ISSN 1022–5439

ITTO Tropical Forest UPDATE

Volume 17 Number 3 2007

A newsletter from the International Tropical Timber Organization to promote the conservation and sustainable development of tropical forests

Into the sunset?

MOST COUNTRIES with significant forest resources have, at one time or another, heard their timber sector referred to as a 'sunset' industry. This is usually the case when other economic development options present themselves that can appear more dynamic and profitable than turning trees into boards. The rapid developments underway in the climate change negotiations and the coalescence of several new partnerships to provide funds to countries for averting deforestation (see *TFU* 17/2) have led some observers (and some tropical countries) to see carbon credits and related funds as a new dawn for the conservation and sustainable development of tropical forests. While there is unprecedented momentum (for which the World Bank and other partners, who recently announced a $300 million fund for averted deforestation, are to be congratulated), it is germane to consider the development of other 'new dawns' for tropical forestry that have been announced over the past couple of decades.

One of the first of these was the prospect for natural medicines derived from tropical forests to fund their conservation and sustainable management. Several

Inside ▸ *Illegal sawnwood in Cameroon* ▸ *monitoring mahogany* ▸ *Indonesian certification …*

Contents

Illegal sawnwood in the East Province of Cameroon 3

Monitoring mahogany 5

Forest certification in Indonesia 10

Advances in teak cloning 13

Training in SFM 16

Measuring the impacts of illegal logging 19

Regular features

Market trends 23

Fellowship report 26

On the conference circuit 27

Recent editions 28

Topical and tropical 29

Meetings 30

Out on a limb 32

Editor Steven Johnson
Editorial assistant Kenneth Sato
Design Justine Underwood
Subscriptions Manami Oshima

The *Tropical Forest Update* is published quarterly in English, French and Spanish by the International Tropical Timber Organization.

Printed on paper produced with a minimum of 50% recycled fibre and a minimum of 15% post-consumer waste and without the use of chlorine gas.

The *TFU* is distributed **free of charge** to over 15 000 individuals and organizations in more than 160 countries. To receive it, send your full address to the editor. Please notify us if you change address. The *TFU* is also available on-line at www.itto.or.jp

International Tropical Timber Organization
International Organizations Center – 5th Floor
Pacifico-Yokohama, 1–1–1 Minato Mirai, Nishi-ku
Yokohama 220–0012 Japan
t 81–45–223 1110
f 81–45–223 1111
tfu@itto.or.jp
www.itto.or.jp

Cover image Sunset over Kaeng Krachan National Park (Thailand). *Photo: A. Compost*

... Editorial continued

articles in respected journals in the 1980s referred to the huge potential value of such medicinal plants and compounds. Unfortunately, pharmaceutical companies were able to synthesize compounds from tropical forest medicines almost as fast as they were discovered and negotiations dealing with bio-piracy and equitable remuneration for such tropical forest resources remain mired today in fora such as the CBD. Another potential source of funding for tropical forests that was trumpeted in the 1980s and 90s was ecotourism. That rosy vision was clouded by a lack of infrastructure in most tropical countries that kept all but the most risk-tolerant investors away. Non-wood forest products are certainly important at a domestic and subsistence level in almost all tropical countries, but they have rarely fulfilled their alleged potential to fund tropical forest conservation.

Granted, all of these sectors (and others) are now playing a role in helping tropical countries pay to manage and protect their forests and have increased in importance in many countries over the years. However, all of them pale in comparison to the contributions of the tropical timber industry, which now generates export earnings exceeding $20 billion per year (including primary and secondary products) and billions more in domestic markets. They also pale in comparison to the perceived needs for implementing sustainable management of tropical forests (eg, inventorying and protecting the permanent forest estate, sustainably managing production and protection forests, etc.) which amount to billions of dollars a year based on work carried out by ITTO in the 1990s.

Despite remaining the largest source of regular revenue from tropical forests, the timber industry alone has been unable to finance the transition to sustainability, nor should it be expected to. The welcome development of significant new revenue streams for tropical forests within the climate change negotiations recognizes the need to place value on the other services they provide. The solution is for all potential revenue streams for protecting tropical forests to be pooled and effectively managed by tropical countries. It is essential that the timber sector be seen as part of the solution to halting deforestation and forest degradation in the tropics, as well as a key player in alleviating poverty, and not as a sunset industry that is part of the problem. ITTO is working with responsible industry players throughout the tropics to implement SFM, log tracking and other schemes that help to ensure that tropical timber products are not negatively impacting the environment and that governments receive the royalties and other fees that help to fund forest management (eg see *Monitoring mahogany*, page 5; *Forest certification in Indonesia*, page 10). ITTO will also be working hard to ensure that sustainable forest management and the tropical timber industry are key considerations in the rapidly evolving negotiations and partnerships on forestry and climate change.

Many of ITTO's activities of relevance to forestry and climate change referred to above have evolved and come to prominence under the leadership of Dr Manoel Sobral Filho, who completes his term as ITTO's Executive Director in early November. Dr Sobral was instrumental in pushing forward ITTO's work on forest monitoring and law enforcement, bio-energy, and the financing of tropical forest management (to name only a few) over his near decade at the helm of the Organization. ITTO's work and leadership in all of these areas in the tropics will be a key contribution as the new Executive Director (Emmanuel ZeMeka) guides the Organization's responses and inputs to climate change and other emerging issues. As Dr Sobral says in this issue's *Out on a limb*, he is leaving the Organization in good shape and in good hands. He is also leaving with the gratitude of the entire ITTO Secretariat for his excellent leadership and wisdom, from which we all benefited. Having been privileged to have him as both a good friend and as my boss over the past decade (and as a colleague for most of the decade prior to that), I am confident that Sobral is in no way heading into the sunset as he leaves ITTO, but into new ventures and challenges in Brazil and beyond. We all wish him well.

Steve Johnson

Illegal sawnwood in the East Province of Cameroon

An analysis of the economics behind illegal sawnwood trade

by
Jean Lagarde Betti[1]
and
Kadiri Serge Bobo[2]

[1]Laboratory of Plant Systematics and Phytosociology
Free University of Brussels
Belgium

betlagarde@yahoo.fr

[2]Centre for Nature Conservation
Georg-August University
Göttingen, Germany

bobokadiri@yahoo.fr

Seized: Illegal sawnwood stored at the Forest and Wildlife headquarters in Bertoua. *Photo: J.L. Betti*

CAMEROON is located virtually at the centre of Africa and covers about 475 000 km². It contains about 16.5 million hectares of dense rainforests (FAO/PNUD 1983, FAO/PNUD and Minagri 1989) Within this area of great biodiversity, there are various types of tropical rainforest: humid savannah, forest galleries, dry forests, dry savannah, and steppes, as well as manmade agro-ecosystems (Letouzey 1968, 1985). The country contains two main climatic zones, namely the equatorial zone and the tropical zone.

The utilization of resources in Cameroon is not always sustainable, constituting a major threat to biodiversity. Systems of farming such as slash-and-burn agriculture constitute the major causes of tropical forest destruction. Poaching has also become a major threat for wildlife that has increased with the proliferation of logging activities (Betti 2004, MINEF 1995).

On 20 April 2007, anonymous informants based in Bertoua alerted the authors to 600 m³ of illegally sawnwood that had been seized and stored at the East Provincial Delegation of Forest and Wildlife headquarters.

Cameroon's new forest policy introduced statutory involvement of rural populations, partners and stakeholders in its implementation, notably by the ownership of community forests and hunting zones (MINEF 1996). This is intended to encourage people to become better stewards of wildlife and forests. Community forests and hunting zones are used by local communities, who can sign specific agreements with the forest administration and private sector partners to harvest their forest resources. However, most of the agreements signed with forest companies are not profitable to local communities. Also, some companies abuse their relationships with community forests to illegally harvest and transport wood.

To stop such illegal harvesting and enhance the contribution of the forest sector to the development of the local communities, the Ministry of Forest and Wildlife implemented control actions in Cameroon's East Province. However, adequate material, financial and human resources are not available to control the whole province, one of the largest in the country. Control actions have therefore been concentrated around the city of Bertoua. This article discusses the reasons for the proliferation of illegal timber sawing in the East Province, focusing specifically on the Koundi community forest located 50 km from Bertoua.

Illegal timber in the East Province

Cameroon is divided into ten administrative provinces: the Centre (Yaoundé being the capital), the Littoral (Douala), the East (Bertoua), the Southeast (Buea), the Northwest (Bamenda), the South (Ebolowa), the Adamaoua (Ngaoundéré), the North (Garoua) and the Far North (Maroua). East Province is covered by semi-deciduous and transition forests, and is often referred to as Cameroon's main timber reserve, contributing 53.5% of the country's total harvest in 2005 (MINEFI 2006). It also contributes about 3 billion CFA francs (FCFA) per year in felling taxes to government revenues.

On 20 April 2007, anonymous informants based in Bertoua alerted the authors to 600 m³ of illegally sawnwood that had been seized and stored at the East Provincial Delegation of Forest and Wildlife headquarters. Field investigations were undertaken in Bertoua and Koundi to examine in detail the background of this timber and the factors driving its production.

On the road: Illegally logged timber is mostly transported to the northern part of Cameroon (Ngaoundéré, Garoua, and Maroua) by chartered trucks. *Photo: J.L. Betti*

The seized wood resulted from a two-week field operation conducted in the beginning of April 2007 by forest officers based in Bertoua. The wood was of three main species: *Triplochilton scleroxylon* (ayous), *Lovoa trichilioides* (bibolo), and *Entandrophragma cylindricum* (sapelli). Ayous, or 'white wood' accounted for more than 90% of the total volume seized.

Wood illegally sawn in the East Province, particularly ayous, is transported from Belabo by train or from Bertoua in chartered trucks to Ngaoundéré. There it is conveyed by tradesmen and exporters by chartered trucks to the northern provinces, namely the North (Garoua) and Far North (Maroua). Much of the wood is used in the domestic markets of the north, but some leaves the country through neighbouring Chad. From Chad, the wood takes various routes through the Saharan desert to supply Libya, Sudan, Egypt, Niger, Algeria and the north of Nigeria. Compared to Meliaceae family timbers (bibolo, sapelli), or 'red wood', ayous is more resistent to the high temperatures that characterize this area. Ayous can withstand very high temperatures and long dry seasons without changing its form.

Koundi community forest

The community forest of Koundi covers 4738 hectares in the northeast of Bertoua, in the 'agricultural and residential' zone of the non-permanent, State-owned estate. It is a natural transition forest. A cooperative known as GIC-DOH is responsible for the management of this community forest. The process of establishing the Koundi community forest started in 2003 and was finalized in June 2006 with the financial support of some traders from the Northern part of the country known as the *Aladji*. GIC-DOH has entered into five main timber sales contracts with private sector partners, of which four are with the *Aladji* (GIC-DOH 2006). The terms of these contracts state that the *Aladji* must provide financial support to the group for managing their community forest, while the group has to sell their sawnwood exclusively to the *Aladji* at 10 000 FCFA/m³ for both red (bibolo, sapelli) and white (ayous, fraké) wood. Production, including the felling and transportation of wood from the forest to the village, is at the expense of the *Aladji*. The felling and transportation of wood is exclusively conducted by GIC-DOH villagers.

The economics of illegality

The production cost of 1 m³ of sawnwood is about 20 000 FCFA (1 US$ = 500 FCFA). This includes the felling of trees, pit-sawing in or near to the forest, and transporting the sawnwood from the forest to the village. A chartered truck often transports 70 m³ of sawnwood. The transportation cost of this quantity of wood from the village to the Bertoua city market is 70 000 FCFA (about 1000 FCFA/m³). Thus, the total cost of the wood, including the 10 000 FCFA/m³ profit margin for GIC-DOH, from the forest to Bertoua is about 31 000 FCFA/m³. At the Bertoua market, the sawnwood is sold for between 45 000 and 50 000 FCFA/m³ depending on the species, giving the *Aladji* a profit of between 14 000 and 19 000 FCFA/m³.

However, the *Aladji* also buy timber directly from households in the village rather than through GIC-DOH. The price of one tree is between 4000 and 6000 FCFA depending on the species. Given that one tree can (on average) provide 3 m³ of sawnwood, the wood price of a cubic meter at the village level becomes very low, between 1500 and 2000 FCFA. From the forest to Bertoua, the cost is therefore reduced to between 22 500 and 23 000 FCFA, giving a profit of between 22 500 and 27 000 FCFA/m³. To avoid controls from the forest administration, the *Aladji* claim that the wood is harvested in the community forest, using trucks marked 'GIC-DOH' to transport their products, since local communities do not pay any felling taxes to the government for harvesting their forest.

The profits realized by the *Aladji* also increase with the distance the wood is transported. In Ngaoundéré, for example, the price of white wood is 80 000 FCFA/m³. In Maroua, the price of the white wood reaches 110 000 FCFA/m³, amounting to 7 700 000 FCFA for a 70 m³ chartered truckload of white wood. The transport cost from Bertoua to Maroua for a chartered truck of 70 m³ is about 3 000 000 FCFA, resulting in a total cost (production and transportation) of about 5 100 000 FCFA if the wood comes from the community forest. The *Aladji* realize a profit of about 2 600 000 FCFA (about US$5200). When the sawnwood is bought directly from households (i.e. illegally produced inside or outside of the community forest area), the total cost of a 70 m³ chartered truck in Maroua becomes 4 540 000 FCFA, giving a profit of 3 160 000 FCFA (about US$6320).

Local communities support private sector groups like the *Aladji* who provide them with substantial funds for their timber. Communities can be resentful of forest officers who seize illegally produced sawnwood, sometimes resulting in conflicts between the forest administration and the villagers. In the East Province of Cameroon, cacao and coffee were once the two most important cash crops for rural farmers. When production and shipping of these crops was hindered by the economic crisis, trade in illegal timber gained importance as a readily available source of cash income. The example of the Koundi community forest suggests that at least in the short run, and especially for traders, sale of illegally produced sawnwood is a relatively simple and lucrative activity.

Continued on page 5

Monitoring mahogany

An ITTO project studies mahogany distribution in Peru and factors affecting harvest quotas

by
Ignacio Lombardi[1]
and
Patricia Huerta[2]

[1]Coordinator
ITTO Project PD 251/03 Rev.3 (F)
ilombardi@lamolina.edu.pe

[2]Officer-in-charge
Forest resources evaluation project component
phuerta@lamolina.edu.pe

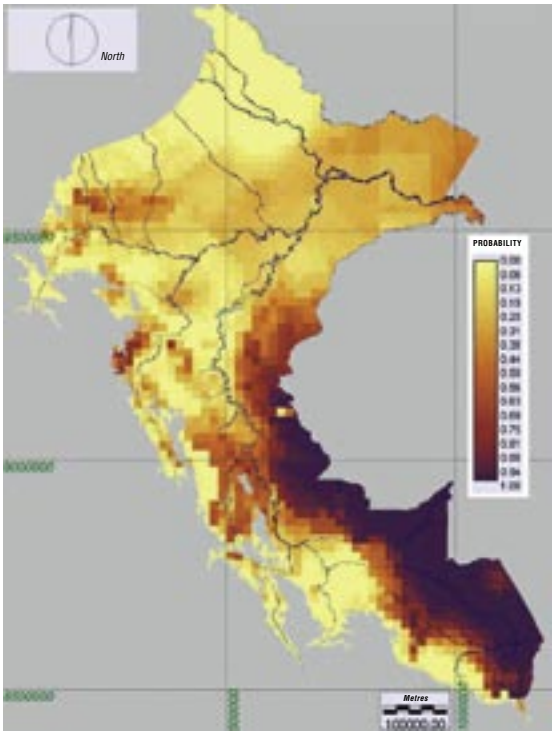
SWIETENIA MACROPHYLLA (mahogany) is the most important commercial forest species in Peru and is subject to intense logging due to the high prices that it commands in international markets. This has also encouraged a significant level of illegal logging of the species to the detriment of both forest concession holders who are operating legally and native communities that in some cases receive very low prices for the harvesting of their forests.

The harvesting of Peruvian mahogany began towards the end of the second decade of the last century, when it was exported as logs. In 1930, a ban was imposed on log exports to generate employment and encourage the value-added processing of products of this timber species, and the sector moved to the export of sawnwood, a situation that prevails to date.

Up to the 1940s, harvesting areas were situated along river areas that were accessible from the city of Iquitos, where the major sawmills were located. From the 1950s to the 1970s, timber production areas rapidly increased, as production regions became more accessible due to the construction of access roads, and the timber was not only shipped out via Iquitos, but could be shipped from other ports as well. During the 1980s and 1990s, timber prices for this species

Where to find it

Figure 1: Climate probability map indicating the presence of mahogany trees in Peru



Note: probability scale ranges from yellow (low) to orange to red to purple (high).

... continued from page 4

Conclusion and recommendations

The East Province's forest is being continuously degraded and local communities derive little profit from forest activities. Illegal logging is continuously increasing. Groups like the *Aladji* are at the centre of a system of excessive pit sawing of often illegally harvested timber from community forests, largely to supply the northern provinces with timber products. The traditional export oriented forest sector has largely ignored the domestic demand for timber, with the result that a growing demand is being largely met by the informal sector.

An open dialogue involving the state forest administration, the *Aladji*, and the local population needs to be initiated. This is a precondition not only for reducing social tensions between forest officers and villagers, but also to solve the inequalities of the agreements entered into by communities with groups like the *Aladji*. An open dialogue would enable local communities to improve their chances of obtaining a fair and equitable share of the proceeds from forest harvesting.

The forest administration should be provided with additional staff, adequate training, and the means to control forest activities so as to regulate and organise the local timber market in the East Province and throughout the country.

The authors acknowledge those who helped in providing information during the field investigation, particularly the Eastern Provincial Delegate of Forest and Wildlife, Mr Mbandji Jacques and his staff, and the President of GIC-DOH.

References

Betti, J-L. 2004. *Impact of forest logging on biodiversity and the possible fate of the Baka pygmies in the the Dja biosphere reserve, Cameroon*. Available from: www.biodiv.org/Programmes/areas/forest/case-studies.aspx.

FAO/PNUD. 1983. *Plan d'action forestier tropical*. Rapport de mission Cameroun – Rome.

FAO/PNUD and MINAGRI. 1989. *Plan d'action forestier tropical*. Préparation de la table ronde internationale, Yaoundé.

GIC-DOH. 2006. *Rapport d'activité de la forêt communautaire de Koundi pour la période de Janvier à Décembre 2006*.

Letouzey, R. 1968. *Etude phytogéographique du Cameroun*. 511 p. Paris, Editions P. Lechevalier.

Letouzey, R. 1985. *Notice de la carte phytogéographique du Cameroun au 1/50 000*.

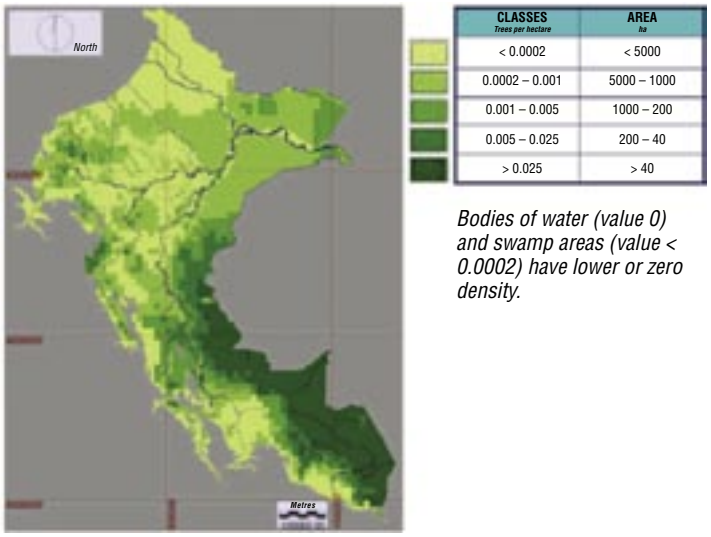
MINEF. 1995. *National Forestry Action Programme of Cameroon*. Forest policy document.

MINEF 1996. *A Compendium of official instruments on forest and wildlife management in Cameroon*. Imprimerie nationale, Yaoundé. 185 p.

MINEFI. 2006. *Annuaire statistique du Cameroun*. Institut National de la statistique.

Before access

Figure 2: Natural mahogany tree density map



Bodies of water (value 0) and swamp areas (value < 0.0002) have lower or zero density.

soared, forest harvesting operations were intensified and, in some cases, illegal practices such as chainsaw quartering and encroachments into reserve and native community areas became more prevalent.

In November 2002, the Conference of the Parties of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), held in Santiago, Chile, adopted a decision to transfer mahogany from Appendix III to Appendix II of CITES, which meant that the survival of this species was being threatened and that it was necessary to adopt corrective measures to avoid the extinction of wild populations of this valuable resource.

This restriction entered into force in November 2003, and meant that exports were only possible if the CITES Scientific Authority in Peru issued a non-detriment finding for the species, a function which in this case is performed by the National Agrarian University of La Molina (Universidad Agraria La Molina—UNALM) through its Faculty of Forestry Science (Facultad de Ciencias Forestales—FCF). At the time of the Appendix II listing FCF stated that it could not issue such findings as there was not enough reliable information available on the current status of the natural populations of mahogany.

In 2006, UNALM, with the support of the International Tropical Timber Organization (ITTO), began to implement a project to ascertain the status of mahogany populations and verify the accuracy of a natural distribution model developed by FCF. The information obtained by the project will benefit forest concession holders and native and rural communities who still have harvestable mahogany stocks within their territories, and it will allow the government forest authority (Institute for Renewable Natural Resource—INRENA) to implement actions aimed at the conservation of this species in the country.

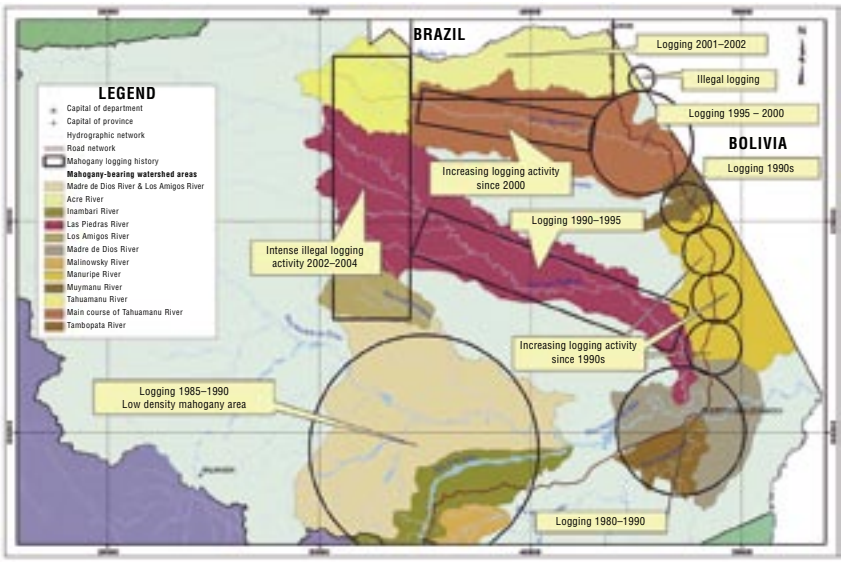
Furthermore, the information obtained will help to establish an allowable cut in accordance with the capacity of permanent production and community areas. This will reduce the rate at which this species is losing its genetic potential and will provide data on mahogany range areas as well as mahogany population density and status.

The current Forestry and Wildlife Law (Act No 27308) only allows logging operations to be carried out in areas under General Forest Management Plans (GFMP) and Yearly Plans of Operation (YPO) that have been duly approved by the competent authority (Forest Department and Technical Forest Administrations), and stipulates that only trees with a minimum DBH of 75 cm can be logged while 10% of seed trees for each harvesting unit must be retained.

The results obtained to date have indicated that 40% of the individuals of this species have a DBH of less than 75cm and the remaining 60% are over this minimum cutting diameter, a situation that is not sustainable over time. It was therefore recommended that the maximum harvest level should be 1200 trees, as long as concession holders and/or native communities include silvicultural plans in their YPOs for the rehabilitation of this species. INRENA has established an export quota for 2007 of 13 476 m^3 of sawnwood, which amounts to approximately 1600 trees based on the current distribution of tree sizes and an assumed 50% sawnwood yield, about one-third more than the recommended harvest level. The size of trees in terms of volume has gradually decreased from one decade to the next, with a decline of 34% recorded over the 87-year period for which detailed

After access

Figure 3: Mahogany-bearing watershed areas and logging history in Madre de Dios



Madre de Dios biometrics

Table 1: Form and volume for individual tree specimens in Madre de Dios

DIAMETER CLASS	NUMBER OF TREES		(FF) *Form factor*	STEM HEIGHT (m)			REAL VOLUME*			% VOLUME DIFFERENCE	WEIGHTED AVERAGE VOLUME**	
	Trees	*%*		*Minimum*	*Maximum*	*Average*	*With bark (m^3)*	*Without bark (m^3)*	*Difference*	*With & without bark*	*With bark (m^3)*	*Without bark (m^3)*
10–19.99	2	1.18	0.8918	7.75	8.00	7.88						
20–29.99	5	2.96	0.8343	4.50	8.50	6.30	0.2575	0.2415	0.0160			
30–39.99	7	4.14	0.8027	6.00	17.00	9.29	0.6991	0.6621	0.0370			
40–49.99	13	7.69	0.7704	4.50	18.00	10.69	1.2678	1.1988	0.0690			
50–59.99	11	6.51	0.6646	6.25	19.00	12.25	1.9020	1.7576	0.1444			
60–69.99	22	13.02	0.7328	7.00	25.00	13.26	3.1266	2.8954	0.2312			
70–74.99	8	4.73	0.7654	6.50	16.00	10.71	3.2487	3.0849	0.1638			
75–79.99	5	2.96	0.8322	8.00	14.00	11.88	4.6042	4.3774	0.2268	4.9259	23.0210	21.8870
80–89.99	7	4.14	0.7203	8.00	21.25	15.05	6.0181	5.7020	0.3161	5.2525	42.1267	39.9140
90–99.99	17	10.06	0.6587	10.00	19.00	14.29	6.6008	6.1945	0.4063	6.1553	112.2136	105.3065
100–109.99	19	11.24	0.7710	8.00	18.00	13.87	9.0715	8.5693	0.5022	5.5360	172.3585	162.8167
110–119.99	10	5.92	0.7999	10.25	20.00	14.53	11.5331	10.8797	0.6534	5.6654	115.3310	108.7970
120–129.99	9	5.33	0.7199	12.00	22.00	16.56	14.2779	13.7344	0.5435	3.8066	128.5011	123.6096
130–139.99	11	6.51	0.6973	9.00	22.50	15.28	14.3200	13.6927	0.6273	4.3806	157.5200	150.6197
140–149.99	8	4.73	0.7207	9.00	18.50	13.75	16.5228	15.8227	0.7001	4.2372	132.1824	126.5816
150–159.99	1	0.59	0.6453	13.75	13.75	13.75	16.5276	15.6488	0.8788	5.3172	16.5276	15.6488
160–169.99	3	1.78	0.7804	12.00	17.00	14.83	23.6001	22.8780	0.7221	3.0597	70.8003	68.6340
170–179.99	2	1.18	0.7243	14.00	18.00	15.83	26.3209	25.0600	1.2609	4.7905	52.6418	50.1200
180–189.99	5	2.96	0.7365	13.00	14.00	13.50	26.7052	25.2231	1.4821	5.5499	133.5260	126.1155
190–199.99	3	1.78	0.7445	12.00	14.00	12.67	27.7166	26.5110	1.2056	4.3497	83.1498	79.5330
200–209.99	0	0.00										
210–219.99	1	0.59	0.6739	12.00	12.00	12.00	28.6816	27.7110	0.9706	3.3841	28.6816	27.7110
TOTAL	**169**	**100.00**	**10.2249**			**197.79**	**TOTAL** *101 commercial trees*			**66.4106**	**1268.581**	**1207.294**
TOTAL *Number of commercial trees*	**101**	**AVERAGE** *FF commercial trees*	**0.73035**			**14.1279**	**WEIGHTED AVERAGE VOLUME**			**4.7436122**	**12.56021**	**11.95341**

*Note: *The volumes shown are average volumes by diameter class; the volume of each individual was calculated by aggregating the real volumes of the sections of each individual (real volume with and without bark); **The sum of all trees that make up the diameter class.*

records of mahogany logging exist (a total of 259 540 specimens have been logged and officially recorded during this period).

Modeling species occurrence probability

A distribution model was developed to determine the number of mahogany individuals at the national level, using the *FloraMap* program, which is a tool used for predicting the distribution of natural organisms on the assumption that the climate in the collection points of a group of individuals is representative of the environmental range of that organism. In the case of plant species, the information can be obtained from herbaria that have registered the samples collected and can thus provide a set of collection points for the required calibration that is then supplemented with information from the locations where the inventories were taken.

A total of 489 trees/collection points were studied, originating from five different information sources:

1) from a review of the YPOs: 228 trees/points were identified;
2) from herbarium databases: 151 trees/points were identified;
3) personal communication: 9 trees/points;
4) forest inventory documents: 9 trees/points; and
5) WWF documents: 92 trees/points.

Figure 1 shows the natural range of the species in Peru and indicates that the highest occurrence probability is in the southern part of the country, particularly in the regions of Ucayali and Madre de Dios, with some possible occurrence in Loreto, which in many cases coincides with native community areas and lands of indigenous peoples living in isolation.

Mahogany occurrence maps

Preliminary results can be seen in the model developed, which combines tree density with the probability of finding the species in a given region.

Figure 2 shows the mahogany tree density in different parts of the country before forest logging or harvesting operations took place. In contrast, *Figure 3* shows the main mahogany-bearing

Ucayali biometrics

Table 2: Form and volume for individual tree specimens in Ucayali

DIAMETER CLASS	NUMBER OF TREES		(FF) Form factor	STEM HEIGHT (m)			REAL VOLUME*			WEIGHTED AVERAGE VOLUME**	
	Trees	%		Minimum	Maximum	Average	With bark (m^3)	Without bark (m^3)	Difference	With bark (m^3)	Without bark (m^3)
30–39.99	1	0.98	0.8606	5.00	5.00	5.00	0.4880	0.3804	0.1076		
40–49.99	1	0.98	0.7983	8.00	8.00	8.00	1.0846	0.8722	0.2124		
50–59.99	4	3.92	0.7499	10.50	5.25	8.94	1.4730	1.3390	0.1340		
60–69.99	9	8.82	0.7224	14.00	9.00	11.22	2.7772	2.4931	0.2842		
70–74.99	3	2.94	0.8634	13.00	10.00	11.00	4.0286	3.6714	0.3572		
75–79.99	4	3.92	0.8820	15.00	11.00	12.94	5.4367	5.0492	0.3875	21.7469	20.1970
80–89.99	10	9.80	0.8379	19.50	8.00	11.95	5.6555	5.2665	0.3890	56.5550	52.6646
90–99.99	12	11.76	0.8076	16.50	5.00	11.10	6.1616	5.7599	0.4017	73.9391	69.1189
100–109.99	11	10.78	0.8142	15.50	9.50	13.02	9.0358	8.2934	0.7423	99.3933	91.2276
110–119.99	7	6.86	0.8739	19.00	8.00	12.43	11.5257	10.8689	0.6567	80.6796	76.0824
120–129.99	7	6.86	0.7609	16.00	8.00	12.79	11.7960	11.1057	0.6902	82.5719	77.7402
130–139.99	10	9.80	0.8127	17.00	7.00	12.10	14.0062	13.1120	0.8941	140.0615	131.1202
140–149.99	4	3.92	0.6601	19.00	12.50	16.25	16.6590	15.7953	0.8637	66.6360	63.1812
150–159.99	7	6.86	0.7706	20.00	10.00	14.21	20.3437	19.2720	1.0717	142.4057	134.9037
160–169.99	4	3.92	0.7825	14.00	9.00	11.75	19.4011	18.4711	0.9300	77.6042	73.8843
170–179.99	1	0.98	0.7431	12.00	12.00	12.00	20.8403	20.3240	0.5163	20.8403	20.3240
180–189.99	3	2.94	0.7312	16.00	14.00	14.67	28.8038	28.1758	0.6280	86.4113	84.5273
190–199.99	2	1.96	0.8152	14.00	10.00	12.00	28.9975	27.3653	1.6322	57.9949	54.7305
200–209.99	0	0.00									
210–219.99	1	0.98	0.7647	12.00	12.00	12.00	33.3162	32.7299	0.5862	33.3162	32.7299
220–229.99	0	0.00									
230–239.99	0	0.00									
240–249.99	1	0.98	0.7067	14.00	14.00	14.00	46.6418	46.2049	0.4368	46.6418	46.2049
TOTAL	**102**	**100.00**	**11.7634**						**TOTAL** *84 commercial trees*	**1086.7977**	**1028.6367**
TOTAL *Number of commercial trees*	**84**	**AVERAGE** *FF commercial trees*	**0.7842246**						**WEIGHTED AVERAGE VOLUME**	**12.9381**	**12.2457**

*Note:*The volumes shown are average volumes by diameter class; the volume of each individual was calculated by aggregating the real volumes of the sections of each individual (real volume with and without bark); **The sum of all trees that make up the diameter class.*

watershed areas in the Madre de Dios region that have been logged over time, and how harvesting areas have gradually moved further away from population centers and access roads.

The current density of mahogany populations in Peru has obviously been affected by the accessibility factor, as new access roads have been opened up in the Amazon region. Natural mahogany populations have been affected and the species range area has been reduced. Furthermore, natural habitats have been destroyed, making rehabilitation more difficult, particularly where cleared lands have been used for agriculture and cattle breeding.

The current status of the species was estimated on the basis of its natural density being affected by the construction of access roads and by deforested areas, where it is clear that the possibility of finding the species has been reduced. Its range is now limited to the most remote locations, thus resulting in the fragmentation of mahogany populations.

In most of these areas, agricultural and cattle-breeding activities have destroyed the habitats of different species that used to occupy these sites, including mahogany. The rehabilitation of these sites should be started so that these species can once again colonize these spaces and thus recover their original range areas.

Associated species

A field data analysis for sample plots was carried out in the Madre de Dios region, with forest types divided into three groups: the first group included sample plots in harvested areas; the second comprised areas with standing mahogany timber trees; and the third was the control area (seed stand).

Based on a simplified inventory of the first group of sample plots, associated species included *Brosimum alicastrum* (mashonaste), *Dipteryx micrantha* (shihuahuaco), *Ceiba pentandra* (lupuna) and *Ficus* spp (renaco).

In the second group of sample plots, the species associated with mahogany included *Ceiba pentandra* (lupuna), *Myroxylon balsamun* (estoraque), *Brosimum guianensis* (manchinga), *Brosimum alicastrum* (mashonaste) and *Aspidospermas macrocarpon* (pumaquiro).

Heart rot: A timber sample of a standing mahogany tree obtained with the Pressler borer. *Photo: I. Lombardi*

In the control group, the species associated with mahogany included *Hevea brasiliensis* (shiringa), *Manilkara bidentata* (red quinilla), *Brosimum alicastrum* (mashonaste), *Amburana* spp (ishpingo), *Myroxylon balsamun* (estoraque) and *Dipteryx micrantha* (shihuahuaco).

Form and volume factors

The project also carried out detailed studies on the form and volume of a sample of commercial mahogany trees harvested from the two major production areas. *Tables 1* and *2* show the results obtained in terms of form and volume of trees and their degree of tapering (form factor), which reduces the total commercial volume of trees. The difference between volume with and without bark for each diameter class is also shown.

The calculations took into account only commercial trees and indicated that the average form factor for the Madre de Dios region is 0.7304 and the difference between volumes with and without bark is an average of 4.75% (0.6068 m^3), ranging from 0.2268 m^3 in smaller diameter trees to 1.4821 m^3 in larger diameter trees. For the Ucayali region, the average form factor is 0.7842 and the difference between volumes with and without bark is an average of 8.96% (0.6924 m^3), ranging from 0.3875 m^3 in smaller diameter trees to 1.6322 m^3 in larger diameter trees. The difference between with bark and without bark volumes for each tree can be used to mask illegally sourced timber.

Hollow trees

Through the assessment of growth rings, it was possible to determine a tree's health status *(see photo)*. It was found that over 21% of the individuals studied in Ucayali and 16% of those studied in Madre de Dios have a central hollow section, while 7–8% of the individualsin both regions are in the process of core decomposition (rotting timber).

The percentage of trees with central hollow sections and the degree of deterioration of each specimen ranges from 42% to 92% across diameter classes. Furthermore, it was found that there is no relation between the size of the hollow section and DBH. In the first tree section (up to 30 m height), it is estimated that the loss could be as much as 84.72% of the volume, which could represent up to 2.68 m^3. In Madre de Dios, the loss could reach 78.69%, representing a loss in volume of up to 3.63 m^3.

Conclusions

Evidence collected by the project shows that higher mahogany tree densities are found increasingly further away from accessible areas, with pressure being exerted on intermediate diameter populations of 75–120 cm DBH. Increasing the minimum cutting diameter should be considered.

According to the analysis carried out using the field data collected by the project, it is necessary to correct the calculation method for production volumes of trees to include volume deductions for bark, damage and disease, which will require further studies. The setting of export quotas on sawnwood when these and other factors (eg conversion efficiency) remain unknown or unquantified leaves concession operators many loopholes to harvest (and legalize) more mahogany trees than anticipated by the quota-setters. For the establishment of logging quotas, not only should more accurate sawnwood yield percentages be calculated and taken into account but also the percentages to be deducted from gross volume to take account of the factors identified above and so arrive at a more realistic merchantable volume.

Such indicators (form factors, percentage of trees with hollows) must be used by INRENA to make the necessary adjustments when calculating the volumes that should be authorized for logging, and concession holders and native communities should be trained and monitored to ensure their volume calculation methods include the necessary reductions.

The setting of export quotas on sawnwood when these and other factors (eg conversion efficiency) remain unknown or unquantified leaves concession operators many loopholes to harvest (and legalize) more mahogany trees than anticipated by the quota-setters.

A longer version of this paper (including references) as well as other project outputs are available from the ITTO Secretariat (rfm@itto.or.jp; Spanish only).

Forest certification in Indonesia

Evaluation of an ITTO project finds room for improvement in the country's eco-labelling scheme

by
Olav Bakken Jensen

ITTO Consultant
olav_bakken.jensen@chello.no

BY THE LATE 1980s, the forest situation in Indonesia had deteriorated seriously through rampant deforestation, illegal logging and corruption, to a level which caused international attention and alarm. A lively forestry policy debate ensued, and as one of the results, the Lembaga Ecolabel Institute or Lembaga Ecolabel Indonesia (LEI) was initiated in 1993 under the chairmanship of former environment minister Emil Salim, in an attempt to apply certification in order to achieve, or at least work towards, sustainable forest management in the country.

LEI was formally organized as a foundation in 1998, and in the same year a certification system with its own criteria and indicators was agreed by industry, the government and NGOs. As certification was seen as an important measure to promote SFM in the 1990s, the creation of LEI came at a very propitious point in time.

There had not been a national initiative of the Forest Stewardship Council (FSC) in Indonesia, but in 1999 a Memorandum of Understanding, and later a Certification Protocol was signed between LEI and FSC. The criteria and indicators (C&I) of the LEI certification system thus became a national standard for certification in the country. In general terms the LEI C&I are compatible both with the ITTO C&I for SFM, as well as the FSC Principles and Criteria, although there are some important differences. For example, in regard to social aspects, the LEI requirements are somewhat more opaque and general than those of FSC. FSC has explicit mention of the rights and plight of indigenous peoples, whereas LEI does not mention this category explicitly, although the needs of local communities are addressed.

Landed: Low impact logging and skidding in a certified concession in Indonesia.
Photo: Tropical Forest Foundation

Although the ex-post evaluation of PD 1/95 was positive for technical aspects, it noted serious shortcomings in social aspects of SFM and certification of forests in the country. Such shortcomings were said to be due partly to gaps in the certification system itself ...

In the global context, it has long been recognized that certification has been lagging behind in tropical countries. As demand for certified forest products has been on the increase, particularly in environmentally sensitive markets, the limited supply of such products from tropical countries has been and continues to be an impediment for trade in forest products from those countries.

There are many causes for slow progress in certification of tropical forest products. A lack of technical and institutional capacity together with financial limitations have played an important role. In that regard, the initiative of LEI (which has concentrated on building such capacity) has filled a gap. Other limiting factors have been the relative unwillingness of forest owners (concessionaires) to embark on the certification process, as the process entails considerable costs also to concessionaires, and the elusiveness of price premiums offered for certified products. Finally, unless national authorities are committed to play their part, and create an enabling environment for both SFM and certification itself, little progress can be expected. This article attempts to analyse the degree of success of certification efforts in Indonesia in terms of the potential impediments mentioned above and also to recommend ways to overcome them.

ITTO projects

In creating and strengthening the certification system, LEI has had the advantage of financing from ITTO for two projects, PD 1/95 and PD 80/01. The first project, executed between February 1998 and December 2000 laid the basis for the certification system with emphasis on certification of natural forests and chain of custody certification (COC). The second project, which was completed between March 2003 and December 2005, consolidated and expanded the

system both geographically and in terms of the training of personnel as well as expanding to certify plantations and community based forest management (CBFM).

PD 1/95 received a favourable ex-post evaluation in 2004, particularly with regard to technical aspects of the project, and the elements of the certification system itself. The system has created a number of independent bodies, with the Provincial Communication Forum (PCF) in a pivotal role in the certification process as well as in certification monitoring. Nine such PCFs were created by PD 1/95 and four more during PD 80/01, one of which was a reactivation of a former PCF. The system now therefore comprises 12 PCFs in 12 main forestry provinces of the country. LEI itself has increasingly concentrated on its function as an accreditation body, and has accredited three national certification bodies (CBs), as well as one operating from Malaysia (SGS Qualifor). Another important element of the system is the creation of the Certification Review Council, an independent appellate body of prominent persons, adjudicating complaints of actual certifications.

Although the ex-post evaluation of PD 1/95 was positive for technical aspects, it noted serious shortcomings in social aspects of SFM and certification of forests in the country. Such shortcomings were said to be due partly to gaps in the certification system itself, which lacked considerations for local villagers and in particular to indigenous peoples, but more importantly, the lack of recognition of land rights for local populations on the part of the central government. The land tenure system in Indonesia remains very complex and confusing with overlapping rights and claims. Typically, all forest belongs to the government which allots concessions to industrialists on properties that are often customary village or indigenous lands.

As a result of the two projects, LEI can now call on some 200 assessors with capacity to carry out actual certification and monitor progress. The system has instituted two separate expert panels at two levels of the certification process, and 66 experts have been trained to serve on these panels. Independently, 40 assessors have been trained in COC certification, 58 trainers in certification, including trainers of trainers, and 31 participants in decision making panels for approving certificates. Altogether, LEI is now well equipped to take on a heavier load and make further progress in certification, although more personnel are needed to reach the point when a majority of concessions will be certified. Given the number of trainers that benefited from the projects, it should be possible to expand the number of personnel to achieve this goal.

Particularly through PD 80/01, certification issues and knowledge of the LEI certification system have been widely disseminated in the country and beyond, both in the South-east Asia region as well as in Europe. LEI has published a number of important and educational brochures and pamphlets, and maintains a web site.

Results

In terms of actual certification results, achievements are still quite modest. During the first project period, only one natural forest operation was certified: PT Diamond Raya Timber. This was a case where the certification was vigorously disputed by NGOs, and attracted international attention. The complaint was brought before the appellate body CRC, and the PCF in Riau province was instrumental in monitoring the case and in suggesting remedial action. Although this conflict has affected the attitude of some national NGOs, which maintain doubts about the benefits of certification at the local level, the active involvement of local NGOs in the conflict resolution process has led many of them to realize the value of the certification system. In this case it brought about a resolution where the forest company ceded a considerable amount of land to local villagers, a solution not guaranteed in most other cases.

As of mid-2007 nine Forest Management Units (FMUs) have been certified, one for a plantation, five for natural forest concessions, and three for community based operations. In addition, one forest industry operation has received a COC certificate.

In terms of actual certification results, achievements are still quite modest. During the first project period, only one natural forest operation was certified: PT Diamond Raya Timber.

The LEI system awards certificates in three categories: gold, silver and bronze. So far, only one silver certificate has been awarded, while the rest are bronze, which means that the FMUs still need to improve within a set time limit (usually a year). Becoming certified, therefore, is not a final 'seal of approval'. Rather, it entails entering a continuous process of improving performance towards SFM.

The Riau Andalan Pulp and Paper Company (RAPP) in Sumatra is a certified FMU that was visited during the ex-post evaluation of PD 80/01. RAPP is a large integrated plantation and pulp and paper operation. The concession is approximately 330 000 ha, although about 25% has been subject to encroachment/degradation and is therefore outside production. In addition, the company also manages another 300 000 ha through a joint venture. Altogether some 9 million m^3 of timber is processed annually, and almost 50 000 ha is planted (partly conversion of natural forest and partly replanting of logged plantations). The main species is *Acacia crasseira*, but some Eucalyptus is also used, in a cutting cycle of 5–6 years. The mill is a modern installation, and the working and living conditions for workers seemed very good.

The mill is ISO-certified and the company has an internal COC certification system, ensuring that no unauthorized timber enters the production chain. About 20% of the concession area is set aside as natural conservation forest, mainly along streams and in narrow wildlife corridors.

Although this is meant to be a positive attribute, it means that in conversion of the natural forest, 80 percent of the forest, most of which is considered of high conservation value, is lost and the remaining 20% is often too narrow or fragmented to constitute viable habitats for many endangered species. For example, the area is within the natural range of the Sumatran tiger, but no tigers have been spotted after the establishment of the plantation. Also, the clear cut compartments that are being logged annually are far too large (in the range of 1000 ha or more) to satisfy Principle 10 of the FSC concerning the spatial distribution of plantation compartments in relation to natural forest. On this violation alone, it is doubtful whether the operation deserves to be certified.

The relative chill between the Ministry of Forestry and local NGOs, including the indigenous peoples' organizations, needs to be overcome. LEI has an important role to play in creating a forum for discussion and conflict resolution.

Another problem of the RAPP concession is serious conflicts with local villagers over land rights. The concession is surrounded by traditional villages claiming customary land rights. In one pending conflict, the concession has planted over 80% of the village's land, leaving the majority of villagers without any arable land. Another problem is that, although the company has a social responsibility programme with many positive results, the employment of local people is limited as the company prefers to contract outsiders such as people from Java. Out of 180 households in the nearest village, only three individuals are employed by the company.

Conclusions

The review of the ITTO PROJECT PD 80/01 found that certification of forests in Indonesia still has a long way to go, although some positive results have been achieved. With about 200 registered concessions in the country, and approximately 100 pursuing active forestry activities, the impact of certification is still very small. Therefore, the increased supply of certified forest products from Indonesia, which was one of the specific objectives of PD 80/01 is still negligible.

It is in fact very difficult to assess the quantitative aspects of certification, as forest statistics in Indonesia are at best unreliable and often completely lacking. Based on the FAO Global Forest Resources Assessment 2005 (FRA 2005), the country's total annual industrial wood removal is said to be about 11.18 million m^3, with 5.46 million from natural forest and 5.72 million from plantations. However, the single operation (RAPP) visited as part of this evaluation is processing approximately 9 million m^3 per annum, nearly twice the volume reported from plantations in the country as a whole. In fact LEI estimates that the real harvest level in the country could be anywhere between 40–80 million m^3 per annum, almost all unreported, and therefore illegal.

Trust has been built at the local level, but needs to be fortified at the national level through intensified contact between all stakeholders. The role of forest authorities is crucial. Policy documents published by ITTO also emphasise the importance of statutory regulations for SFM in order to achieve certification. Certification represents an added value in SFM, and is obviously easier to achieve in situations where a sound basis for SFM has already been created by governments through statutory and obligatory regulations that are being followed up and complied with.

On the bright side, the Ministry of Forestry has enacted a few regulations conducive to certification. One of them is a regulation allowing certified operations to harvest to the full quota of the annual allowable cut (AAC), whereas operations that are not certified will only be allowed 70%. More such regulations are being planned, which is very encouraging.

However, in general, the Ministry of Forestry in Indonesia and the entire Forestry Service in the country still have a long way to go to function optimally, and that goes far beyond improving forest statistics. Following the decentralization and democratization in 1997–98, hopes were high for improvements in forestry administration, but so far results have been slow in coming, despite a plethora of sound advice form international organizations and agents, like the World Bank, ITTO and others. The ITTO Technical Mission to Indonesia in 2001 forwarded some 50 concrete recommendations in its report, including many suggestions for project ideas. Among them was a recommendation for a complete overhaul of the land tenure system in the country, particularly aiming to ensure land rights for local villagers and indigenous peoples. Also included was a plan to decentralize the Forestry Service through reduction of the staff in the Ministry itself. However, very few of these recommendations have been acted upon. The Ministry in Jakarta still employs some 2000 staff, and the Forest Service at the local level is still said to be ineffective, if not corrupt.

In order to help Indonesia to engage in international policy debate on indigenous affairs, the country should ratify the ILO Convention 169 on Indigenous Peoples. In doing so, they will receive technical and other assistance in solving concrete problems in this important social field. LEI should also work proactively towards this goal, and also refine its C&I to reflect the concerns of indigenous peoples. Furthermore, LEI should also set ambitious targets for the certification of FMU's within a set time horizon. (eg 50% within 5 years, 70% within 10 years).

The relative chill between the Ministry of Forestry and local NGOs, including the indigenous peoples' organizations, needs to be overcome. LEI has an important role to play in creating a forum for discussion and conflict resolution. Distance between parties in a conflict can serve no useful purpose. All experience shows that engagement in dialogue and conflict resolution will bring parties closer to eventually overcoming such conflicts.

The complete report of the ex-post evaluation is available on request from the ITTO Secretariat (eimi@itto.or.jp).

Advances in teak cloning

New developments in teak cloning lead to better plantation stock

by
Olivier Monteuuis[1]
and
Henri-Félix Maître[2]

[1]CIRAD-BIOS, TA 10/C
Baillarguet 34398 Montpellier Cedex 5, France
monteuuis@cirad.fr

[2]CIRAD-E.S. TA C-DIR /B
Baillarguet 34398 Montpellier Cedex 5, France
maitre@cirad.fr

New and improved: This Ghanaian village used improved planting stock for their ITTO supported teak plantation. *Photo: J. Gasana*

ALTHOUGH widely planted in the tropics, teak (*Tectona grandis*) originates from India, Laos, Myanmar and Thailand. Strong international demand for good quality teak has resulted in depletion of natural stocks, which are increasingly protected by strict conservation policies to preserve biodiversity.

This situation has resulted in changes in the basic plantation concept of teak. Traditional teak plantations, managed mostly by state organizations for harvesting in 60–80 years (Ball et al. 2000), are no longer well-adapted to the current needs of private investors looking for the best returns in the shortest possible time. For such investors, the quality and the origin of teak planting stock has become a crucial issue.

... the 'seedling route' is outdated and actually represents a deterrent to wide scale increased productivity in teak plantations, and as such to commercial teak plantation investment.

Limits of teak seedling forestry

The traditional means of propagating teak through seeds has been practiced for centuries. While it allows the possibility of storing seedlings in the form of 'stumps' for transportation, to wait for suitable planting conditions, etc., this mode of sexual propagation has the following serious handicaps:

- the quantity of seeds produced per tree is too limited and their germination rates remain low overall (20–25%);
- the period to reach the flowering/seed-bearing stage is lengthy, due to the desirability of maintaining the terminal meristem in a vegetative state for as long as possible (flowering status usually induces a fork formation and straight bole length directly affects teak's market value);
- significant variability of economically important traits (growth, form, wood technological and aesthetic characteristics, etc.) among individuals even when derived from the same mother tree ; and
- limited knowledge about the inheritability of such economically important traits (and consequent uncertainty about potential gains from costly breeding programs).

Several experts (e.g. Kjaer and Foster 1996, Kjaer et al. 2000) have documented these shortcomings. White and Gavinlertvatana (1999) stated that the 'seedling route' is outdated and actually represents a deterrent to wide scale increased productivity in teak plantations, and as such to commercial teak plantation investment. According to these authors, the magnitude of the real genetic gain associated with the seedling route remains uncertain, as does the value of teak breeding efforts employing it over the past several decades. This is undoubtedly a major concern for potential investors, for whom rapid and assured returns are crucial.

Propagating teak vegetatively

In contrast to seed propagation (where every individual is genetically different from every other), asexual or vegetative propagation involves duplicating (theoretically without limit) genotypes while preserving through mitotic divisions their original genetic make-up, and consequently their individual characteristics. This is essential to ensure the transfer of traits that are under non-additive control, especially those that are of economic importance. Moreover, vegetative propagation is applicable to any individual, even

Attack of the clones: Teak plantations at 42 months, established from local seedling stock (left) and from selected clones (right), under the same environmental and cultural conditions in Mato Grosso, Brazil. *Photo: O. Monteuuis*

those without fertile seeds, due to immaturity, unfavorable environmental conditions, or other factors.

As in other tree species, multiplying teak vegetatively by cuttings is a useful research technique in addition to its obvious application to operational or production activities. Research applications encompass, for instance:

- clonal tests, including between clone comparisons and within clone variability ('C effects');
- genotype—environment interactions;
- genetic parameter estimates i.e. broad sense inheritabilities, genetic correlations between traits, etc.; and
- ex-situ conservation of particular genotypes or gene complexes.

More practically, propagating teak vegetatively by cuttings can be useful for establishing 'safe' clonal seed orchards, avoiding risks of 'illegitimate' clones associated with clonal seed orchards traditionally produced by grafting on unselected stock. Vegetative propagation can also be used to develop timber production populations using either bulk or clonal strategies, the pros and cons of which have been documented by Monteuuis (2000). Clonal propagation by rooted cuttings from wisely selected teak 'plus' trees remains the only way to generate top grade teak timber trees in a reasonable time, counteracting the heterogeneity associated with seedling or even bulk options.

Comparative economic analyses have shown that for the production of more than 100 000 cuttings per year, tissue culture procedures are more efficient than nursery production.

New mass clonal propagation methods

In little more than a decade, the possibility to mass clonally propagate any mature selected teak trees at reasonable cost, either in nursery or tissue culture conditions, has radically changed the prospects of teak plantations (Monteuuis 1995).

The nursery techniques developed initially in Sabah (Malaysia) consist of serially propagating selected teak trees of any age by rooted cuttings under proper mist-system facilities. Average rooting rates of 70 to 80% were obtained from several thousand cuttings collected from mature teak genotypes intensively and properly managed as container-grown stock plants. On average 40 rooted cuttings were produced annually per stock plant, corresponding to 600 rooted cuttings per square meter (15 stock plants per square meter). This method has been successfully transferred to various countries of South East Asia, Latin America and Africa.

Comparative economic analyses have shown that for the production of more than 100 000 cuttings per year, tissue culture procedures are more efficient than nursery production. In addition to local uses, tissue culture plants can be exported (in the absence of any phytosanitary restrictions), contrary to rooted cuttings, for enriching local genetic bases. Moreover, these in-vitro plants can be produced year around, irrespective of the climatic conditions, unlike nurseries.

The tissue culture protocols developed for teak were conceived as simply as possible in order to be easily applicable, cost efficient and highly productive (the latter two are particularly important to large-scale applications). The micropropagation technique established is similar to propagation by rooted cuttings. Shoots are raised from auxiliary buds, in order to limit the risks of somaclonal variations and maintain genotypic fidelity. The in-vitro elongated shoots are rooted in more natural nursery conditions. This technology allows the mass micropropagation of any teak genotype to give rise to an unlimited number of clonal offspring, resulting in exponential multiplication rates through successive subculture cycles. Several million cloned teak plantlets have been produced in different laboratories using this technique to date.

Once transferred to the field, the rooted cuttings or microcuttings have performed satisfactorily, remaining true-to-type. The first mass-produced rooted cuttings and microcuttings from mature trees were field planted in 1993 and in 1995, respectively. In addition to superior phenotypic traits, after 6–8 years the clonal offspring display (depending on site conditions) an unexpectedly high proportion of

valuable quality heartwood (Goh and Monteuuis 2005, Goh et al. 2007).

Innovative technologies for teak forestry

Usually only phenotypic (external) criteria are considered when selecting the candidate plus trees (CPT), from which the clones arise. The importance of also using intrinsic wood qualities along with external traits for CPT selection is obvious given the high value of teak timber, and the variations between grades and prices of this timber based on wood quality. This is now possible thanks to the development of non-destructive wood core sampling analyses as described in Goh et al. (2007). Near Infrared Spectroscopy (NIRS) technology allows rapid analysis of such core samples for basic density, the modulus of elasticity and strength, radial and tangential shrinkage, natural durability as well as the extractive content of the wood. Once properly calibrated, NIRS is a fast, low-cost, easy-to-use, non-destructive, reliable and versatile analytical method, which can accommodate heterogeneous wood samples, and identify slight chemically induced wood variations.

Adapted DNA molecular markers are another innovative technology to assist the development of clonal forestry with teak. This technology allows the primary origin of various teak populations available locally to be determined, i.e. whether they were initially imported from India, Myanmar (ex-Burma), Thailand or Laos. This is useful for basic research (i.e. determining range of adaptability of native teak provenances to other environments in various countries), as well as for operational and commercial activities. For example, the highly prized Burma teak may now also exist in several other countries. Much Latin American teak (introduced largely via Trinidad and Tobago) appears to have been originally from Tenasserim (Burma), as does the Solomon Islands' teak.

Assessing the genetic diversity and levels of co-ancestry/inter-breeding in the teak germplasm that exists locally allows for optimal management and utilization of tree improvement programs. Knowledge of the genetic background of CPTs and/or seed producers will enable tactics to reduce risks of inbreeding to be employed, for instance by limiting the numbers of close relatives included in seed orchards. Information on the genetic relatedness of candidate clones for wood production plantations will also enable implementation of tactics to control the level of genetic diversity/recombination in such plantations and possibly improve pest and disease resistance. Clonal identification by DNA fingerprinting can also have applications in establishing property rights or genetic fidelity of mass-propagated clones.

Conclusion

Since the mid-1990s, millions of rooted cuttings and microcuttings of clonally propagated teak trees have been produced and planted by private companies all around the world. The superiority of such planting material compared to seedlings has led to increasing interest in this technology from both private investors and landowners eager to maximize returns in a reasonable time. In addition to enabling superior volume yields and enhanced wood quality in both traditional plantation systems and agroforestry applications, teak clones also offer an opportunity to enrich local teak genetic resources. Tree breeders should continue research and development to ensure that the best available clones are available for teak plantation establishment throughout the tropics. This will help to ensure that the excellent properties of this remarkable timber continue to be enjoyed in perpetuity, regardless of the declining availability of natural stocks.

Adapted DNA molecular markers … allow the primary origin of various teak populations available locally to be determined …

References

Ball, J.B., Pandey, D. & Hira, I.S. 2000. *Global overview of teak plantations*. FORSPA Publication No 24/2000, Teaknet Publication No 3: 11–33.

Goh, D. & Monteuuis, O. 2005. *Rationale for developing intensive teak clonal plantations, with special reference to Sabah*. Bois et Forêts des Tropiques, 28: 5–15.

Goh, D.K.S., Chaix, G., Baillères, H. & Monteuuis, O. 2007. *Mass production and quality control of teak clones for tropical plantations: The Yayasan Sabah Group and Forestry Department of Cirad Joint Project as a case study*. Bois et Forêts des Tropiques (In press, July 2007).

Kjaer, E.D and Foster, G.S. 1996. *The economics of tree improvement of teak (*Tectona grandis L.*)*. Technical note No 43, DANIDA Forest Seed Centre, Denmark, 23p.

Kjaer, E.D., Kaosa-ard, A. and Suangtho, V. 2000. *Domestication of teak through tree improvement. Options, possible gains and critical factors*. In: Site, technology and productivity of teak plantations. FORSPA Publication No 24/2000, TEAKNET Publication No 3: 161–189.

Monteuuis, O. 1995. *Recent advances in mass clonal propagation of teak*. Proc. of BIO-REFOR, Kangar, Malaisie, 28 Nov–1 Dec1994: 117–121.

Monteuuis, O. 2000. *Propagating teak by cuttings and microcuttings*. FORSPA Publication No 24/2000, Teaknet Publication No 3: 209–222.

White, K.J. and Gavinlertvatana, P. 1999. *Vegetative reproduction of teak: the future to increased productivity*. Paper presented at the Regional Seminar on site, technology and productivity of teak plantations, Chiang Mai, Thaïland, 26–29 Jan.1999, 7p.

Evaluation of four ITTO projects in Bolivia, Indonesia and Cameroon shows many trained but only moderate effectiveness

by
Ken Rodney

ITTO Consultant
krodney@iwokrama.org

Learning SFM: On-site training in Bolivia. *Photo: V.H. Achá (ESFOR)*

IN NOVEMBER 2005 the Committee on Reforestation and Forest Management decided to carry out ex-post evaluations of four completed ITTO projects related to training in sustainable forest management. The evaluation was to provide a concise diagnosis of successful and unsuccessful outcomes, the reasons for successes and failures, the contributions of the projects towards ITTO's Objective 2000 and the ITTO Yokohama Action Plan and to draw lessons that can be used to improve similar projects in the future.

The projects were:

1) **PD 89/90 (F) I, II & III:** Sustainable Forest Management and Human Resources Development in Indonesia – Phase I, II & III;
2) **PD 26/92 REV.2 (F,I):** Development of Methods and Strategies for Sustained Management of Moist Tropical Forests in Cameroon;
3) **PD 63/97 REV.3 (F):** Specialization Program for Forest Technicians on Sustainable Tropical Forest Management in Bolivia; and

The evaluation was to provide a concise diagnosis of successful and unsuccessful outcomes, the reasons for successes and failures, the contributions of the projects towards ITTO's Objective 2000 and the ITTO Yokohama Action Plan and to draw lessons that can be used to improve similar projects in the future.

4) **PD 42/00 REV.1 (F):** 'Training of Trainers for the Application of the ITTO, and the National Criteria and Indicators (C&I) of Sustainable Forest Management at the Forest Management Unit Level' (Indonesia).

These projects were completed between December 2001 and February 2005 and were evaluated in the second half of 2006.

The author was the team leader of the ex-post evaluation mission for the four selected projects, with specific tasks assigned on a regional basis (see acknowledgements). The author visited each of the project sites, accompanied by a regional consultant.

Differences between projects

There are important distinctions to be made with regard to the type of training provided by each project:

- **PD 89/90 (Indonesia)** assisted national forestry professionals to participate in SFM related post-graduate programs overseas and locally; however PD 89/90 had three distinct objectives, only one of which dealt with human resource development related to forest management;
- **PD 26/92 (Cameroon)** was predominantly a research project that included some training; the project strategy was based on the combination of research and training-related activities;
- **PD 63/97 (Bolivia)**—the executing agency (Escuela Superior Forestal—ESFOR) developed curricula and training modules and provided post-graduate specialization courses in SFM to national and regional forestry professionals, as well as to undergraduates; and
- **PD 42/00 (Indonesia)** conducted practical training of trainers for the application of the ITTO and the Indonesian C&I for SFM at the management unit level (forest concession holders).

Evaluation

The four selected projects contributed to the attainment of several of ITTO's objectives, policies, plans and strategies as outlined in ITTO's Objective 2000 and the ITTO Yokohama Action Plan.

All of the projects were primarily aimed at achieving the ITTO Objective 2000 through the training and development of forestry professionals servicing the forestry sector. In addition, Project PD 26/92 (Cameroon) assisted a private sector partner (Wijma-Douala SARL) to achieve FSC certification of its operations.

The actual contribution of the four projects to ITTO's SFM work is in the large number of forestry professionals trained in SFM and the fact that many of them are now in positions, either in government or the private sector, to influence national forest policy. In addition, many training manuals and research documents have been produced, which, when disseminated, will provide the tools for more widespread implementation. Project sponsored workshops and seminars have served to increase the awareness of all stakeholders in the importance and value of SFM.

This pool of trained human resources has an enormous potential to promote SFM practice, assuming that these staff be given the opportunity, the environment, and further encouragement to become active advocates of SFM in their respective organizations. This will require both governments (national and local) and forest concessionaires to harness this resource as trainers and advocates for SFM.

The impact of the four projects on all forestry stakeholders is not yet very discernible, except in those companies that have proceeded to seriously consider SFM and the implementation of the C&I in their operations. However, assuming that the appropriate policy and implementation environment for SFM is put in place, the projects may be credited as having contributed very substantially to fulfilling the various interests of forestry stakeholders in the countries concerned.

The development and specific objectives of the four projects were substantially achieved. The post-graduate programs, training activities, manuals, documents, studies and research done under the projects are all significant contributions to SFM, in many instances going beyond the original scope of the projects.

The overall effectiveness of the four projects can only be gauged as moderately effective, but this is not a reflection on the projects themselves. A large human resource pool has been developed and stakeholder awareness has been increased, but it remains to be seen whether such a pool of expertise and increased awareness can effectively influence the attainment of SFM in the countries concerned. The factors that determine this are beyond the scope of the projects, and often beyond the control of the executing agencies themselves.

Lessons Learned

Human resource development is an on-going process, and is of utmost importance in increasing the capacities of ITTO member countries to achieve SFM. Projects on human resource development for SFM must continue to be supported. In the case of the two Indonesian projects, where a great many training manuals were developed solely in the Indonesian language, it is important to ensure that all manuals, guidelines and other training documents developed by human resource development projects or those resulting from practical on site application of forest management techniques be translated and shared among other countries.

The virtual training modules developed by ESFOR (Bolivia) in implementing its specialization course has been an innovative approach and as such should be considered in training nationals on sustainable forest management in future projects in other countries.

The impact of the four projects on all forestry stakeholders is not yet very discernible, except in those companies that have proceeded to seriously consider SFM and the implementation of the C&I in their operations.

With regard to the organizational arrangements of these projects, there were several key lessons learned:

- Project organizational structures need to be simple, compact and efficient, such as in Bolivia's PD 63/97, which was composed of Steering Committee, Technical Consultative Committee and Technical-Administrative Coordination Council. This proved adequate for the successful implementation of the project and should be replicated in future projects.
- All projects, but especially complex, multi-disciplinary projects such as Indonesia's PD 89/90, require a dedicated project manager to ensure the efficient and timely coordination of all activities.
- On projects such as PD 42/00 (Indonesia), several national core training teams should have been organized in order to ensure the availability of trainers when and where required.
- Both of the Indonesian projects contained a component for testing ITTO's C&I for SFM, and were being implemented at about the same time. Project Steering Committees should be aware of other projects which may have overlapping scope or objectives with the project which they oversee. Complementarity and collaboration with such related projects would be extremely beneficial and productive.
- Ex-post evaluations should be scheduled no more than two years following project completion to avoid the loss of institutional memory and important project documents that could result in a less then adequate evaluation, as was the case with PD 26/92 (Cameroon)

which was completed in 2001. At the time of the evaluation, the team was unable to verify the exact numbers of trainees or the various disciplines in which they were trained.

Recommendations

Future projects on human resource development for SFM should have, at the minimum, the following generic objectives:

- to educate major decision makers in government and the forest industry so that SFM becomes institutionalized in the decision-making processes for forest management;
- to establish a comprehensive training curriculum, appropriate to the conditions of the country, that can continue to be developed and implemented even after the phase-out of ITTO support;
- to expand the coverage of training to a broader spectrum of forestry practitioners at many levels; and
- to ensure that training documents be shared among other countries.

Mid-term monitoring and mid-term evaluations of projects should deliberately identify the presence and applicability of post-project sustainability plans, including the existence of potential threats to such sustainability plans ...

The following innovative practices/designs may be adopted in future SFM training projects:

- incorporating SFM and C&I training modules in the regular human resource development programs of forestry companies, government forestry agencies and in the curricula of forestry schools and universities;
- identifying, and popularizing, 'best practices' that exemplify SFM in a country;
- including SFM and C&I in the coverage of forestry licensure examinations in countries where such licensure processes are present;
- organizing workshops and seminars on SFM and C&I for a broader range of stakeholders and especially for indigenous communities; and
- replicating ESFOR's innovative virtual training modules in other countries.

In addition, all countries would benefit from SFM training for the following target groups:

- senior decision makers in forestry agencies and other government agencies, including local governments;
- senior decision makers in forestry companies and other related forestry organizations/associations;
- middle-level managers and field staff of forestry companies and related forestry organizations;
- staff of planning units of forestry companies, government forestry agencies, and local government units;
- faculty and staff of forestry schools and universities;
- staff of forestry consulting organizations and forestry professional associations;
- leaders of indigenous communities whose livelihoods are dependent on the forest resources; and
- females (future projects should identify ways to stimulate a greater presence of women in SFM training courses as they were under-represented in all four of the projects evaluated).

Mid-term monitoring and mid-term evaluations of projects should deliberately identify the presence and applicability of post-project sustainability plans, including the existence of potential threats to such sustainability plans, in order to ensure that there is a smooth phase-out of the project and a smooth phase-in of project results into the 'regular' work of beneficiary organizations of the project. The need for second or follow-up project phases, if appropriate, should be identified early and the required documentation and approvals processed in such a way so as to ensure there is no, or minimal, loss of momentum from the first phase.

Consideration should be given to supporting more SFM training projects with private sector organizations or associations as executing agencies. Such projects will likely benefit from a more streamlined, efficient management system and greater uptake of results by the forest sector. Finally, there is a need to evaluate how human and physical resources generated by SFM-related projects have been utilized, and how effective these resources have been in contributing to the attainment of SFM.

Acknowledgements

The author sincerely thanks and acknowledges the able assistance of the consulting team: Cecilia G. Malaguti de Souza do Prado (Bolivia); Romeo T. Acosta (Indonesia); and Obiora Dennis Nwokeabia (Cameroon). He also wishes to thank the staff of the executing agencies, in particular: Gustavo Guzman (Bolivia); Pak Kuswanda (Indonesia) and Schadrack Ekotto (Cameroon).

The complete report of the ex-post evaluation is available on request from the ITTO Secretariat (rfm@itto.or.jp).

Measuring the impacts of illegal logging

A new study shows strong economic incentives exist for legal producers of wood products to support measures to reduce illegal logging

by
James A. Turner[1]
Frances Maplesden[2]
and
Steve Johnson[3]

[1]Scion
New Zealand Forest Research Institute Ltd.
james.turner@scionresearch.com

[2]ITTO Secretariat
maplesden@itto.or.jp

[3]ITTO Secretariat
johnson@itto.or.jp

ILLEGAL LOGGING in many ITTO producer countries is known to adversely affect sustainable forestry practices, forest products trade, and other economic, environmental and social values. However the effects of illegal logging extend beyond the countries in which illegal logging occurs. With the exception of work conducted in the US (Seneca Creek, 2004), there have been few quantitative assessments of the impacts of illegal logging on producers of legal timber. New Zealand is only a minor importer of tropical timber (mainly processed) products and a net exporter of softwood products but the NZ Ministry of Agriculture and Forestry (MAF) has been sufficiently concerned about the global impacts of illegal logging on its own forestry sector to commission a study to determine the production, trade and price effects of trade distortions resulting from illegal logging on its forest industry. The recent study by James Turner, Andres Katz and Joseph Buongiorno (Turner et al., 2007) quantifies the effects of illegal logging on both prices and competitiveness of New Zealand wood products in domestic and export markets. It uses the Global Forest Products Model (GFPM) to view the New Zealand forest sector in its full international context and the Radiata Pine Market Model (RPMM) to provide more detailed information on the New Zealand forestry and sawmilling sectors. This article reports on the main findings of the study.

Assessments are complicated by differences in policies and institutions that govern forest utilization and hence establish the rules to apply in determining whether specific logging activities and wood products trade are legal.

Nature of illegal logging and trade

The study recognized the considerable variation and uncertainty in estimates of the magnitude of illegal logging and trade of wood products. Assessments are complicated by differences in policies and institutions that govern forest utilization and hence establish the rules to apply in determining whether specific logging activities and wood products trade are legal. Statistics on legal production and trade are often lacking or unreliable in many countries, making estimates of illegality more uncertain. Illegal logging was defined in the report as occurring when timber is harvested, transported, bought or sold in violation of national and/or international laws. Differences between NGO and government approaches to assessment were considered to explain much of the variation found in estimates of illegal logging. NGO assessments include issues such as logging concession award processes, whether forests are managed sustainably (according to often differing criteria), and whether taxes and fees have been levied at a fair or market rate. Government estimates, on the other hand, usually focus on the extent that wood can be traced to an officially sanctioned logging operation. The most comprehensive and widely quoted review of illegal logging and trade is Seneca Creek (2004), which derived estimates that generally fall between the extremes of NGO and governmental sources.

Recognizing the limitations of each source, the range of assessments was used in the study to derive 'low', 'most likely', and 'high' estimates *(Table 1)*, which form the basis for modeling the effects of trade distortions due to illegal logging. Due to the scope of the review and its widespread recognition, the Seneca Creek study was influential in the derivation of the 'most likely' scenario.

Wide-ranging suspicions

Table 1: Estimated rates of 2005 suspicious industrial roundwood harvests

	ILLEGAL HARVEST ESTIMATES (%)		
COUNTRY/REGION	LOW	MOST LIKELY	HIGH
WEST AFRICA[1]	20	30	40
BRAZIL	13	19	25
OTHER LATIN AMERICA[2]	6	8	11
CHINA	20	30	40
INDONESIA	50	60	80
MALAYSIA	3	5	35
OTHER ASIA[3]	12	17	23
OCEANIA[4]	50	75	80
ACCEDING EU[5]	7	10	13
RUSSIA	10	18	40

[1]Gabon, Cameroon, Ghana and Liberia; [2]excluding Brazil; [3]excluding Indonesia, Malaysia, and China; [4]Papua New Guinea and Solomon Islands; [5]Latvia and Estonia

Modeling approach

The detailed theoretical principles and assumptions underlying the economic models used in the study are available in the full report (Turner et al., 2007). Here a brief description of the methods is provided. The study used two economic models of the forest sector; the GFPM and RPMM. The GFPM is a dynamic spatial equilibrium model which predicts production, exports, imports and prices of 18 forest products (both commodity and secondary processed products) in 180 individual countries (Buongiorno, 2003; Turner et al., 2006). It allows an analysis of the repercussions that changes in illegal logging may have on the production, consumption, trade, and prices of forest products in other countries. The RPMM predicts production and prices of more detailed categories of New Zealand log grades and sawnwood as well as the influence of forest returns on plantation area development, reflecting price adjustments to changes in global supply and demand as predicted by the GFPM.

The study estimated the effects of eliminating illegal logging by comparing four sets of projections modeled by the GFPM and RPMM. A 'base' or 'with illegal logging' scenario, was compared with three alternative, or 'without illegal logging', scenarios ('low', 'most likely' and 'high') in which the supply

Up and down

Table 2: Change in industrial roundwood production and trade in 2020 from eliminating 'most likely' levels of illegal logging (selected countries)

	BASE SCENARIO			CHANGE					
	PRODUCTION	IMPORT	EXPORT	PRODUCTION	IMPORT	EXPORT	PRODUCTION	IMPORT	EXPORT
COUNTRY	('000 m³)			('000 m³)			(%)		
AFRICA	**49 077**	**694**	**7 818**	**161**	**78**	**-282**	**0.3**	**11.2**	**-3.6**
Nigeria	9 160	1	2	1	0	0	0.0	0.0	0.0
South Africa	18 738	1	3 088	1 047	0	828	5.6	0.0	26.8
NORTH/CENTRAL AMERICA	**797 163**	**5 833**	**29 450**	**18 904**	**447**	**2 748**	**2.4**	**7.7**	**9.3**
Canada	246 513	4 517	2 263	5 335	431	4	2.2	9.5	0.2
United States of America	530 691	1 162	27 126	14 402	1	2 748	2.7	0.1	10.1
SOUTH AMERICA	**202 601**	**52**	**2 266**	**-21 431**	**3**	**169**	**-10.6**	**5.8**	**7.5**
Argentina	7 421	9	12	-10	0	0	-0.1	0.0	0.0
Brazil	138 773	9	596	-20 181	0	-5	-14.5	0.0	-0.8
Chile	40 343	7	1 410	-889	0	174	-2.2	0.0	12.3
ASIA	**258 439**	**120 744**	**10 583**	**-26 469**	**2 022**	**-2 744**	**-10.2**	**1.7**	**-25.9**
China	119 003	65 636	621	-15 315	-1 833	1	-12.9	-2.8	0.2
Indonesia	40 293	250	735	-5 851	21	-298	-14.5	8.4	-40.5
Japan	20 632	34 137	52	445	2 730	3	2.2	8.0	5.8
Malaysia	16 528	676	4 437	-2 714	66	-1 497	-16.4	9.8	-33.7
India	29 224	2 286	13	-1 551	6	0	-5.3	0.3	0.0
OCEANIA	**55 809**	**93**	**19 875**	**496**	**0**	**-135**	**0.9**	**0.0**	**-0.7**
Australia	28 572	81	4 342	1 207	1	902	4.2	1.2	20.8
New Zealand	23 901	5	12 698	1 048	0	660	4.4	0.0	5.2
Papua New Guinea	2 435	0	2 121	-1 286	0	-1 243	-52.8	0.0	-58.6
Solomon Is	856	0	791	-636	0	-616	-74.3	0.0	-77.9
EUROPE	**749 025**	**87 590**	**144 694**	**-7 240**	**-15 533**	**-12 678**	**-1.0**	**-17.7**	**-8.8**
EU25	414 871	80 203	30 604	16 326	-15 753	3 540	3.9	-19.6	11.6
Finland	57 814	31 889	357	3 664	-11 668	3	6.3	-36.6	0.8
France	37 974	1 036	2 181	1 041	0	89	2.7	0.0	4.1
Germany	40 639	486	13 024	2 362	0	1 877	5.8	0.0	14.4
Sweden	79 127	17 217	384	3 654	-3 695	2	4.6	-21.5	0.5
United Kingdom	9 457	418	18	262	188	0	2.8	45.0	0.0
Russian Federation	250 165	304	102 406	-24 564	0	-16 296	-9.8	0.0	-15.9

of industrial roundwood was reduced starting in 2008 by the amount of illegal logging estimated for each country in Table 1.

Global impacts of illegal logging

Study predictions from the GFPM show that a variety of shifts in global wood products production and trade will occur with the elimination of illegal logging. Focusing on the 'most likely' scenario for illegal logging, in 2020 world industrial roundwood production is predicted to be 1.5 percent lower and the average log price 4.2 percent higher[1] with the elimination of illegal logging *(Tables 2 and 4)*. As would be expected, countries with significant 'suspicious' harvest, such as Russia, China, Indonesia, Papua New Guinea, and Brazil experience decreased production due to reduced wood supply from their own forests, and from other supplying countries and regions such as Papua New Guinea, the Solomon Islands and West Africa (Table 2). The report results suggest that reduced competition from these countries means that countries with lower levels of 'suspicious' wood, including New Zealand, United States, Canada, Finland, Sweden and Germany, experience higher production, export and prices for their wood products. In countries with high levels of illegal harvests and/or that process raw material from illegal harvests, comparative advantage in processing is dependent on both raw material and manufacturing costs. Countries that have low manufacturing costs, such as China and Indonesia, may remain competitive, even in the absence of illegal harvests.

The study found that the trade of industrial roundwood is affected more than production, due to the shift in harvesting from countries with high illegal logging to those without. Russia, Indonesia, Malaysia, and Papua New Guinea log exports are reduced by 16 percent to 59 percent, while the United States, Germany, South Africa, Australia and New Zealand increase their log exports.

[1] *All prices used in the study are real, ie. corrected for changes in inflation using 2006 as a base.*

The study also found that the elimination of illegal logging leads to lower global wood products production in developing countries, including in many of the ITTO producer countries *(Table 3)*. Global trade of all wood products is also lower, including in both ITTO producer and consumer member countries. The corresponding prices of all products are higher (Table 4). Exports of sawnwood and wood panels by developing economies are most affected (in percentage terms), reflecting the large proportion of these products produced in countries with high levels of suspicious harvests.

In terms of growing stock, the reduction in global harvests associated with the elimination of illegal logging results in. higher global forest stock (318 million m^3 or 0.1 percent higher in 2020), especially in countries with suspicious harvests. China and Indonesia's forest stock increases by 1.0 and 1.4 percent respectively in 2020. Forest stock is predicted to be lower in the United States, New Zealand and Sweden due to increased harvests. The report notes that the predicted increase in global forest stock is likely to be an underestimate because the GFPM does not consider the positive effect of higher industrial roundwood prices on investment in sustainable management practices, and increased relative returns to forestry that would lead to conversion of agricultural and other land to forests.

The reduction in global harvests associated with the elimination of illegal logging is dependent on the estimated extent of suspicious harvests. For the scenarios eliminating 'low' and 'high' levels of illegal logging, global industrial roundwood production is 0.9 percent to 2.6 percent lower, respectively, in 2020, compared with the base scenario. The world price of industrial roundwood is 2.6 percent to 8.4 percent higher, compared with the base scenario.

Impacts on New Zealand

The study predicted significant changes to New Zealand's export markets due to the elimination of illegal logging. The report results suggest that there will be higher prices for species competing with New Zealand radiata pine in international markets. Projections from the RPMM show that this will lead to increased demand and hence production and prices for radiata pine *(Table 5)*.

The RPMM results from the study found that the most significant change for New Zealand is an increase in volume and prices for log exports, while sawnwood production and production of other wood products (wood panels, pulp, paper and secondary processed products) is less affected. This is because New Zealand sawnwood is consumed largely in the domestic and Australian markets for structural products, where the proportion of wood products produced from illegal logs is relatively minor. Other markets (such as the United States mouldings market) also have a very low presence of illegal wood.

Focusing on the study's 'most likely' scenario, the price of New Zealand export logs is most affected by the elimination of illegal logging, being 10.6 percent higher, whereas the domestic log market shows a more modest 1.3 percent price rise. The combined effect of these production and price changes is that New Zealand forestry and wood products sector producer revenues are higher. Significantly, the New Zealand forest industry as a whole would gain US$177 million[2] per year in increased revenue. The study suggests that this impact is similar to the potential increase in producer revenue that would be realized with elimination of global tariffs on all wood products. The RPMM also predicts significant positive impacts on land value and plantation rates, stimulated by improved investor interest in forestry. In the 'most likely' scenario, land values increase by 7.6% (assuming a discount rate of 10%).

Conclusions

The study by Turner et al. (2007) and previous studies (Li et al., 2007; Seneca Creek, 2004) have shown that the elimination of illegal logging leads to significant increases in the price and production of wood products in almost all countries without illegal harvests. The report results suggest that an economic incentive exists for legitimate producers in all countries to support measures to reduce illegal logging.

Beyond the direct economic benefits to the forest industry identified in the study, the report suggests that illegal logging has potentially significant economic implications at the national level, in terms of lowering investment in forests

[2] *Assuming a 10 percent discount rate, 2008 onwards.*

Developing and developed

Table 3: Change in wood products production and trade in 2020 from eliminating 'most likely' levels of illegal logging

		BASE SCENARIO			CHANGE					
		PRODUCTION	IMPORT	EXPORT	PRODUCTION	IMPORT	EXPORT	PRODUCTION	IMPORT	EXPORT
REGION	PRODUCT	('000 m^3 or '000 t)			('000 m^3 or '000 t)			(%)		
DEVELOPING	Industrial roundwood	633 580	87 860	19 521	-53 350	-386	-5 383	-8.4	-0.4	-27.6
	Sawnwood	128 563	28 428	18 634	-7 670	-960	-4 977	-6.0	-3.4	-26.7
	Wood panels[2]	113 148	21 759	22 591	-9 860	-236	-4 466	-8.7	-1.1	-19.8
	Wood pulp[3]	48 001	22 464	10 809	-3 454	562	-613	-7.2	2.5	-5.7
	Paper[4]	188 421	33 614	11 288	-3 760	241	-913	-2.0	0.7	-8.1
DEVELOPED[1]	Industrial roundwood	1 665 129	128 571	195 864	18 345	-12 534	-7 538	1.1	-9.7	-3.8
	Sawnwood	367 314	108 944	121 304	3 750	-6 188	-2 171	1.0	-5.7	-1.8
	Wood panels	214 429	65 143	66 464	3 503	-3 918	311	1.6	-6.0	0.5
	Wood pulp	206 171	24 162	37 277	1 205	-1 496	-321	0.6	-6.2	-0.9
	Paper	319 774	73 884	101 779	982	-859	295	0.3	-1.2	0.3

[1] *South Africa, Canada, United States, Japan, Australia, New Zealand, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom;*
[2] *Plywood and veneer, particleboard, and fibreboard;* [3] *Mechanical and chemical pulp;* [4] *Newsprint, printing and writing paper, and other paper and paperboard*

The bottom line

Table 4: Change in world wood product prices from eliminating 'most likely' levels of illegal logging

	BASE SCENARIO			CHANGE					
	2010	2020	2030	2010	2020	2030	2010	2020	2030
PRODUCT	(US$/ m³ or US$/ t)			(US$/ m³ or US$/ t)			(%)		
Industrial roundwood	60	55	49	1.7	2.3	3.2	2.8	4.2	6.5
Sawnwood	185	175	164	2.6	4.0	6.0	1.4	2.3	3.6
Wood panels	327	317	311	3.2	2.7	5.1	1.0	0.8	1.6
Wood pulp	352	336	319	4.7	7.1	10.5	1.3	2.1	3.3
Paper	681	664	652	4.0	4.2	5.3	0.6	0.6	0.8

and forest development. At the global level, illegal logging discourages forest investment that could help to address global deforestation and climate change.

The report concludes that policies aimed at reducing illegal logging must address three important issues:

1) they must be widely adopted to ensure illegal supply is significantly reduced;
2) property rights for legitimate producers must be improved to enable them to capture benefits from reduced illegal logging; and
3) the costs for legitimate producers must not increase more than those for illegal log producers, as an incentive for illegal logging comes from its lower cost.

A variety of measures to address illegal logging are being identified. The report proposes that economic models of the forest sector, such as the GFPM and the RPMM, can be used to assess the relative efficacy of these different measures. Such analyses could answer questions of relevance to ITTO producer countries such as:

- Would expanding the country and product coverage of the European Union's Action Plan (2003) for Forest Law Enforcement, Governance and Trade (FLEGT) be beneficial?
- How much would reducing the cost of compliance for legal harvests affect illegal harvests?
- Will compliance costs in natural forests increase relative to plantations, accelerating the move to timber production from plantations?
- Would a market for carbon increase the profitability of legal forest management?

The modeling approach used in this study allows policy-makers to observe the dynamics of global production and trade in wood products and the impacts that policy may have on all producers and consumers. Tropical wood producers are not producing, consuming and trading wood products in isolation but are a component of the global system. As with all economic models, the accuracy of the predictions is dependent on the data and the assumptions used in the models. Improved statistical information on forest production, consumption and trade, especially in ITTO producer countries, will lead to improved predictions about the impacts of illegal logging and policies to combat it.

References

Buongiorno, J., S. Zhu, D.Zhang, J. A. Turner, and D. Tomberlin. 2003. *The Global Forest Products Model: Structure, Estimation and Applications*. Academic Press, San Diego.

Li, R., J. Buongiorno, J.A. Turner, S. Zhu, and J. Prestemon. 2007. *Long-term effects of eliminating illegal logging on the world forest industries*. Department of Forest and Wildlife Ecology Internal Report. Forest and Wildlife Ecology, University of Wisconsin-Madison, Madison, WI (submitted).

Seneca Creek and Associates. 2004. *'Illegal' logging and global wood markets: The competitive impacts on the US wood products industry*. Prepared for American Forest and Paper Association by Seneca Creek and Associates and Wood Resources International.

Turner, J.A., J. Buongiorno, F. M. Maplesden, S. Zhu, S. Bates and R. Li. 2006. *World Wood Industries Outlook: 2005–2030*. Forest Research Bulletin 230. Scion, Rotorua, N.Z. 84pp.

Turner J.A., A. Katz and J. Buongiorno. 2007. *Implications for the New Zealand wood products sector of trade distortions due to illegal logging*. A report prepared for the New Zealand Ministry of Agriculture and Forestry by Scion. September 2007. www.maf.govt.nz/forestry/illegal-logging/trade-distortion-implications/index.htm

Kiwi effect

Table 5: Change in New Zealand log and sawnwood production and prices in 2020 from eliminating 'most likely' levels of illegal logging

	BASE SCENARIO		CHANGE			
PRODUCT	PRICE	PRODUCTION	PRICE	PRODUCTION	PRICE	PRODUCTION
	(US$/ m³)	('000 m³)	(US$/ m³)	('000 m³)	(%)	(%)
Sawlogs & small logs	39	12 356	0.5	33	1.3	0.3
Export logs	16	7 920	1.7	81	10.6	1.0
Peeler logs	37	1 549	0.5	5	1.5	0.3
Pulp & chip logs	4	4 506	0.3	25	5.9	0.6
TOTAL roundwood	26	26 331	0.8	145	3.1	0.6
Sawnwood	271	5 998	0.8	19	0.3	0.3
Sawmill operating margin[1]	79		-0.2		-0.3	

[1]*Operating margin is revenue minus fixed and variable operating costs*

Rain and currencies impact tropical timber prices during first half of 2007

by
Lauren Flejzor

MIS Coordinator
ITTO Secretariat
mis@itto.or.jp

DURING the first half of 2007, prices for West African tropical timber were unsteady due to weakening demand from China. Southeast Asian logs were in limited supply due to heavy rains. The effects of a weakening US dollar also impacted tropical timber prices, particularly in Latin America, with effects continuing into mid-summer.

African prices fall

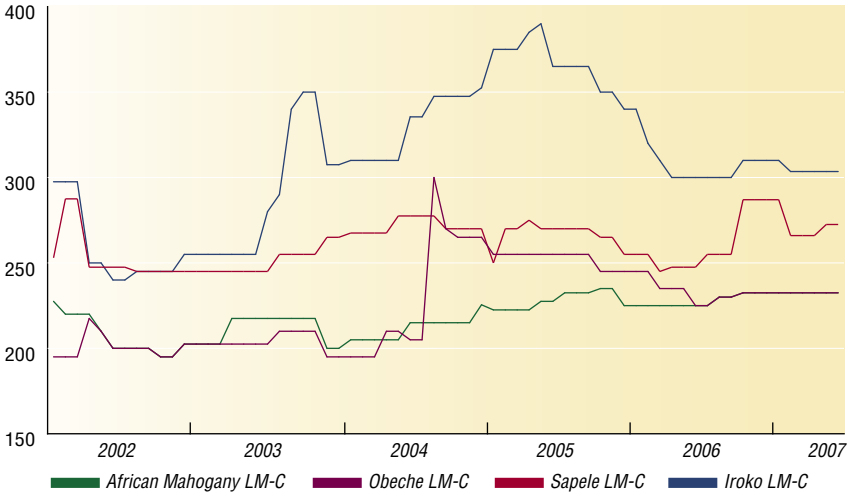
Although African prices were steady in the second quarter of 2007 (see *TFU* 17/2), a glut in log stocks in West Africa caused prices to fall thereafter. Weakening demand from Chinese buyers heightened the overstocking of logs at West African ports. However, prices were not severely impacted in April and May, due to strong demand from India, Europe and the Middle East. Prices for some species, such as sapele, were rising through the end of June *(Figure 1)*, although prices for okoume were hit by overstocking. Producers were also fearful that the European holiday period would have a negative impact on prices at the start of the second half of the year.

While demand for teak logs continued to be high in the spring and early summer months, some price fluctuations occurred due to limited supplies of higher quality logs as the six month average price system came into use beginning in July 2007.

Ghana's Timber Industry Development Division (TIDD) reported a record increase in trade volume for the first half of 2007. The results showed a 22% increase in volume and a 9.5% hike in value from 2006. Plywood exports (including overland exports), lumber (KD) and lumber (AD) contributed 24%, 21.2% and 15.5%, respectively, of the total volume of timber exports (265,910 m^3) for the half year period, with the main plywood importer from Ghana being Nigeria. Ghana started exporting okoume sawnwood for the first time in 2007.

Africa Logs

Figure 1: Log export prices, 2002–2007 (US$/m3 FOB)



Note: LM-C = Loyal Merchant, grade C (log grade)

Southeast Asia prices remain high

Malaysia began to search for new wood products markets in Latin America in 2007. Indonesia also sought new markets, setting a goal to double its trade with Qatar by pushing key exports such as furniture, plywood, blockboard and paper. Prices for Malaysian timber reached all time highs, due to price increases for building materials. Prices for all thicknesses and grades of Southeast Asian plywood rose steadily through the third quarter of 2007 *(Figure 2)*. Several Southeast Asian furniture manufacturers that had invested in product development and innovation also began to see returns on their investment in the form of strategic business partnerships with major multinational companies in the first half of 2007.

In Myanmar, prices began to be fixed by the state-controlled Myanma Timber Enterprise in June, using a six month weighted average for new log contracts. There was some initial unease about the new prices, as the averages used were said to reflect spot rather than actual prices. While demand for teak logs continued to be high in the spring and early summer months, some price fluctuations occurred due to limited supplies of higher quality logs as the six month average price system came into use beginning in July 2007.

Brazil feeling impact of weakening dollar

Media reports in Brazil in early 2007 projected that wood product exports would increase by the end of the year. Such claims seem to be contradicted by results reported in June and July, which revealed that wood product exports (with the exception of pulp and paper) were falling. The only exception to this drop was furniture exports, which increased 7.7% in the month of June, compared to June 2006. Furniture imports, however, were also increasing rapidly, rising by 45% in the first four months of 2007 compared to the previous year.

In Peru, wood sector exports rose marginally in value by 5.5% during the first half of 2007, compared to the same period in 2006. Semi-manufactured products and furniture parts increased in value by 18.8% and 17.1%, respectively, while sawnwood exports rose 13.5% to account for more than half of total wood products export value. On the other hand, building components exports declined by 6.9% in value, manufactured products by 2.7% and veneer sheets by 92%. Reconstituted panel (-82%) and fuelwood/charcoal (-90.8%) exports also fell sharply as these products (like veneer) were directed to domestic rather than international markets. While the US, Mexico and China remained the top three destinations for Peru's wood product exports in the first half of 2007, EU markets continued to grow in importance, with their market share rising by 17.4% during the first quarter of 2007 alone.

Bolivia's wood products also gained market share in Europe, with exports increasing by 8% to the UK and by 3% to the Netherlands during the first quarter of 2007. Wood exports reached US$55 million during the first quarter, up 24% from the same period in 2006. The US and China remained the biggest importers of Bolivian wood exports. During January–July 2007, exports from Bolivia's Santa Cruz and La Paz regions grew by 30% and 19%, respectively. The two regions accounted for 80% of the total value of Bolivia's timber exports.

Imports remained high in China, although domestic timber consumption declined during the first half of 2007 as exports continued to boom and domestic harvests declined.

China market remains strong

Imports remained high in China, although domestic timber consumption declined during the first half of 2007 as exports continued to boom and domestic harvests declined. Weather conditions made the harvesting, transport and stocking of logs difficult in China. As a result, traders seemed desperate to buy logs, even at higher prices. In the first half of the year, log imports through Zhangjiangang Port alone rose 40.8% in batch, 43.3% in volume, and 58.6% in value from the same period in 2006. Other ports, such as Heihe, also had record imports of logs and had yet to feel the impact of higher Russian tariffs.

Imports of logs, paper pulp, waste paper, wood chips and furniture rose dramatically, although plywood, fiberboard and particleboard imports declined markedly. Suifenhe City, recently named 'The Capital of China's Wood Industry', revealed that timber imports in the first half of 2007 were 3.95 million m³ and US$ 420 million, up 13% in volume and 27% in value from 2006.

The total value of Chinese exports of wooden furniture, paper and paper products and plywood topped US$14.6 billion in the first half of 2007. Lianyun Port exported 50% of the nation's wood based panels, with exports reaching 2.1 million m³ during the first half of 2007. Exports of fiberboard, resin and resin products also increased but raw material exports such as sawnwood, wood chips and charcoal showed a declining trend.

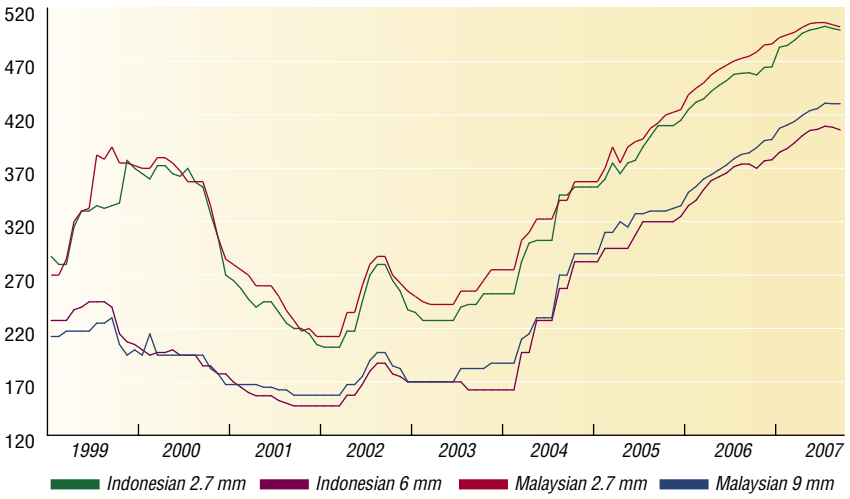
Quingdao Customs reported that plywood exports through Shangdong Port rose 41% in volume and 78% in value during the first half of the year from the same period in 2006. The main export targets were the US, EU and ASEAN countries, which accounted for 69% of plywood exports through the port. The plywood industry received a boost from east, south and north China's high yielding plantations, especially in Hebei, Shangdong and Jiangsu provinces where Italian poplar was introduced and cultivated. Although China's wood based panel industry has been growing in recent years, further expansion of the industry is being constrained by the country's raw material shortages. Local experts have recommended that wood-based panel companies establish more forest plantations and use more substitute products (e.g. bamboo) and recycled waste wood.

Japan ply imports fall

Japan continued the trend towards increasing its reliance on domestic wood supplies. As a result, plywood imports continued to be unstable and resumed their downward trend after briefly recovering in April and May. Softwood plywood production is now over triple that of hardwood production which has fallen along with tropical log imports. Poor weather conditions and high prices for logs from Southeast Asia and the Pacific continued to drive down demand from Japan. Tropical log imports are likely to drop below 1 million m³ in 2007, their lowest level in over 50 years.

Plywood rising

Figure 2: Plywood export prices, 2002–2007 (US$/m3 FOB)



ITTO study highlights complexities of shipping timber

Loaded: Bulk log carrier on the high seas. *Photo: Delmas*

A new ITTO study has been released that investigates the international shipping of tropical timber products. The purpose of the study was to review the processes and problems relating to the international transportation of tropical timber products and identify potential gaps in the trade chain where illegalities could occur.

The study discusses the linkage of maritime shipping to land-based processes that may weaken the legal international trade of tropical timber products. It explores substantive issues of trade data discrepancies, documentation processes and procedures for shipping timber products, legal guidelines and provisions governing the transportation of timber products and the gaps in ensuring the legal trade of tropical timber. The study presents examples of weaknesses in the tropical timber trade chain and proposes a number of realistic approaches for closing gaps that allow for illegal practises.

The main suggestions to curb illegal trade in tropical timber include strengthening human and technical resources mainly in tropical timber producing countries (particularly related to capacity building for foresters and customs authorities) and improving measurement standardization via the use of a standardized measurement system for logs, sawnwood, veneer and plywood. The study also suggests that traders and authorities should use gross volumes rather than merchantable volumes with reductions when calculating and reporting timber and timber product volumes, since such reductions can result in differences of up to 20%. The study proposes that an attestation of legal origin of the shipped product be drawn up by an independent third party and accompany internationally traded timber and timber products. Finally, the study recommends that a multi-stakeholder conference on the international transportation of tropical timber be held, in line with previous Trade Advisory and Civil Society Advisory Groups' suggestions, to fully address the concerns of land- and sea-based shipping services and other stakeholders.

The report, Study on the International Transportation of Tropical Timber Products*, is available from the ITTO Secretariat (flejzor@itto.or.jp).*

Tropical timber on INFOCOMM

ITTO and the United Nations Conference on Trade and Development (UNCTAD) have been working in partnership to improve the dissemination of statistics, studies and information on tropical timber and tropical forests. Cooperation in this context has resulted in the expansion of UNCTAD's Market Information in the Commodities Area (INFOCOMM) portal to include tropical timber, as well as the dissemination of selected ITTO publications through the web-based INFOCOMM facility.

The INFOCOMM portal provides up-to-date information on factors influencing commodity chains. The portal is organized under 10 headings (characteristics, crop, quality standards, uses, trade, marketing chain, companies, technology, prices and economic policies). It includes smart links to authoritative stakeholders interested in the commodities area. Facts and figures are displayed in a user-friendly manner for facilitating access to analysis vital to the formulation of pertinent policies for commodity production, marketing, processing and financing.

The e-platform is being developed in English, French and Spanish. Products currently available (twenty-five commodity profiles) include citrus fruits, cashew nuts, bananas, wheat, tropical and temperate timber, cocoa, cotton, iron ore/steel, natural gas, olive oil, jute, karité, nickel, palladium, platinum, crude oil, pepper, rice, sugar, tobacco, tea, and zinc.

For further information, please contact:
Mr Olivier Combe
Tel +41 22 917 48 98; Fax +41 22 917 05 09
olivier.combe@unctad.org ***or***
infocomm@unctad.org; ***or***
consult the INFOCOMM website:
www.unctad.org/infocomm

Fellowship report

Developing a tree breeding program for Cameroon

by Gusua Roseline Caspa

Institute of Agricultural Research for Development (IRAD)
P.O. Box 2067
Yaounde, Cameroon
rosegusua@yahoo.com

TIMBER EXPLOITATION in Cameroon takes place exclusively in the natural forest. Logging is selective and concentrated on a few species. The timber species *Triplochiton scleroxylon* (ayous), *Entandrophragma cylindricum* (sapelli) and *Lophira alata* (azobe) account for about 60% of current wood exports, leading to forest degradation and loss of genetic resources. The uncertainty of seed production and the slow process of natural regeneration of these species make it necessary to develop techniques for their mass propagation while maintaining desired quality timber. Such techniques can help to preserve genetic resources and meet local and international timber demand.

As tree improvement techniques are not well developed in Cameroon, ITTO support was sought through the Fellowship Program to undertake a customized short training course on tree improvement organized by the Forest Tree Breeding Center (FTBC), Japan. The training was aimed at acquiring skills for the development and mass production of improved planting stock for plantations, to ensure better quality forest products and to conserve genetic resources.

Tree breeding and propagation

In conventional tree breeding, trees with desirable phenotypic qualities are selected and tested to ensure that the qualities they exhibit are genetically determined. These elite trees are then used for mass production of seeds or vegetative propagules. When seed production is uncertain, vegetative propagation has been used in forestry as an alternative to ensure sufficienct planting stock and the multiplication of desired genotypes for special uses such as in seed or breeding orchards.

The objectives of tree breeding focus on enhancing desirable qualities such as bole straightness; fast growth for characteristics like height, diameter and volume; high wood specific gravity and resistance to pests and unfavorable weather. Practical lessons on vegetative propagation techniques such as grafting, budding, cuttings and layering were carried out at the Iriomote Tropical Tree Breeding Center using tropical species like *Acacia auriculiformis*, *Paraserianthes falcataria*, *Tectona grandis* and *Eucalyptus urophylla*.

Grafting

Grafting is largely used to multiply desired genotypes. It has been used widely in forestry for clone preservation and seed orchard establishment. Training focused on different techniques of treating and handling the root stock and scion stock plants before, during and after grafting, and also on how to set and protect the graft union to ensure success.

Cuttings

Cuttings are used to produce large quantities of planting materials of identical genotype. Training illustrated the various stages of setting cuttings from the establishment of a scion garden with improved material, to the process of hedging to ensure the availability of juvenile material.

Air layering

Layering leads to the generation of roots on intact branches by girdling. It is used to produce propagules for the establishment of seed orchards, thus avoiding graft incompatibility. It is sometimes used as an intermediate method to obtain roots for species with marginal success of producing rooted cuttings. Training on the process of setting air layers involved the identification of the appropriate branch, girdling, placement of rooting medium and the elimination of competitive branches.

Conclusion

The training received under this ITTO Fellowship award has helped to develop knowledge and skills to develop tree varieties with desired quality timber through selection. The various vegetative propagation methods will be of great importance in the mass production of improved planting material of tropical timber species for plantation establishment, and for the multiplication and preservation of desired clones. Current work in Cameroon is focusing on development of pest resistant varieties of vulnerable species like iroko and African mahogany for plantations as well as better conservation of tree genetic resources. Contacts are being maintained with the staff of FTBC who are providing on-going advice as a tree improvement program for Cameroon is developed and implemented.

Grafted: the author sets and ties a graft union in *Paraserianthes falcataria. Photo: C.Osamu—FTBC Iriomote Tropical Tree Breeding Center*

Forum tackles critical financing issues

Asia-Pacific Tropical Forest Investment Forum

6–8 August 2007
Bangkok, Thailand

This forum was one of four that ITTO has convened throughout the tropics under its 2006–07 Work Program. The event, which was hosted by Thailand's Royal Forestry Department and organized in collaboration with its Ministry of Natural Resources and Environment, the Food and Agriculture Organization's Regional Office for Asia-Pacific, the UN Economic and Social Commission for Asia and the Pacific and the World Bank, brought together over 100 participants to discuss issues critical to tropical forest finance.

The three-day session consisted of presentations and question and answer sessions on how investment in tropical plantation forests has outpaced investment in natural tropical forests and current forest investment trends in the Asia-Pacific region. Key themes from the forum related to public and private finance schemes, including those in conservation areas, carbon markets, community forestry and ecotourism. In particular, participants questioned how to strengthen dialogue between stakeholders on forest investment and how governments could restructure international policy guidelines to maximize investment opportunities while meeting conservation objectives. Participants also called for improving investment guidelines and methodologies for forest investing. Finally, they posed a number of ideas on how the region could benefit from payment for ecosystem services schemes and developments in carbon markets.

The event stimulated new ideas and will serve as a basis for future work by ITTO and its members on forest investment. In particular, forum attendees noted that tropical forest conservation and afforestation projects held promise for attracting greater finance. Some participants, however, queried whether such projects were compatible with measures to implement sustainable forest management over the last two decades. Participants will continue to develop these ideas and work toward financing solutions for SFM in the tropics at the upcoming 43rd Session of the International Tropical Timber Council meeting in Yokohama, Japan and the UN Framework Convention on Climate Change's 13th Conference of the Parties in Bali, Indonesia.

The report of the forum will be available on the ITTO website (www.itto.or.jp) in November.

Taking stock and moving forward

DENR/FAO/ITTO Regional Workshop on Improving Forest Law Compliance and Governance in Southeast Asia

11–13 September 2007
Manila, the Philippines

Organized by the Philippine Department of Environment and Natural Resources (DENR), the Food and Agriculture Organization of the United Nations (FAO) and the International Tropical Timber Organization (ITTO), a regional workshop was held during 11–13 September in Manila, Philippines, to promote multi-stakeholder dialogue and the exchange of views among countries in Southeast Asia on the challenges related to improving forest law compliance and governance, and to agree on tangible and deliverable actions to enhance progress on the ground.

Some 50 representatives from concerned government agencies, NGOs and private sector in 10 countries as well as 14 regional/international organizations actively engaged in panel and plenary discussions and working group deliberations.

The workshop reiterated the aspirations and high-level commitment of the Bali Ministerial Declaration from September 2001 to address illegal logging and its associated trade, and took stock of the ongoing initiatives carried out, among others, by the East Asia Forest Law Enforcement and Governance (EA-FLEG) process, ASEAN Secretariat, Asia Forest Partnership, the EU-FLEGT Action Plan, FAO and ITTO.

Towards a holistic strategy and concrete actions

Any strategy aimed at addressing the problems of illegal logging must be holistic and include a wide range of policy, legal, institutional and technical options designed to: 1) rationalize the policy and legal framework; 2) build institutional capacity; and 3) improve knowledge and information about the forest resources and sector.

These three key elements of an integrated strategic approach to improve forest law compliance and governance formed the framework for the workshop structure and process. Accordingly, the participants were able to identify the major obstacles to improving compliance and governance, formulate concrete recommendations and next steps to surmount these barriers, and specify the roles of different stakeholders in implementing the recommended actions.

Effectively implementing these recommendations would have profound impacts in terms of delivering on the promise of the Bali Declaration and acting as an effective deterrent for future forest crimes. For example, the arrest, prosecution and conviction of major large-scale illegal loggers and/or corrupt government officials, along with seizure and forfeiture of all ill-gotten wealth, would be a major breakthrough for ongoing initiatives to curb illegal logging.

One critical action identified for all stakeholders is to develop strategic alliances for effective resource mobilization to support the implementation of future actions, which includes promoting corporate social responsibility approaches, securing government budget allocations, and obtaining supplementary donor support for transitional arrangements and capacity building.

The participants strongly urged governments to make explicit commitments to implement recommended actions and time-bound next steps at upcoming meetings regarding FLEG, including the 29th ASEAN Ministers on Agriculture and Forestry Conference (Bangkok, September 2007), in which a ministerial declaration or statement on EA-FLEG is expected to be issued, and a possible second EA-FLEG Ministerial Meeting (anticipated sometime in 2008).

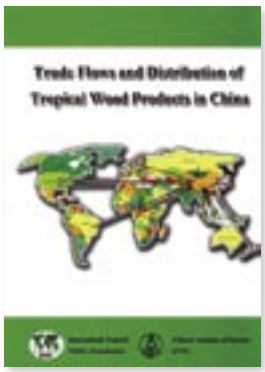
The report of the workshop will be available on the ITTO website (www.itto.or.jp) in November.

Recent editions

Edited by Ken Sato

Research Institute of Forestry Policy and Information (RIFPI), Chinese Academy of Forestry (CAF) 2007.* Trade Flows and Distribution of Tropical Wood Products in China. *Beijing, China. ITTO, Yokohama, Japan.

Available from: *ITTO Secretariat (see page 2 for contact details)*



This technical report of ITTO PROJECT PD 171/02 REV.4(M) describes the status of forest and industrial production, and the consumption, distribution and trade of wood products in China over the last decade. It also provides analysis of the changes in import sources, major domestic production areas and consumption patterns over this period. The report includes forecasts of China's tropical forest product markets over the next decade. It is presented in five chapters: 1) China's Forest Resources; 2) Production of Wood Products in China; 3) China's Foreign Trade in Wood Products; 4) Tropical Timber Trade Flows in China; and 5) China's future wood product consumption and development of markets for tropical wood products.

Available in English, French and Spanish.

FAO 2006.* Responsible management of planted forests: Voluntary guidelines. *Planted Forests and Trees Working Paper 37/E. FAO, Rome, Italy.

Online at: *www.fao.org/docrep/009/j9256e/j9256e00.htm*

These voluntary guidelines are the result of an extensive multi-stakeholder process coordinated by FAO over a period of two years regarding the responsible management of planted forests. The document includes inputs from experts in planted forests from governments, the private sector, non-governmental and intergovernmental organizations (including ITTO) and academics.

Planted forests have not always lived up to their potential due to the lack of knowledge, capacity and capability in developing authoritative policies, laws, regulations, plans and technical support systems to sustain them. This has resulted in some planted forests performing poorly in terms of health, vitality, productivity and return on investment, as well as causing problems regarding land-use and social and environmental issues.

FAO decided to develop these guidelines as part of a process to strengthen country capacity for planted forest management in order to increase their contributions to sustainable livelihoods and land use. The guidelines are grouped under twelve principles which are themselves clustered under five headings (institutional, economic, social/cultural, environmental and landscape approach principles). ITTO's *Criteria and Indicators for the Sustainable Management of Tropical Forests* and *Guidelines for the Establishment and Sustainable Management of Planted Tropical Forests* served as references in the formulation of the principles and guidelines. The document also includes a detailed chapter on implementation considerations which will prove useful to decision-makers involved in the establishment of planted forests.

Available in English, French and Spanish.

FAO 2007.* 60 Years of Unasylva: Weaving knowledge into development. Unasylva Issue #226/227 Volume 58 2007/1–2. *Rome, Italy. ISBN 0041–6436

Online at: *www.fao.org/forestry/unasylva*

This special double-issue of *Unasylva* celebrates its 60th anniversary, making it FAO's longest running periodical. The publication has gone through numerous changes over the years, but has consistently published articles regarding issues relevant to global forestry. The new FAO Forestry slogan 'Weaving knowledge into development' not only communicates FAO's objectives, but what has been accomplished through the pages of *Unasylva* for 60 years.

This issue is a collection of reprinted articles and excerpts from past issues of *Unasylva*, many of them featuring ideas that have evolved through the years and are highlights in the development of forestry. Some articles presented concepts that were ahead of their time. For example, the concept of sustainability, which was codified in the 1990s, following the United Nations Conference on Environment and Development, was a concern in the 1940s according to a reprinted article from that era. The articles representing each decade in this issue reflect key themes, many of which are still relevant to the state of forestry today.

Available in English, French, and Spanish.

Edited by Ken Sato

Global Forest Partnership proposed

The World Bank is proposing a new Global Forest Partnership to bring together many organizations to accelerate progress in managing forests, in ways that better meet social, environmental and economic needs. Its focus would be on joint action with developing countries.

The International Institute for Environment and Development (IIED) is working with the World Bank to carry out an independent assessment of stakeholder views on this proposal. IIED will convene an internet consultation during October and November to seek feedback and ideas on this proposal from a wide range of different stakeholders to assist the World Bank in deciding how best to proceed.

IIED is looking for ideas and comments on what the overall objectives of such a partnership should be and what type of funding, governance, possible activities and possible partners would contribute most to reducing poverty and sustaining communities and livelihoods.

To join the debate, go to www.iiedgfpconsultation.org where 15 key questions can be answered directly online or downloaded for replies by email or post (all replies must be received by 30 November). All documentation is available in English, French and Spanish.

For further queries contact IIED's Nicole Armitage (gfpconsultation@iied.org; Tel: +44 020 7388 2117).

ITTO and IUFRO sign MOU

A ceremony for signing a Memorandum of Understanding (MoU) between The International Union of Forest Research Organizations (IUFRO) and ITTO was held on 29 September 2007 in Seoul, Korea. The MoU was signed by Dr. Manoel Sobral Filho, Executive Director of ITTO, and Dr. Don K. Lee, the President of IUFRO. It formalizes the agreement between the ITTO and IUFRO to strengthen partnership and collaboration through their activities and other undertakings as members of the Collaborative Partnership on Forests (CPF).

Also present at the ceremony were Dr. Young Kyoon Yoon, Director General of Forest Resources Policy Bureau of Korea Forest Service, Dr. Hwan Ok Ma, Project Manager of ITTO, Dr. Won Yung Ahn, Professor Emeritus at Seoul National University (SNU), and Dr. Ho Sang Kang, IUFRO's Global Forest Information System (GFIS) Regional Coordinator for Asia and Russia.

Dr. Lee called the MoU an important commitment to collaboration. He also confirmed his and IUFRO's participation at the 43rd Session of the International Tropical Timber Council (ITTC) which will be held in Yokohama, Japan on 5–10 November 2007.

Toyota drives Philippine forest conservation

Conservation International has recently announced a partnership with Toyota to protect forests in the Philippines. Toyota will provide US$1.5 million in funding to restore and protect more than 4 000 acres of the Philippines' Peñablanca Protected Landscape and Seascape (PPLS) reserve, located in the northeastern area of one of the nation's main islands. The fund will be provided during the course of the next three years as part of a two-phase program consisting of three-years each.

The project will promote forest conservation in the PPLS as well as demonstrate the compatibility among multiple uses of forests, including biodiversity protection, watershed management, ecosystem services for the benefit of local communities and CO2 offsets.

The Philippines is considered to be one of the most threatened of the world's 34 biodiversity hotspots, and is home to many critically threatened mammals, birds and amphibians. The Peñablanca conservation project will validate the concept of sustainable development with partnerships that come not only from the local level, but from global stakeholders as well.

Collaborators: Dr Lee (left) with Dr Sobral after signing the MoU.
Photo: H.S. Kang (Seoul National University)

Meetings

5–7 November 2007. **5th Ministerial Conference on the Protection of Forests in Europe 2007**. Warsaw, Poland. ***Contact:*** *Bozena Kornatowska, Liaison Unit Warsaw; Bitwy Warszawskiej 1920 r. Nr 300–973 Warsaw, Poland; Tel +48 22 3317031; liaison.unit@lu-warsaw.pl; www.5th.mcpfe.org*

5–10 November 2007. Forty-third Session of the International Tropical Timber Council and Associated Committees. Yokohama, Japan. ***Contact: Information Officer (Mr Collins Ahadome), ITTO Secretariat; Tel 81–45–223 1110; Fax 81–45–223 1111; itto@itto.or.jp; www.itto.or.jp***

8–9 November 2007. **2nd European Hardwood Conference: Hardwood '07**. Stuttgart, Germany. ***Contact:*** *www.holzkongress.de/Start2.cfm?sLang=EN*

11–16 November 2007. **ATIBT Forum**. Belém, Brazil. ***Contact:*** *forumbelem@orange.fr*

12–15 November 2007. **Asia Forest Partnership 7**. Yokohama, Japan. ***Contact:*** *afp@cgiar.org*

15–16 November 2007. **International Conference on Oil Palm and Environment 2007.** Nusa Dua Bali, Indonesia. ***Contact:*** *icope_2007@yahoo.com; www.icope2007.org/*

20–22 November 2007. **Fifth Roundtable Meeting on Sustainable Palm: Promoting The Growth, Trade In and Use Of Sustainable Palm Oil**. Kuala Lampur, Malaysia. ***Contact:*** *Ms Ng Lay Mei, RT5 Secretariat; c/o GroundBreakers Sdn Bhd, #08–02, Level 8, UOA II 21, Jalan Pinang 50450, Kuala Lumpur, Malaysia; Tel +603 2168 8887; Fax +603 2168 8886; rt5@groundbreakers.com.my; www.rspo.org/5th_Roundtable_Meeting_(RT5)_on_Sustainable_Palm_Oil.aspx*

3–14 December 2007. **United Nations Framework Convention on Climate Change Conference of the Parties (COP 13) and Third Session of the Meeting of the Parties to the Kyoto Protocol (CMP 3)**. Nusa Dua, Bali, Indonesia. ***Contact:*** *Climate Change Secretariat (UNFCCC); Tel 49–228–815 1000; Fax 49–228–815 1999; secretariat@unfccc.int; www.unfccc.int*

Field trips to a community forest and a teak plantation managed by Perum Perhutani (www.perumperhutani.com) are being organized after the COP. ***Contact:*** *ditprod@perumperhutani.com for details.*

8 December 2007. **Forest Day: Shaping the Global Agenda for Forests and Climate Change**. Nusa Dua, Bali, Indonesia. ***Contact:*** *Rachel Carmenta, Climate Change Research Officer, CIFOR; Tel 62–251–622 622; Fax 62–251–622 100; rcarmenta@cgiar.org; www.cifor.cgiar.org*

17–20 December 2007. **IUFRO International Conference on Sustainable Forest Management and Poverty Alleviation: Roles of Traditional Forest-related Knowledge**. Kunming, China. ***Contact:*** *Dr John Parrotta; jparrotta@fs.fed.us;* ***or*** *Dr. Liu Jinlong; liujl@caf.ac.cn;* ***or*** *Dr. Sim Heok-Choh; simhc@frim.gov.my*

16–18 January 2008. **Climate Change: Science and Solutions–8th National Conference on Science, Policy and the Environment**. Washington, DC. ***Contact:*** *conference2008@ncseonline.org; www.ncseonline.org/2008conference/*

21–25 January 2008. **Sixth Meeting of the CBD Open-ended Working Group on Access and Benefit-sharing**. Geneva, Switzerland. ***Contact:*** *secretariat@cbd.int; www.cbd.int/doc/meeting.aspx?mtg=ABSWG-06*

4–5 February 2008. **Dubai Wood Summit 2008**. Dubai, United Arab Emirates. ***Contact:*** *Grace Oh, Marketing Manager, Centre for Management Technology; 80 Marine Parade Road, #13 -02 Parkway Parade, Singapore 449269; Tel 6563469147; Fax 65 63455928; grace@cmtsp.com.sg; www.cmtevents.com/*

12–14 February 2008. **National Symposium on Intensive Forest Farming: The State of the Art**. Ludhiana, India. ***Contact:*** *Dr Sanjeev K Chauhan, Organizing Secretary, Co-ordinator IUFRO 1.03.03 (Applied Tropical SRF), Department of Forestry & Natural Resources, PAU, Ludhiana – 141 004 (India); Tel 0161–2401960 ext. 380; Fax 91–161–2400945; Chauhansk@dr.com; chauhanpau@rediffmail.com*

18–22 February 2008. **Thirteenth Meeting of the CBD Subsidiary Body on Scientific, Technical and Technological Advice**. FAO, Rome, Italy. ***Contact:*** *secretariat@cbd.int; www.cbd.int/doc/meeting.aspx?mtg=SBSTTA-13*

15–17 March 2008. **The 4th China International Wood Suppliers & Consumers Trading Conference**. Shanghai, China. ***Contact:*** *Guo Jianjun; Wood China 2008 Secretariat Office, SFA Building 2, No.18 of Hepingli East Street, Beijing; Tel 0086–10–84238983, 84238474; Fax 0086–10–84238474; woodexpo@163.com; www.woodchina.cn*

1–3 April 2008. **30th Meeting of the Joint FAO/UNECE Working Party on Forest Economics and Statistics**. UN Headquarters, Geneva, Switzerland. ***Contact:*** *info.timber@unece.org; www.fao.org/forestry/site/europeanmeetings/en/page.jsp*

2–4 April 2008. **International Conference: Mountain Forests in a Changing World**. Vienna, Austria. ***Contact:*** *georg.gratzer@boku.ac.at; http://mountainforestry.boku.ac.at/*

15–18 April 2008. **17th Meeting of the CITES Plants Committee**. Geneva, Switzerland. ***Contact:*** *CITES Secretariat; International Environment House, Chemin des Anémones, CH-1219 Châtelaine, Geneva, Switzerland; Tel +41-(0)22-917-81-39/40; Fax +41-(0)22-797-34-17; info@cites.org; www.cites.org*

20–25 April 2008. **UN Conference On Trade And Development, 12th Session (UNCTAD XII)**. Accra, Ghana. ***Contact:*** *Secretary of the Conference, Ms Jo Elizabeth Butler; Fax +41 22 917 0056; infoUNCTADXII@unctad.org; www.unctadxii.org/en/*

21 April–2 May, 2008. **Seventh Session of the United Nations Permanent Forum on Indigenous Issues. Special theme: Climate change, bio-cultural diversity and livelihoods: the stewardship role of indigenous peoples and new challenges**. UN Headquarters, New York. ***Contact:*** *Secretariat of the Permanent Forum on Indigenous Issues; United Nations, 2 UN Plaza Room DC2–1772, New York, NY, 10017; Tel 1–917–367–5100; Fax 1–917–367–5102; indigenouspermanentforum@un.org; www.un.org/esa/socdev/unpfii/en/session_seventh.html*

19–30 May 2008. **Ninth Meeting of the Conference of the Parties to the Convention on Biological Diversity**. Bonn, Germany. ***Contact:*** *secretariat@cbd.int; www.cbd.int/doc/meeting.aspx?mtg=COP-09*

2–5 June 2008. **10th World Conference on Timber Engineering (WCTE 2008)**. Miyazaki, Japan. ***Contact:*** *Yoshiyasu Fujimoto; Miyazaki Prefectural Wood Utilization Research Center, 21–2 Hanaguri Miyakonojo City, 885–0037, Japan; Tel +81–986–46–6041; Fax +81–986–46–6047; conference_s@wcte2008.com; http://wcte2008.com/*

7–11 July 2008. **11th International Coral Reef Symposium**. Ft. Lauderdale, Florida, USA. ***Contact:*** *Nancy Copen, Meeting Manager; Tel 1–301–634–7010; ncopen@faseb.org; www.nova.edu/ncri/11icrs*

change and the role of tropical forests in the carbon cycle, exciting and challenging times lie ahead for ITTO and its partners. I hope and trust that members will maintain and even increase their support in coming years. I am delighted that the efforts we have taken to broaden the Organization's funding base are already starting to pay off. Recently, about US$6 million has been pledged by donors who have either never before contributed or whose contributions had previously been in decline.

Apart from this, I honestly regret to leave all of my friends and colleagues from the Council and the Secretariat, but I know I will see most of you again.

You alluded to the possibility of carbon markets becoming important for ITTO. Where do you see (or where would you like to see) ITTO 10 years from now?

We are certainly hearing a lot of talk about the potential for carbon markets to play (and possibly pay) a role in tropical forest conservation. There are a lot of new acronyms floating around, the ideas behind most of which need to be further developed. I sincerely hope that the talk about millions or even billions of dollars for REDD (reduced emissions from deforestation and degradation) in tropical forests or other schemes can be realized. Certainly ITTO can play a role in the development of these ideas but we need to remain pragmatic and realize that despite the early promise of other schemes to save the tropical forests (e.g. eco-tourism, bio-prospecting and natural medicines, etc.), tropical timber remains today the single most important source of revenue and development opportunities for the majority of tropical countries. ITTO's experience in promoting the sustainable production and trade of tropical timber should be a valuable input to the on-going discussions on climate change and forestry in the tropics.

There is one area that I believe has great potential for tropical countries and that is the production of biofuels. Given tropical countries' comparative advantage in producing biomass and relatively cheap land and labour costs, I believe development of biofuel industries holds great promise. I also believe that ITTO and others should devote more research over the next decade to the potential of cellulosic biofuel from tropical tree species. ITTO could also play a key role in helping to develop sustainability guidelines and standards for this emerging industry based on its work with tropical timber. In short, I think tropical timber will still be important in 10 years time, but I hope that ITTO can be instrumental in helping to develop other sustainable paths to development for its producer member countries.

Some observers see development of biofuel industries in the tropics as a threat to tropical forests.

The development of any industry can be a threat to conservation and sustainability if it is poorly planned and implemented. And probably some areas of tropical forest will be converted to biofuel plantations, just as some areas have been converted to soy beans in my home country. My point is that this is one component of the various alternatives emerging from the carbon market discussions that has serious potential for tropical countries and where there are already existing markets. ITTO needs to work with its member countries that want to take advantage of these markets so that they do so in a way that is consistent with the principles of sustainability that the Organization is based on.

Any advice for your successor?

Have a good sense of humor! Seriously, I know Mr ZeMeka will do an excellent job. My main advice is to continue to value the excellent staff in the Secretariat. One of my biggest difficulties was recruiting and retaining qualified staff, especially internationally, so it is important to try and keep morale high to keep turnover at a minimum. I know all of the senior staff will support the new ED 100%.

What are your plans? Will we see you at ITTO in the future?

I have so many plans I can't summarize them all here. I have been away from my country for over 20 years and during that time there have been remarkable developments there, I really look forward to re-establishing contacts in Brazil. I have a six year old son who is also very happy his father's coming home!

Regarding seeing me at ITTO, I'm not sure. Given the discussions on frequency and duration of Council Sessions that will take place at the November ITTC session, I may make an effort to attend the May Session in Ghana just in case that is the last of ITTO's iconic 'outside' Council Sessions. My eventual attendance of any future Sessions will be as an observer and friend of ITTO.

Any final comments?

I'd like to thank a group of people whose role in the Organization might sometimes be taken for granted but cannot be over-stated. The Secretariat is small by most intergovernmental standards, but it must be ranked as one of the most efficient on the planet. Not only is it blessed with talented individuals, it is also dedicated to the Organization. Council delegates see how hard the Secretariat works during Council sessions, but many of its staff work even harder between sessions. To them all, I give a special thank you. When I leave Yokohama in a few weeks' time, I will leave behind many friends and valued colleagues.

It is my respect and high regard for the people in the Secretariat that moves me to nominate what might seem a relatively minor reform in the Organization as one of my proudest achievements as Executive Director. That is my work with the Council to remove the unfairness in the Secretariat's Pension Fund by extending its benefits to Japanese staff members, along with my decision to modernize the management and investments of the overall Pension Fund. This has, I believe, greatly increased the welfare of a very dedicated group of people.

I rate this achievement so highly because for the long-term health of the Organization it is essential to look after the people who tend it on a daily basis. I hope that ITTO stands for decades to come and becomes even more effective in its work. With the new ITTA set to come into force and the welfare of the Secretariat safeguarded, I have great faith that it will.

Out on a limb

The TFU goes out on a limb with Dr Manoel Sobral Filho, who completes his distinguished term as ITTO's Executive Director in November 2007

***TFU*: You've been involved with ITTO since its inception in the early 1980s. What were some of the highlights of your career?**

MSF: Well the first would have to be joining the Organization as one of its first Assistant Directors in the late 1980s. I was lucky to be servicing the Forest Industry Committee for my first decade or so at ITTO, during which time some of the Organization's landmark activities arose. These included the genesis of ITTO's Objective 2000, which still provides a framework for the work of the Organization, and development of the ITTO Fellowship Program under which more than $5 million in small grants have been disbursed to deserving candidates throughout the tropics.

The ITTO Fellowship Program was one of the Organization's first initiatives and it has proved to be its longest-lasting. As you know, the ITTO fellowship program sponsors young and middle-level professionals working for government, research institutions, civil society and the private sector to pursue professional development opportunities and improve their career prospects. The ITTO fellows are thus a cohort of dedicated forestry professionals that will help lead the forestry sectors in their countries over the next few decades. By now, ITTO has sponsored close to a thousand people from over 40 countries through its fellowship program. The Organization should be proud to have made a difference to the careers of so many young foresters.

Another highlight of my career with ITTO has been watching the Organization evolve through its work in policy development. When ITTO was created back in 1983, there were no international policies on forest management anywhere, let alone in the tropics. ITTO has led the way with its Objective 2000, a series of guidelines and policy frameworks, its criteria and indicators of sustainable forest management, and other important milestones. Even more importantly, it has worked with governments and other stakeholders to improve these policy initiatives, where they needed improving, and to start implementing them at the national and field levels. It has certainly been professionally rewarding for me to be actively involved in ITTO's evolution in policy development.

However, policies alone are not enough to change things in the forest. Another highlight of my work with ITTO has been the degree to which I have been able, through projects and other activities, to observe countries actively implementing these policies. This was brought home to me in yet another highlight of my time with ITTO, the survey published last year of the status of forest management in the tropics. It found that forest policies in the tropics are evolving in line with ITTO's policy work, and it found that forest management is improving.

I take great heart from this, because it shows that our work has not been in vain. Of course, most of the improvement is due to the efforts of the member countries themselves and the hundreds of thousands or millions of people involved in the forestry sectors there, but I believe that ITTO has played an important role as well. In fact, many of the forest areas now under SFM are, or have been, the focus of ITTO projects, strengthening the link between international policy development, ITTO project work, and improvement on the ground.

Finally, any list of highlights has to include my participation in negotiations toward the three International Tropical Timber Agreements (1983, 1994 and 2006), the first as a delegate, the second as Assistant Director and the most recent as Executive Director. The negotiations of the ITTAs shaped the Organization we have today and I was extremely pleased to have been able to participate in these seminal events and contribute, however modestly, to their successful outcomes.

Any disappointments or regrets?

Well, I regret that I was unable to further widen the donor base for ITTO more effectively to increase funds for the Organization's long term well-being. While I leave the Organization in excellent health, its potential has not been fully tapped and we still rely too much on a few donors that have lately been unable to continue to fund ITTO at historical levels. Over the last twenty years we have established an effective model for how an international agency can assist members in the pursuit of forest conservation and sustainable forest-based development. We now know that, given additional resources, this model can be scaled up to a point where it will make a huge positive impact across the tropics.

With increasing concern about global climate

Continued on page 31