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Going downstream

Over the years, ITTO has funded many projects and activities aimed at supporting the development of sustainable, value-added timber-based industries in tropical countries. The establishment of local timber-processing ("downstream") industries can benefit countries in many ways, such as by providing employment, contributing to government revenues and encouraging sustainable forest management and the development of timber plantations. In this edition of the *Tropical Forest Update*, we examine some of ITTO's efforts to assist its member countries in going downstream.

Pradeepa Bholanath (p. 3) reports on an ITTO project that aimed to promote a number of lesser-used species in Guyana's natural tropical forests. The

Inside: lesser-used species; genetic conservation for plantations; hands-on training; Council outcomes

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Images: Boards harvested and milled in a community forest in Marraganti, Panama, are floated downriver to processing facilities. "Downstream" (or further) processing adds value to the forest, as long as the benefits accrue to the forest owners (cover). *Photo: Carlos Espinoza*; a researcher tests wood qualities in a laboratory at the University of São Paulo, Brazil, as part of a wood-performance trial on tree species harvested in secondary forests (above). *Photo: R. Carrillo, ITTO*

outcomes of that project, which finished six years ago, are bearing fruit today in the increased use of several of those species, the properties of which rival some of Guyana's more renowned timber species. Increasing the value of previously lesser-used species is one way of increasing the value of natural forests and financing their sustainable management.

Amha bin Buang (p. 6) reports on his ex-post evaluation of an ITTO project designed to encourage the greater use of Indonesia's rubber-tree plantations for timber production. Indonesia's vast rubber estate could produce a sustainable supply of rubberwood of about 13.5 million m^3 per year, but less than one-quarter of this potential is being used. The ITTO project made important contributions to increasing the use of this vast resource, but much more needs to be done.

Sukiman Sae Yung Kim and Tetra Yanuariadi report on an ITTO activity aimed at increasing the efficiency of 40 existing timber-processing facilities in various countries in the three tropical regions. This model of in-house training has proved capable of improving processing efficiency, and it is popular with factory workers; it could be scaled up to reach many more timber-processing facilities in the tropics.

Another ITTO project, described by Nalvarte and co-authors (p. 12), conducted technical studies on ten timber species that are abundant in secondary and residual primary Amazon forests with the aim of increasing the range of timber that could be harvested in such forests and thereby increasing their economic value. The project demonstrated a range of uses for various abundant species, such as furniture manufacturing, packaging, flooring and decking, which, in the long run, is expected to increase interest in the sustainable management of secondary and residual primary forests and improve the livelihoods of local people.

Also in the Amazon, Paula Gabriella Surdi (p. 15) evaluated the use of wood residues in the wood flooring industry from six tropical hardwood species in the production of particleboard, as part of an ongoing ITTO project. She found that three of the species showed considerable potential for this use.

Developing timber plantations to replace the dwindling supply of hardwood species from natural tropical forests is an ongoing task in many tropical countries. In Indonesia, despite past over-harvesting of ramin and a consequent reduction in supply, there has been little private-sector interest in commercial plantations of this species. A lack of planting material is one of the factors holding back such plantations, and Tajudin Edy Komar (p. 16) reports on an ITTO project that has developed vegetative propagation methods for the production of high-quality ramin planting materials and established ramin hedge orchards in Sumatra and Kalimantan.

A similar project in Côte d'Ivoire, reported by Kouablan Adou and Bafitini Ouattara (p. 19), explored the genetic conservation of iroko and the production of planting materials. Iroko is a high-value timber that was once common in West Africa but is now under threat.

These ITTO-funded projects have helped make headway in the development of viable timber industries in tropical countries that are underpinned by a sustainable resource base. Such projects will not be transformative in isolation, however; ultimately, a vibrant timber industry requires conducive government policies, a motivated private sector, and the willing involvement of landowners and local communities. Some countries are making more progress than others. The voyage downstream can be long and difficult, but it's likely to be a trip worth making.

Timber that lasts

An ITTO project in Guyana helped increase the marketability of poorly known but highly durable timber species

by Pradeepa Bholanath

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Watertight case: The shingles in this roof in Georgetown, Guyana, are made of wallaba (*Epura falcata*), a high-value tropical timber. An ITTO project has provided convincing evidence that a range of lesser-used species in Guyana's forests is also suitable for such applications.
Photo: Guyana Forestry Commission

Many tropical timber-producing countries have recognized the need to change the way in which their forest resources are used. Harvesting is too often restricted to a few species and the resulting "creaming off" can have negative environmental consequences. Producers target species that are highly valued by markets, and, inevitably, unknown or "lesser-used" species (LUS) are sidelined. Guyana's forests have high species' diversity, and some areas allocated to forest concession holders—especially smaller concessions—lack significant quantities of prime species.

The Guyana Forestry Commission is working with sector agencies with a view to expanding the range of species that are valued by the market and thereby increasing the returns from forests for both the nation and community stakeholders. In 2006, the Commission received approval and financing from ITTO to implement a project focused on expanding the use of lesser-used timber species. ITTO Project PD 344/05 Rev. 2 (I): "Utilization of lesser-used wood species in Guyana" aimed to provide firm baseline information, supported by science, to boost the use of LUS and to inform Guyana's forest sector on the marketing and promotion of these species.

The project was implemented over 12 months in 2007–08 and involved three main activities: laboratory tests on key characteristics of selected LUS; marketing and promotion; and training in the use of the species.

There is strong demand worldwide for durable, cost-effective and environmentally acceptable construction materials. In its favour, Guyana has a track record in environmentally sound forest management at the national and concession levels. The use of LUS in structural applications (especially in the marine and freshwater engineering subsectors) faces a number of challenges, however: the poor past performance of some timber species in structural applications; a perceived increase in the prevalence of the marine borer *Limnoria quadripunctata*; and the requirement to meet stringent procurement rules. Additionally, recent legislative changes in some countries have prevented the use of certain types of wood preservatives in marine applications and barred certain timber species from such uses. Restrictions on the use of preservative-treated timber in marine applications has led to pressure to use naturally durable timber species. However, the construction industry is generally reluctant to specify timber species that lack a proven performance record in such applications and appropriate data on key timber properties.

The increased use of LUS is hindered, therefore, by either a lack of information on their resistance to marine borer attack or a lack of confidence in the pedigree of available technical information. It was noted at the outset of the project that a high level of natural durability in terrestrial environments does not necessarily guarantee robust marine performance. This was taken into consideration in the development of tests to be conducted on the LUS.

Approach and results

Under the project, TRADA Technology, a United Kingdom (UK)-based consultancy firm, conducted detailed tests on 15 LUS from Guyana's forests to determine their resistance to abrasion and attack by marine borer. All tests were informed by findings of a desktop review of available information on the properties of the 15 LUS. Marine

Table 1: Summary of results of laboratory testing of ten lesser-used species for resistance to marine borer and abrasion, relative to ekki and greenheart

Lesser-used species			Testing of resistance to *Limnoria* (marine borer) relative to:				Abrasion testing relative to:			
			Ekki		Greenheart		Ekki		Greenheart	
Common name	Scientific name	International trade name	Better	Same	Better	Same	Better	Same	Better	Same
Burada	*Parinari campestris*	Parinari		√	√			√		√
Black kakaralli	*Eschweilera sagotiana*	Mata mata		√	√			√		√
Tonka bean	*Dipteryx odorata*	Cumaru		√		√		√		√
Kurokai	*Protium decandrum*	Beru		√		√				√
Morabukea	*Mora gongrijpii*	Morabukea		√		√		√		√
Wadara	*Couratari guianensis*	Wadara		√		√				√
Muneridan	*Qualea rosea*	Muneridan				√				
Itikiboroballi	*Swartzia benthamiana*	Itikiboroballi						√		√
Darina	*Hymenolobium flavum*	Angelim								√
Iteballi	*Vochysia surinamensis*	Quaruba								√

borer and abrasion tests were benchmarked against two species commonly used in marine construction in the UK: greenheart (*Chlorocardium rodiei*) and ekki (*Lophira alata*). Scots pine (*Pinus sylvestris*) was used as a control to validate the vigour of the test organisms in the marine borer tests. The species were targeted for promotion in applications such as marine construction, heavy structural applications, and decking/cladding. Table 1 shows that ten LUS performed the same as, or better than, the two benchmarked species.

The project also tested the natural resistance to fungal decay of ten LUS: dalli (*Virola surinamiensis*), wadara, kurokai, futui (*Jacaranda copaia*), muneridan, iteballi, burada, morabukea, black kakaralli and tonka bean, with beech (*Fagus sylvatica*) used as a control.

The natural-durability tests were conducted by TRADA Technology, which assessed the results using European laboratory standards EN 113:1996: *Wood preservatives—test methods for determining the protective effectiveness against wood destroying basidiomycetes—determination of the toxic values*, and EN 350 Part 1:1994: *Durability of wood and wood-based products—natural durability of solid wood—guide to the principles of testing and classification of the natural durability of wood*. The results show that, of the ten species tested, three were very durable, two were durable and four were moderately durable; only one, dalli, was not durable (Table 2).

Because the natural-durability tests were conducted in accordance with recognized European standards, the results are useful in marketing LUS for appropriate applications throughout the European Union.[1]

Table 3, which is based on British Standard 8417:2003: *Preservation of timber—recommendations*, shows the natural durability required in commodities for particular end uses and with specific service-life requirements. It shows that a number of the tested LUS could be used in high-hazard applications (where decay would cause significant risks) without preservative treatment. This property makes these species very attractive in export markets.[2]

Table 2: Durability of ten Guyanese lesser-used species

Species	Durability classification	Durability class
Tonka bean	Very durable	1
Black kakaralli	Very durable	1
Morabukea	Very durable	1
Burada	Durable	2
Iteballi	Durable	2
Muneridan	Moderately durable	3
Futui	Moderately durable	3
Kurokai	Moderately durable	3
Wadara	Moderately durable	3
Dalli	Not durable	5

Immediate impact on the forest sector

Activities to encourage market promotion and build capacity in the use of the 15 LUS showed early positive results. For the first seven months of 2008 (January–July), muniridan and iteballi ranked tenth and eleventh in harvesting volume nationally, with darina and dalli also included in the top 20 species harvested in that year. The production of ten of the 15 LUS (dalli, fukadi, futui, iteballi, itikiboroballi, kurokai, muniridan, suya, wadara and morabukea) increased by 16–35% between 2007 and 2009. Exports of these species also increased, including within the Caribbean and to the UK; the volumes of iteballi and muniridan shipped to Venezuela and St Vincent grew,

1 TC//F07096 Part 2: Natural Durability, p. 10. TRADA Technology, UK.

2 Ibid.

Table 3: Suitability of LUS from Guyana for various uses, by service life (heartwood without treatment)

Use	Hazard class	Species suitable for use, by service life (years)		
		15	20	60
Internal joinery	1	Dalli	Dalli	Dalli
Roof timbers (dry)	1	Dalli	Dalli	Dalli
Roof timbers (dry) (in areas exposed to the *Hylotrupes* wood beetle)	1	Wadara, kurokai, futui, muneridan	Wadara, kurokai, futui, muneridan	Wadara, kurokai, futui, muneridan
Roof timbers (risk of wetting)	2	No species tested as "slightly durable"	Wadara, kurokai, futui, muneridan	Iteballi, burada
External walls/ground floor joists	2	No species tested as "slightly durable"	Wadara, kurokai, futui, muneridan	Iteballi, burada
Sole plates below damp-proof course	4	Iteballi, burada	Morabukea, black kakaralli, tonka bean	Morabukea, black kakaralli, tonka bean
External joinery	3	No species tested as "slightly durable"	Wadara, kurookai, futui, muneridan	Iteballi, burada
Fence rails, garden decking	3	No species tested as "slightly durable"	Wadara, kurookai, futui, muneridan	Iteballi, burada
Fence posts	4	Iteballi, burada	Morabukea, black kakaralli, tonka bean	Morabukea, black kakaralli, tonka bean
Poles	4	Iteballi, burada	Morabukea, black kakaralli, tonka bean	Morabukea, black kakaralli, tonka bean
Sleepers	4	Iteballi, burada	Morabukea, black kakaralli, tonka bean	Morabukea, black kakaralli, tonka bean
Timber in freshwater	4	Iteballi, burada	Morabukea, black kakaralli, Tonka bean	Morabukea, black kakaralli, tonka bean
Timber in salt water	5	Morabukea, black kakaralli, tonka bean	-	-
Cooling-tower packing (fresh water)	4	Iteballi, burada	Morabukea, black kakaralli, tonka bean	-
Cooling-tower packing (salt water)	5	Morabukea, black kakaralli, tonka bean	-	-

too. The Guyana Forestry Commission reported that these positive trends were due, in large part, to activities implemented under the project.

Follow-up work

Guyana's timber industry has evolved since the project ended in 2008. There is less reliance on well-known species such as greenheart and purpleheart and a move towards LUS. In 2014, the top ten species for log production volumes were wamara, baromalli, kabukalli, mora, soft wallaba, tauroniro, shibadan, muniridan, greenheart and purpleheart. Muniridan was one of the 15 LUS tested in 2007, and burada, another LUS, is also being harvested in significant volumes. The domestic market has expanded the species base, with increased demand for wallaba, kabukalli and shibadan.

To complement the efforts of the Guyana Forestry Commission, the Forest Products Development and Marketing Council has engaged in several activities to further boost the use of LUS in both domestic and export markets. In 2014, the Council launched the *Wood Utilization Handbook*, which presents the main results of the ITTO project with the aim of building consumer confidence in a wide range of species. The handbook highlights the results of the testing completed by TRADA Technologies and sets out the technical and mechanism properties of each species. The handbook has been disseminated and was used recently at a national builders' seminar in Guyana. In addition, the *Guyana Wood Magazine* was launched in 2013 with the aim of promoting various end-use applications for Guyana's timbers, with a focus on LUS. This effort will lead to the building of model structures using LUS and promoting them in various public places.

The results of the ITTO project have been used as a core component in capacity-building and outreach sessions that continue to be held with stakeholders in the timber sector, including added-value timber manufacturers, builders, contractors and architects. The sessions aim to inform operators of the value of LUS, their wide range of end uses, and the rising demand for them in the export market.

In the six years since the completion of ITTO Project PD 344/05, the Guyanese forest sector has opened up the export market for LUS, and there has been an overall increase in the acceptance of LUS in both domestic and export markets. The results of the project continue to support a sustainable timber trade in Guyana today.

Scratch-resistant: These pens are made of itikiboroballi (*Swartzia benthamiana*), an LUS that rated the same as greenheart and ekki in abrasion tests. *Photo: Guyana Forestry Commission*

Harnessing valuable tropical timber outside natural forests

An ex-post evaluation of an ITTO project to increase the use of rubberwood in Indonesia finds that more work needs to be done

by Amha bin Buang

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Rubberwood check: Government officials, company and project staff, and the author (third from left) stand in front of a stack of rubberwood at P.T. Hijau Lestari Raya in Palembang, Sumatra. *Photo. A. bin Buang*

Indonesia is blessed with abundant non-forest wood resources, including rubber plantations, for which Indonesia is the world's leading cultivator. The timber industry has not fully capitalized on the rubberwood resource, however, even though it has the potential to significantly alleviate the problems associated with the dwindling supply of timber from natural forests. The rationale of ITTO Project PD 523/08 Rev. 1 (I): "Operational strategies for the promotion of efficient utilization of rubberwood from sustainable sources in Indonesia" was to identify and overcome the obstacles and constraints to the greater use of rubberwood and thereby to pave the way for operational strategies to promote the efficient use of rubberwood from sustainable sources in Indonesia.

Background

Over the years, the installed capacity of the timber industry in Indonesia has come to greatly exceed the supply of timber from natural forests, which has declined due to illegal logging and the over-exploitation and destruction of these forests, a problem exacerbated by inefficiencies in the industry. In addressing the supply gap and with the urgent aim of alleviating the unrelenting pressure on Indonesia's natural tropical forests, the Government of Indonesia initiated a programme to revitalize the timber industry as one of five priority programmes initiated to support sustainable forest management. One of the main activities in the industry revitalization programme is promoting the use of timber from sources other than natural forests, in line with recommendations made by the ITTO technical mission to Indonesia in 2001.

Hevea brasiliensis, a native tree species of the Amazon forests, has been cultivated commercially in Southeast Asia for more than a century, principally for its latex, which is used in the manufacture of tires and other rubber products. As a result of research and development and technological advances in recent decades, rubberwood has been transformed successfully into a commercial timber, with mechanical properties comparable with timbers traditionally used in furniture manufacture. The development of rubberwood in some countries, especially Malaysia, has reached the point where earnings from rubberwood exceed those from latex.

Indonesia is the world's leading grower of natural rubber, with an estimated total cultivated area of 3.5 million hectares and an estimated sustainable annual harvestable volume of rubberwood logs of 13.5 million m^3. Only 22% of the rubberwood log volume is used by the wood industry, however, with the remainder consumed as fuelwood or simply burnt or left to rot on the ground. Increasingly aware of the attendant costs and forgone benefits and opportunities associated with the gross underuse of rubberwood, the Government of Indonesia has undertaken a number of efforts to promote rubberwood use, including the formulation and implementation of ITTO Project PD 523/08 Rev. 1 (I). The development objective of this project, which was a follow-up to ITTO Pre-project PPD 80/ 03 Rev. 2 (I)[1], was to help alleviate the wood raw-material supply problem by increasing the use of the vast rubberwood resource available from sustainable sources.

1 This pre-project was titled "Promoting the utilization of rubberwood from sustainable sources in Indonesia".

The key problem to be addressed by the project was the very low use rate of rubberwood from old rubber plantations caused by: a lack of interest among big rubber-plantation companies in using rubberwood; a lack of incentives for and capacity among rubber farmers/smallholders in using rubberwood; weak government policy; a lack of investment in rubberwood use; and the unavailability of appropriate technologies for rubber farmers/smallholders in using rubberwood. Accordingly, the specific objective of the project was to promote the use of rubberwood from sustainable sources, to be achieved through the following five outputs:

1) Interest in the use of rubberwood owned by big companies increased.
2) Incentives for and capacity in the use of rubberwood from smallholdings improved.
3) Government policy governing rubberwood use revised and enhanced.
4) Investment in rubberwood use increased.
5) Appropriate technologies available for the use of rubberwood from smallholdings.

Implementation

The Indonesian Sawmill and Woodworking Association (ISWA—the "collaborating agency") implemented the project efficiently between June 2010 and May 2013 on behalf of the Directorate General, Forestry Enterprise Development of the Ministry of Forestry (the "executing agency"). The project was completed within its approved duration without delays or additional funding and in general conformity with the rules and procedures of ITTO and the Government of Indonesia.

Field inspection: The author (right) visits a rubberwood agroforestry demonstration plot at Banyuasin, South Sumatra, as part of his evaluation of ITTO Project PD 523/08 Rev. 1 (I). *Photo: A. bin Buang*

Outcomes

The implementation of the project contributed in some measure to the achievement of the planned outputs, but gaps remain in the attainment of the outputs.

Output 1: Initial interest in rubberwood processing was raised among the big rubber companies, but those companies did not adjust their replanting schedules or invest in rubberwood use.

Output 2: The capacity of rubber smallholders in the use of rubberwood was enhanced through studies, dialogues, consultations, a survey on the incentives needed for replanting, the establishment of agroforestry models, and training in harvesting and agroforestry systems, but there was no apparent provision of the needed incentives to smallholders.

Output 3: Government policy on rubberwood resource use was the subject of an excellent review by the project. However, the enhancement of the policy was thwarted by the rejection of the proposed coordinating mechanism and by the putting on hold of consideration of the draft Presidential Instruction, due to reservations about the accuracy of data on the rubberwood growing stock in the smallholder subsector.

Output 4: Transparency, the dissemination of relevant information and data, and recognition and understanding of the importance and challenges of investment in rubberwood use were all enhanced, but there was no evidence that this resulted in an increase in actual investment in rubberwood processing.

Output 5: Technologies were made available and transferred to smallholders through training. The technologies were restricted, however, to the multi-ripper sawing machine—which is too expensive to be acquired individually by smallholders—and to inexpensive wood preservation and the manufacturing of charcoal—which can only generate low market benefits.

There were also gaps in the attainment of the specific objective of increasing rubberwood production in Jambi Province and in securing signed understandings between rubber companies and the timber industry. There is uncertainty as to whether the project will have met its development objective of reducing the shortage of raw-material supply in relation to the processing capacity of the timber industry by 2016.

Impacts

Despite these gaps in the achievement of its outputs and objectives, the project generated considerable momentum, interest, outputs and outcomes, including the following:

- Enhanced awareness and interest in rubberwood use among stakeholders, particularly rubber smallholders and big rubber companies, which need to be nurtured to prevent them waning over time.
- Enhanced capacity in rubberwood use among rubber smallholders in terms of knowledge and skills imparted through various trainings in the development of agroforestry models, systems and

management, the harvesting and replanting of rubber, rubberwood sawing, inexpensive rubberwood preservation, and charcoal manufacturing.

- Established agroforestry models for rubber replanting, with a potential continuing impact throughout their economic lifespan of 25–30 years.
- Excellent work on the policy review and the production of a draft new policy on rubberwood use, which could serve as a sound foundation for policy enhancement and the formulation of a specific policy on rubberwood use with clear objectives, strategies, priorities and targets.
- Compilation of very rich and relevant data and information on various aspects of rubberwood use, including the rubberwood information system and excellently prepared project reports, survey reports and manuals, which can be used as inputs in the formulation of appropriate policies and strategies for promoting rubberwood use in Indonesia.

Lessons

The important lessons learned from the project include the following:

- For a project involving complex social, economic and political issues, and without complete data and information, the prior implementation of a pre-project is highly appropriate for providing inputs and a basis for the sound formulation of the project.
- Efficiency in the implementation of a project is a result of a combination of factors, such as sound project design; an appropriate implementation strategy; the active involvement and support of stakeholders and target beneficiaries; a competent and proactive project team; close cooperation among the executing and collaborating agencies; and efficient and responsible financial management.
- The early and continuous involvement and participation of project stakeholders and beneficiaries facilitate commitment, support, attachment and ownership, which, in turn, contribute to the smooth implementation of a project.
- Clarity of objectives, outputs and impact indicators is critical for ensuring and measuring the extent to which objectives and outputs are achieved.
- In implementing and evaluating a project of a regional nature, there is a need to be perceptive of, and sensitive to, the differences and peculiarities among localities within the geographical scope of the project.
- The ability to adapt to unexpected developments, externalities and risks is crucial for ensuring the smooth implementation of a project.
- Appropriate follow-up after project completion is essential for ensuring the sustainability of project outcomes and for minimizing waste and the loss of momentum.

Way forward

Despite gaps in the achievement of the outputs and objectives of the project, the need to significantly increase rubberwood use in Indonesia remains relevant and urgent. There is ample room for the optimal use of the huge rubberwood resource in Indonesia, not only to alleviate pressure on the dwindling natural forests and provide raw material for the domestic timber industry, but also to develop a thriving rubberwood industry that can contribute meaningfully to employment, wealth creation and export earnings. Efforts to promote rubberwood use in Indonesia should continue in earnest, building on the achievements of the project and addressing its shortcomings. Appropriate follow-up after project completion would include:

- making good use of the rich and relevant data and information on various aspects of rubberwood use—including a rubberwood information system and well-produced project reports and manuals—as inputs into the formulation of appropriate policies and strategies for promoting rubberwood use in Indonesia;
- maintaining, updating, expanding and refining all relevant information and baseline data generated by the project to be used as a basis for further planning, development and assessment of progress in promoting rubberwood use in Indonesia;
- conducting further scientifically valid surveys of the rubberwood growing stock in the smallholder subsector, ensuring data accuracy;
- monitoring the agroforestry models developed under the project throughout their economic lives as a long-term experiment in motivating smallholders to replant in a timely way; and
- considering alternative approaches to promoting rubberwood use in Indonesia, such as by emphasizing the rubber smallholder subsector and the domestic wood-processing subsector, formulating a national policy on rubberwood use, and selecting rubber as one of the species to be used in the development of forest plantations in Indonesia.

Hands-on training to improve factory efficiency

An ITTO activity has worked to improve processes at tropical timber-processing factories

by Sukiman Sae Yung Kim[1] and Tetra Yanuariadi[2]

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Drawing a picture: ITTO consultant trainer, Sukiman Sae Yung Kim, explains an aspect of mill efficiency to workers at a mill in Mexico. *Photo: T. Yanuariadi, ITTO*

Forest industries add value to tropical forest resources and thereby contribute to their sustainable management. Since 2000, however, there has been a decline in the value of both tropical sawnwood and tropical plywood. In many tropical countries, forest industries are affected by structural deficiencies and managerial weaknesses that reduce their ability to add value to resources. Managerial weaknesses are particularly common in small and medium-sized enterprises (SMEs), posing difficulties for effective supply-chain management and product tracking.

SMEs may lack sufficient capacity to apply appropriate technology and management methods, and this can be a barrier to their integration with established supply chains. In many companies, wood-processing is inefficient, resulting in a high level of waste. Substantial volumes of wood residues—up to 50% or more—produced by forest and timber-industry operations in the tropics remain unused (Schroeder et al. undated).

Tropical timber producers must adopt efficient wood-processing technologies to help reduce waste and improve the quality of their products. With this in mind, ITTO implemented Activity PPA/47-262: "Strengthening the capacity to promote efficient wood-processing technologies in tropical timber-producing countries". The aim of this pilot in-house training initiative was to promote efficiency in wood-processing facilities by testing the applicability of training approaches and methodologies developed in the implementation of ITTO Project PD 286/04 Rev. 1 (I): "Strengthening the capacity to promote efficient wood-processing technologies in Indonesia". The in-house training involved forest companies, forest-industry associations, forestry training and research institutions, and representatives of relevant government agencies.

Activity PPA/47-262 was carried out in 2012–2014 in Cameroon (four factories), Ghana (five factories), Guatemala (nine factories), Guyana (three factories), Malaysia (five factories), Mexico (nine factories), Myanmar (three factories), and Papua New Guinea (two factories). The "factories" comprised sawmills, plymills and woodworking and furniture-plants.

The scope of the in-house training was to strengthen capacity in common problem areas in wood-based industries, namely: logs stocking and loading; kiln drying and boiler; saw-doctoring; finger-jointing; laminating; packing; waste control; maintenance and arrangement; and worker safety and commitment.

A consultant, Mr Sukiman Sae Yung Kim of Indonesia, was engaged as head trainer. He developed the training modules and materials and worked with national-level consultants to facilitate training in each country; he also prepared a report on the overall implementation of the activity (available at www.itto.int/news_releases/id=4128).

Improving business efficiency and competitiveness

In-house training is a pragmatic approach because it allows the direct, on-the-spot examination of technical and managerial weaknesses and the on-the-ground demonstration of correct procedures and techniques. Importantly, an in-house training format can accommodate large numbers of trainees and facilitate discussions among trainers and all factory personnel—owners, executives, managers, supervisors and operators.

Operational efficiency in business competitiveness

Operational efficiency is a key determinant of the competitiveness of a business. Essentially, it is the ratio between output and input of a process—thus, operational efficiency = output divided by input, normally expressed as a percentage. For example, a mill that yields 0.5 m^3 of wood products (output) from the processing of 1 m^3 of log (input) would have a processing efficiency of 50%. This type of physical efficiency is not necessarily useful in determining business profitability, however; it may be more meaningful to compare the monetary values of output to input—the larger the ratio, the more efficient a firm would be in monetary terms. Physical efficiency does not always correspond with financial efficiency because, for example, the price obtained for the output (the processed product) might be low because of the low quality of the product.

The operational efficiency of a business is determined by a number of forces that directly or indirectly affect the monetary values of the outputs and inputs of a production process. The most important of these are:

- *economies of scale*—decreasing the fixed-cost component by producing a larger volume;
- *learning effects*—decreasing production cost due to the increasing experience and productivity of employees;
- the application of appropriate technology and methods of operation;
- the marketing strategy and tactics;
- the inventory system;
- the level of professionalism and skills of personnel;
- the extent of innovation-oriented research and development; and
- the company's infrastructure, especially the capacity of the leadership to develop and maintain operational efficiency.

An efficient operation keeps production costs as low as possible, thereby enabling products to be sold at lower prices compared with those of competitors and thus raising competitiveness.

The in-house training conducted under Activity PP-A/47-262 was concerned primarily with increasing the managerial and technical skills of personnel involved in wood-processing and with the appropriateness of the technologies and operational methods in use.

Essential elements in product quality and industrial management

High-quality products are goods and services that are reliable in the sense that they do the job they are designed for, and do it well. This concept applies to wood products. The impact of high quality on competitiveness is twofold. First, providing high-quality wood products increases the value of those products in the eyes of consumers, allowing the producers of the products to charge higher prices. Second, high-quality products are the outcomes of efficient operations, which reduces the unit cost of the product. Less employee time is wasted making defective products and less time must be spent in fixing mistakes, translating into higher employee productivity and lower unit costs.

The main determinants of wood-product quality are the quality of the wood raw material, the processing technology, the skill of the personnel, the quality of inputs such as glue and paint, and the tools and facilities used. The handling of these aspects of production is the task of industrial management.

In-house training methodology

Selection of wood-processing mills

The factories to receive in-house training were selected by the host countries, taking into account, among other things, the scale of operation, product lines, ownership and accessibility.

Scope of the in-house training

The aspects of wood-processing covered by the in-house training were:

- **Log handling at log yard.**
- **Sawmilling**—log crane; log carriage; breakdown and pony sawing.
- **Plymilling**—veneering/wood slicing.
- **Saw-doctoring**—bandsaw blade and circular saw; knives (molder, planer, and rotary and wood slice).
- **Conditioning and air drying**—kiln drying and boiler.
- **Wood-processing**—cross-cutting; grading and sorting; laminating; molding; planing; rip-sawing; sanding; coating and painting; repairing and finishing.
- **Packaging.**
- **Product quality and industrial management**—handling wood raw material; handling processed products; capacity utilization rate; process layout and sequencing of processing; human resource management; availability and maintenance of tools and facilities; quality-control system applied; waste utilization; working environment.

In-house training defined

In-house training is a format of capacity building wherein employees improve their skills through their direct involvement in the detection of technical and operational problems and in troubleshooting action, as demonstrated by highly competent professionals. As indicated by the term "in-house", the training is devoted to detecting and solving problems faced by the host mill. Participants in in-house training are not limited in number or rank, but normally they are managers and employees at the host mill. Owners and executives are expected to take part, given their roles in decisions on follow-up action.

In in-house training, managers and operators of particular process chains have the opportunity to watch and directly observe the activities of other chains. This increases the understanding and appreciation of all tasks and responsibilities among managers and operators. Problems and solutions are discussed openly, without the need to worry about business confidentiality. In addition to increasing the technical and managerial

skills of individual participants, therefore, the in-house training format generates additional benefits by helping to improve production systems.

Implementation strategy

In every session conducted under the activity, training was normally organized in the following way:

- The training expert, a member of the ITTO Secretariat and national counterpart(s) met with the mill's executives and managers to discuss the purpose and scope of the training and the expected outputs.
- After the meeting, the team inspected the end-products and waste dumps. The quality of the end-products normally provided clues to the performance of the process chain(s). Likewise, knowledge of the quantity and characteristics of wood waste—such as dimensions and form—was helpful in determining which steps in the process chains were responsible for the wastage.
- The team then observed all suspect process chains, identified their technical problems and explained or demonstrated (as appropriate) the actions that should be taken to overcome the problems. To facilitate discussion, irregularities encountered in any process chains were documented using a digital camera.
- Observations were not limited to suspect process chains and, subject to time availability, other chains were also observed. In each chain, the trainer and trainees visually examined the appearance of the products produced by the chain, indicated any process irregularities, identified the sources of those irregularities, and discussed actions that could be taken to improve the process.
- As needed, a closing meeting involving all participants was held at each mill to discuss findings—the problems encountered and their causes and business consequences. At these meetings the trainer showed photos of observed product irregularities and compared them with products that are free of technical irregularities. The trainer also provided participants with information on how to go about effective troubleshooting.

Conclusion

The advantages of in-house training over conventional training formats include the following:

- Classroom lecturing, when undertaken, is used to inform participants about the objectives and scope of the training and thus consumes only a small amount of time.
- Large numbers of participants, ranging from executives to managers, supervisors, operators and general employees, can be accommodated in each training session with almost no additional cost to the host mill (for example, an average of 25 people were involved in the in-house training described in this article).
- The identification of technical as well as managerial problems and discussions on the causes and consequences of problems (and solutions for them) can be done openly and transparently, without needing to worry about business confidentially.
- Technical and managerial problems are company-specific in nature, and the in-house training approach enables the tailoring of work programmes to suit the needs of individual mills.

Circular argument: Sukiman Sae Yung Kim and mill staff study a circular saw at a mill in Cameroon. *Photo: T. Yanuariadi, ITTO*

- The consultant and training participants can work together on the spot in identifying weaknesses and irregularities in wood-processing operations and their causes and consequences and in determining and demonstrating the actions needed to overcome such weaknesses and irregularities.
- The written and oral responses of participants during the course and at the completion of the training revealed the following:
  - The majority of participants welcomed the training using an in-house training format and expected further such training in the future.
  - The majority of participants responded positively to the various elements of the training, and in most cases the training met their expectations. For example, most participants felt that the knowledge they had gained had high future applicability to their work.
  - The majority of participants rated the quality of the training as good or excellent.
  - Forest authorities welcomed the in-house training and proposed that ITTO implement more such training in the future, with a view to improving efficiency in wood processing and the quality of processed wood products.

Overall, this training in efficient wood-processing technologies using an in-house training format was applied in 40 wood factories in Cameroon, Ghana, Guatemala, Guyana, Malaysia, Mexico, Myanmar and Papua New Guinea. It would also be applicable in other ITTO member countries, adapted to suit the circumstances of individual countries.

The new resource

An ITTO project has increased knowledge on ten under-used species that are abundant in secondary and residual primary forests in Peru

by J. Nalvarte[1], P. Santiago, C. Guevara and M. Espinoza

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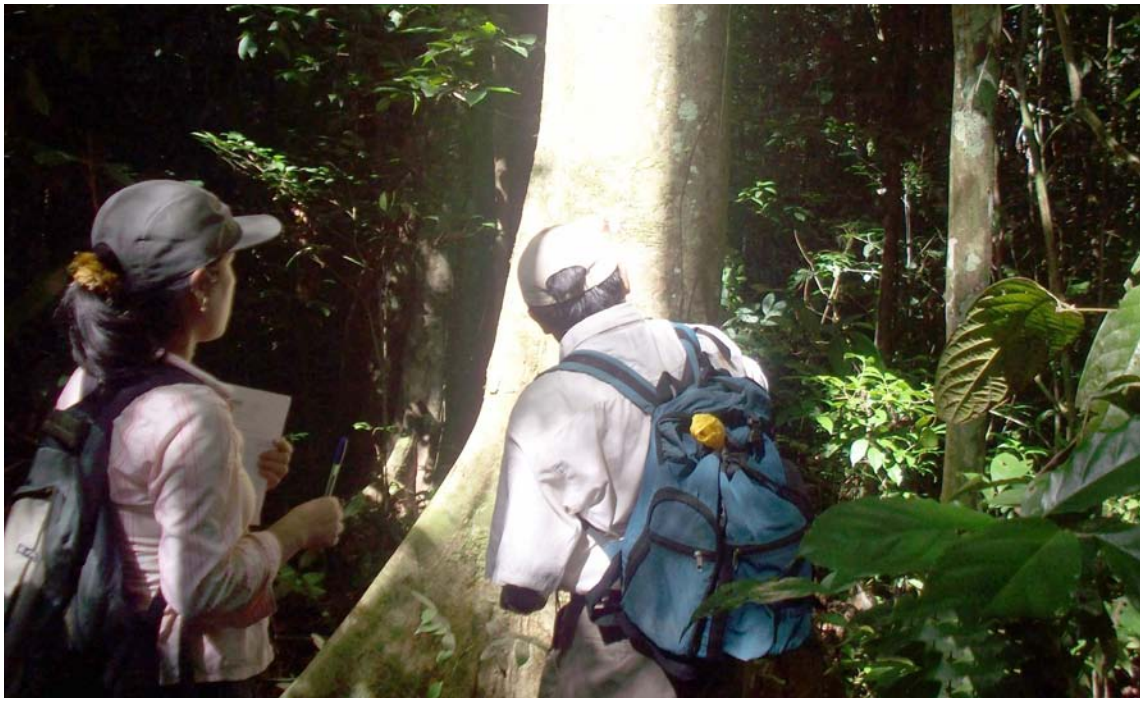

Forest assessment: Scientists measure a tree as part of an ITTO project to study the commercial potential of abundant timber species in secondary and residual primary forest in Peru. *Photo: AIDER*

ITTO Project PD 512/08 Rev.2 (I): "Industrial utilization and marketing of ten potential timber species from secondary and residual primary forests" was implemented between 2010 and 2013 by Peru's Association for Integrated Research and Development (AIDER), with technical and financial assistance from ITTO and in cooperation with the National University of Ucayali and the General Forest and Wildlife Directorate of Peru's Ministry of Agriculture. The project conducted technical studies on ten timber species that are abundant in secondary and residual primary Amazon forests to determine their marketing potential. The overall aim was to contribute to sustainable forest management by increasing the economic contributions of secondary forests and residual primary forests and thereby improving the livelihoods of local communities in the Peruvian Amazon.

The species under study

The species to be studied were selected in a participatory manner based on their abundance and frequency in production forests in the Department of Ucayali. They were: *Apeiba membranacea* (local name = maquizapa ñagcha), *Apuleia leiocarpa* (ana caspi), *Brosimun utile* (panguana), *Croton matourensis* (aucatadijo), *Jacaranda copaia* (huamanzamana), *Matisia cordata* (sapote), *Schizolobium parahyba* (pashaco blanco), *Septotheca tessmannii* (utucuro), *Simarouba amara* (marupa) and *Terminalia oblonga* (yacushapana amarilla).

Target beneficiaries

The project´s target beneficiaries were:

- forest concession-holders and native communities managing secondary forests and residual primary forests with large volumes of potentially valuable timber species that could be sold in domestic and export markets and thereby increase incomes; and
- primary and secondary wood-processors, who, as a result of the project, may have more options for marketing competitive timber products from sustainably managed secondary forests.

The procedure

Technical studies carried out under standardized laboratory conditions included:

- an anatomical structure study to understand wood behaviour and the physical, chemical and mechanical properties of the woods of selected species to determine their qualities and limitations;
- an assessment of wood performance during drying, preservation and machining to identify the best processes for optimizing product quality and to determine potential uses; and
- a survey of primary and secondary wood-processing industries in Pucallpa, including a characterization of local, regional and national markets and the identification of potential market niches for the various species at the national and international levels.

The information obtained from these technical studies was used in the development of wood-product prototypes for the ten target species in six secondary-processing lines, according to the inherent characteristics and use potential of each species as well as the production capacity of the mills and workshops of target beneficiaries. In addition, six business plans were developed to enable participating companies to incorporate the species in their

production lines. At each stage of project implementation, dissemination materials were developed and later shared at various local and national events.

Results of the technical studies

According to the results of the physical property tests, the species were divided into four groups as follows:

1. very low strength—*Jacaranda copaia* and *Schizolobium parahyba*;
2. low strength—*Apeiba membranacea*, *Croton matourensis* and *Simarouba amara*;
3. medium strength—*Brosimun utile*, *Septotheca tessmannii* and *Matisia cordata*; and
4. high strength—*Apuleia leiocarpa* and *Terminalia oblonga*.

Tests on wood performance[1] during machining showed that, under laboratory conditions, none of the species could be rated in the defect-free or very poor performance categories (the two extremes of the performance categories).

The results of wood-preservation tests using boron compounds showed total penetration and retention levels above 4.8 kg per m^3 for the following species: *Apeiba membranacea*, *Brosimun utile*, *Croton matourensis*, *Jacaranda copaia*, *Matisia cordata*, *Schizolobium parahyba* and *Simarouba amara*. This means that these species are well-suited to preservation treatments to increase their durability.

The species under study may be dried using "gentle" programmes (*Apuleia leiocarpa* and *Terminalia oblonga*) or "strong" programmes[2] (*Apeiba membranacea*, *Brosimun utile*, *Croton matourensis*, *Jacaranda copaia*, *Matisia cordata*, *Septotheca tessmannii*, *Schizolobium parahyba* and *Simarouba amara*). The programs produced defect-free or only slightly defective lumber with minor defects that could easily be eliminated through mechanical processing.

The durability of the species was assessed as follows:

- slightly resistant to non-resistant—*Jacaranda copaia*, *Schizolobium parahyba* and *Apeiba membranacea*;
- slightly resistant—*Croton matourensis*;
- moderately resistant—*Simarouba amara*, *Brosimun utile* and *Matisia cordata*;
- resistant—*Apuleia leiocarpa* and *Septotheca tessmannii*; and
- highly resistant—*Terminalia oblonga*.

1 Wood performance refers to the degree of defect, such as torn grain, chipped grain and softness, in brushing, boring, molding and lathing tests.

2 A gentle programme is characterized by a relatively low dry-bulb temperature and little variation, with no drying stresses. A strong programme is characterized by a relatively high temperature on the dry bulb and a relatively low temperature on the wet (humid) bulb.

End-product: Some of the products produced by the project are displayed at the Citeindigena SRL factory in the city of Pucallpa, Peru. *Photo: M.L. Espinoza Linares, AIDER*

Potential uses

Based on their technical characterizations, the species under study were found to be suitable for the following uses:

- *Apeiba membranacea*—interior uses only. Builders' carpentry/joinery products (e.g. doors); wood panelling (e.g. tongue-and-groove panels for walls and ceilings); furniture (e.g. coffee tables, shelving units and desks); and fine packaging for high-end consumer products.
- *Apuleia leiocarpa*—indoor tongue-and-groove flooring; decking; heavy structures such as bodywork parts and components; railway sleepers; and outdoor furniture.
- *Brosimun utile*—builders' carpentry/joinery products such as doors and window frames; interior tongue-and-groove panelling; decorative veneer; plywood (tri-ply); lounge, dining and bedroom furniture; and packaging.
- *Croton matourensis*—packaging for agricultural produce for export and other products; packaging for agricultural produce in domestic markets; other wooden packaging; and interior tongue-and-groove panelling.
- *Jacaranda copaia*—fine packaging; packaging for agricultural and other products; interior tongue-and-groove panelling; and indoor furniture.
- *Matisia cordata*—builders' carpentry/joinery products (e.g. doors and window frames); interior tongue-and-groove panelling; packaging for agricultural products; fine packaging; and indoor furniture.
- *Septotheca tessmannii*—construction uses (e.g. panelling structures, support battens); builders' carpentry/joinery products (e.g. doors and window frames); interior tongue-and-groove panelling; and packaging and packing materials.

- *Schizolobium parahyba*—packaging (e.g. wooden crates and skid-type crates); and simple packaging for agricultural produce (*jabas*).
- *Simarouba amara*—fine packaging; packaging for agricultural produce for export and other products; interior tongue-and-groove panelling; builders' carpentry/joinery products (e.g. doors and window frames); and indoor furniture.
- *Terminalia oblonga*—construction uses (heavy and light structures); flooring, especially decking; outdoor furniture; and bodywork parts and components.

Study on value-added product prototypes

In coordination with local producers, six secondary processing lines were developed for various species: 1) packing line (fine or deluxe packing and agricultural produce packing); 2) packaging line (wooden crates, skid-type crates); 3) builders' carpentry and joinery line (interior and exterior doors, solid partition walls and coffee tables); 4) outdoor timber flooring or decking line; 5) wood-panelling line (tongue-and-groove panels for interior and exterior walls and ceilings); and 6) outdoor furniture line. The photo on the previous page illustrates these lines.

Business plans and dissemination of results

Six business plans were developed for local businesspeople, and four local business roundtables were facilitated to ensure coordination among raw-material producers, primary and secondary processors, and end-consumers; Table 1 summarizes these business plans.

The results of the various tests were disseminated through outreach materials such as technical fact-sheets, a forest production guide, a manual and a leaflet. Three wood collections were developed at the wood anatomy laboratories of the National University of Ucayali, and information was posted on the websites of AIDER, ITTO, Peru's National Forestry Chamber, the Exporters' Association of Peru, and various social media networks. The project's technical team also made presentations at events such as the Fifth Latin American Forestry Congress, the Tenth National Forestry Congress, and the Eighth International Convention for Sustainable Forest Industries, as well as at various institutions in the Ucayali region.

Project impacts

- The technical studies have helped promote the use of ten tropical timber species by primary and secondary processors and facilitated their competitive introduction to the market.
- The project has contributed to professional development by facilitating more than 30 undergraduate degrees and post-graduate research projects (the results of the latter are being published).
- Research on wood properties at the National University of Ucayali has furthered the study of the project's ten target species, as well as other species.
- Local producers have been incorporating the target species into their product manufacturing and marketing processes because of increased interest among national buyers, who are requesting significant product volumes.
- Local research institutions and producer organizations, among others, have formulated research projects that are complementary to the studies carried out by this project on the ten target species.
- Project results have been disseminated via the websites of various institutions, while the project's printed materials have been made available to the national and international scientific communities.

By increasing knowledge on timber species growing in secondary and residual primary forests, the project has helped add value to such forests. In the long run, this is expected to increase interest in the sustainable management of secondary and residual primary forests and thereby to reduce deforestation pressure.

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Nalvarte, J., Santiago, P., Guevara, C. & Espinoza, M. 2013. Project PD 512/08 Rev.2 (I): Industrial utilization and marketing of ten potential timber species from secondary and residual primary forests. Project technical reports. ITTO, Peru General Forest and Wildlife Directorate, and Peru Association for Integrated Research and Development, Pucallpa, Peru.

Table 1: Six companies with business plans for lesser-used species

No.	Company name	Manager	Business plan
1	Industrial Montes EIRL	Hugo Montes Santillán	Manufacturing of furniture using timber from *Apuleia leiocarpa* and *Terminalia oblonga*
2	Consorcio Acosta EIRL	Eduardo Acosta Zarate	Manufacturing of flooring and school furniture using timber from *Apuleia leiocarpa*
3	Wech SAC	Charly Bernales	Manufacturing of battens and pallets using timber from *Terminalia oblonga*
4	Industria de machihembrado Daniela EIRL	Gary Céspedes Sánchez	Manufacturing of doors using timber from *Simarouba amara*
5	Comunidad Nativa Pueblo Nuevo	Raúl Amaringo Ahunari	Production of commercial sawnwood from *Simarouba amara* and other species, marketed through the company Citeindigena SRL
6	Centro de transformación e innovación tecnológica SRL/Citeindígena SRL	Wilian Tuesta Sajami	Seasoned and dimensioned commercial sawnwood from *Simarouba amara*, *Septotheca tessmannii* and other species

Waste not a particle

Waste from the processing of Amazonian woods can be used in the manufacture of particleboard

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Leftovers: Sawmill residues were transformed into chips to produce particleboard. *Photo: National Hardwood Flooring Association*

Growing demand for wood products in Brazil has led to an increase in the volume of waste produced in tropical-timber sawmills and by veneer and flooring manufacturers. This waste could be used to develop products with high added value, such as particleboard.

Particleboard is suitable for the production of residential and commercial furniture. Its main applications are in doors, furniture, shelves, partitions, upright panels, worktops and drawers (ABIPA 2014). Particleboard can also be used as a substrate in flooring and construction—for example in pre-fabricated homes—if moisture-resistant adhesives are used (Stark et al. 2010).

According to ABRAF (2013), the market prospects for composite boards in Brazil are very strong because of technological modernization (offering new products and improving quality); increasing civil construction (due to a reduction in interest rates and incomes); and the call for sustainable alternatives to solid wood resources.

My research was an activity of ITTO Project PD 433/06 Rev.3 (I): "Sustainable model for the Brazilian wood-flooring production chain", which was implemented by the Brazilian National Hardwood Flooring Association. The purpose of the research was to evaluate the potential use of wood residues of six tropical hardwood species—*Caryocar villosum*, *Hymenolobium excelsum*, *Mezilaurus lindaviana*, *Erisma uncinatum*, *Tachigali myrmecophyla* and *Qualea paraensis*—in particleboard production. The research was undertaken at the Department of Forest Sciences in Luiz de Queiroz College of Agriculture at the University of São Paulo.

As part of the research, 21 kinds of particleboard were produced from residues generated in the processing of the six species and an equal mix of all six. Their performance was evaluated with respect to their physical (i.e. specific gravity, moisture content, water absorption and thickness swelling) and mechanical (static bending – modulus of elasticity and modulus of rupture, internal bond, direct screw withdrawal) properties. It was concluded that the particleboard manufactured using residues of *Caryocar villosum*, *Hymenolobium excelsum* and *Tachigali myrmecophyla* showed the highest potential for use in particleboard manufacture.

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The end-product: Particleboards produced from the wood waste of various species. *Photo: Paula Gabriella Surdi*

Hedging bets on ramin

An ITTO project has helped establish ramin hedge orchards to support the development of ramin plantations

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Well-cut: A ramin plant grown from a cutting. *Photo: Tajudin Edy Komar*

Ramin (*Gonostylus bancanus*) is under serious threat in Sumatra and Kalimantan due to the degradation and loss of its habitat and a lack of both natural and artificial regeneration. Poor natural regeneration is caused mainly by population fragmentation and depletion in both production forests and conservation areas, and even in areas previously designated for seed production. There has been little private-sector interest to date in commercial plantations of ramin, yet forest restoration is critical for the conservation of this species.

A lack of designated areas for seed sources (e.g. seed orchards, seed stands and seed production areas) has contributed to a scarcity of seed production and an overall lack of ramin planting materials. Poor maintenance and a lack of security in areas otherwise suitable for ramin seed collection have contributed to the rapid loss of seed trees. Changes in stand structure may be the cause of irregular ramin flowering and fruiting and increased predator attack on ramin fruits and seed. All these factors and others are making the relatively large-scale and continuous production of planting material from ramin seeds all but impossible.

ITTO Project PD 426/06 Rev. 1 (F), which commenced in 2007 and was completed in 2012, aimed to contribute to the sustainable management of ramin forest by, among other things, developing approaches to the vegetative propagation of high-quality ramin planting materials. This article describes the development of vegetative propagation techniques developed under the project.

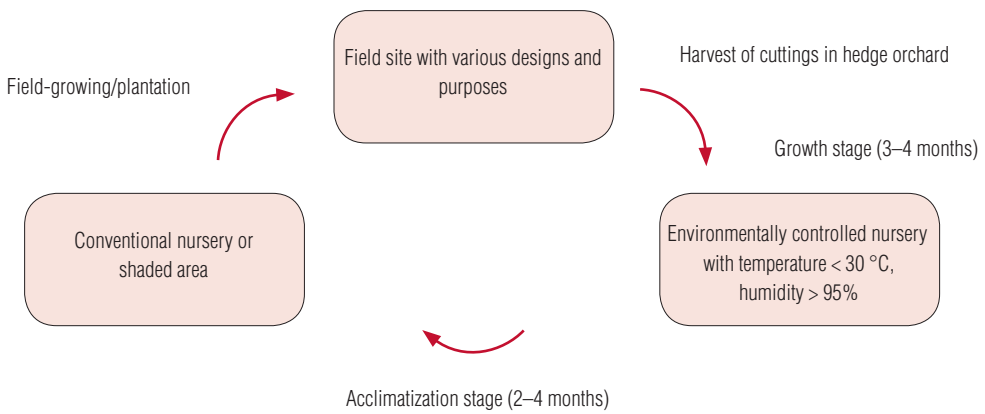
Production cycle

The production of rooted cuttings takes 5–8 months, from the harvesting of cuttings to the stage at which there has been sufficient development of the root system and leaves to enable planting out in the field (Sumbayak and Komar 2010). Figure 1 shows the various development stages, starting with the harvest of shoot-stem cuttings in hedge orchards (also called cutting gardens) or other sources, followed by a growth stage in environmentally controlled nurseries (e.g. using fog-cooling), an acclimatization stage, and planting. The growth stage takes 3–4 months and the acclimatization stage 2–4 months, depending on environmental conditions. In Bogor, the acclimatization stage takes 2–3 months.

The cycle illustrated in Figure 1 applies to shoot-stem cuttings collected from young stockplants of ramin. The growing of shoot-stem cuttings obtained from mature trees has not been tested because of the difficulty of shoot-stem collection from such trees. Hedge orchards were established in peat swamp forest in Ogan Komering Ilir (OKI), South Sumatra, and the Tumbangnusa Research Forest in Central Kalimantan. Cycles for shoot-stem cuttings from other sources have not yet been developed.

Stockplants in the OKI hedge orchards were raised from seeds and rooted cuttings; in the Tumbangnusa Research Forest they comprise wildlings (naturally regenerated seedlings) collected in natural stands. The height of

Figure 1: Production cycle of planting material from shoot-stem cuttings



Ramin emerges: A planted rooted cutting in an area of peat swamp forest. *Photo: Tajudin Edy Komar*

stockplants (measured to shoot tip) is 60–150 cm. The timing of the harvest of shoot-stem cuttings varies; normally, cuttings can be taken after six months. Under current treatments, however, only 50–60% of stockplants produce suitable shoot-stem cuttings. Ramin produces mostly 1–2 orthotropic ("leader") shoots per individual plant. Non-orthotropic ("lateral") shoots yield poor rooting systems and therefore cuttings of those mostly dehydrate and die.

Current sources of cuttings and capacity

OKI hedge orchard, South Sumatra

The District of Ogan Komering Ilir allocated 20 hectares of deforested (i.e. severely degraded) peat swamp forest for ramin propagation and restoration in 2007, and this area has been under effective use since 2009.

About 2000 stockplants are available as sources of cuttings in the hedge orchard at this site, occupying four of the 20 hectares, the remainder of which is allocated to various ramin plantation designs. The number of stockplants will be expanded to more than 10 000 at 1000 stockplants per ha, with the ultimate aim of achieving a total inventory of 20 000. The hedge orchard is expected to yield at least 10 000 ramin cuttings per year for use in forest restoration and rehabilitation in Sumatra, especially South Sumatra and its neighbouring province, Jambi.

The number of stockplants will be increased by planting rooted cuttings sourced from within OKI, other locations in Sumatra, and Kalimantan (especially the hedge orchards of the Tumbangnusa Research Forest). Given current sources of stockplants and the production capacity of rooted cuttings, an inventory of 20 000 stockplants could be achieved in OKI wthin 6–8 years, assuming that the necessary enabling conditions are in place.

Tumbangnusa Research Forest, Central Kalimantan

The hedge orchard in the Tumbangnusa Research Forest in Central Kalimantan is also located in peat swamp forest, in a forest area of approximately 5 000 hectares used for various research purposes and managed by the Forestry Research and Development Agency (FORDA) in the Ministry of Forestry. This research forest is available for expanding the hedge orchard, plantation trials (especially enrichment planting) and future seed orchards. Small-scale trials have been established in the area using various designs and planting methods. Most of the wildlings have been collected in areas of the research forest allocated to be converted to other forest uses; therefore, their collection and planting is helping to maintain the local ramin gene pool.

Three hedge orchards have been established in the Tumbangnusa Research Forest since 2010. The first comprised 1000–1100 wildlings. The second was established using strip planting in a secondary forest stand in which a total of 500 wildlings per strip were planted in ten strips, for a total of 5000 wildlings. The survival rate in this orchard was relatively low (30–40%), however, and replenishment has been carried out annually.

Another hedge orchard was established in 2011 using gap planting; the gaps were 10 m x 10 m in size, and 100 wildlings were planted in each gap (at a spacing of 1 m x 1 m). Fifty gaps were planted, for a total of 5000 wildlings. Again, the survival rate was low (20–30%), and replenishment has been carried out since 2012. The cause of the low survival rates is still under investigation.

The aim is to maintain at least 11 000 stockplants in hedge orchards in the Tumbangnusa Research Forest, and more wildlings will be collected and planted using various designs. In the longer term, the hedge orchards will produce 10 000 shoot-stem cuttings per year to support ramin plantings in Central Kalimantan.

Consistent production of ramin planting materials

The long-term plan for the production of ramin planting materials is part of the Strategy and Action Plan for Ramin Rehabilitation and Plantation, which appeared in the Roadmap for Ramin Sustainable Management and Conservation issued by the Directorate of Biodiversity Conservation, Ministry of Forestry (especially Chapter IV, Section 4.2: "Restoration, rehabilitation and plantation"). Among other things, this strategy and action plan specifies: enhancing the identification of priority areas for ramin restoration and rehabilitation; providing high-quality ramin planting material; increasing capacity in seedling propagation and plantation; and conducting action research and development to support the restoration, rehabilitation and planting of ramin.

The roadmap will never be put in place without consistent contributions from, and the strong commitment of, relevant stakeholders in providing the enabling conditions for ramin rehabilitation and planting. Two key stakeholders are the Directorate General of Forestry Planning, which has responsibility for spatial land-use planning and information on the legal status of forestland to be allocated for restoration, and the Directorate General of Forest Rehabilitation and Social Forestry (now the Directorate General Development Agency for Watershed Management and Social Forestry—DG DAWMSF), which has responsibility for ensuring the provision of tree-planting materials, including the establishment of sources of genetic materials such as seed and hedge orchards, seed stands and seed production areas. At the regional level, centers for forest tree seed production (BPTHs), under the DG DAWMSF, have the specific task of supplying planting materials for forest plantations and land rehabilitation initiatives. FORDA is responsible for research and development into techniques for ramin seed production, handling and planting.

To date, two BPTHs have agreed to cooperate in the procurement of ramin planting materials. BPTH South Sumatra facilitates the production of ramin planting materials (rooted cuttings) from shoot-stem cuttings at its permanent nursery in Palembang. FORDA (through the Regional Research Center South Sumatra—a department in FORDA—and the ITTO–CITES Programme) provides in-house training for BPTH staff on vegetative ramin propagation techniques. In the longer term, BPTHs will produce ramin planting materials from cuttings as part of their regular programmes using their own resources.

Areas to be rehabilitated and planted

It has been estimated that nearly 13 million hectares of Indonesian tropical peat swamp forests was originally ramin habitat (Komar 2006), but a large part of this habitat has been degraded or deforested. Degraded peat swamp forests are allocated as production forest, conservation forest or protected forest. Severely degraded ramin habitat requires replanting with local indigenous species at a density of 1000–1200 plants per hectare. For less-degraded ramin habitats, and habitat with an insufficient number of ramin seedlings, enrichment planting at a density of 400 ramin seedlings per hectare may need to be carried out, especially in forest areas designated for timber production (production forests).

Maintaining genetic variation

A challenge in a planting approach to ramin habitat restoration is maintaining genetic diversity in the hedge orchards and therefore in the planting materials. A previous assessment of ten populations in Sumatra and Kalimantan indicates that ramin has high genetic variation (Widiyatmoko 2010). It is important to establish wide genetic variation in hedge orchards at an early stage of development to ensure that the production chain of cuttings maintain sufficient diversity. Wildlings from representative populations will be collected and established in the hedge orchards as part of a strategy to ensure diversity.

Canopy-bound: A ramin seedling from a rooted cutting at 3–4 years old with high-intensity care (weeding four times per year and fertilizer application at least twice per year). *Photo: Tajudin Edy Komar*

Sustainability

Although early growth is relatively fast (Istomo 2005), ramin is generally a slow-growing tree. The continued commitment of all stakeholders to the restoration of ramin habitat is critical for the success of the initiative. Considerable effort is still required to implement the Roadmap for Ramin Sustainable Management and Conservation, including the provision of sufficient high-quality planting materials. Success will require the long-term support—in terms of funding, human resources, and other—of the central and provincial governments, the private sector, the research community, and donors.

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Safeguarding iroko

An ITTO project has boosted iroko's conservation prospects by broadening the genetic pool for tree-breeding

by Kouablan Adou[1] and Bafitini Ouattara[2]

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Safeguard: SODEFOR staff members inspect a two-year-old iroko tree established from a cutting. *Photo: P. Masupa, ITTO*

ITTO Project PD 54/00 Rev.4 (F) [CFC/ITTO/60]: "Genetic resistance of iroko to *Phytolyma lata*—Phase II", also called the Iroko II project, was implemented by the Forest Development Authority (*Société de Développement des Forêts*—SODEFOR) in Côte d'Ivoire, with funding from the Common Fund for Commodities, the United States of America and Japan.[1] The project was undertaken because of the economic importance of iroko in West Africa and the threat to its survival posed by *Phytolyma lata*, a gall-forming insect. Iroko is the common name given to the two species in the *Milicia* genus—*M. excelsa* and *M. regia*. The economic significance of iroko is due partly to the natural durability and excellent technological properties of its wood, and the two species are also important to local communities for their medicinal qualities.

The specific objectives of the project were to broaden the genetic pool of available planting material of the two species, and to establish experimental iroko plantations.

Stakeholders

The main partners in Côte d'Ivoire for the implementation of the project were: the Ministry of Water and Forests, SODEFOR (the executing agency), the National Center for Agricultural Research (*Centre National de Recherche Agronomique*—CNRA), Félix Houphouët Boigny University at Yamoussoukro, timber companies, and communities neighbouring the project site. Beyond Côte d'Ivoire, Cameroon's National Agency for Support to Forest Development (*Agence Nationale d'Appui au Développement Forestier*—ANAFOR) and Ghana's Forestry Research Institute of Ghana (FORIG) were involved in the implementation of some project activities.

1 SODEFOR expresses its gratitude to these donors.

Major outputs

The project helped improve the genetic resistance of iroko to attack by *Phytolyma lata* by making available pest-resistant plant materials and testing their viability. The focus of the project was on improving the propagation of high-quality plant materials through cuttings, which was carried out in a nursery equipped with a modern irrigation system with nebulizers. At project completion, the iroko genetic pool in Côte d'Ivoire had been broadened through the achievements of the following outputs:

- A total of 4.4 kg of seeds were collected from 34 pest-resistant mother trees at 15 locations (31 seed trees at 13 locations in Côte d'Ivoire and three mother trees at two locations in Ghana) for the establishment of breeding orchards.
- Pest-resistant clones of iroko were identified and selected from 909 individuals in breeding orchards (585 for *Milicia regia* and 324 for *Milicia excelsa)*, for the establishment of trial plots.
- The regional transfer of experiences and expertise with FORIG was undertaken through the exchange of experts on iroko propagation using cuttings. Cooperation with ANAFOR involved the participation of four Cameroonian experts in two information-sharing workshops.
- A nursery was established and equipped with a modern irrigation system, and the key project team members received training from experts at CNRA and FORIG. SODEFOR now has the capacity and expertise to produce pest-resistant planting materials for reforestation activities in Côte d'Ivoire.
- One hundred hectares of experimental mixed plantations of iroko pest-resistant seedlings and companion species (*Khaya anthoteca*, *Tectona grandis* and *Acacia mangium*) have been established (with iroko representing 25% of seedlings planted). These plantations will enable long-term scientific study of the extent to which species' mixing can reduce the infestation of iroko by *Phytolama lata*.
- Technical cooperation between SODEFOR, ANAFOR and FORIG on iroko pest-resistant plant materials has become a reality. Exchanges with ANAFOR and FORIG, the involvement of industrial timber companies (e.g. clone transfer and workshops), and the active participation of neighbouring communities (e.g. in plant production and the establishment and tending of plantations) all contributed to the realization of project objectives.

Main project beneficiaries

Timber-sector companies. In the short term, timber companies, which are required by law to conduct replacement planting, have access to high-quality, pest-resistant iroko planting materials, based on a roadmap for the establishment of iroko plantations. In the longer term, project outputs will help diminish the threat of extinction to iroko species while increasing the available timber resource in Cote d'Ivoire. The international timber market will benefit from the greater availability of iroko species in forests in Cote d'Ivoire and other African countries.

Neighbouring communities. The project has had several economic impacts on neighbouring communities. Community members participated in work activities generated by the project, many of which will continue after project completion. In the future, communities will also benefit from the increase in the availability of iroko wood for the craft industry and the use of iroko as a traditional medicine and for other cultural purposes.

Government of Côte d'Ivoire and reforestation institutions. Project outputs will continue to contribute to the realization of government objectives in relation to the sustainable management of Côte d'Ivoire's forests. Through the project, SODEFOR gained expertise in the production and establishment of iroko plantations.

Scientific research. The project made several contributions to research on pest-resistant iroko species. For example, it has increased data on the characteristics of iroko seedlings in Côte d'Ivoire; helped broaden and conserve the iroko genetic pool in pest-resistant iroko species; developed propagation techniques using iroko stump shoots and root shoots; and created opportunities for researchers and students to conduct studies based on project outputs.

Other countries. Forestry stakeholders in project partner and non-partner countries will be able to use the project outputs according to their needs through collaboration with SODEFOR. In the longer term, the knowledge gained in the project will benefit the development of iroko plantations elsewhere in Central and West Africa.

Integration and internationalization of lessons learned

The development of subregional cooperation was one of the goals of the project. The first exchanges of experiences gained under the project and through other initiatives were carried out in capacity-building and expertise missions in Ghana (March 2008) and Cameroon (April 2012), as well as at the inception and completion workshops and a dissemination seminar held in Abidjan in 2012 (Anon. 2012).

Influence on national policies and laws

This project was developed because of the threat posed to iroko survival and the lack of knowledge on the artificial regeneration of iroko. The project's outputs assisted in the development of several biodiversity conservation projects. These include ITTO Project PD 419/06 Rev. 3 (F): EXT.—TICAD 5—Rev. 1: "Forest seeds management and conservation: rehabilitation and restoration of degraded forests in Côte d'Ivoire with the involvement of local communities (refugees, internally displaced persons and local populations)", and another titled "Capacity-building for the sustainable management of 90 forest reservations in Côte d'Ivoire in partnership with the private and public sectors", funded by the French Cooperation Agency under a public–private partnership agreement. Both these projects are now under implementation.

The "Integrated project for the preservation of reservation forests in Côte d'Ivoire" (financed by the Japan International Cooperation Agency), another biodiversity conservation project, enabled SODEFOR to acquire essential equipment for forest protection and bushfire control as part of risk prevention measures.

Future prospects

The project completion workshop recommended the establishment of a regional platform involving the research and development sector, the Government of Côte d'Ivoire and scientists from Cameroon and Ghana.

The sustainability of the main project outputs (i.e. the nursery and trial plots and pilot forest plantations) is assured because the SODEFOR Gagnoa Management Center is located at the project site. The selection work on pest-resistant/pest-tolerant clones of iroko will be continued through the SODEFOR research and development programme. The project nursery is becoming an important seedling production center in reforestation activities in Côte d'Ivoire by providing high-quality pest-resistant/tolerant iroko seedlings. Other timber species seedlings are also produced in the cuttings center associated with this nursery.

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Council announces new funding

US$8.3 million in new funds for projects, thematic programmes and other activities were pledged for tropical forests at the 50th session of the International Tropical Timber Council

Taking counsel: Emmanuel Ze Meka, ITTO's Executive Director (left), Rob Busink, Chair of the International Tropical Timber Council, Dr BCY Freezailah, Vice-chair of the Council (and incoming Chair), Jennifer Conje, incoming Vice-chair of the Council, and Carlos Moreno, UN Conference on Trade and Development Legal Advisor, consult during the 50th session. *Photo: Earth Negotiations Bulletin*

At its 50th session, held in Yokohama, Japan, in November 2014, the International Tropical Timber Council announced additional funding of US$8.3 million to continue ITTO's work in promoting the expansion and diversification of international trade in tropical timber from sustainably managed and legally harvested forests and the sustainable management of tropical timber producing forests. The Council also approved a new biennial work programme (BWP) for 2015–2016.

The Council is ITTO's governing body. It meets at least once a year to discuss wide-ranging issues aimed at promoting sustainable tropical forest management and the trade of sustainably produced tropical timber. The 51st session of the Council will take place in Kuala Lumpur, Malaysia, on 16–21 November 2015.

Among other things, the additional funds made available at the 50th session will support projects to assist in: the rehabilitation of degraded forest in Côte d'Ivoire; sustainable forest management (SFM) through REDD+ in Cambodia; the development of small and medium-sized forest enterprises in Guatemala; the management of the Tara and Cempaka plantations in Peru and Indonesia, respectively; the promotion of SFM in African forests; and community forest management in Malaysia.

A range of activities will be undertaken as part of the new BWP, such as: a workshop on mangrove forests; support for the international wildland fire conference to be held in Korea in October 2015; strengthened statistics collection; support for forestry extension services; and work with the World Customs Organization. Additional funding was also provided for the Freezailah Fellowship Fund and the Thematic Programme on Trade and Market Transparency. The table below provides summaries of all projects, pre-projects and activities funded at the session. Donors at the session were: the governments of Japan, the European Commission, the United States, Germany, the Netherlands, China and the Republic of Korea; and APFNet, Sumitomo Forestry and the Japan Lumber Importers' Association. Funds were also sourced from ITTO's Bali Partnership Fund and Working Capital Account.

During the session the government of the Central African Republic acceded to the International Tropical Timber Agreement, 2006, bringing ITTO membership to 70, the largest ever. Negotiations were held on the appointment of a new Executive Director for the Organization, but no decision was made and the process will continue at the next session.

For more information on the 50th Council Session go to www.itto.int or www.iisd.ca/forestry/itto/ittc50.

Recently funded projects

Rehabilitation of degraded forest land in the Ahua Forest Reserve by the women members of the MALEBI Association in compensation for the forest resources removed to meet the need for firewood and charcoal

Project no.: PD 725/13 Rev.2 (F)

Budget:	ITTO	US$149 408
	Counterpart	US$66 754
	Total	**US$216 162**
Donors:	Japan, USA	

The Ahua Forest Reserve in Côte d'Ivoire has deteriorated sharply due to land clearing for agriculture and illegal logging to meet the need for woodfuel (charcoal and firewood). This project aims to reverse the deterioration through agroforestry, which will be undertaken by women from the MALEBI Association, to replace the wood they use in woodfuel production.

Sustainable forest management through REDD+ mechanisms in Kampong Thom Province (Cambodia)

Project no.: PD 740/14 Rev.2 (F)

Budget:	ITTO	US$484 792
	Counterpart	US$76 230
	Total	**US$561 022**
Donor:	Japan	

This project aims to advance the REDD+ programme in Cambodia by standardizing the procedures for meeting the technical specifications of REDD+ with the aim of reducing deforestation and forest degradation in the Tomring Forest, Kampong Thom Province.

Development of a business management services programme for forest micro, small and medium enterprises in Guatemala

Project no.: PD 756/14 Rev.1 (M)

Budget: ITTO US$149 341
Counterpart US$125 712
Total US$275 053

Donor: USA

Community enterprises are usually established through local non-profit social development projects and their most common weakness is a lack of capacity for effective production and marketing of forest products. This project will improve local business management capacities to develop and manage forest micro, small, and medium-sized forest enterprises.

Guidelines for the management of tara (*Caesalpinea spinosa*) plantations with a view to the rehabilitation of waste lands in the sub-humid tropics of the coastal region of Peru

Project no.: PD 724/13 Rev.1 (F)

Budget: ITTO US$149 632
Counterpart US$215 310
Total US$364 942

Donor: Japan

This project, to be implemented in southern Peru, will develop guidelines and a technical package for rehabilitating degraded lands in the Peruvian coastal region using *Caesalpinea spinosa* and agroforestry systems. It stems from project PD 583/10 Rev.1 (F), which assessed the feasibility of restoring ecosystems in the southern coastal region of Peru.

Initiating the conservation of cempaka tree species (*Elmerrillia* spp.) through plantation development with local community participation in north Sulawesi, Indonesia

Project no.: PD 646/12 Rev.3 (F)

Budget: ITTO US$435 187
Counterpart US$128 850
Total US$564 037

Donor: Japan

The increased demand for cempaka (an indigenous tree in North Sulawesi) is affecting its supply in natural forests. The aim of this project is to address the imbalance between supply and demand by promoting cempaka plantations. It will develop technical guidance for community cempaka plantations; establish nurseries and community cempaka plantations; and assist in developing policies for sustainable cempaka plantations.

Sustainable management of production forests at the commercial scale in the Brazilian Amazon – Phase II

Project no.: PD 452/07 Rev.5 (F)

Budget: ITTO US$656 630
Counterpart US$890 928
Total US$1 547 558

Donor: Japan

An earlier project developed and validated silvicultural and managerial tools to support enterprises working in the Brazilian Amazon in planning, implementing and monitoring their operations to achieve sustained financial benefits. This follow-up project will focus on transferring these tools to timber enterprises; among other things it will build capacity in training centers and universities in the Amazon.

Community-based forest management of the Sungai Medihit watershed, Sarawak, Malaysia

Project no.: PD 563/09 Rev.5 (F)

Budget: ITTO US$460 000
Counterpart US$133 000
Total US$593 000

Donor: APFNet

This project is designed to promote sustainable forest management (SFM) in the Sungai Medihit watershed by building the capacity of the community, demonstrating an innovative operational model, and establishing a new governance mechanism for community development.

Activities

Development of ITTO guidelines to incorporate gender equity in the Organization's activities, programmes and projects in member countries

Budget: US$10 000

Donor: USA

Aim: to analyze ITTO instruments and tools, particularly those most commonly used by ITTO countries, and identify which require the incorporation of gender-related mechanisms.

Publish the ITTO Voluntary Guidelines for the Sustainable Management of Natural Tropical Forests as a policy document

Budget: US$100 000

Donor: Bali Partnership Fund, Subaccount B

Aim: to publish the ITTO Voluntary Guidelines for the Sustainable Management of Natural Tropical Forests in the three working languages of the Organization, along with promotional materials for the dissemination of the document to key stakeholders in ITTO member countries and the international community.

Continue to monitor progress in the application of criteria and indicators for sustainable forest management

Budget: US$10 000

Donor: USA

Aim: to facilitate active ITTO participation in the global dialogue on monitoring, assessing and reporting on forests, including the CPF Task Force on streamlining forest reporting, and harmonizing reporting on forests between ITTO's SFM Tropics and FAO's Forest Resources Assessment (including through the Collaborative Forest Resources Questionnaire).

Enhance cooperation between ITTO and CITES

Budget: US$330 000

Donor: USA, the Netherlands

Aim: to allow the continuation of ITTO's CITES capacity-building programme through 2016. The program is country-driven and foresees an expansion to include additional timber species and non-timber trees listed in CITES and a widening of coverage to other range states of species of concern.

Promote the conservation, restoration and sustainable management of mangrove ecosystems

Budget: US$50 000

Donor: USA

Aim: to develop and strengthen actions and partnerships to facilitate the conservation, restoration and sustainable management of mangrove forests and ecosystems, specifically by reviewing actions taken by ITTO and other organizations and stakeholders at the national, regional and international levels and organizing an international conference in 2016, in close collaboration with the International Society for Mangrove Ecosystems and other partners.

Study on carbon removals and emissions associated with production and use of harvested tropical wood products

Budget: US$70 000

Donors: Japan, Sumitomo Forestry

Aim: to facilitate the estimation of carbon removals and emissions associated with the production and use of tropical wood products, in line with the IPCC guidelines for harvested wood products.

Further ITTO's commitment to the UNISDR Global Wildland advisory group, GWFN and GFMC, and provide support for the regional forest fire networks and other interinstitutional cooperation efforts for the 6th international Wildland Fire Conference

Budget: US$60 000

Donors: Republic of Korea, USA

Aim: to provide support for the Africa, Asia, and Latin America Regional Wildland Fire Networks and other interinstitutional cooperation efforts made by the United Nations International Strategy for Disaster Reduction Global Wildland Advisory Group and the related Global Wildland Fire Network and Global Fire Monitoring Center, in their preparatory meetings and the participation of ITTO and its member countries at

the 6th International Wildland Fire Conference, to be held in October 2015 in South Korea.

Coverage of ITTC session by the Earth Negotiations Bulletin

Budget: US$30 000

Donors: USA

Aim: to provide coverage of important developments for the tropical forest sector to be discussed at the 51st session of the International Tropical Timber Council in Malaysia in November 2015.

Improve the branding, positioning and marketing of ITTO

Budget: US$50 000

Donors: Bali Partnership Fund, Subaccount B

Aim: to develop compelling cases for support for the various areas of work of ITTO based on the impacts and results of recently completed ITTO projects and activities, which will be disseminated through high-impact and attractive marketing and communication materials to support fundraising and outreach activities.

Creation of web-based 'one-stop' interactive profiles of the wood based industry, trade and forestry sectors in producer member countries to support tropical timber market transparency and diversification

Budget: US$100 000

Donors: Japan, the Netherlands

Aim: to facilitate the creation of a web portal of trade and forest-sector profiles for producer member countries.

Consider advice from and facilitate involvement of the Trade Advisory Group (TAG) and the Civil Society Advisory Group (CSAG)

Budget: US$50 000

Donors: USA, Bali Partnership Fund, Subaccount B

Aim: to encourage the active and meaningful participation of TAG and CSAG members in the sessions of the International Tropical Timber Council.

Continue to provide for ITTO's cooperation and consultation with the Collaborative Partnership on Forests (CPF) in support of the United Nations Forum on Forests (UNFF) and other relevant international and Regional organizations, institutions and initiatives

Budget: US$25 000

Donors: USA

Aim: the effective participation of ITTO in the work of UNFF and CPF.

Decide on eligible fellowship applications in 2015 and 2016 based on the recommendations of the fellowship selection panel

Budget: US$300 000

Donors: USA, the Netherlands, Bali Partnership Fund, Subaccount B

Aim: to award applications to the ITTO Fellowship Programme.

Enhance the technical capacity of member countries, particularly developing member countries, to meet the statistics and reporting requirements

Budget: US$25 000

Donors: Bali Partnership Fund, Subaccount B

Aim: to support country-level training workshops or other activities (including, where appropriate, regional workshops), on request, to enable producer countries to meet their reporting requirements on forest-sector statistics.

Improving forestry extension schemes to ensure the implementation of sustainable forest management (SFM) and contribute to the conservation of tropical forest ecosystems

Budget: US$100 000

Donors: Bali Partnership Fund, Subaccount B

Aim: to conduct an international seminar in Latin America to discuss forestry extension services and schemes with the aim of contributing and improving field practices on the sustainable management of tropical forests and tropical forest ecosystems.

Enhance the cooperation between ITTO and World Customs Organization (WCO) through the preparation of guidelines for frontline customs officials in combatting illegal timber trade

Budget: US$222 207

Donors: USA, Japan Lumber Importers' Association, Japan

Aim: to develop guidelines to assist customs officers in validating and verifying the legality of tropical timber and timber products in trade and enhance the enforcement of the timber trade.

Undertake a study to assess the use of the various ITTO guidelines on the sustainable management of plantations, secondary forests, biodiversity and natural forests in the tropics

Budget: US$50 000

Donors: USA

Aim: to conduct a survey to assess the use of key ITTO policy guidelines from a full range of tropical forest stakeholders through a professional online survey services provider, with the aim of analyzing the impacts of ITTO policy guidelines and their best use towards the achievement of sustainable forest management in the tropics.

Study on regional ITTO presence and representation

Budget: US$25 000

Donors: Working Capital Account

Aim: to inform Council's deliberations at its 51st Session on ITTO presence and representation in the regions.

ITTO Thematic Programme on Trade and Market Transparency

Budget: US$100 000

Donors: USA

Aim: to increase tropical timber producers' capacity to develop and apply market intelligence and improve market transparency by enhancing information sharing.

Building the capacities for biodiversity conservation in transboundary conservation areas in the Congo Basin countries through SFM practices and the use of satellite and radar imagery (Phase I)

Budget: US$1 280 619

Donors: Japan

Aim: to contribute to the management of threats to biodiversity in transboundary biodiversity conservation areas in the countries of the Congo Basin by building capacity and expertise in the use of satellite imagery data in the Congo Basin countries.

Additional funding for ongoing projects and activities

Development and implementation of species identification and timber tracking systems in Africa with DNA fingerprints and stable isotopes

Project no.: PD 620/11 Rev.1 (M)
Additional funding: US$220 751
Donor: Germany

Promotion of sustainable management of African forests

Project no.: PD 124/01 Rev.4 (M) Phase III, Stage 3
Additional funding: US$100 000
Donor: China

Assistance for project identification and formulation

Project no.: PD 73/89 (M,F,I)
Additional funding: US$22 755
Donor: USA

Major Groups Partnership on Sustainable Forest Management

Activity no.: PP-A/30-102B
Additional funding: US$675 460
Donor: Germany

Staff secondment to UNFF

Activity no.: PP-A/43-211
Additional funding: US$30 000
Donor: The Netherlands

Enhance cooperation between ITTO and CITES

Activity no.: PP-A/39-162A
Additional funding: US$1 621 442
Donor: European Commission

Freezailah Fellowship Fund

Project no.: PD 99/99 (I)
Additional funding: US$132 094
Donor: The Netherlands

Fellowship report

Marking 25 years of capacity development through the ITTO Fellowship Programme

by Chisato Aoki

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Spreading the word: An ITTO Fellow participates in a field visit during a short course on payments for environmental services at CATIE in Turrialba, Costa Rica. *Photo: Francisco Visoni*

The ITTO Fellowship Programme began in 1989, and 2014 therefore marked its 25th anniversary. To commemorate this milestone, the ITTO Secretariat created the ITTO Fellowship Network to help ITTO Fellows and alumni share knowledge[1], conducted a survey of alumni on the impacts of the ITTO Fellowship Programme on career development, and invited three alumni to present their Fellowship stories at the 50th session of the International Tropical Timber Council in November. This article looks back at the development of the ITTO Fellowship Programme over its 25-year history, summarizes the results of the survey, recaps the presentations of the three alumni at the Council session, and proposes a next phase of the Fellowship Programme based on needs-based training.

The last 25 years

The ITTO Fellowship Programme started in 1989 as a project in the Division of Forest Industry. The project was proposed by Dr Manoel Sobral Filho (then an assistant director at ITTO and later the Organization's Executive Director) with the aim of building capacity in the fields of tropical forest industries and timber marketing.
In 1993, the Programme was expanded (under a new project) to cover the three broad fields of ITTO's mandate: reforestation and forest management; forest industry; and economic information and market intelligence. The aim of the expanded programme was to develop capacity in member countries for achieving the ITTO Year 2000 Objective by training young people in sustainable tropical forest management. In 2000, the Fellowship Programme Review Panel, led by Stephanie Caswell (a former Chair of the Council), proposed the creation of the "Freezailah Fellowship Fund" (in honour of ITTO's first Executive Director, Dr BCY Freezailah), with the aim of attracting more donors by increasing the visibility of the Programme. The Council duly established this fund.

As of December 2014, about 1300 Fellows had received funding under the ITTO Fellowship Programme over its 25 years. The number of women participating in the Programme has increased considerably over time: in 1989, only three of the 37 fellows were women (8% of the total awards at the time); by December 2014, 382 (30%) of all awardees were women. In recent years, the percentage of women receiving fellowships has fluctuated between 30% and 50%.

The Programme has supported Fellows from 49 countries: 41% in Asia and the Pacific, 32% in Africa, and 24% in Latin America and the Caribbean. Three percent of Fellows have been from consumer countries.

Fellowship activities have changed in emphasis over the years. In the early years, most activities were short-term, such as participation in conferences, study tours and short training courses. Today, more than half of all Fellows receive their fellowships to pursue longer-term activities such as advanced studies (e.g. Master's or PhD programmes) and publishing technical documents.

Fellowship survey

To examine the impacts of the ITTO Fellowship Programme on the careers of Fellows in the field of sustainable forest management, in July 2014 the ITTO Secretariat sent a questionnaire to 650 Fellows and received 186 responses (a response rate of 29%). Responses

1 See TFU 23/2 and www.ittofellownet.org.

were distributed quite evenly across the three tropical regions (36% were from Africa, 35% were from Asia and the Pacific, and 27% were from Latin America and the Caribbean, with about 3% from consumer countries) and between genders (60% men, 40% women). Fifty-one percent of respondents received fellowships after 2010, 44% received them between 2000 and 2009, and 5% received them between 1993 and 1999.

Thirty-six percent of respondents are working today in Asia and the Pacific, 33% are working in Africa, 24% are working in Latin America and the Caribbean, and 3.5% are working in each of Europe and the United States. Of the Fellows working in Europe and the United States, some are PhD students and the others are working in organizations dealing with international forestry and climate change, particularly in relation to tropical forests. These results confirm that the knowledge and skills gained through the Fellowships are being used in the tropics.

Ninety-five percent of respondents considered the ITTO Fellowships to be "extremely useful and relevant" and 5% considered them "useful and relevant". Respondents appreciated the variety of activities that the ITTO Fellowship Programme allows, as well as the clear, transparent and speedy Fellowship selection process. Almost all respondents reported recommending the ITTO Fellowship Programme to friends and colleagues because of its usefulness and importance for capacity development in their countries.

More than two-thirds of respondents reported feeling more confident in their work because of the recognition they received from ITTO, and they completed their Fellowship activities with "great satisfaction". Eighty-five percent of respondents reported that the Fellowships further motivated them to use and enhance their capacity to contribute to the sound management of tropical forests in their countries.

Ninety percent of respondents appreciated the ITTO Secretariat's recent initiative to create the ITTO Fellowship Network as a way of sharing the knowledge they had obtained through their Fellowship and post-Fellowship activities. Some respondents requested the ITTO Secretariat to convene regional meetings to discuss the challenges of tropical forests and find collaborative solutions.

The stories of three Fellows

Three ITTO Fellows—Professor Daniela Pauletto, Assistant Professor at Universidade Federal do Oeste do Pará, Brazil, Dr Paul Bosu, Senior Research Scientist at the Forestry Research Institute of Ghana, and Professor San Win, Pro Rector of the University of Forestry, Ministry of Environmental Conservation and Forestry, Myanmar—were invited to present their stories at the 50th session of the International Tropical Timber Council in November 2014. These stories, which were well-received by delegates, are summarized in TFU 23/3, and excerpts of their addresses to Council are included below.

Daniela Pauletto: "In June this year I got a position as Assistant Professor at the Federal University of Oreste do Pará and I am teaching in the areas of agroforestry systems, forest protection and reforestation. I am working on environmental regulation, the recovery of degraded areas, the implementation of farming systems in association with forests, and payments for environmental services. I now have 48 students who will soon become forestry engineers, and I always try to show them the need to work with passion and enthusiasm and to always respect the knowledge and wisdom of local communities.

"My plan for the next five years is to set up research projects at the university to encourage forest plantations and other agricultural activities associated with forests. I will monitor social and economic aspects and environmental services that are promoted through such activities. Then I intend to carry out a study for my doctoral thesis on payments for environmental services for producers of plantations. My goal is to set up a research and extension center at the university that should be a reference point in the monitoring of sustainable forestry projects.

"I thank ITTO for having helped me along this life path. The ITTO Fellowship has had a great and positive impact on my professional and personal life."

Dr Paul Bosu: "With funding from ITTO and the Government of Ghana, we have tested over 50 native species in various combinations and ratios and have recommended alternatives for establishing native species' plantations. A handbook has also been published to help tree-growers in that regard. In 2005, my team was assigned a task of managing forest health and developing protocols for protection against pests and diseases in small plantations established under the National Forest Plantation Development Project. This was the first ever to systematically monitor tree health in Ghana.

"My contribution to the study and conservation of butterflies at the Bobori Sanctuary and Ecotourism Center, established and managed by my institute, has helped to conserve the nearly 5400-hectare Bobori Forest Reserve.

"I have transferred the knowledge and skills I have acquired to others. I have supervised or served on the graduate committee of two PhD students and five Masters students. I have also directly supervised over 20 undergraduate students' theses.

"For me, the Fellowship I received in 1997 was like a springboard upon which I leapt into a forestry career. It was more like startup capital invested in my future and in everything I have done to support trees and forests."

Fellowship awardees

The following 23 people received ITTO Fellowships at the 50th session of the International Tropical Timber Council: Mr Walter Onekon Angwere (Cameroon); Mr Werhner Atoche Montoya (Peru); Mr Simon Kodjoli Awokou (Benin); Ms Eleonora Camacho Moreno (Mexico); Ms Marisa Camilher Camargo (Brazil); Ms Rita Mosume Ebune (Cameroon); Dr Anoop Ev (India); Dr Eyi Ndong Hugues Calixte (Gabon); Mr Marco Vinicio Guaman Hernandez (Ecuador); Mr Ishmael Hashmiu (Ghana); Ms Bidéname Kedjeyi (Togo); Mr Yao Elvis Franklin Kouacou (Côte d'Ivoire); Dr Segio Andres Molina Murillo (Costa Rica); Mr Innocent Ngiehnu Nchu (Cameroon); Mr Samuel Kwadwo Nsiah (Ghana); Mr James Amponsah Oppong (Ghana); Mr Darwin Rolando Paguada Pérez (Honduras); Dr Silvia Rebollar Domínguez (Mexico); Mr Bo Sann (Myanmar); Dr R. Sheik Mohammed Shamsudeen (India); Ms Thinn Thinn (Myanmar); Ms Vaglica Valentina (Italy); and Dr Deepti Verma (India).

Seven of the awardees will be taking short courses, internships or study tours; two will be participating in conferences; eight will be undertaking post-graduate studies; and six will be using their Fellowships to publish technical documents.

ITTO fellowship applications—2015 spring cycle

ITTO offers fellowships to promote human resource development and strengthen professional tropical forestry and related expertise in member countries. The next deadline for applications is 20 February 2015 for activities starting after 15 July 2015. To apply online, please visit www.itto.int/feature20, or contact Dr Chisato Aoki, Fellowship Coordinator, at: fellow-application@itto.int; fax +81–45–223 1111 (see page 2 for ITTO's postal address).

Professor San Win: "I wish to share four achievements made through the ITTO Fellowship Programme. First, the Fellowship enhanced my knowledge on shifting cultivation, including the real lives of shifting cultivators and why they prefer shifting cultivation to agroforestry—because the former provides food in a shorter time than the latter. The knowledge gained is very useful for me as well as for policymakers in addressing the issues of shifting cultivation and in achieving sustainable forest management (SFM) in Myanmar.

"The second achievement is the impact on the younger generation. I have taught my knowledge on shifting cultivation in my agroforestry teaching to more than 800 undergraduate forestry students and 12 post-graduate students at the University of Forestry. Most of them are working at the Ministry of Environmental Conservation and Forestry as young researchers and foresters. They can now identify the best-suited nitrogen-fixing tree crops for agroforestry practices in local community forests. Their understanding of shifting cultivation and their efforts in agroforestry in community forests are promoting SFM.

"The third achievement is that I have translated the document I wrote with funding from the ITTO Fellowship into the local language, and it received the Ohn Pe Literature Award in 2003. The publication extends knowledge on the things to be taken into consideration in designing agroforestry practices with local people in Myanmar.

"The fourth achievement is that I have developed an agroforestry project titled "Agroforestry, alternative to shifting cultivation" with a German professor, which has been funded by the Livelihood and Food Security Trust Fund and the World Agroforestry Centre and is now being implemented. Through the project we will extend practices to shifting cultivators to enhance their livelihoods.

"My vision is that the people should live in harmony with natural ecosystems, and my mission is to educate people more on ecosystems. My plan therefore is to study farming practices that are detrimental to the environment, like unsustainable shifting cultivation, and to employ more environmentally, socially and economically viable options in place of shifting cultivation. Therefore, in the next five years I will establish agroforestry demonstration plots in the Shan and Chin regions for farmers.

"I could not have done such important work for Myanmar without the ITTO Fellowship Programme, which is truly building capacity in the younger generation in its member countries. Therefore, many, many thanks to the ITTO Fellowship Programme, which promoted my career, extended my personal knowledge on shifting cultivation and agroforestry practices, and shaped my life and my capacity to promote SFM."

Conclusion

The ITTO Fellowship Programme has successfully helped develop capacities in ITTO member countries to implement SFM. This success has been made possible by the continuous support of donors, who have provided US$9.8 million to the Fellowship Programme over 25 years. The main donors have been Japan (71% of the total), the United States (16%), the Netherlands (8%) and Australia (3%); others include Sweden, the United Kingdom and the private sector.

Some donors have requested the ITTO Secretariat to prepare a strategic plan for needs-based training in member countries to ensure that ITTO's training efforts fully match the needs of countries, regions and institutions. Funding is now being sought to prepare such a plan, which would enable the ITTO Fellowship Programme to move to a new stage in capacity development, in partnership with the private sector and academic institutions.

Market trends

The tropical timber trade needs a strategy to arrest declining market share, but EUTR likely not to blame

Compiled from materials published in the Tropical Timber Market Report

The tropical timber industry could regain market share if it articulated a clear message to create public support for the sustainability and legality of tropical wood and wooden products, according to participants in ITTO's 2014 Annual Market Discussion, which was organized by ITTO's Trade Advisory Group (TAG) at the 50th session of the International Tropical Timber Council last November. Addressing the theme "domestic and emerging international markets—a changing market landscape", the forum discussed global demand for wood products, which is shifting from west to east. The forum heard from the International Wood Products Association (USA), the Brazilian Association for Mechanically Processed Timber, the Thai Timber Association, the Wood Foundation (South Africa), and independent consultants.

A statement made on behalf of the TAG suggested that the industry had sufficient understanding of the reasons for the declining market share and competitiveness of tropical timber and timber products; what was needed was a comprehensive strategy to address the decline. The TAG envisaged an approach to developing such a strategy that blended private-sector initiative and the resources of the International Tropical Timber Council. The strategy would draw on the accumulated experience and expertise of ITTO and public- and private-sector actors, with the aim of securing the future of tropical forests and the international tropical timber trade.

Rising concern on impact of EUTR

Meanwhile, as reported in TFU 23/2, a number of wood-sector stakeholders are raising concerns about the implementation of the European Union Timber Regulation (EUTR), which has been in force since March 2013. Trade interests are worried about the inconsistent application of the regulation across the EU and even within member states, and about the lack of clear guidance on key elements such as risk assessment. Non-governmental organizations have queried the lack of visible progress in some European Union (EU) member states in developing enforcement regimes.

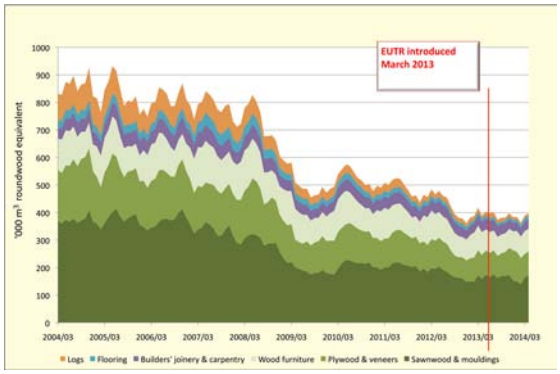
In July 2014, the European Timber Trade Federation (ETTF) convened a meeting "to consider perspectives on implementation, enforcement and outcomes of the EUTR on the market", which was attended by representatives of ETTF member associations from France, Germany, Italy, the Netherlands and the United Kingdom (UK). Also at the meeting were Svetla Atanasova of the European Commission (EC)'s Environment Directorate and Rupert Oliver, lead consultant in ITTO's EC-funded FLEGT VPA Independent Market Monitoring (IMM) project.

In a presentation delivered on behalf of the ITTO IMM, Oliver examined whether the EUTR had contributed to a reduction in EU trade in tropical hardwoods. He observed that the post-EUTR trade in tropical hardwoods was most notable for its stability (albeit at a low level) relative to its precipitous decline before the introduction of the EUTR, especially since about 2008. Figure 1 shows this decline over a ten-year period, and Figure 2 shows EU import data for a two-year period spanning the introduction of the EUTR.

EU market weak but stable

This stability might be due partly to the EUTR, which, along with weak consumption and a lack of financial credit, has contributed to greater risk aversion in the trade. European importers appear to be engaging in much less speculative purchasing of tropical hardwood products than they have in the past.

Figure 1: EU28 imports of tropical wood products, by product group, month of March, 2004–2014



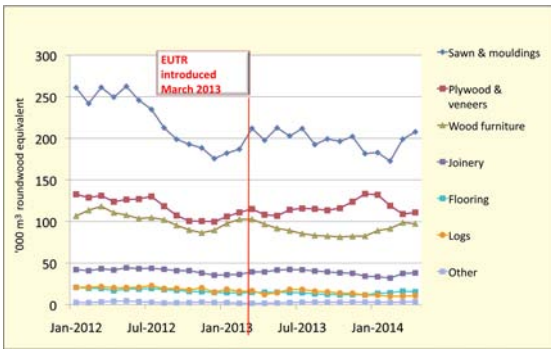
Note: Values are monthly (moving average) volumes.
Source: ITTO Independent Monitoring Project analysis of Eurostat data.

Oliver highlighted recent structural changes in Europe's tropical hardwood trade. EU import data combined with anecdotal reports suggest that one effect of the EUTR has been to concentrate the trade in the hands of a few large operators. Those operators are focusing on suppliers with whom they have formed long-term commercial relationships and who have been most cooperative in providing the detailed information now required to demonstrate negligible risk.

But the structural changes in Europe's tropical hardwood trade are also a result of long-term constraints on the supply of tropical hardwood to European specifications. These constraints have arisen because of a reduction in processing capacity in some tropical supply countries and the increasing diversion of trade to domestic and emerging markets, notably China. In a seller's market, tropical hardwood exporters have more options and have become less inclined to service increasingly demanding European buyers.

Oliver noted that short-term fluctuations in EU hardwood imports since the coming into force of the EUTR were explained most readily by commercial factors rather than by the EUTR. For example, a recent slide in the volume of EU tropical sawn hardwood imports, which began in August 2013 and reached a low in February 2014

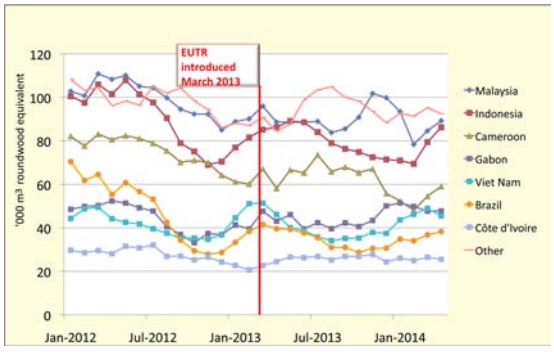
Figure 2: EU28 imports of tropical wood products, by product group, 2012–2014



Source: ITTO Independent Monitoring Project analysis of Eurostat data.

(Figure 2), was caused by the combined effects of the low availability of commercially popular African species such as sapele; infrastructure problems at Douala port, which greatly reduced exports from Cameroon; overstocking in the European garden-decking sector; and a sharp dip in imports from Malaysia in early 2014 after an increase in EU import taxes following a change in Malaysia's Generalized System of Preferences status. Figure 3 shows fluctuations in tropical wood product imports between January 2012 and mid-2014, by exporting country.

Figure 3: EU28 imports of tropical wood products, by supply country, 2012–2014



Source: ITTO Independent Monitoring Project analysis of Eurostat data.

Are imports being directed to EU countries with lax EUTR enforcement?

Oliver also considered whether there was evidence of changes in the direction of imports of tropical wood from EU countries with strong sanctions regimes towards EU countries with weaker regimes. By analysing timber trade statistics he concluded that, as of mid-2014, there was no significant evidence of this, and any alterations in the sourcing of imports into the EU were more readily explained by changes in consumption.

Import volumes of tropical hardwood products into the UK increased consistently through 2013, even after the implementation of the EUTR and even though the UK has one of the most active EUTR regimes. Meanwhile, tropical hardwood imports into France—which is only now (late 2014) introducing a regime for the EUTR enforcement—declined last year.

Declining volumes of tropical hardwood imports into Germany in the second half of 2013 might be partly explained by the uncertainties created by EUTR enforcement action against wenge log imports from the Democratic Republic of the Congo in August 2013. Tropical hardwood imports into Germany increased in 2014, although this was due less to a recovery in African imports than to an increase in Asian products, notably bangkirai decking and Indonesian plywood.

EC puts member states on notice to enforce EUTR

It is perhaps unsurprising that trade flows are yet to show significant change as a direct result of the EUTR. Reports from national associations and the EC at the ETTF meeting highlighted that there are still significant gaps in the enforcement of the EUTR.

Svetla Atanasova reported that the EC Environment Director General, Karl Falkenberg, sent a letter to all member states last April putting them on notice to toughen up on the EUTR or face sanctions. The letter asked member states to provide details of their implementation of the EUTR to date, including enacting legislation and sanctions and whether due diligence checks on affected companies by the national competent authorities were being carried out.

On the basis of the response of EU member states to this letter, the EC prepared a summary table of the status of EUTR implementation across the EU.[1]

Responses to the letter indicated that 17 of the 28 EU member states have fulfilled the three main obligations of EUTR—establish EUTR "competent authorities"; implement sanctions; and start checks on operators. The countries fulfilling all these obligations are: Austria, Belgium, Bulgaria, the Czech Republic, Cyprus, Denmark, Estonia, Finland, Germany, Slovakia, Ireland, Lithuania, the Netherlands, Portugal, Slovakia, Sweden and the UK.

A further eight countries—France, Greece, Italy, Latvia, Luxembourg, Malta, Slovenia and Romania—are in the process of fulfilling the three obligations. Only three countries— Croatia, Poland and Hungary—have not begun to fulfil one or more of the obligations. Judging from the EC's summary table, Hungary is particularly lagging behind.

Svetla Atanasova said the EC would take enforcement action against any member state that fell short of its EUTR obligations. A task force has been created to work with EU member states to increase implementation efficiency.

1 The table is available at: http://ec.europa.eu/environment/forests/pdf/EUTR%20implementation%20scoreboard.pdf.

Insights from trade representatives

Trade representatives at the July ETTF meeting provided further insights into the status of EUTR enforcement at the national level. Anand Punja reported that enforcement action in the **UK** is already well advanced, with regular checks of UK importers underway. The National Measurement Office (the UK's EUTR competent authority) has required a number of operators to alter their due diligence procedures, the main concern being a failure to adequately assess the credibility of documents received from suppliers. There have been no prosecutions, but the trade is not being complacent.

Paul van den Heuvel noted that EUTR enforcement is active in **the Netherlands**, although resources are spread thin given that the Dutch competent authority has identified 5000 operators that are placing timber on the market. Although checks are underway, the Dutch competent authority has been unwilling to divulge details of any issues it may have identified.

Eric Boilley noted that, after several delays, the regulation establishing the EUTR enforcement regime in **France** was expected to be passed in September 2014, and the first checks on operators were anticipated soon thereafter. The sanctions regime will be very onerous, with fines of €150 000 simply for a failure to implement adequate due diligence.

Davide Paradiso and Domenico Corradetti noted that EUTR enforcement measures have barely begun in **Italy**. Informing the industry and preparing for the EUTR is a vast task given the large numbers of mainly small operators in Italy. There are estimated to be up to 10 000 operators in the paper sector and 6000 in the importing sector, as well as 8000 forest enterprises. Given the absence of sanctions in Italy, enterprises are not strongly motivated to improve due diligence procedures.

Nils Olaf Petersen noted that the Federal Office for Agriculture and Food, which acts as the EUTR competent authority in **Germany**, has undertaken checks of timber importers since July 2013. Around 60 companies have been checked so far and the procedures have been strict—more so than audits of financial accounts. Penalties have been imposed, including a severe penalty on an importer of wenge logs from the Democratic Republic of the Congo.

ETTF call for definitive central guidance on supplier legal documents

ETTF ended its July meeting with a call for definitive central guidance on the legal documents provided by overseas suppliers. Competent authorities are clearly keen to ensure that importers do not take legal documents at face value and instead scrutinise their validity.

It was noted that Greenpeace's latest claims that legality documentation from Brazil fell short of EUTR requirements also highlighted the importance of this issue. In the absence of clear independent advice, several large European importers have discontinued all purchases of Brazilian ipe on the strength of the Greenpeace campaign.

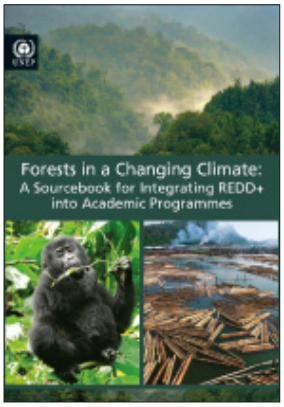
Given that very few timber-importing companies have the resources or skills at their disposal to undertake detailed scrutiny of the legal situation in each country and the validity of every document supplied with consignments, there is an urgent need to rationalize the approach and provide more support. Otherwise, more tropical timber may well be excluded at the slightest hint of controversy simply because of a lack of reliable information.

Many tropical timber producers have close and often longstanding business relations with importers across Europe, and many producer countries are close to concluding voluntary partnership agreements (VPAs) with the EU that ultimately will lead to trade in EU FLEGT [Forest Law Enforcement, Governance and Trade]-licensed timber products. Exporters anticipate that EU FLEGT licences will pave the way for expanded exports to EU member states. Indonesia has a ratified VPA with the EU. Although FLEGT-licensed timber is not yet being traded, the Indonesian Ministry of Trade has reported an increase in exports to the EU on the strength of the country's timber legality verification system.

The most immediate and worrying aspect emerging from the introduction of the EUTR is the cost of compliance for small importers. There is an urgent need for a greater focus on commercial implications and the development of cost-effective mechanisms for compliance, particularly among smaller companies, which are so important in the timber trade.

Recent editions

Compiled by Ken Sato

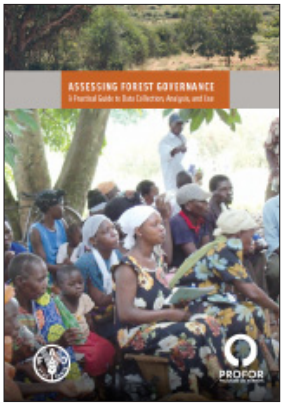


UNEP 2014. *Forests in a changing climate: a sourcebook for integrating REDD+ into academic programmes*. United Nations Environment Programme, Nairobi, Kenya.

ISBN: 978-92-807-3392-1

Available at: www.unep.org/Training/docs/Forest_in_a_Changing_Climate.pdf

This sourcebook gives an overview of the key topics related to forests and climate change, under the overarching and evolving REDD+ narrative, with the purpose of facilitating the integration of this new knowledge domain into academic programmes. The sourcebook provides detailed references for further study in each module; it can be used comprehensively or with a focus on a specific topic of interest or relevance for the course of study.



Cowling, P., DeValue, K. and Rosenbaum, K. 2014. *Assessing forest governance: a practical guide to data collection, analysis and use*. PROFOR and FAO, Washington, DC.

Available at: www.fao.org/3/a-i3918e.pdf

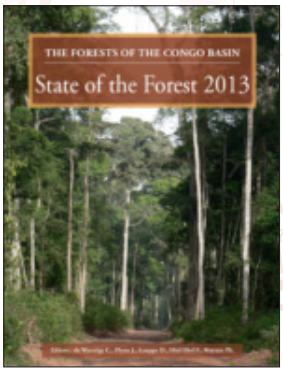
This guide is the outcome of a collaboration of experts from organizations with differing views and roles on governance who united to direct the compilation of a common set of good-assessment practices. The guide presents a step-by-step approach to planning forest governance assessment and monitoring, collecting data, analyzing it, and making the results available to decision-makers and other stakeholders. The guide also presents five case studies to illustrate how assessment and monitoring initiatives have applied each of the steps in practice, and it includes references and links to dozens of sources of further information.

Caswell, S., Tomaselli, I. and Hirakuri, S. 2014. *Indicating progress: uses and impacts of criteria and indicators for sustainable forest management*. ITTO Technical Series No. 42. ITTO, Yokohama, Japan.

ISBN: 978-4-86507-010-1

Available at: www.itto.int/technical_report

This publication reports the results of an ITTO-commissioned study on the experiences of countries worldwide in using criteria and indicators (C&I) for sustainable forest management (SFM). It examines the early evolution of C&I for SFM, developments in the five C&I processes and in international forest policy since 2000, the responses of governments, non-governmental organizations and the private sector to surveys on C&I, and trends and emerging issues related to C&I. The report draws firm conclusions and makes a number of recommendations.

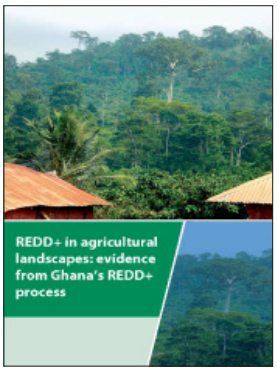


de Wasseige C., Flynn J., Louppe D., Hiol Hiol F. and Mayaux Ph. (eds) 2014. *The forests of the Congo Basin—state of the forest 2013*. Weyrich, Belgium.

ISBN: 978-2-87489-299-8

Available in English and French at: www.observatoire-comifac.net/edf2013.php?l=en (English), www.observatoire-comifac.net/edf2013.php?l=fr (French)

This report, which is the second state of the forests report for the Congo Basin, represents the collaborative effort of over 150 individuals from a diversity of institutions and the forestry administrations of the Central African countries. National groups (4–10 individuals working within forestry administrations) collected part of the dataset presented in this report. The data were validated at national workshops attended by government officials as well as representatives of environmental NGOs, the private sector and development projects. Each of the ten chapters was reviewed and commented on by a panel of experts.



Agyei, K., Agyeman, V.K., Asare, R.A., Asante, W.A., Benefoh, D.T., Blaser, J., Damnyag, L., Deppeler, A., Feurer, M., Foli, E.G., Heeb, L., Kofie, W., Klossner, M., Kyereh, B., Kwakye, Y., and Oduro, K.A., 2014. *REDD+ in agricultural landscapes: evidence from Ghana's REDD+ process*. Bern University and CSIR-Forestry Research Institute of Ghana.

ISBN: 978-9988-2-0238-5

Available at: www.itto.int/files/itto_project_db_input/3046/Technical/REDD+%20in%20Agricultural%20Landscapes%20in%20Ghana_Final%20to%20ITTO.pdf.

This report, an output of the ITTO Thematic Programme on Reducing Deforestation and Forest Degradation and Enhancing Environmental Services in Tropical Forests, consists of case studies derived from Project RED-PD 093/12 Rev. 3 (F): "Advancing REDD+ in Ghana: preparation of REDD+ pilot schemes in off-reserve forests and agroforests". It aims to contribute to the development of approaches that generate short-term revenues in combination with longer-term gains from tree resources and describes the outcomes of empirical and literature studies exploring the potential for off-reserve REDD+ in Ghana.

Topical and tropical

Compiled by Ken Sato

ITTO project on Indonesian bamboo aims for synergy

The *Jakarta Post* published a story in mid-November about an ITTO project (PD 600/11) in Bangli, Bali, Indonesia, which is aiming to revitalize the bamboo industry there. The project is working on both upstream and downstream aspects of bamboo production with the aim of fostering synergy between bamboo growers and the bamboo producing and processing industry in the area.

Read the news story at: www.thejakartapost.com/news/2014/11/18/revitalization-project-aims-boost-bamboo-s-image.html

Amended Lacey Act reducing illegal wood imports

Recently published research by US Forest Service economist Jeff Prestemon supports the contention that the 2008 Lacey Act amendment has reduced the supply of illegally harvested wood from South America and Asia available for export to the United States. Analyzing monthly import data from 1989 to 2013, Prestemon found that the prices of lumber and hardwood plywood imports into the US from suspected illegal wood-fibre source countries increased and their quantities decreased after the coming into force of the 2008 Lacey Act amendment, indicating a decrease in export supply in these countries. The findings have been published in the *Journal of Forest Policy and Economics*.

Read the full article at: www.srs.fs.usda.gov/compass/2014/11/20

Myanmar Timber Enterprise to lease its mills to private sector

The Myanmar domestic press (*Daily Eleven*, 11 November) has reported that, of the 80-plus sawmills owned by the Myanma Timber Enterprise (MTE), more than 70 will be leased to the private sector. The other mills will remain under MTE management to supply sawnwood for special projects by the government and for emergency use in natural disasters.

Read the story on this topic in the 1–15 November 2014 edition of the ITTO Tropical Timber Market Report: www.itto.int/direct/topics/topics_pdf_download/topics_id=4205&no=1

Overhaul in tropical forest research needed

For decades, the primary method of studying tropical forests has been extrapolation from field inventory plots, but there is a risk that such plots do not fully capture the diversity of tropical forests. In the Amazon, fewer than 500 field plots (typically about one hectare or less in size) are used to represent more than 500 million hectares of forest. Researchers at the Carnegie Institution used advanced three-dimensional forest mapping techniques to determine the extent to which typical field plots are representative of their surroundings in forested landscapes. Their findings, published in *Proceedings of the National Academy of Sciences*, indicate that field plots alone often give scientists substantially biased results. The biggest biases were associated with the number and size of forest canopy gaps, which are used to estimate rates of tree damage and mortality, as well as regrowth. The study also found landscape-scale biases in the measurement of aboveground carbon stocks when based on fieldwork alone. Nevertheless, field plot networks are still valuable resources, according to the research team.

Read the full article at: www.eurekalert.org/pub_releases/2014-11/ci-oit111414.php

Sarawak companies reaffirm commitment to good forest governance

Representatives of KTS, Rimbunan Hijau, Samling, Shin Yang, Ta Ann and WTK, the largest timber companies in Sarawak, recently signed a "corporate integrity pledge" with the state government as part of a move by the new chief minister to promote transparency and good governance. According to Malaysian Anti-Corruption Commission deputy chief commissioner, Datuk Mustafar Ali, "The landmark document is aimed at strengthening public- and private-sector commitment towards integrity and addressing corruption. The corporate integrity pledge is a self-regulatory document. Signatories have made a commitment to uphold anti-corruption principles". The domestic media reported that state cabinet members would also sign the integrity pledge.

Read the story on this topic in the 16–30 November 2014 edition of the ITTO Tropical Timber Market Report: www.itto.int/direct/topics/topics_pdf_download/topics_id=4238&no=1

Coming soon!

ITTO will soon launch a website dedicated to expanding the use of lesser-used species. The website will facilitate access to existing technical information about species availability, wood properties, uses and processing into value-added wood products. For more information, go to www.itto.int.

ITTO also recently:

- launched an online search engine to facilitate access to information on projects financed by ITTO at www.itto.int/project_search
- created a social media platform for ITTO Fellowship alumni at www.ittofellownet.org.

Meetings

19–23 January 2015
ITTO–CITES Asian Regional Workshop on the Management of Wild and Planted Agarwood Taxa
Guwahati, India
Contact: Kanako Ishii, ishii@itto.int; www.itto.int/workshop_detail/id=4222

2–6 March 2015
Major Groups-led Initiative in Support of the UNFF: "Sustainable Forest Management: Designing the Vehicles for Securing the Means of Implementation"
Kathmandu, Nepal
Contact: info@mgp-forests.org; www.mgp-forests.org

16–19 March 2015
Symposium: Silviculture and Management of Dryland Forests
Milan, Italy
Contact: Ben du Toit, ben@sun.ac.za; www.sun.ac.za/english/faculty/agri/forestry/dryland-forestry-symposium

17–20 March 2015
Fourth Mediterranean Forest Week
Barcelona, Spain
Contact: José G. Borges, joseborges@isa.ulisboa.pt; http://med.forestweek.org

18–19 March 2015
CROJFE 2015 International Scientific Conference: Forest Engineering—Current Situation and Future Challenges
Zagreb and Zalesina, Croatia
Contact: Tibor Pentek, tpentek@sumfak.hr; http://blog.openforests.com/event/crojfe-2015-international-scientific-conference-forest-engineering-current-situation-future-challenges

9–11 April 2015
International Conference: Coppice Forests: Past, Present and Future
Brno, Czech Republic
Contact: Tomas Vrska, tomas.vrska@vukoz.cz

14–19 April 2015
Milan Furniture Show
Milan, Italy
Contact: www.cosmit.it/en

21–23 April 2015
Forest Machine Technology Conference
Montreal, Canada
Contact: Jean-Francois Gingras, jean-francois.gingras@fpinnovations.ca; http://fmtc.fpinnovations.ca

4–15 May 2015
11th Session of the United Nations Forum on Forests
New York, USA
Contact: unff@un.org; www.un.org/esa/forests

11–16 May 2015
3rd World Teak Conference 2015: Strengthening Global Teak Resources and Markets for Sustainable Development
Guayaquil, Ecuador
Contact: Roger Meder, roger.meder@csiro.au; P. K. Thulasidas, thulasidas@kfri.org; http://teaknet.org/world-teak-conference-2015-11-16-may-2015-guayaquil-ecuador

19 May 2015
Mobilization of Woody Biomass for Energy and Industrial Use: Smart Logistics for Forest Residues, Pruning and Dedicated Plantations
Rome, Italy
Contact: Raffaele Spinelli, spinelli@ivalsa.cnr.it

19–20 May 2015
Japan Biomass Power Market
Tokyo, Japan
Contact: maureen@cmtsp.com.sg; www.cmtevents.com/eventschedule.aspx?ev=150514&

24–29 May 2015
17th International Boreal Research Association Conference
Rovaniemi, Finland
Contact: IBFRA2015@metla.fi; www.ibfra2015.org

26–28 May 2015
CIOSTA 2015 Conference: Environmentally Friendly Agriculture and Forestry for Future Generations
St Petersburg, Russian Federation
Contact: Mike Wingfield, mike.wingfield@fabi.up.ac.za; http://ciosta2015.org

1–5 June 2015
IUFRO 2015 International Congress: The 27th International Biennial Conference of IUFRO Research Group 7.01 "Impacts of Air Pollution and Climate Change on Forest Ecosystems"
Nice, France
Contact: Andrzej Bytnerowicz, abytnerowicz@fs.fed.us; http://iufro-nice2015.com

7–12 June 2015
58th International Convention Society of Wood Science and Technology
Jackson Lake Lodge, Grand Teton National Park, Wyoming, United States
Contact: www.swst.org/meetings/AM15/index.html

8–12 June 2015
Tree Biotechnology 2015 Conference: Forest: the Importance to the Planet and Society
Florence, Italy
Contact: info@treebiotech2015.it; www.treebiotech2015.it

22–26 June 2015
IUFRO WP 7.03.10 Methodology of Forest Insect and Disease Survey in Central Europe "Fluctuation of Insect and Diseases"
San Michele all'Adige, Italy
Contact: Miloš Knížek, knizek@vulhm.cz; www.iufro.org/science/divisions/division-7/70000/70300/70310/

27 June–1 July 2015
10th World Bamboo Congress: Bamboo for a Greener Future
Damyang, Republic of Korea
Contact: Susanne Lucas, susannelucas@gmail.com; www.worldbamboocongress.org

6–9 July 2015
4th International Conference on Forests and Water in a Changing Environment
Kelowna, Canada
Contact: Adam Wei, adam.wei@ubc.ca; Shirong Liu, liusr@caf.ac.cn; www.forestandwater2015.com

11–13 August 2015
Ecology, Silviculture and Management of Spruce Species in Mixed Forests
Edmonton, Canada
Contact: phil.comeau@ualberta.ca; www.iufro.org/download/file/10614/1411/edmonton15-1st-announcement_doc

19–23 August 2015
New Frontiers of Forest Economics: Forest Economics Beyond the Perfectly Competitive Commodity Markets
Beijing, China
Contact: shashi.kant@utoronto.ca; http://neffe.nsd.edu.cn

23–30 August 2015
Sustaining Ecosystem Services in Forest Landscapes: Concepts, Research, and Applications
Tartu, Estonia
Contact: sandra.luque@irstea.fr; http://iufrole2015.to.ee

1–4 September 2015
A Global Perspective on the Ecology and Management of Bark and Wood Boring Insects
Bariloche, Argentina
Contact: Barbara J. Bentz, bbentz@fs.fed.us; www.iufro.org/fr/science/divisions/division-7/70000/7 0300/70305

7–11 September 2015
XIV World Forestry Congress
Durban, South Africa
Contact: WFC-XIV-Info@fao.org; www.fao.org/forestry/wfc/en

9–11 September 2015
Wilder By Design? Managing Landscape Change and Future Ecologies
Sheffield, UK
Contact: info@hallamec.plus.com; www.ukeconet.org/events/event/wilder-by-design

6–7 October 2015
Timber Expo 2015
Birmingham, UK
Contact: www.timber-expo.co.uk

12–16 October 2015
6th International Wildland Fire Conference
Pyeongchang, Republic of Korea
Contact: www.fire.uni-freiburg.de/course/meeting/2015/meet2015_02.htm

21–24 October 2015
Scientific Cultivation and Green Development to Enhance the Sustainability of Eucalypt Plantations
Nanning City, China
Contact: sxchen01@163.com; www.iufro.org/events/calendar/current

2–6 November 2015
3rd European Forest Week and the 72nd Joint Session of the ECE Committee on Forests and the Forest Industry
Engelberg, Switzerland
Contact: paolo.cravero@unece.org; http://forests-l.iisd.org/events/silva2015-and-third-european-forest-week/#more-249570

16–21 November 2015
51st Session of the International Tropical Timber Council
Kuala Lumpur, Malaysia
Contact: info@itto.int

30 November–11 December 2015
21st Conference of the Parties to the United Nations Framework Convention on Climate Change
Paris, France
Contact: http://unfccc.int/meetings/unfccc_calendar/items/2655.php?year=2015

21–23 April 2016
Perception–Prediction–Action: Managing Risk in Uncertain Times
Istanbul, Turkey
Contact: http://riskanalysis-iufro.org//2016Meeting_Announcement.pdf

25–29 April 2016
IUFRO All-Division 7 Conference: Climate Change, Biological Invasions, Air Pollution, Forest Pathology, Forest Entomology, and their Interactions
Istanbul, Turkey
Contact: eckehard.brockerhoff@scionresearch.com

15–19 August 2016
15th IPS International Peat Congress
Kuching, Malaysia
Contact: peat2016@gmail.com; www.ipc2016.com