. Sarre

This report is one of a series initiated by the International Institute for Environment and Development (see 'Noticeboard' on page 30 of this edition for details), the aim of which is a better understanding of the forces at plays in contests over forest policy, the winners and losers, and the factors that affect policy outcomes.

Making space for better forestry is certainly illuminating in this regard. Costa Rica is not a large country: its population of around 3.3 million lives on a land area of some 5.1 million hectares. One would think that here forest policy would be at its most simple, yet as this report shows, untangling the history of its development is no simple task. But it is a potentially useful task for other countries: with more than a third of its remaining tropical forests in conservation reserves, Costa Rica may be viewed as an experiment in the virtues and perils of the 'reserve system' approach to forest conservation.

The authors – foresters, economists, social scientists and political analysts – spent two years studying forest policy development in the country. They identified four phases in its evolution. The first of these, 'before 1950', set the scene for much that was to come. According to the authors, for example, the declaration of free, compulsory education in 1869 helped to shape the development of a democratic political process in the 20th century. And, towards the end of the period, two laws were enacted which led to a significant shift in the pattern of land ownership and caused an increase in deforestation: the Family Providers Law and the Land Tenancy Information Law enabled settlers to gain ownership of up to 300 hectares of unused land by clearing it.

More changes were made to land ownership patterns during the second period, 1950–70, when the Institute of Lands and Colonisation was given responsibility for the allocation of 'unused' public lands. Combined with previous legislative changes and the introduction of new technologies (notably the chainsaw), this precipitated an even more dramatic deforestation of the nation.

While policy development to this point was probably similar to that seen in other tropical countries, the third period, 1970–90, saw Costa Rica diverge. The authors call this a period of "great contrasts. The rate of deforestation reached its height, whilst the establishment of protected areas also proceeded apace." By 1990, about 29 per cent of the country was contained in public or private protected areas, while colonisation of unallocated land and the expansion of banana plantations resulted in half a million hectares of natural forest being cleared during the period.

'… the success of the country's protected area system in the period 1970–90 was bought at the expense of local people, who lost access to forest goods and services.'

The authors characterise the fourth phase, 1990–97 as "sustainable development's growing pains", an attempt to reconcile two conflicting trends – agricultural expansion with little regard for forests on the one hand and the tendency towards absolute protection with little regard for the needs of the people on the other.

How is the attempt proceeding? One of the keys is the changing influence of various stakeholders. For example, small and medium sized landholders are more organised than they have been in the past, forming new alliances and lobby groups which have influenced the development of new legislation, most notably the 1995 Organic Environmental Law and the 1996 Forest Law.

As Costa Rica continues to grapple with sustainable development concepts and practice, what lessons might be learned by other countries? After summarising current government policies, the authors draw a number of notable conclusions. For example, the success of the country's protected area system in the period 1970–90 was bought at the expense of local people, who lost access to forest goods and services. New approaches are now attempting to redress the balance so that local people benefit more from conservation; these "need a firmer basis in formal policy". The growth of ecotourism – now the country's top foreign exchange earner – has also helped to 'sell' the concept of protected areas, as have initiatives in bioprospecting, carbon credits and debt-for-nature swaps. Nevertheless, "It remains to be seen whether such initiatives can channel significant returns to those communities and forest managers who are trying to maintain good management of the resource".

The report concludes with 14 recommendations to improve the national policy process. One of the great challenges is to bring all stakeholders to a point where their diverse agendas can be tabled and, where possible, accommodated. Even in a small country such as Costa Rica, such a task requires time, patience and a transparent process. But according to the authors, at the heart of the matter is ensuring that key stakeholders – many of whom have been ignored in the past – gain the 'political space' they need to have their views taken into account.

This well-edited report is highly recommended – if the rest of the series is this good, it should make an important contribution to forest policy debates, both between and within countries.

Topical and Tropical

Edited by Alistair Sarre

Fire Feedback Destroys Forest

A study by Mark Cochrane and his colleagues published in a recent edition of *Science* (Vol 284 No 5421, 11 June 1999) showed that the incidence and importance of fire in the Amazon have increased substantially in the last decade. They used ten 0.5 hectare plots to study fire impacts on forest structure, biomass and species composition, and then extended these results over two regions in the Brazilian Amazon – Tailândia and Paragominas – using a time-series of satellite images. They found that accidental fire-induced deforestation (as distinct from slash-and-burn deforestation) increased deforestation rates in Paragominas by 129% in the period 1993–95.

The authors noted that fire-return intervals of less than 90 years can eliminate rainforest tree species, whereas intervals of less than 20 years may eradicate trees altogether. On the basis of their satellite imagery analysis, they concluded that the forests of Paragominas and Tailândia are currently experiencing fire rotations of 7–14 years. They also suggested a positive feedback between forest fires, future fire susceptibility, fuel loading and fire severity: previously burned forests were much more likely to burn than unburnt forest, and second fires are faster moving and much more intense. The authors concluded that, left unchecked, "fire has the potential to transform large areas of tropical forest into scrub or savanna".

Regrowth Forests May Grow Less

A study reported in a recent issue of *Forest Ecology and Management* (118:127–38) estimated the above-ground biomass of trees in 65 one-hectare plots spanning a 1,000 km^2 landscape in the central Amazon. Authors Laurance et al. estimated biomass values in each plot by measuring diameter-at-breast-height of all ≥10 cm trees and then using an allometric equation to estimate total tree biomass. They also measured slope in each plot and obtained detailed information on soil characteristics. Biomass estimates varied from 291 to 492 tonnes per hectare and were positively associated with soil parameters such as total nitrogen, clay content, organic carbon and exchangeable bases. These estimates were generally higher than comparable estimates from other parts of the Amazon; the authors suggested that as deforestation and logging proceed into the central Amazon, the region could become a major new source of greenhouse gas emissions. The authors also speculated that since the burning of slash to clear pastures reduces the values of soil parameters correlated to biomass, secondary forest growing on abandoned pasture sites in the region may attain a maximum biomass below that of the original forest.

Commercial Harvesting in Tapajós

The timber company Agropecuária Treviso Ltda has commenced commercial operations in 3,222 hectares of the National Forest of Tapajós in the Brazilian state of Pará. The company has two large sawmills in the region and expects to extract about 128,000 m^3 of timber from Tapajós over the next five years. The government will closely monitor these operations as part of the Tapajós project, which is currently being implemented with the support of ITTO. (*Gazeta Mercantil*, São Paulo, 28 April 1999.)

India Plans Forest Improvement

The Indian Prime Minister, Mr Atal Behari Vajpayee, recently announced two new schemes aimed at promoting sustainable development on forested and other lands, as reported in *The Hindu* (7 June 1999). The first, called the Bamboo Development Scheme, will receive an investment of Rs 150 crores (about US$36 m) over a five-year period. It will promote bamboo cultivation on both private and state-owned lands, aid the establishment of micro-enterprise development centres to add value to bamboo products, provide marketing support, and promote exports through state trading corporations. It is estimated that the scheme will provide five million person-days of employment per year.

The second scheme will provide assistance to rural women through the Integrated Rural Development Programme to raise nurseries on forest lands. State forest departments will be obliged to buy back at least 75 per cent of seedlings produced from such nurseries, while the other 25 per cent may be offered for sale on the open market. The two schemes will be coordinated by the Ministry of Environment and Forests; they form part of its action plan to bring 30 million hectares of non-forest land under forest and tree cover over the next 20 years and to rehabilitate a further 30 million hectares of degraded forest.

Training Program Shows Promise

The July 1999 edition of the Tropical Forest Foundation's newsletter reported a steering committee meeting for an ITTO-funded training project in Brazil. Since it began in mid 1998, 48 managers and practitioners have received forest management training that emphasises applied low-impact logging techniques. According to the newsletter, the project has been so successful that talks are under way to establish a permanent tropical forest management training centre, either through the Fundação Floresta Tropical (TFF's Brazilian subsidiary) or through the Brazilian government.

New Management Program Launched in Ghana

A new Natural Resource Management Programme for Ghana worth US$90 million was launched recently by the Ghanaian Minister of Lands and Forestry, Dr Christian Amoako-Nuama. Funded by the World Bank and the governments of Ghana, the United Kingdom, Denmark and the Netherlands with support from the European Union, it consists of five components: high forest resource management; biodiversity conservation; savanna resource management; wildlife resource management; and environmental management coordination. The ten-year program, to be carried out in three phases, will provide focus and direction for the implementation of the Ghanaian Forestry Development Master Plan. ■

Noticeboard

Policy That Works

The International Institute for Environment and Development recently published a series of reports by various authors under the umbrella heading of 'Policy that works for forests and people'. The series includes six country studies (featuring Papua New Guinea, India, Costa Rica – see review page 28, Pakistan and Zimbabwe), an overview report and two discussion papers ('Climate change mitigation by forestry: a review of international initiatives' and 'Entering the fray. International forest policy processes: an NGO perspective on their effectiveness'). They may be ordered from: *Publications, IIED, 3 Endsleigh Street, London WC1H 0DD, UK; Fax 44–171–388 2826; Email bookshop@iied.org*

25-year Compendium

The Forest College and Research Institute at India's Tamil Nadu Agricultural University celebrated 25 years of existence in 1998. To mark the occasion it has published 'Twenty five years of forest research: a compendium', in which many of its research findings are reported. To obtain a copy, contact: *The Dean, Forest College and Research Institute, Tamil Nadu Agricultural University, Mettupalayam 641 301, Coimbatore District, India; Tel 91–422–431 672; Email fcri.tnau@rmy.sprint.rpg.vsnl.net.in*

Insect Pests of Australian Forests

A recently published book entitled *Insect Pests of Australian Forests: Ecology and Management* is, according to its publicity, the only comprehensive reference available on the subject. It contains introductory chapters on Australian forests and insect classification and biology followed by detailed accounts of the main pests of native and exotic trees, with information on damage caused and natural enemies. The final chapter covers the management of forest insect pests. The book contains over 200 colour photographs and an extensive reference list and glossary. It should prove useful to plantation managers using Australian species in the tropics and elsewhere for safeguarding against and managing these insect pests. Authors Humphrey Elliott, Cliff Ohmart and Ross Wylie have many years practical forestry and pest management experience in tropical, subtropical and temperate forests.

The book can be purchased from *Butterworth Heinemann, PO Box 251, Port Melbourne, Victoria 3207, Australia; Fax 61–3–9245 7577; Email bhau.marketing@reededucation.com.au*

MSc in Tropical Forestry

The Wageningen Agricultural University runs a 17-month MSc program in tropical forestry, starting each year in September. It offers two specialisations: social forestry; and silviculture and forest ecology. Applicants should have a BSc in forestry (or equivalent), fluency in English and, preferably, working experience. Applications for the 2000–02 program should be received by 15 November 1999. Contact: *Sub-department of Forestry, Director MSc Program Tropical Forestry, Frits J. Staudt, PO Box 342, 6700 AH Wageningen, the Netherlands; Tel 31–317–482928; Fax 31–317–483542; Email frits.staudt@alg.bosb.wau.nl*

TROPIS Still Expanding

The Tree Growth and Permanent Plot Information System (TROPIS) now contains data from 25,307 plots with 3078 species in 66 countries. About 70 per cent of plots are in plantations. The coordinators are seeking further data contributions – any remeasured forest plot from any part of the world may be included in the database. For more information, contact: *Jerry Vanclay and Rita Mustikasari, TROPIS Coordinators, CIFOR, PO Box 6596 JKPWB, Jakarta 10065, Indonesia; Tel 62–251–622 622; Fax 62–251–622 100; Email Jvanclay@scu.edu.au or R.Mustikasari@cgiar.org*

Proceedings Available

The following proceedings are currently available.

Memorias del simposio internacional sobre posibilidades de manejo forestal sostenible en América tropical held 15–20 July 1997 in Santa Cruz de la Sierra, Bolivia. Available from: *BOLFOR, Cuarto Anillo, Av, 2 de Agosot, Casilla #6204, Santa Cruz, Bolivia; Fax 591–3–480854; Email bolfor@bibosi.scz.entelnet.bo* *(see also box p 12)*

Extension forestry: bridging the gap between research and application held 19–24 July 1998 in Blacksburg, Virginia, USA. Available for US$20 from: *College of Forestry and Wildlife Resources, 324 Cheatham Hall, Mail Code 0324, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, USA; Fax 1–540–231 7664; Email jej@vt.edu* *(see also box p 12)*

Disease/environment interactions in forest decline held 16–21 March 1998 in Vienna, Austria. Available from: *Thomas L. Cech, Federal Forest Research Centre, Institute of Forest Protection, Seckendorff-Gudent-Weg 8, Vienna, Austria; Tel 43–1–87838; Email Thomas.Cech@fbva.bmlf.gv.at* *(see also box p 12)*

Fellowship Report
Continued from page 26

tested job descriptions for chainsaw operators and helpers, tractor operators, foremen, supervisors of production and block inspectors. A clear organisational structure should also be provided.

Concluding Comment

The manual examines many other aspects of reduced impact timber harvesting and provides detailed procedures for planning and managing a reduced impact logging operation. It targets students, researchers and logging managers and supervisors. I hope it will contribute to the education process at Indonesian forestry faculties and serve as a comparative reference for related educational institutions. It should also prove useful for the promotion of environmentally sound timber harvesting practices in the tropical natural forests in Indonesia and be viewed as a reliable source of information for decision-making at various institutions.

Copies of the manual are available from the author for US$20.

Course Calendar

◆ **Introduction to Forest Certification**

15 Nov 1999 Oxford, UK

This one-day course will provide delegates with an understanding of the various international initiatives to define forest management and to trace product through the supply chain. Cost: £225+VAT

Contact: Mrs Katie Livesey, SGS Forestry, Oxford Centre for Innovation, Mill St, OX2 0JX, Oxford, UK; Fax 44–1865–790 441; Email klivesey@sgsgroup.com

◆ **Achieving Forest Certification**

16–18 Nov 1999 Oxford, UK

This course aims to provide delegates with a detailed understanding of the various international initiatives to define forest management and to provide them with the tools to implement such systems within their own organisations. Cost: £495+VAT

Contact: Mrs Katie Livesey as for course above.

◆ **Implementing Chain-of-custody**

19 Nov 1999 Oxford, UK

This course will help delegates understand the rationale for a secure chain-of-custody (COC) for raw materials and products and the benefits of improved stock management which result from an efficient COC system. It will also enable delegates to implement the key standards of a COC system in their own organisations. Cost: £225+VAT

Contact: Mrs Katie Livesey as for course above.

◆ **1) Social Forestry; 2) Commercial Forestry; 3) Protected Area Management; and 4) Natural Resources Management**

10 Jan–3 March 2000

These courses are open to anyone holding a BSc in tropical forestry or natural resources management. Cost: US$1,500

Contact: International Masters Programme, Larenstein International Agricultural College, Box 9001, 6880GB Velp, the Netherlands; Fax 31–26–361 5287; Email masters@iahlvlp.agro.nl

◆ **Monitoring and Evaluation for Successful Projects and Programs**

28 Feb–24 Mar 2000 Canberra, Australia

This course emphasises monitoring and evaluation (and the use of information systems) as activities taking place throughout the project and program cycle. The course provides a structured learning environment that will help participants build on their own skills and experience. Cost: AUD8,800.

Contact: Training Manager, ANUTECH Development International, GPO Box 4, Canberra ACT 2601, Australia; Fax 61–2–6249 5875; Email anutech.courses@anutech.com.au; www.anutech.com.au

◆ **Rural Projects: Participatory Planning, Design & Management**

28 Feb–24 Mar 2000 Canberra, Australia

This course will assist planners and managers to facilitate the design and management of projects competently, effectively, and in consultation with rural communities. Cost: AUD8,800

Contact:Training Manager, as for course above.

◆ **Gender Analysis and Planning**

8–19 May 2000 Canberra, Australia

This course will assist participants to anticipate the positive and negative impacts of development interventions on women and men, girls and boys. Participants will learn skills in how to appraise, design and redesign projects to overcome possible negative gender impacts and to create opportunities for the greater empowerment of women. Cost: AUD4,800

Contact: Training Manager, as for course above.

◆ **Geographic Information Systems for Development Planning and Resource Decisions**

13 June–14 July 2000 Canberra, Australia

This course enables participants to: develop an understanding of GIS principles and potential as a tool for development planning and resource management; develop hands-on skills in the development and use of GIS for storing, retrieving and analysing complex sets of resource and environmental data; and gain skills in the application of GIS in real-world decisions for resource management and planning. Cost: AUD8,800

Contact: Training Manager, as for course above.

◆ **The Application of Biotechnology in Forestry**

1–5 August 2000 Kuala Lumpur, Malaysia

This course is designed to introduce the concepts and practices of biotechnology to young scientists, researchers, foresters and others interested in gaining insight into the field of forest biotechnology. Previous experience with the topic is not required. Cost: US$500

Contact: Dr Kamis Awang, Executive Secretary, APAFRI Secretariat, Faculty of Forestry, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia; Tel 603–916 0334; Fax 603–916 0266; Email kamis@admin.upm.edu.my

◆ **Forestry Research Strategy Formulation, Planning and Management**

1–5 August 2000 Kuala Lumpur, Malaysia

This course is targeted at mid-career personnel in research institutes, departments, universities and the private sector. It will present: methods for the formulation of organisational vision, mission and objectives; methods for the preparation of strategic and operational plans; and methods of research planning, monitoring and evaluation. Cost: US$800 or RM3,000. A limited number of scholarships are available.

Contact: Dr Rusli bin Mohd., Dean, Faculty of Forestry, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia; Tel 603–948 7835; Fax 603–943 2514; Email rusli@forr.upm.edu.my

◆ **Tropical Forestry**

Oct–Dec 2000 Bangor, Wales

Cost: £1800/month (excludes accommodation)

Contact: Short Course Secretary, Centre for Arid Zone Studies, University of Wales, Bangor, Gwynedd LL57 2UW, UK; Tel 44–1248–382346; Fax 44–1248–364717; Email cazs@bangor.ac.uk

◆ **Commercial Tropical Forestry**

Nov 2000–Feb 2001 Bangor, Wales

Cost: £1800/month (excludes accommodation)

Contact: Short Course Secretary, as for course above.

◆ **Tropical Agroforestry**

3 July–8 Sept 2000 Edinburgh, Scotland

This course combines agroforestry, forestry, agriculture and extension methods to provide vocational training for the introduction or improvement of agroforestry systems, participatory forestry, farm woodlands, silvopastoral systems, and other compatible mixtures combining trees, crops and farm animals. Cost: £6,600+VAT @ 17.5% (£1,155.00), if applicable

Contact: Amy Middlemass, Edinburgh Research & Innovation, Weir Building, King's Buildings, West Mains Road, Edinburgh EH9 3JY UK; Tel 44–131–650 7236; Fax 44–131–650 7140; Email Amy.Middlemass@ed.ac.uk

◆ **Tropical Forest Management and Planning**

3 July–8 Sept 2000 Edinburgh, Scotland

This course provides in-service training in modern management methods for foresters with experience in government or commercial tropical or subtropical forestry. Cost: £6,600+VAT @ 17.5% (£1,155), if applicable

Contact: Amy Middlemass, as for course above.

Note: all courses listed above will be presented in English.

ITTO Tropical Forest Update

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Layout: Justine Underwood

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Other enquiries to ITTO should be sent to the same postal address above or to the general ITTO email address: itto@mail.itto-unet.ocn.ne.jp

The **ITTO Homepage** can be accessed at http://www.itto.or.jp

Forthcoming Meetings

◆ 12–14 October 99. **2nd Forest Products Seminar: Towards More Efficient Processing of Our Timber Resources**. Kuching, Sarawak. Contact: Dr Peter Kho, Sarawak Timber Association; Tel 60–82–442 935; Fax 60–82–441 447; Email sta@pop.jaring.my

◆ 18–22 October 99. **Impact of Logging on Biodiversity**. Hanoi, Vietnam. Contact: Titiek Setyawati, Research Fellow, CIFOR, PO Box 6596, JKPWB Jakarta 10065, Indonesia; Fax 55–41–766 1276; Email t.setyawati@cgnet.com

◆ 18–23 October 99. **2nd Latin American Symposium on Advances in the Production of Forest Seeds**. Santo Domingo, Dominican Republic. Contact: Rodolfo Salazar, CATIE, Turrialba, Costa Rica; Fax 506–556 7766; Email rsalazar@catie.ac.cr

◆ 24–26 October 99. **Biodiversity Friendly Practices and Technologies.** Colombo, Sri Lanka. Sponsored by ITTO. Contact: P. Balakrishna, No. 48, Vajira Rd, Colombo 5, Sri Lanka; Tel 94–510 517; Fax 94–580 202; Email scott@slt.lk

◆ 25-28 October 99. **A Variável Ambiental em Obras Rodoviárias (Environmental Issues in Highway Construction).** Foz do Iguaçu, Brazil. Contact: Maurício Balensiefer, Rua Bom Jesus, 650, Cabral - CEP 80035-010 Curitiba - Paranã, Brazil; Fax 55-41-253 2332; Email fupef@floresta.ufpr.br

◆ 6–9 November 99. **International Workshop on Forestry Extension and Participatory Management**. Nauni-Solan, India. IUFRO 6.06.02. Contact: Dr P. Khosla, H.P.K.V.V. Palampur – 176062 (HP) India; Tel 91–1894–30521; Fax 91–1894–30511; Email (Dr. B. Hansra) hansra@kab.delhi.nic.in

◆ 8–12 November 99. **6th Meeting of the Latin American and Caribbean Forest Information Systems Network**. Curritiba, Brazil. IUFRO 6.03.04. Contact: Erich Gomes Schaitza, EMBRAPA-Florestas, Estrada da Ribeira km 111, 83411-000, Colombo, Brazil; Tel 41–766 1313; Fax 41–766 1276; Email erich@enpf.embrapa.br; http://iufro.boku.ac.at/iufro

◆ 10–16 November 99. **6th Meeting of the Conference of the Parties to the Convention on Migratory Species**. Cape Town, South Africa. Contact: UNEP/CMS Secretariat, Tel 49–228–815 2405; Fax: 49–228–815 2449; Email cms@unep.de; http://www.wcmc.org.uk/cms/

◆ 16–19 November 99. **Criteria and Indicators for the Sustainable Management of Neotropical Forests**. Turrialba, Costa Rica. Contact: Alain Franc, Ecole Nationale du Génie Rural, des Eaux et des Forêts, Département Mathématiques Appliquées et Informatique, 19, avenue du Maine F-75732 Paris, France; Tel 33–1–4549 8905; Fax 33–1–4549 8827; Email franc@engref.fr

◆ 22–24 November 99. **Forestry and Forest Products Research – Tropical Forest Harvesting: New Technologies Examined**. Terengganu, Malaysia. Contact: The Secretariat, CFFPR Conference Series, Natural Forest Division, FRIM, Kepong, 52109 Kuala Lumpur, Malaysia; Fax 60–3–636 7753; Email harvest@frim.gov.my

◆ 28 November–2 December 99. Kathmandu, Nepal. **Biotechnology Applications for Reforestation and Biodiversity Conservation**. Contact: BIO-REFOR, Nepal Workshop, c/o Nepal Flora Implementation Project Office, Dept of Plant Resources, MFSC, HMG/N, GOP Box 2270, Kathmandu, Nepal; Tel 977–1–251159; Fax 977–1–251141; Email banaspati@flora.wlink.com.np

◆ 1 December 99. **Annual Meeting of the International Society of Tropical Foresters**. Washington, DC, USA. Contact: W. Doolittle, ISTF, 5400 Grosvenor Lane, Bethesda, Maryland 20814, USA; Email istfiusf@gc.apc.org

◆ 9–13 January 2000. **Developing Policies to Encourage Small-scale Forestry**. Cairns, Australia. IUFRO 3.08.00. Contact: John Herbohn, James Cook University, Townsville QLD 4811, Australia; Tel 61–77–814 250; Fax 61–77–814 019; www.jcu.edu.au/school/cea/crc/trem

◆ 10–20 January 2000. **Geospatial Information in Agriculture and Forestry**. Florida, USA. Contact: El Conferences, PO Box 134008, Ann Arbor, MI 48113-4008, USA; Fax 1–734–994 5123.

◆ February 2000. **The Future of Perennial Crops: Investment & Sustainability in the Humid Tropics**. Abidjan, Côte d'Ivoire. Contact: Hubert Omont, CIRAD, BP 5035, 34032 Montpellier Cedex, France; Tel 33–4–6761 7178; Fax 33–4–6761 7120; Email hubert.omont@cirad.fr

◆ 14–18 February 2000. **International Conference on Managing Natural Resources for Sustainable Agricultural Production in the 21st Century**. Contact: A.K. Singh, Secretary-General, Indian Agricultural Research Institute, New Delhi, 110 012 India; Tel 91–11–573 1494; Fax 91–11–575 5529; Email icmnr@bic-iari.ren.nic.in

◆ 6–8 April 2000. **Information Management in Forest Enterprises**. Munich, Germany. IUFRO 4.04.02. Contact: Martin Moog, Chair of Forest Economy Science, Ludwig-Maximilian University, Munich, Am Hochanger 13, D-85354 Freising, Germany; Tel 49–8161 7146–30; Fax 49–8161 7146–31.

◆ 9–14 April 2000. Noosa, Australia. **Symposium on Hybrid Breeding and Genetics**. Contact: Heidi Dungey, Queensland Forestry Research Institute, MS 483, Fraser Rd, Gympie Qld 4570, Australia; Fax 61–7–5482 8755; Email dungeyh@qfri1.se2.dpi.qld.gov.au

◆ 24–29 April 2000. **Manejo Sostenible de los Recursos Forestales**. Pinar del Rio, Cuba. IUFRO 1.07.09. Contact: Pastor Amador, Universidad de Pinar del Rio, Facultad Forestal, Marti No 270, Pinar del Rio 20100, Cuba; Email dptopfor@netupr.upr.edu.cu; http://iufro.boku.ac.at/iufro/iufronet

◆ 15–26 May 2000. **5th Meeting of the Conference of the Parties to the Convention on Biological Diversity**. Nairobi, Kenya. Contact: CBD Secretariat, World Trade Center, 393 Jaques St, Suite 300, Montreal, Quebec, Canada, H2Y 1N9; Tel 1–514–288 2220; Fax 1–514–288 6588; Email chm@biodiv.org; http://www.biodiv.org.

◆ 27–30 May 2000. **Impacts of Air Pollution and Climate Change on Forests – 19th International Meeting for Specialists in Air Pollution Effects on Forests**. Houghton, USA. IUFRO 7.04.00. Contact: David Karnosky, School of Forestry and Wood Products, Michigan Technological University, 101 U.J. Noblet Forestry Building, 1400 Townsend Drive, Houghton, Michigan 49931-1295, USA; Tel 1–906–487 2898; Fax 1–906–487 2897; Email karnosky@mtu.edu

◆ 4–9 June 2000. **International Symposium on the Biogeography of Southeast Asia 2000**. Leiden, the Netherlands. Contact: Rienk de Jong, Nationaal Natuurhistorisch Museum, Dept of Entomology, PO Box 9517, 2300 RA, Leiden, the Netherlands; Fax 31–71–513 3344; Email jong@nnm.nl

◆ 22–23 June 2000. **Wood Adhesives 2000**. Lake Tahoe, USA. IUFRO 5.00.00 Forest Products. Contact: John A. Youngquist, USDA Forest Service, Forest Products Lab, One Gifford Pinchot Dr, Madison Wisconsin 53705, USA; Tel 1–608–231 9398; Fax 1–608–231 9582; www.fpl.fs.fed.us/pdcomp/

◆ 25–30 June 2000. Pralognan-la-Vanoise. **Multipurpose Management of Mountain Forests: Concepts, Methods, Techniques**. Contact: Martin Price, 11 Bevington Rd, Oxford OX2 6NB, UK; Fax 44–186–528 4691; Email martin.price@ecu.ox.ac.uk

◆ 16–23 July 2000. Amsterdam, the Netherlands. **Geoinformation for All**. Contact: S. Tempelman, c/o ITC, PO Box 6, 7500 AA Enschede, Netherlands; Tel 31–53–487 4358; Fax 31–53–487 4335; Email isprs@itc.nl; http://www.itc.nl/

◆ 7–12 August 2000. **XXI IUFRO World Congress**. Kuala Lumpur, Malaysia. Contact: XXI IUFRO World Congress Organizing Committee, Forest Research Institute Malaysia, Kepong, 52109 Kuala Lumpur, Malaysia; Fax 60–3–636 7753; Email iufroxxi@ frim.gov.au

◆ 8–13 October 2000. **Forest Genetics for the Next Millennium**. Durban, South Africa. IUFRO 2.08.01. Contact: Colin Dyer, IUFRO Conference Organiser, PO Box 11636, Dorpspruit 3206, South Africa; Tel 27–331–425 779; Fax 27–331–944 842; Email iufro@icfr.unp.ac.za

◆ 18–25 April 2001. Fremantle, Australia. **16th Commonwealth Forestry Conference.** Contact: Commonwealth Forestry Association, Oxford Forestry Institute, South Parks Rd, Oxford OX1 3RB, UK; Fax 44–1865–275074; Email cfa@plants.ox.ac.uk

ITTO Calendar

◆ 26–30 October 99. **IV Plywood and Tropical Timber International Congress** (ITTO Project PD 40/99). Belem, Brazil. Contact: General Coordination WR, Rua Clovis de Oliveira, 86-Jd Guedala, 05616-130, São Paolo, Brazil; Fax 55–11–814 3116; Email wrsp@uol.com.br

◆ 1–6 November 99. **XXVII Session of the ITTC and Associated Sessions of the Committees**. Yokohama, Japan.

◆ December 99. **ITTO Training Workshop on Tropical Forestry and Timber Trade Statistics**. Kribi, Cameroon.

◆ 30 January–4 February 2000. **Forest Restoration for Wildlife Conservation**. Chiang Mai, Thailand. Funded by ITTO. Contact: Janice Kerby, FORRU, Department of Biology, Chiang Mai University, Chiang Mai 50200, Thailand; Tel 66–53–943358; Fax 66–53–892259; Email scopprn@chiangmei.ac.th

◆ 24–30 May 2000. **XXVIII Session of the ITTC and Associated Sessions of the Committees**. Lima, Peru.

◆ 30 October–4 November 2000. **XXIX Session of the ITTC and Associated Sessions of the Committees**. Yokohama, Japan.

◆ 11–13 June 2001. **International Conference on ex situ and in situ Conservation of Commercial Tropical Trees**. Yogyakarta, Indonesia. Contact: Ms Soetitah S. Soedojo, ITTO Project PD 16/96 Rev.4 (F), Faculty of Forestry, Gadjah Mada University, Bulaksumur, Yogyakarta 55281, Indonesia; Fax 62–274–902 220; Email itto-gmu@yogya. wasantara.net.id