



TFU

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conservation and
sustainable development
of tropical forests

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Balancing act

Sustainably managing forests, creating sustainable supply chains and ensuring that local resource owners and managers obtain fair remuneration for their efforts requires a balancing act. The margins are always likely to be slim in sustainable forest management—even the fastest-growing forests take years to reach harvestable age, and the world still seems a considerable distance away from fully paying for the essential ecosystem services that forests provide. Yet the need for sustainable forest management is growing increasingly urgent—articles in this edition show that organizations and local people are finding smarter ways to get the balance right.

TRAFFIC's Chen Hin Keong (page 5) presents guidelines—developed recently with ITTO support—to assist customs officers worldwide in verifying the legality of timber in international trade. As Chen says, customs officers are guardians of national borders, but they are rarely experts in

timber identification and trade. The new guidelines are designed to assist customs by facilitating knowledge of the timber trade, information-sharing, analysis, and the development of operating procedures to combat cross-border timber crime—while also enabling the legal trade of wood products.

At a more local scale, Desy Ekawati and her co-authors (page 8) tell the inspiring story of women in Bali, Indonesia, who, with help from an ITTO project, have created a cottage industry for the manufacture of culturally important products from bamboo. Today, more than 60% of women in the Bangli Regency (and many other women in Bali) earn a living from bamboo weaving. The income they earn is commonly used to support household expenses such as for food supplies, schooling and religious needs. As the industry has grown, farmers upstream have begun to realize that the bamboo growing on their farms, which they had previously considered worthless, now has significant economic value, and they are making efforts to manage their bamboo resources sustainably.

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Cover image: A Balinese woman carries *sokasi* woven from bamboo on her way to a temple for a religious ceremony. *Photo: FOERDIA*

Above: Minato-mirai, Yokohama, Japan.
Photo: ITTO



Also at the local scale, Tetra Yanuariadi (page 13) reports on a recently completed project (a collaborative effort between ITTO, the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation and the Sarawak Forestry Department) to assist Kelabit and Penan communities develop new sustainable livelihood strategies. Poverty is rife in both communities, and the forests on which their survival depends are becoming increasingly degraded. The aim of the project was to assist the communities to improve their living conditions and to promote sustainable forest management. Among other things, the project introduced new ways of earning income, such as poultry and *tagang* fish farming and homestay ecotourism, and it generated important lessons to inform future development projects and programmes.

The balancing act of sustainable forest management is extended to the regional scale in a study by FAO presented on page 16. The Asia-Pacific Forest Sector Outlook Study (to which ITTO contributed with, among other things, data on the production and trade of tropical timber), was launched at Asia-Pacific Forestry Week in Incheon, Republic of Korea, last June. The study

canvasses the state of forests and forestry in the region and uses scenarios to indicate actions governments and other stakeholders might take to achieve a desirable future. The study concludes that immediate action is required throughout the region to avert environmental catastrophe.

This is not hyperbole: climate change, biodiversity loss and conflicts over land, among other pressures, threaten the provision of vital ecosystem services at the planetary scale. Moreover, as ITTO Executive Director Gerhard Dieterle (page 3) points out, an ample supply of wood is essential if the world is to transition successfully to a bioeconomy, yet the annual supply gap for wood is projected to rise as high as 6 billion m³ by 2050.

Forest and trees have vital roles to play in restoring ecosystem functionality in degraded landscapes and in supplying humanity with the materials we will need in the future. A failure to act now to halt deforestation and start repairing the damage that unsustainable land use has caused is likely to be catastrophic. The world is walking a tightrope—and the balancing act has become a matter of life or death.



On track: A timber-tracking system has improved the forest-data-collection system in the Philippines, thanks to an ITTO project. *Photo: Philippines' Forest Management Bureau*

From the Executive Director

The role of forests in climate change has been widely debated for more than a decade. It is undisputed that tropical forest degradation and loss are contributing to global warming, but forests can also be big contributors to mitigation



by Gerhard Dieterle
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Adding economic value to conserve and expand tropical forests

Recent research suggests that forest degradation is at least as big a problem for carbon dioxide emissions as actual deforestation. International forest and climate policies have not yet provided a decisive response to this because it would require the broadening or refocusing of the established REDD+ doctrine and because the assessment of degradation is methodologically complex.

Forest degradation is advancing rapidly, especially in the peripheries of the big tropical forests (e.g. the Amazon, the Congo Basin and Borneo) and in drier areas where people must satisfy their daily needs for wood and non-wood products (e.g. southern and western Africa) (Baccini et al. 2017), and it is estimated to account for 50–70% of carbon dioxide emissions in the tropics (depending on the method of calculation). Yet international policymakers are not yet paying sufficient attention to forest degradation and its impacts on human communities and the environment. It is rapidly becoming evident that the take-up of agricultural land alone cannot be blamed as the driver of forest-related emissions and that consideration must also be given to other important factors, such as daily demand for woodfuel and timber among local communities, a lack of expertise in forestry management, a failure to invest, illegal practices, and reduced forest vitality due to climate change. Forestry agencies and forest-related institutions could address at least some of these factors.

Population growth boosts demand for wood

If it continues, the shrinking productive capital of tropical forests will coincide with an expected dramatic increase in demand for wood products and wood energy in coming decades, especially in Africa.

The forecasts are extremely worrying: on the one hand, the global population will continue to grow and, on the other, forestry stocks will dwindle rapidly. The annual supply gap for wood is projected to rise to as high as 6 billion m³ by 2050. Analyses by the World Bank, including case studies in selected tropical countries, indicate that this supply gap will affect large swathes of the tropical regions towards the middle of the century (World Bank 2017).

Wood's role in a sustainable bioeconomy

One reason why the looming supply gap is so worrying is that, as a consequence, the use of sustainably grown wood as a substitute for non-renewable materials and energy will be unable to play its potentially critical role in countering global warming. De Galbert et al. (2013) and Oliver et al. (2014) showed that this role could be considerable and that the substitution effects of using more wood products (in construction and furniture, etc.) would be greater than using forests as carbon sinks. It is also regrettable that these actual and potential substitution effects are not being attributed to forestry but, rather, they are being treated as reductions in emissions from non-renewable resources. In my view, greater differentiation would be helpful.

Saving tropical forests

There is an urgent need for more analysis because the conclusion is clear: forest protection measures alone will be insufficient to save key tropical forests. Rather, sustainable-use strategies, incentives and investments will be necessary to satisfy the predicted additional demand. A failure to act would be irresponsible, and it would have adverse consequences for sustainable development in many tropical countries due to:

- the greater use of non-renewable resources, especially in connection with rapid urbanization in the tropics;
- the rising pace of forest degradation to satisfy daily needs for wood and wood energy;
- the pressure to fill supply gaps with imports from northern countries running wood surpluses; and
- the loss of jobs and income, especially in rural regions, combined with a faster pace of migration.

As it is, countries producing tropical wood already face tangible disadvantages. For one thing, tropical wood suffers from a poor image and is associated with deforestation, forest degradation and corruption. As a result, tropical wood producers already experience considerable disadvantages and risks (Table 1).

Landscape restoration founded on sustainable added value

What is urgently needed, therefore, is massive investment in:

- forest landscape restoration;
- reforestation;
- the efficient management of existing forests (including through the wider adoption of reduced-impact logging in forests managed for timber, wood-based energy and non-timber forest products); and
- better protection of high-conservation-value forests.

Tropical forests will only be conserved if higher value can be created in the sustainable supply of products and services; indeed, a large reason for the existing high rates of deforestation and degradation has been the lack of competitiveness of sustainable forest management. The current global push towards forest landscape restoration is in the right direction, but the focus is still mostly on outcomes for climate and the environment, and there is insufficient attention on ensuring commercially viable use and the creation of employment and income. Moreover, unsustainable practices make good businesses unprofitable because they incur higher costs compared with business as usual or illegal activities. There is a need, therefore, to “beef up” international forest and climate policy if the forest-related Sustainable Development Goals (SDGs) and nationally determined contributions (NDCs) are to be achieved.

Table 1: Consumer–producer dynamics in the trade of tropical wood

Consumers	Producers
<ul style="list-style-type: none"> Public and political acceptance of tropical wood has declined substantially (illegal practices, deforestation, etc.) Consumer countries (e.g. Australia, European Union member states, Japan, New Zealand, the Republic of Korea and the United States of America) have toughened their legality requirements Proof of legality and sustainability is becoming the norm in a growing number of consumer countries The wood industry is increasingly shifting investments to “safe” tropical countries to meet legality and sustainability requirements Major consumer countries (e.g. China and India) are seeking self-sufficiency by investing in their own forest resources Demand for tropical hardwoods has declined due to improved mechanical and chemical wood-processing technologies for non-tropical softwoods Private-sector initiatives for deforestation-free supply chains are putting tropical producers under pressure 	<ul style="list-style-type: none"> Tropical wood producers find it difficult to compete with illegal, unsustainable operators The European Union Timber Regulation and the United States of America’s Lacey Act are having an effect, and tropical timber has less access to Western markets China’s Green Supply Chain Initiative has further reinforced legality and sustainability requirements Balance-of-trade deficits are increasing due to bigger imports to meet demand for wood in tropical countries Countries are shifting towards the use of non-renewable resources as forests are depleted Pressure on forests is increasing from local communities Conflicts and migration flows are increasing as means to secure access to wood resources There is a lack of skilled labour, knowledge and technology

Achieving SDGs and NDCs through deforestation-free supply chains

We can derive optimism from the willingness now being shown in the private sector and international trade to set up legal and sustainable deforestation-free supply chains for food and wood products. Consumer countries have a major responsibility for encouraging sustainability among tropical wood producers through stricter policies for greater procurement and consumption of legal and sustainable wood. The European Union Timber Regulation is proving effective, even if it is implemented unevenly by member states. According to a study by WWF UK, there has been a sharp fall in recent years in the percentage of potentially illegal wood and wood products, with current estimates putting it at 15%. China—Europe’s biggest trading partner for wood products and the world’s largest importer of tropical wood—has adopted the national Green Supply Chains Strategy as part of its new “ecological civilization” philosophy, not least because of louder demands from various sales markets.

In July 2018, 14 Chinese corporate market leaders with an estimated combined trading volume of USD 14 billion joined together, with support from ITTO, to form the Global Green Supply Chain initiative. This has huge potential to integrate many other companies, both inside and outside China, in the next few years and hence to inject more sustainability into tropical forest management.

It is crucial that tropical wood producers, importers, processors and consumers work closely together because deforestation-free supply chains require intricate dovetailing and the documented tracking of products, from the forest to the shop. For many tropical forestry and wood businesses, this will be a major challenge.

As part of the process to create global green supply chains, ITTO will be co-hosting an international conference this October in Shanghai, China. The aim is to highlight the importance of legal and sustainable wood product supply chains and to promote the establishment of a platform to facilitate business information exchange and collaboration between wood product producers, buyers, processing industries and market representatives, nationally and internationally. More details of the conference can be found at www.itto.int

This article is an adapted English translation of the author’s original piece published in AFZ-Der Wald No. 22/2018 available at www.forstpraxis.de

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When timber crosses the border

ITTO has joined forces with TRAFFIC and the World Customs Organization to develop guidelines for use by customs officers in verifying timber trade legality

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New arrivals: Legally imported logs from Cameroon await processing in a log yard in Shanghai, China. *Photo: Li Qiang/ITTO*

TRAFFIC, ITTO and the World Customs Organization (WCO) have jointly developed guidelines—published in August 2018—designed to assist customs officers in verifying the legality of timber in international trade. This article provides an overview of the rationale for the guidelines, their content, and what they aim to achieve.

Illegal logging

Illegal logging and illegal timber trade occur when timber is harvested, transported, processed, bought or sold in violation or circumvention of national or subnational laws, including administrative infractions.

Illegal logging can occur at any scale, from small (e.g. by a single individual with a chainsaw) to large (e.g. by a multinational corporation). Government officials at the local, subnational and national levels, as well as companies and local people, can all play roles in stopping illegal forest activities and facilitating the legal and sustainable trade of wood products. As guardians of national borders, customs officers are key individuals in ensuring that timber shipments comply with national and international legislation.

Why timber legality matters to customs

Timber is the most valuable traded natural-resource commodity, with an estimated annual turnover of more than USD 300 billion. Its illegal trade is a threat to sustainable forest management: illegal logging, including processing, is estimated to cost the world economy USD 30–100 billion per year, which is 10–30% of the total global wood trade (UNEP & Interpol 2012).

Fraud, counterfeiting, money laundering, violence and corruption are often found in combination with various forms of wildlife crime, causing significant losses in assets

and revenues in many developing countries. The theft of, and illegal trade in, natural resources can also threaten the livelihoods and food security of rural communities and cause widespread ecological damage.

As the most heavily traded wildlife resource (by both volume and value), achieving a sustainable timber trade is crucial for addressing the problems associated with illegal trade. Moreover, their sustainable management brings many benefits: for example, sustainably managed forests help minimize soil erosion, are a source of jobs and livelihoods, help regulate regional climates, and act as a buffer against climate change by absorbing carbon dioxide and mitigating flooding. Conserving forest ecosystems by, among other things, combating illegality is hugely important, therefore, for economic, social and environmental reasons and for maintaining human wellbeing.

Why customs officers need guidelines for verifying timber legality

Customs officers work to ensure that timber trade is legal, that timber consignments are properly identified at borders, and that illicit trade is intercepted and responded to appropriately. Customs officers must also ensure that government revenue is maximized from efficient timber trade, that supply chains work at optimal efficiency, and that, through appropriate border-control techniques, illegal timber trade is eliminated or reduced.

Until now, however, there has been a lack of timber-specific guidelines and reference materials for frontline customs and other border officials to use in their daily operational work and in cross-training. The present guidelines, *Guidelines for Verifying Timber Legality for Customs*, were developed in light of two sets of recommendations made by the Customs

Cooperation Council.¹ The first of these, “Concerning actions against cross border environmental offences”, issued in June 2008, recommended the provision of basic and specialized training programmes for customs officials, particularly frontline officials. The second, “Recommendations on the declaration on the illegal wildlife trade”, issued in June 2014, encouraged customs authorities to continue holding dialogue and enhancing cooperation with non-governmental organizations and to develop new tools and guidelines to support frontline officers in their daily work.

Funding and support for the project

ITTO and TRAFFIC jointly developed a project to address the needs expressed by the Customs Cooperation Council. The Government of Japan and the United States Bureau of International Narcotics and Law Enforcement Affairs funded the work.

Input was sought from customs officers in Switzerland, the United Kingdom of Great Britain and Northern Ireland (UK), the Netherlands and the World Customs Organization's Environment Programme; the Malaysian government agreed to assist in developing the guidelines, using Malaysia as a case study. Malaysia was an excellent country for piloting the guidelines because it has a well-developed legal and institutional framework for forestry and timber trade covering three regions: Peninsular Malaysia, Sabah and Sarawak.

Purpose of the guidelines

The aim of the guidelines is to increase legal timber trade and, correspondingly, to reduce illegal timber trade. The use of the guidelines should lead to the more timely facilitation of cross-border timber trade and support thorough, effective investigation and controls by:

- facilitating knowledge and information on timber trade for customs;
- assisting customs to understand relevant information on forest-focused legislation;
- providing customs with a tool covering the entire supply chain for the monitoring of policy, regulatory and tariff controls; and
- supporting customs operating procedures for risk analysis, best practices and specific wood-related procedures.

The guidelines are intended for worldwide use by customs officials, particularly those on the frontline, with the aim of facilitating knowledge, information-sharing, analysis and operating procedures to combat cross-border timber crime while enabling the legal trade of wood products. The guidelines, which apply to the entire timber-trade chain of custody, provide information to assist in determining the best practices and procedures for customs officers and other enforcement agents to follow.

¹ The Customs Cooperation Council is the supreme body of the WCO and decides on the WCO's work and activities.

Topics covered

The guidelines have five chapters:

- **Chapter 1** focuses on problems and issues in the timber trade and the impact of these on the environment and on people's resources, revenue and livelihoods, with the overall aim of improving the knowledge and understanding of senior managers in customs agencies.
- **Chapter 2** is aimed at increasing effectiveness and efficiency in controlling timber trade by customs officials, including frontline agents at borders.
- **Chapter 3** assists users in determining the legality of timber products that may be encountered in trade.
- **Chapter 4** provides further information on various measures and facilities that customs agents can call on to assist in determining the legality of timber shipments.
- **Chapter 5** provides further information on tools and networks that can assist customs agents in enhancing their efficiency in controlling the trade.
- **Annexes** provide further information and details that can assist customs agents in increasing their efficiency in controlling the trade.

Illegal timber trade and CITES

Illegally traded precious woods are most commonly seized in the country of origin, in transit, or on the borders of destination markets. Customs worldwide have reported significant seizures of timber, particularly species listed in the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The timber species most commonly seized are red sandalwood (*Pterocarpus santalinus*), rosewood (*Dalbergia* spp.) and big-leaf mahogany (*Swietenia macrophylla*). All these species are listed in CITES Appendix II, which means they can be traded—subject to certain controls—through a licensing system, but timber of these species is often smuggled, mislabelled or misidentified. Training modules—which should be localized to reflect national laws, institutions and systems—should include a quick identification methodology for customs officials (as non-experts) to determine whether a timber shipment has been mislabelled.

Dissemination of the guidelines

Customs officials in Malaysia received initial training, provided in collaboration with the Malaysian Timber Industry Board, to ensure the relevance of the guidelines for use by customs officials at headquarters and on the frontline. The guidelines have been shared with customs administrations in Cameroon and China, with funding from the UK's Department for International Development (DFID) through the Forest Governance Market and Climate (FGMC) Programme. They were also presented to customs enforcement officers at the WCO's 38th Enforcement Committee meeting in Brussels in March 2019 and at the Combating Smuggling of Endangered Species Asia-Pacific Customs Workshop in Suzhou, China, also in March, organized by the China General Customs Administration and TRAFFIC.



Carve-up: Artisans in a factory in Shanghai, China, carve high-value rosewood (*Dalbergia* species) for use in furniture manufacture. *Dalbergia*, which is listed in CITES Appendix II and produces extremely valuable timber, is of considerable interest to customs officials. Photo: L. Qiang/ITTO

Speaking at the WCO's 38th Enforcement Committee meeting, Mr Deepankar Aron from the Directorate of Revenue Intelligence of India highly recommended the use of the guidelines to customs officials worldwide and spoke of his appreciation of the document.

Mr Mohd Shukri bin Abdul Wahab, a senior officer in the Malaysian Royal Customs Department, provided technical support in the development of the customs training curriculum and the training modules. Towards the end of the process, he stated: "I am happy to encourage this very useful guidelines to my customs colleagues in Malaysia and to support the inclusion of the training modules for regular customs training. This will help customs to ensure efficient trade flows while helping to stop illegal timber trade".

TRAFFIC is now localizing the guidelines for Malaysia, with funding from FAO, and for Cameroon, China, the Congo and Viet Nam with funding from DFID's FGMC Programme. The localized versions will be used to train customs administration officials in those countries. The training tools can also be used to train other law enforcement agencies with roles in a country's control and administration of the forest and timber trade sectors.

Over time, it is expected that the guidelines will become a key tool for helping customs officers worldwide ensure that the world's timber trade is carried out legally and sustainably and that revenues obtained via that trade are properly obtained and distributed. ITTO, the WCO and TRAFFIC will continue to collaborate to ensure the wide dissemination of the guidelines, and they will also continue working with national customs administrations to ensure the efficient and effective control of timber trade.

For information on obtaining the guidelines, please contact the author at hk.chen@traffic.org.

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The bamboo-weaving women of Bali

A traditional handicraft among women has become an important commercial product, improving livelihoods and boosting efforts towards sustainable forest management

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Team effort: Balinese women prepare and weave strips of bamboo to make culturally important products for domestic use and export. Photo: FOERDIA

Bamboo—Indonesia's green gold

There has been a paradigm shift in forest management in Indonesia in recent decades, in which timber is no longer the main output of forests. Instead, the forest sector is focused increasingly on the production of non-timber forest products as a means to improve the economies of forest communities, regions and the nation.

Bamboo has huge potential as a forest commodity, and it has been prioritized by Indonesia's Ministry of Environment and Forestry in development programmes such as social forestry; community forest development and capacity building; and forest restoration and rehabilitation, including watershed management and integrated landscape management (Ekawati 2017). Many rural communities in Indonesia have long used bamboo for a wide range of purposes, with basic knowledge on various uses passed on from generation to generation. Bamboo is important for livelihoods in many communities and in social and cultural ceremonies.

Today, bamboo is being processed into a wide range of modern products, such as foods, home and kitchen utensils, decorative items, clothing, paper, construction materials, flooring, walls, roofs and renewable energy. The modern use of bamboo requires expertise, capital and appropriate technology; on the other hand, many traditional uses continue, requiring the upkeep of craftsmanship and cultural knowledge. This article explores the experiences gained by rural women, supported by an ITTO project, in maintaining their traditions, increasing their skills and improving their livelihoods in a bamboo-weaving home-industry cluster in Bangli Regency, Bali.

ITTO's support for bamboo industry development in Indonesia

Indonesia has a long history and tradition in the use of bamboo for houses, furniture, handicrafts and musical instruments. Bamboo sequesters carbon, making it an environmentally friendly, renewable material.

In collaboration with the Ministry of Environment and Forestry's Forestry and Environment Research Development and Innovation Agency (FOERDIA), ITTO supported the development of the bamboo sector in Indonesia through project-based interventions carried out in 2013–2017.¹ The overall development objective of the project was to improve the sustainable use of bamboo resources, spreading the benefits to local communities. The aim of the project was to assist local communities in pilot areas to increase, add value to and better manage their bamboo resources. The project had three main outputs: the promotion of investment in bamboo industry development; an improved institutional framework for the bamboo sector; and the increased participation of local communities in bamboo industries (Ekawati 2017). Among other things, the project created a new bamboo treatment facility in East Nusa Tenggara Province aimed at increasing the longevity of bamboo products using a non-chemical, environmentally friendly preservation treatment. The project also developed a model for capacity building in Bali Province that can be replicated elsewhere in Indonesia as part of the government's "1000 Bamboo Villages" programme, which is designed to support the development of a thriving national bamboo industry.

¹ ITTO project PD 600/11 Rev.1 (I): "Model capacity building for efficient and sustainable utilization of bamboo resources in Indonesia". The project was declared completed at the 54th session of the International Tropical Timber Council in December 2018.

The project was implemented in Bangli District in the Province of Bali, which the Indonesian Ministry of Forestry designated as a “bamboo development cluster” in 2010 (Indonesian Ministry of Forestry 2011). Most Balinese people are concerned about environmental conservation, and their culture has great respect for the values of all human beings and nature. The living culture of the Balinese includes the concepts of *tri hita karana*, meaning “three causes of goodness” (which emphasizes the three essential harmonies of people–God; people–people; and people–nature), and *desa kola patra*, meaning “place, time and situation” (which underscores the idea of resilience and adaptation to change while retaining essential values intact). Thus, culture is one of the greatest development assets in Bali because it will support a balance between socio-economic development (such as through the expansion of bamboo industries) and the conservation of nature.



Skilful hands: A Balinese woman weaves an item using thin strips of bamboo. Photo: FOERDIA

Balinese women: the main driver of the bamboo-weaving industry

Bamboo weaving is a hereditary tradition among Balinese women, particularly in the Bangli and Susut districts. Traditionally, woven-bamboo handicrafts were made by only a few people for the purposes of Hindu religious services and household goods for self-consumption. Mothers and girls wove bamboo in their free time when housework and gardening was completed. Although it is unknown when this craft began, every religious ceremony and aspect of Balinese culture involves bamboo products, including woven products. Bamboo weaving, therefore, might have arisen hundreds of years ago with the entry of Hinduism to Bali.

This tradition began to develop into an economic activity after the eruption of Mount Agung in 1963. Lava bursts and dust produced by the great volcanic eruption landed on agricultural land and caused massive crop failures—and only a few bamboo clumps survived. Faced with a threat to survival, the community began weaving the bamboo and exchanging woven products for food, clothing and other essential items. Realizing the economic potential of their woven-bamboo products, communities began to pursue the craft as a form of livelihood. Although the industry and markets eventually extended to all regions of Bali, the Bangli Regency became known as the centre of bamboo weaving in Bali (Putra et al. 2017).



Cultural role: Woven-bamboo products serve important social and religious functions in Bali. Photo: FOERDIA



Cultural learning: Girls learn the art and craft of bamboo weaving from their mothers and other elders. Photo: FOERDIA



New weave: Women learn new weaving patterns as part of efforts to increase the range of designs in their products. Photo: FOERDIA

Women learning from women

Woven bamboo products are part of the daily rituals of the Hindu Balinese, and almost all women in the Bangli Regency—girls, housewives and even career women—possess bamboo-weaving knowledge and skills. They obtain this expertise from direct observation and through the continuous training provided by their mothers and other elders, and they do not require higher education. Weaving ability is passed from generation to generation among women in the community, with women practising bamboo weaving in their spare time to earn additional income for their families. Even when women have other sources of income that substitutes for that earned from bamboo weaving, they do not leave their weaving culture behind. Weaving bamboo has become a *dharma* for them—working as a good deed (Bhaktivedanta Swami 1972). This is in line with the nurture theory—that is, that gender roles are constructed by culture (e.g. Sasongko 2009 in Saskara et al. 2012). Thus, when Balinese women participate in weaving it is not merely because of economic factors but also for cultural and ethical reasons.

Many women weave bamboo almost every day in their homes as they conduct their other domestic household duties when the men are at work (commonly in agriculture or forestry). Mothers and girls weave together with others in *banjar* (village) terrace neighbourhoods. This social element also supports the development of the bamboo-weaving industry because the women share and help each other.

Participating women earn useful sums

Today, more than 60% of Bangli women earn their living from bamboo weaving. The most common woven bamboo product is a container called *sokasi* used for making offerings in Hindu rituals. The mothers and girls make semi-finished *sokasi*, which they sell to craftspeople for the next steps in processing, including furnishing, painting, coating and drying. A semi-finished *sokasi* is produced in about three days. Thus, a bamboo weaver will, on average, sell one semi-finished *sokasi* to craftsmen every three days. The cost of the most commonly used raw material, *bambu* (or “*tiing*”) *tali* (*Gigantochloa apus*), is about IDR 50 000 (USD 3.60)

per bundle, with a bundle consisting of five 2.5-metre-long bamboo poles. It is possible to produce 15 semi-finished *sokasi* from one bundle of bamboo poles, each of which can fetch a price of IDR 25 000 (USD 1.80), for a total of about IDR 375 000 (USD 27) per bundle. Thus, a weaver earns about IDR 325 000 (USD 23) net for three days of weaving work (the equivalent of IDR 108 000—USD 7.70—per day). This income is commonly used to support household expenses, such as food, school and religious needs, or it is added to family savings. In general in Indonesia, the involvement of housewives in smallholder industries contributes 35–70% of family income: for example, bamboo crafts in Tomohon (Sulawesi) and *ketak* crafts in Lombok (West Nusa Tenggara) contribute about 36%, and *pandan* crafts in Gianyar (Bali) contribute about 70% (Yuniati & Khotimah 2018).

The ITTO project provided capacity building to increase the women's weaving skills, improve the quality of their products, broaden the range of designs, and help develop entrepreneurship through training in basic accounting, business management and electronic marketing. Now, the women can produce more designs based on the basic *sokasi* design, as well as other woven products, expand their markets and increase the added value of their bamboo handicrafts. A participant in the training, Ni Nyoman Budiartini from Sulahan Village in Susut District, said: “After the training I became more aware of how to record the cash flow from the handicrafts I produced, how much income I got and how much it cost. ... Moreover, I was happy because in this training we were also introduced to other designs of bamboo woven handicrafts, not only *sokasi*, and we could also make modifications to make designs more modern”.

Regional economic development

In addition to contributing to family income, bamboo weaving assists in regional economic development, with many woven products sold domestically and internationally. Woven-bamboo handicrafts sold in export markets include containers, newspaper boxes, baskets, cone hats, wallets and ornaments. Major export markets for such products are the United States of America (22.2% of total products exported), France (11.1%), Japan (7.2%), Spain (7.5%), Australia (4.7%), Hong Kong (4.4%), the Netherlands (4.3%) and Germany (3%).



Offerings: A craftsperson decorates *sokasi* for sale. Photo: FOERDIA

The foreign exchange earned from bamboo handicraft exports from Bali Province, as reported in April 2018, was valued at USD 1.24 million, which was 2.5% of total exports from the province (Sutika 2018).

The transferred value from downstream to upstream

Market demand for woven bamboo products is increasing, which means that a sufficient and continuous supply of raw materials is needed. On the other hand, increasing demand for such raw materials could lead to the overexploitation of bamboo forests. There is a need for strong upstream-downstream linkages between the woven-bamboo industry and bamboo farmers to encourage sustainable forest management practices in bamboo forests (Figure 1).

Bangli and Susut districts are known as downstream centres of bamboo craft industries, and Kintamani District has an abundance of bamboo resources. Kintamani District, therefore, supplies the bamboo raw materials needed to support the craft industries.

Previously, farmers considered the bamboo clumps growing on their farms to be worthless, but with the emergence of the bamboo-weaving industry, such clumps now have economic value. Farmers have realized that bamboo is beneficial to them, and they are consciously trying to manage their clumps sustainably as an ongoing source of income. Thus, bamboo weaving is stimulating the sustainable management of bamboo resources.

In addition, bamboo farmers are encouraged to sustainably manage their bamboo resources by *awig-awig adat*, a customary law that regulates what one can and cannot do.

Among other things, it prohibits excessive bamboo cutting and dictates certain days when the cutting of living beings is prohibited. Thus, there are customary limitations on the exploitation of bamboo stocks in forests. Moreover, customary forestland cannot be traded to people outside a local community, effectively preventing the conversion of forest to agricultural or residential land.



Basket cases: The manufacture of these woven-bamboo baskets used designs and techniques learned during project training. Photo: FOERDIA



Culmination: This truck will deliver its load of bamboo culms to weavers in Bangli and Susut, Bali. Photo: FOERDIA

Thus, the communities already have supportive local wisdom and good awareness of the importance of forest sustainability. This has been crucial for the success of the ITTO project, which has worked to increase the capacity of farmers to manage their bamboo clumps sustainably. Despite their cultural awareness of sustainability, many farmers possessed only limited basic knowledge of bamboo management, and the project therefore conducted a training programme to leverage traditional knowledge and introduce the principles of sustainable bamboo forest management—such as how to manage bamboo clumps from nursery to harvest; fertilization methods; sustainable harvesting (including a coding system²); and bamboo preservation and marketing. Table 1 lists the main species of bamboo used for handicrafts in Bali.

The training programme has succeeded in increasing the knowledge and skills of bamboo farmers, who are now better able to manage their bamboo clumps sustainably and thereby produce bamboo continuously to meet the needs of the downstream bamboo industry. Thus, the bamboo-weaving industry has stimulated bamboo farmers to implement sustainable bamboo forest management.

The way forward: integrated bamboo industry development

Bamboo-based industries will develop rapidly and achieve optimum results if established in an integrated way. More cooperation and coordination is needed between home-based (or cottage) industries and medium-sized and large companies that manufacture bamboo products as a way of increasing the efficiency of bamboo use. For example, the laminated-bamboo industry uses only the central part of bamboo stems and not the base or top, which can be used in the woven-bamboo and other craft industries. In building an integrated bamboo industry, it is important to identify the division of roles between communities, entrepreneurs, home-based enterprises and large companies.

Especially in the woven-bamboo industry, where culture and traditions are crucial, women and their skilful hands have dominant roles. Therefore, in building the bamboo industry in Indonesia, a national policy is needed to promote

Figure 1: The flow of goods and money in the bamboo-weaving supply chain

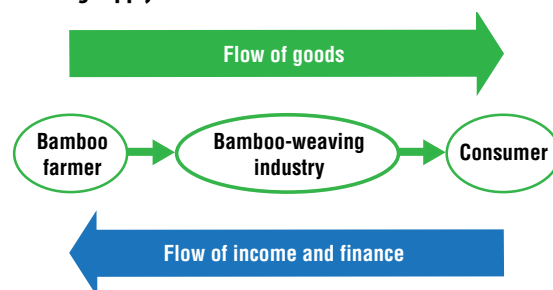


Table 1: Bamboo species commonly used for weaving handicraft products in Bali, Indonesia

Species name	Local name
<i>Gigantochloa apus</i>	Tiing tali/bambu tali
<i>Gigantochloa sp1</i>	Tiing bali
<i>Gigantochloa sp2</i>	Tiing mambang
<i>Schizostachyum brachycladum</i>	Tiing tambling
<i>Schizostachyum castaneum</i>	Buluh kadampal
<i>Schizostachyum lima</i>	Buluh taluh
<i>Schizostachyum zollingeri</i>	Buluh batu

Source: Arinasa (2005)

integration by strengthening upstream, midstream and downstream sectors and enhancing interactions among stakeholders. In this scenario, the Balinese craftswomen will continue to play important roles in driving the economies of households through their home-based production of woven bamboo products.

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² The coding system is a numbering method for identifying the ages of bamboo culms in a clump—clumps may contain three or four generations of culms—and thereby facilitate selective harvesting.

Seeking sustainability in the Sungai Medihit watershed

A recently completed project in the Malaysian state of Sarawak has helped Kelabit and Penan communities develop new sustainable livelihood strategies

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Long legs: Long Napir people convene a community meeting in their longhouse. *Photo: T. Yanuariadi*

The Kelabit and Penan indigenous communities dwell in the tropical forests of the Sungai Medihit watershed—an area of about 35 400 hectares—in Ulu Limbang, Sarawak, Malaysia. The Kelabit have been living in the watershed since the early 1890s, and they have been practising shifting agriculture for generations. The Penan, in contrast, formerly lived nomadic lifestyles in the deep forests of Sarawak and Brunei; the Sarawak government settled them in the Sungai Medihit watershed in 1972.

Both communities subsist in a state of poverty, obtaining their livelihoods from shifting agriculture and resources collected from the increasingly disturbed surrounding forests. The two communities face many problems: the catchment has been logged and its resources are generally neither sustainably managed nor used to their best advantage. The communities have traditional or customary rights as part of the water catchment area; although the concessions granted by government were outside the customary rights areas, the negative impacts of logging have affected the communities. The rivers have become polluted; the communities have been unable to implement cash-generating activities; and the catchment's timber resources and ecosystems are degraded and there has been a lack of innovative approaches to restoration. The communities are poor and lack secure livelihoods, and the degradation of natural resources and the environment continues.

In 2015–2018, the Sarawak Forestry Department implemented a project funded by the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) and supervised by ITTO with the aim of promoting sustainable forest management in the Sungai Medihit watershed to enable the betterment of living conditions for indigenous communities. Importantly, the project was formulated based on the results of an ITTO pre-project¹

implemented by the Sarawak Forestry Department in collaboration with Hirosar Jaya Sdn Bhd in 2008–2009. The project's strategy involved the following four key activities:

- 1) informing local communities on where, and with what resources, they are able to operate cash-generating community development projects, thereby obviating the need to deplete local resources through subsistence activities;
- 2) formulating guidelines to enable local communities and licence holders to sustainably manage the catchment;
- 3) developing skills among local communities and licence holders for restoring and sustainably managing catchment resources for profit and the catchment's wellbeing; and
- 4) developing a tradition, process and forum for enabling stakeholders to work more closely together in catchment management and use.

I revisited the villages of the two communities, Long Napir and Kampung Bahagia, in August 2018 to carry out a terminal evaluation of the project. The aim was to establish the extent to which the project intervention had achieved its planned outputs and outcomes and to draw conclusions and recommendations for similar interventions in the future.

Winning the hearts of the communities

New development interventions are not always easily accepted in target communities. The boundaries of customary rights over forest lands are often unclear on the ground, leading to conflicts. Early on in the project, people in both the Kelabit and Penan communities feared that the Sarawak Forestry Department would take away their lands and give them to loggers, and they objected to this. After numerous dialogues between community leaders and project officers, however, it became clear to the communities that the project would help them conserve the forests and improve their livelihoods.

¹ PPD 135/07 Rev. 7 (F): "Community-based forest management of Sungai Medihit watershed".



Shifting shelter: Temporary Penan lodging for the practise of shifting agriculture. *Photo: T. Yanuariadi*

Specifically, the objectives of the project were to:

- 1) improve sustainable forest management by setting rational forest management plans, applying innovative forest management techniques and establishing an effective forest management mechanism;
- 2) enhance the capacity of communities to implement sustainable forest management and develop livelihoods; and
- 3) improve living conditions by renovating community services' infrastructure.

The project conducted a baseline survey of community socioeconomic status, forest resources, biodiversity and traditional cultures. The information gained from this was used in developing community-level forest management plans, demonstration activities on sustainable forest management, and a community-based forest management platform and mechanism for the co-management of forest resources. This platform and mechanism operates as a partnership arrangement in which target communities, government agencies and other stakeholders share the responsibility and authority for decision-making over the management of forest resources. It is a collaborative arrangement to enable collective management.

The impacts of project interventions—especially on increasing the capacity of the communities to carry out productive activities—were assessed through discussions with local communities and government agencies and on visits to project sites.

The training programme for community members involved a training needs assessment; the formulation of a training programme; the development of training guidelines and training action plans; the carrying out of training sessions; and documentation and evaluation. The training helped improve skills and techniques in alternative livelihood activities.

Alternative livelihoods

The alternative-livelihood activities in which community members were trained included poultry-raising and *tagang* fish farming, which also help address the hunting threat to wildlife; vegetable-growing to tackle the short supply of vegetables; and homestay ecotourism. The project also helped complete some local infrastructure, including the gravelling of 7 km of road from Camp Kilo 0 to Long Napir, the construction of 1.5 km of road to old Long Napir, the building of a school guesthouse, and the installation of alternative solar energy facilities. The road construction by the project increased accessibility by land to the villages. Nevertheless, the constructed roads, and the connected logging roads to the villages, require upgrading to ensure their accessibility in the heavy rainy season.

As a result of these activities, the target communities have been exposed to new ways of increasing household incomes. Each participating household learned—first-hand—new skills to increase livelihoods, and interviews with community members indicated that their incomes have increased, thereby reducing their direct dependence on forest resources. Households that did not participate directly gained inspiration from seeing their neighbours succeed with the new methods.

Handicraft-making was not included in the project; nevertheless, the marketing of handicrafts made using plastics increased with the road development carried out under the project, which improved access to Kampung Bahagia. When I visited this village in 2017, villagers were using rattan as the main materials for their handicrafts, but plastics are now being used because of the dwindling supply of rattan. The craftspeople in Kampung Bahagia lack experience, market information, and adequate tools and skills, among other problems, in developing their enterprises, and this could be one of the focuses of a subsequent phase of the project.



Carry bags: Members of the Long Napir community sit with some of their handicrafts. *Photo: T. Yanuariadi*



New path: A section of newly constructed road to the isolated villages of Long Napir. *Photo: T. Yanuariadi*

Overall post-project situation

The prevailing situation after project completion can be summarized as follows:

- The villagers' income has increased due to the introduction of alternative livelihood activities, especially vegetable-growing and handicrafts.
- The access of villagers to markets for their products has increased with the construction of roading to connect them with the main road.
- A participatory community forest management mechanism is in place. On receiving formal approval from the forestry authority, the mechanism will help the communities to consolidate their efforts to increase income generation using their local forests.
- *Tagang* fish farming has great potential for income generation. The Sarawak Agriculture Department has taken on this activity in its village development programme.

Lessons learned

The evaluation unearthed the following lessons from project implementation:

- Stakeholders were involved in identifying the problems to be addressed by the project during the development of the pre-project in 2008–2009 and the full project proposal. This was important for developing the sense of ownership necessary for smooth implementation and for overcoming initial suspicion about the project.
- The pre-project had undertaken a robust problem analysis, which was essential for ensuring a sound and relevant project design.

- The project encountered certain obstacles in its first year of implementation. One of these was a lack of coordination between the project manager, the Sarawak Forestry Department and the supervisory body (ITTO). However, collaboration between the Sarawak Forestry Department, ITTO and APFNet led to corrective actions that enabled smooth implementation thereafter. An able new project management team was put in place, consisting of officers from the Sarawak Forest Department and supportive partners, especially village administrations and consultants, backed by an active project steering committee.
- An important problem facing the project was the accessibility of target villages, especially in rainy seasons, when the heavily damaged road network hampered regular visits. Although the road building greatly increased access, all-weather roads would have assisted project efficiency and its effectiveness in achieving its objectives.
- Trust-building between project teams and communities is crucial for success. This requires effective communication, which, in turn, requires that project team members and consultants speak the local languages (this was the case in this project). Before a project starts, there is a need to convey its aims, scope, activities and potential benefits (and costs) to target communities in order to avoid misunderstandings and false expectations.

This article is based on the results of the terminal evaluation conducted by the author of the following project: APFNET 2073P3-MAS/ITTO PD 563/09 Rev.5 (F): "Community-based sustainable forest management of Sungai Medihit watershed, Sarawak, Malaysia". Project outputs can be found by inserting the project code PD 563/09 into the ITTO project search function at www.itto.int/project_search

Act now on forests—or suffer later

An FAO outlook study for the Asia-Pacific region urges the forest sector to take immediate action at the landscape scale to avert environmental catastrophe



Forests are crucial: Field staff measure the litter carbon pool during training in East Java, Indonesia, under an ITTO project designed to assist in reducing emissions from deforestation and forest degradation and enhancing carbon stocks in the Meru Betiri National Park. *Photo: FORDA*

FAO launched a report on the outlook for the forest sector in the Asia-Pacific region at Asia-Pacific Forestry Week in Incheon, Republic of Korea, in June 2019. The study on which the report is based involved at least 800 people and a wide range of institutions, including ITTO, which provided inputs based on its collection, analysis and dissemination of data on the production and trade of tropical timber. The Organization was also a member and sponsor of the study's advisory committee.

The report:

- provides a strategic analysis of forests and landscapes in the region to help policymakers and others decide on the actions needed to realize a sustainable future;
- explores three scenarios – business-as-usual, aspirational and disruptive – for the future of forests and the forest sector in the region to 2030 and 2050; and
- provides options for robust actions that various stakeholders can take to address challenges in forest and landscape management and attain an aspirational future.

This article, which is derived from the report's executive summary, sets out the study's main findings; Box 1 summarizes the report's key messages.

The region's forests and landscapes are changing rapidly

Landscapes in the Asia-Pacific region continue to evolve through four broad phases—pre-agrarian, agrarian, industrial, and post-industrial. Today, the region's landscapes consist largely of land-use mosaics and are highly dynamic. Both landscapes and land uses continue to transform in response to changes in land policies and laws.

Box 1: Key messages of the outlook study

- The ongoing decline of biodiversity and resilience in natural forests in the Asia-Pacific region must be reversed.
- Avoiding further environmental catastrophes by mid-century requires a transformation in the way forests and landscapes are managed.
- Strengthening management of the region's forests and landscapes requires that countries work much more closely together.
- Primary forests must be conserved – but time is running out.
- The future of forests depends on us.
- It is not too late to restore the region's forests and landscapes for the benefit of all, but it requires leadership and immediate action.

Most forest landscape changes in the Asia-Pacific region in recent decades can be attributed to policies favouring timber concessions, the large-scale expansion of commodity plantations like rubber and oil palm, infrastructure development, and mining. Landscape approaches are gaining traction, seeking to transcend traditional agricultural, forestry and other land-use governance mechanisms and apply evidence-based participatory decision-making. The average forest area per capita in the Asia-Pacific region is 0.18 ha per person, considerably lower than the world average of 0.54 ha.

Overall, forest cover increased in the region by 17.6 million ha between 1990 and 2015. A few countries may be undergoing forest transitions—in which forest area ceases to decline and begins increasing—due almost entirely to the expansion of

planted forests. The area of planted forests almost doubled in the region between 1990 and 2015, from 69 million to 126 million ha, although the rate of new planted-forest establishment apparently slowed in 2010–2015. Most planted forests are monocultures, and questions remain about their capacity to provide certain ecosystem services.

The area of primary forests continues to decline in the region and now comprises only 19 percent (140 million ha) of the total forest area (723 million ha). There is evidence of ongoing forest degradation, which is concerning because of its effects on ecosystem services such as biodiversity conservation and watershed protection.

The percentage of agricultural land with tree cover (although not necessarily forest) increased in almost all countries in the region between 2000 and 2010. Planted forests and trees outside forests are becoming more important for wood production, although the logging of primary forests still predominates in some countries.

Maintaining or increasing wood production from planted forests will require addressing constraints on the availability of productive land, the impacts of climate change, and, in many cases, a lack of capacity in forest management agencies.

Big shifts are happening in forest value chains

There has been a major geographical shift in the wood and wood products industry in recent decades, with the Asia-Pacific region's share of global production, trade and consumption growing quickly. The region has become a major producer, consumer and exporter of wood products. Industrial roundwood production has grown but demand is rising faster, increasing dependence on imports.

A few countries, especially China, India, Indonesia and Japan, have had especially significant impacts on regional and global trends in wood trade and consumption. Japan dominated in the 1970s and China has been the leading force more recently.

Total roundwood consumption has been relatively stable in the region for the last two decades at about 1.2 billion m³ per year, with efficiency gains and recycling reducing the volume of virgin industrial wood required. Industrial roundwood accounted for 41 percent of total roundwood consumption in 2017 (the rest being woodfuel), up from 26 percent in 1990. The region's production of wood panels grew more than eightfold between 1990 and 2017.

The traditional use of wood as a source of domestic energy is declining rapidly, due largely to increasing incomes, urbanization and substitution with fossil fuels and electricity. The share of wood in the region's production of modern biofuels is relatively low.

The increased consumption of panels and reconstituted wood, and higher rates of wood recovery, mean that industrial roundwood consumption has grown only modestly in recent decades compared with economic and population growth. Nevertheless, new wood-based products such as bioplastics are entering the marketplace, with potentially major impacts



Sustainable wood supply: Trainees take part in a directional felling exercise in hill dipterocarp forest as part of ITTO-supported capacity building in reduced impact logging in Peninsular Malaysia. Photo: A. Khalim/Forestry Department Peninsular Malaysia

on the region's forest sector. The emergence of a bioeconomy could stimulate growth in wood demand, although this may face constraints in production due to the limited availability of land and water.

Health-and-beauty products derived from non-wood forest products are proliferating, driven by developments in processing technologies and demand for “natural” products. Value chains linked to the amenity values of forests are developing quickly, especially due to rising incomes and urbanization, and payments for ecosystem services are emerging.

Global forest value chains are replacing local value chains, with positive and negative impacts. The trend has increased choice for forest product consumers but caused declines in some local industries.

The region's population is growing and people are on the move

Although covering less than one-quarter of the global land area, the Asia-Pacific region accounted for more than half (55 percent) of the world's population in 2015. Pressure is likely to increase on forest resources, with the region's population projected to grow by 16 percent by 2050 (an additional 666 million people).

The region's lower-middle-income and low-income countries face the greatest challenges in population growth to 2050. Many already have low per-capita natural capital as well as low human capital, posing immense difficulties for sustainable forest use. As resource pressure accelerates, low-population-density, forest-rich countries have emerged as deforestation frontiers, essentially to cater to demand from resource-scarce countries.

The Asia-Pacific region is urbanizing rapidly, with the proportion living in cities growing from 30 percent in 1990 to 46 percent in 2015, increasing demand for forest products and ecosystem services. The need for urban green spaces is also rising, but urban-planning capacity is limited in some countries, leading to disorganized urban development.

In some countries, especially in South Asia, the migration of men away from rural settings means that older people and women are increasingly responsible for forest and landscape management. Combined with international remittances, this is reducing land-use intensity in some areas and thereby increasing forest growth. Migration due to climate-change-related factors – such as water stress, declining land productivity and increased disaster severity and frequency – will increasingly affect land use, including forestry.

Economies are booming, with opportunities and threats for forests

Asia-Pacific, led by China and India, is the fastest-growing of the world regions, and it now commands more than 40 percent of global gross domestic product. Continued economic growth coupled with a rapidly expanding middle class will increase demand for forest products.

Housing booms in China, India and Indonesia have increased demand for forest products. In the past, however, the bursting of housing bubbles has had severe impacts on the forest sector.

There have been dramatic decreases in the number of extremely poor people in the region. In some countries, however, some of the most impoverished people live in forested areas.

Globalization has brought major changes in the production, processing, trade and consumption of forest products. A recent backlash against globalization could slow investment, trade and technology transfers in the forest sector.

The structure of economies in the region is undergoing rapid change. The share of agriculture (including forestry) in value added has dropped sharply in recent decades, although the sector remains a major employer in many countries.

Increases in bovine and other livestock populations in the region, due in part to changing diets linked to increased incomes, have caused widespread forest degradation and deforestation, including for the production of livestock and poultry feed. Investments in infrastructure, mining, urban development and industrial crops are expected to continue growing in the region, with the potential to unleash a new era of deforestation.

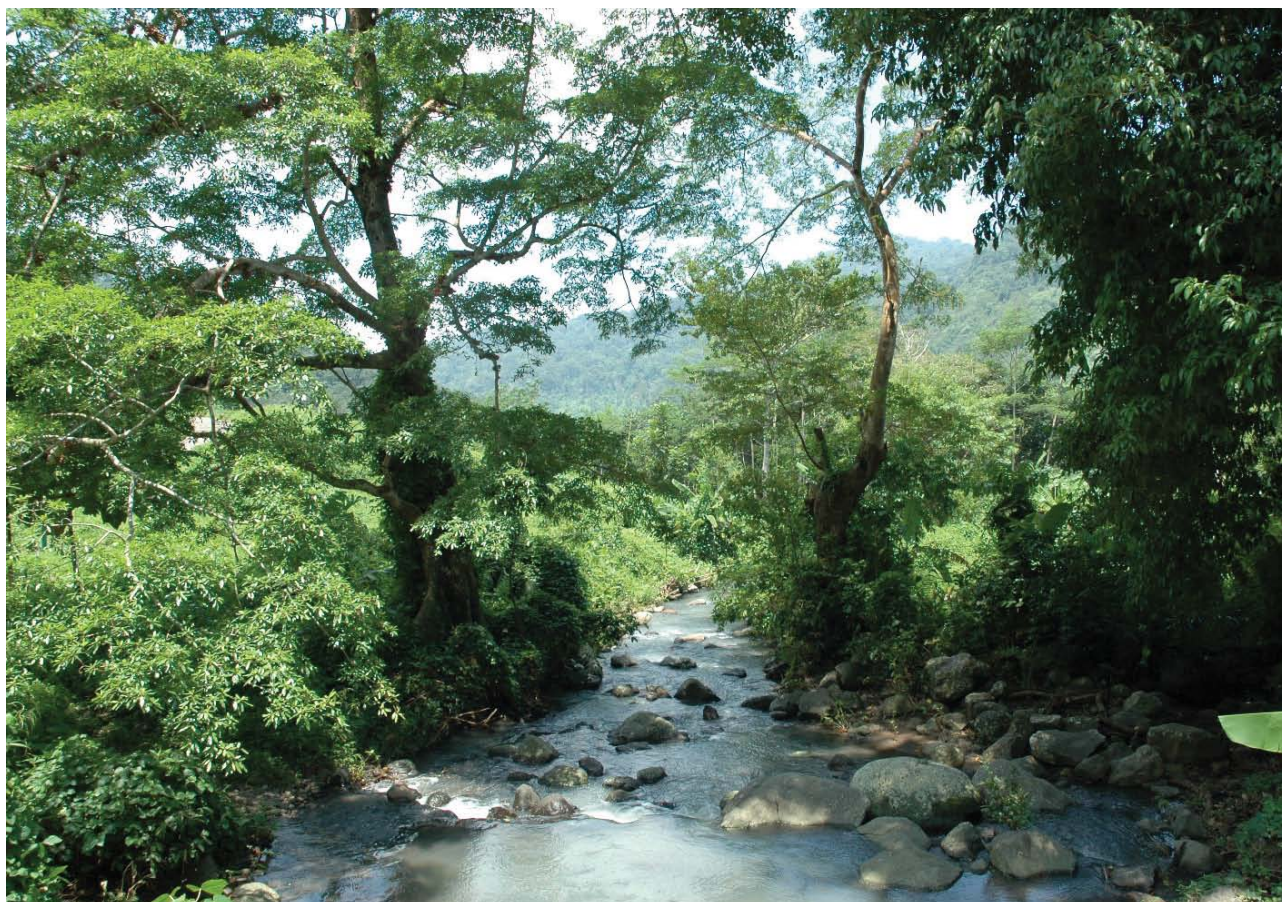
Environmental challenges threaten—and countries seek ways to increase ecosystem services

The proportion of greenhouse-gas emissions in the region contributed by land use, land-use change and forestry declined from 40 percent of total emissions in 1990 to 20 percent in 2014, due to a significant increase in the region's fossil-fuel emissions. Forests remain a net source of greenhouse-gas emissions.

Most of the countries in the Asia-Pacific region involved in the implementation of REDD+ have made progress in REDD+ readiness and a few are moving to the implementation of national REDD+ strategies. The complex economic, social and political environment in which REDD+ must operate poses many challenges in making it an effective results-based payment system.

The area of forests set aside for biodiversity conservation in the Asia-Pacific region increased from 68 million ha (12.4 percent of all natural forests) in 1990 to 119.2 million ha (16.5 percent) in 2015. The forest sector can play a leading role in biodiversity conservation but, in most of the region, “development first” still dominates policymaking, limiting the scope to prevent further biodiversity losses.

Countries in the region face acute water deficits, which will be exacerbated by climate change. Twenty-one countries have designated, on average, 35 percent of their forests for soil and



Ensuring a flow: Forests play vital roles in the Asia-Pacific region and globally in the provision of clean water. Photo: FORDA

water conservation, but little information is available on how these forests are actually managed for stable water supply.

The number of people living in degraded agricultural lands is increasing in the Asia-Pacific region. Arresting and reversing land degradation through forest and landscape restoration is emerging as a key priority in most countries. Governments continue to seek ways to finance forest and landscape restoration and sustainable forest management for the provision of ecosystem services, including combinations of regulatory and market-based approaches.

People's desire to reconnect with nature is rising as urbanization continues and incomes grow. Forestry institutions need to adapt quickly to ensure that increased demand for forest amenity values—which can be viewed as highly positive for environmental awareness—does not jeopardize sustainability.

New technologies are transforming forestry—but uptake is patchy

Technological advances in, for example, remote sensing and data analysis are revolutionizing forest management and environmental monitoring, but the rate of uptake is far from uniform in the region.

There is greater uptake of technologies to increase forest productivity and industrial efficiency in the planted-forest sector than in the management of natural forests. Governments are beginning to leverage new technologies to improve land mapping, the management of land-ownership information, and forest governance. Increasing access to the internet has the potential to enable forest-dependent communities, including those in remote areas, to participate more in forest-related monitoring and decision-making. Huge volumes of forest data will be generated and collected in the future, requiring increased human-resource capacity in data processing and analysis.

Product innovations, such as engineered wood, are enabling new uses of wood; among other things, these will assist the quest to achieve low-carbon economies.

Enabling conditions for accelerating technological uptake in the region's forest sector, especially in countries that are lagging behind, include conducive policies and laws; agile governance; improvements in communication infrastructure; public investment in technology transfer; the strengthening of forest research, development and education institutions; and strategic partnerships. Young people consulted for this study indicated that the uptake of new technologies in the forest sector has been too slow. They called for more opportunities for young people to learn and apply these new technologies.

Participation in forest governance grows, but conflicts loom

Four broad governance discourses have helped shape the region's forest landscapes and governance institutions: 1) forestry for timber; 2) participatory forestry; 3) multiple benefits; and 4) climate change and sustainable development.



Conserving the resource: These teak seedlings, established as part of an ITTO project, are part of efforts to ensure the conservation of teak genetic resources.
Photo: Myanmar Forest Department

Efforts to strengthen forest governance in the region include increasing stakeholder participation, market-based approaches, forest-related conflict management, and institutional reform. Most government officials in charge of forestry perceive that forest governance has improved since 2010, especially in terms of stakeholder participation.

In 16 countries in the region, the area designated for or owned by indigenous peoples and local communities grew by about 17 million ha between 2002 and 2017 as governments started to recognize their rights. Nevertheless, many indigenous peoples and local communities still face tremendous challenges in the face of development, marginalization, the loss of lands, and conflict.

The commitments made by governments as part of global policy processes will influence national forest-related priorities to 2030, but a lack of adequate finance is a major challenge.

An increasing number of importer countries are putting in place laws and regulations to prevent illegal timber imports. In 2017, Indonesia became the first country to export legality-verified timber to the European Union under a voluntary partnership agreement.

Conflicts related to protected areas, land-grabbing, tenure and benefit sharing, among other things, are prevalent in the region and may be exacerbated by climate change in the future. Despite a shift in the role of forest agencies from dominant players to facilitators of participatory approaches, many countries lack effective mechanisms for resolving forest-related conflicts.

Young people have shown capacity to mobilize transnationally on environmental causes, especially climate change. A survey and consultation of young people conducted for this study found a strong expectation among youth of greater participation and transparency in the region's forest governance.

Forests face divergent futures to 2030 and 2050

Three scenarios—business-as-usual, disruptive and aspirational—are discussed for 2030 and 2050, assuming differing outcomes from the drivers of forest change. Scenario building provides an opportunity for stakeholders to discuss possible futures, identify robust actions and develop strategies for steering the future along desirable pathways. In the business-as-usual scenario for 2030, the role of forests and the forest sector in addressing global challenges and achieving global targets such as the Sustainable

Development Goals (SDGs), the Paris Agreement on climate change, the Bonn Challenge and the Global Forest Goals will be suboptimal.

In the disruptive scenario for 2030, deforestation and forest degradation will accelerate, few countries will achieve forest restoration targets, forest-based livelihoods and ecosystem services will deteriorate, forest-related tensions will escalate, and forest-based industries will fail to ensure resource sustainability. This could have major ramifications for food and water production, human well-being and overall ecological stability well beyond forests.

In the aspirational scenario for 2030 and in line with the Global Forest Goals, forest area in the region will increase by 22 million ha. With the current pace of establishment of new forests, the region could even aspire to more than this (e.g. an additional 50 million ha by 2030). Additionally, the forest-related SDGs and other targets agreed in global processes will be achieved, although this will require transformational changes in forest and landscape management.

The business-as-usual, disruptive and aspirational scenarios for 2050 involve similar outcomes to those for 2030, driven to further extremes. Building the resilience of forests, landscapes and people would help ensure that the region has the capacity to respond to future shocks and uncertainties.

Nearly 300 forestry students and young professionals from more than 30 countries consulted for this study considered that they can shape a sustainable future by taking leadership roles, generating momentum through collaboration and social media, and changing rigid institutions from within by shaking them up.

Forestry can lead the region towards a sustainable future

Sustainable forest and landscape management poses a “wicked problem” because of its many intertwined challenges at various scales.

Alternatives to the prevailing economic development model may be needed to achieve a sustainable future. Counter-narratives to the “growth first” model are yet to gain traction, but an increasingly vocal youth may help bring about change. New approaches to forest and landscape governance are also needed, involving greater transparency, the increased participation of women, indigenous peoples, youth and other marginalized groups, equitable tenure, and effective conflict-management mechanisms, among other elements.

The Asia-Pacific region has the capacity to achieve a sustainable future. Attention to the following seven “robust actions”, which should be taken now or in the near future, will be crucial:

- 1) Promote and institutionalize a learning culture and adaptive management.
- 2) Consolidate efforts to make global visions work nationally by increasing coordination and cooperation among stakeholders.
- 3) Put much more emphasis on maintaining and improving forest quality and restoring degraded landscapes.
- 4) Explore and invest in alternative economic development models that consider progress beyond growth.
- 5) Put more effort into achieving good forest and landscape governance at all levels, and institute effective conflict-management mechanisms.
- 6) Build the resilience of forests, landscapes and people in coping with climate change, shocks and uncertainties.
- 7) Commit sufficient resources and effort to make landscape approaches work.

Forest-sector actors in the region could use this outlook study as an entry point for obtaining buy-in from diverse actors and bringing about rapid positive change at the national level. The forest sector has huge potential to lead regional efforts towards a sustainable future and thereby to set an example for other regions and the world.

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Fellowship report

An ITTO Fellowship enabled a study of the ecological and social value of a timber production system in the Téné gazetted forest in Côte d'Ivoire

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Stand tall: A stand of planted *Terminalia ivorensis* in the Téné gazetted forest, Côte d'Ivoire, in 2017. Photo: B.T.A. Vroh

Are sustainable silvicultural models possible in Côte d'Ivoire?

The concept of sustainable forest management has evolved rapidly since the Earth Summit in 1992 and so, therefore, have forest policies. Forest managers, both public and private, have reflected on new ways of integrating the economic, social and environmental values of forests.

A means of reversing deforestation in Côte d'Ivoire has been the reforestation of gazetted forests (Vroh et al. 2017), with the Forest Development Company (*Société de Développement des Forêts*—SODEFOR) tasked with implementation. SODEFOR has applied a management system in the country's 231 gazetted forests focused on timber production, and more than 210 000 hectares of the gazetted forests have now been reforested (Kassoum 2018). It is crucial that the silvicultural models applied in these reforested areas are economically viable and socially acceptable and help in the conservation of biodiversity.

Téné gazetted forest: timber production and forest resilience

SODEFOR has carried out a reforestation programme in the Téné gazetted forest (*forêt classée de la Téné*—FCT), which is located in the forest–savanna transition zone in central Côte d'Ivoire. Successive reforestation initiatives have been applied on more than 8000 hectares since 1986 using single and multiple species, both exotic and indigenous (Sagne et al. 2008). The FCT now comprises several forest types: old-growth forests, secondary forests, multispecies planted forests (composed of 2–3 species involving combinations of *Tectona grandis*, *Terminalia ivorensis*, *Terminalia superba*, *Cedrela odorata*, *Triplochiton*

scleroxylon and *Gmelina arborea*) and single-species planted forests of *Tectona grandis* (Eblin & Amani 2015). More than 30 years after the first reforestation operations, an ITTO Fellowship helped fund a study to identify the reasons for the success or failure of these operations, taking into account natural resilience, certain environmental risks (e.g. the loss of biodiversity and biomass) and the services provided to local communities living in the vicinity of the FCT.

Study objectives

The overall objective of the study was to produce an ecological and social diagnosis of the timber production systems deployed in the FCT. Specifically, this involved determining ecological and conservation values for plant diversity in the reforested areas of the FCT and analyzing relationships between local rural communities and the FCT.

Activities conducted

Floral and vegetation inventories were conducted in the following forest types: old-growth forests; multispecies planted forests (aged 30–40 years); and single-species (teak) planted forests aged 10 years (“old”) and 5–10 years (“young”). Plots (0.25 hectares in size) were established in each of these forest types, as follows:

- old-growth forests, n = 6 plots;
- multispecies planted forests, n = 13 plots;
- old teak planted forests, n = 6 plots;
- young teak planted forests, n = 6 plots.

In these plots, all vascular plants were identified and the circumferences measured for trees with diameters at breast height (dbh) > 2.5 cm.

The uses of plant species were identified through ethnobotanical surveys of local people in the five villages closest to the FCT (Simonkro, Zangué, Diegbo Nguessankro, Oumé and Froitiekro); a total of 51 people were interviewed. Potential uses explored were for foods, medicines, crafts, construction wood, totems and during worship.

In analyzing the collected data, the ecological value of the timber production system was assessed by identifying the presence of endangered species (IUCN 2017) and species endemic to the forests of West Africa (Aké-Assi 2001, 2002). Floristic diversity indexes (richness, Shannon, Simpson and Piélou) were compared using variance analysis tests. Vegetation parameters (i.e. density, basal area, biomass and specific index of regeneration) were calculated. Biomass was determined using the allometric equation of Chave et al. (2005) for dense, semideciduous forests (for this parameter, only stems with a dbh ≥ 10 cm were considered). The values obtained for biomass were converted to carbon stock applying the recommended methodology of the Intergovernmental Panel on Climate Change (IPCC 2003).

The plant species used by local communities were classified according to usage. These species were used to estimate the social value of the timber production system for local communities (Roué et al. 2016).

Findings

Ecological and conservation values of forest types in the FCT

The inventories identified 158 species across the four forest types: 109 species in the old-growth forests; 104 species in multispecies forest plantations; 70 species in older teak plantations; and 72 species in younger teak plantations. The average species richness (per 0.25 ha) was highest in the young teak plantations and lowest in old-growth forests. In contrast, the Shannon, Simpson and Piélou indexes indicated greater diversity in old-growth forests than in teak plantations (Table 1).

Old-growth forests contained more species endemic to West Africa (six species) and more endangered species (seven species) listed on the International Union for



Aspirational: A wildling of *Milicia regia*, an endemic species listed as vulnerable on the IUCN Red List, grows in the Téné gazetted forest. Photo: B.T.A. Vroh

Conservation of Nature (IUCN) Red List. Seven endemic species and five endangered species were found in multispecies planted forests, which was more than in the single-species teak plantations (tables 2 and 3). Some endemic or threatened species, such as *Napoleonaea vogelii* and *Milicia regia*, were found in all forest types.

Stem density was higher in young and old teak plantations than in old-growth forests and multispecies planted forests (Table 4). On the other hand, old-growth forests and multispecies planted forests had larger basal areas, implying that stems in the teak plantations had relatively small diameters. Aboveground tree biomass was higher in planted

Table 1: Summary of specific diversity indexes in the different biotopes

Diversity index (for 0.25 ha plots)	Old-growth forest	Planted forest		
		Multispecies	Old teak	Young teak
Richness	23.4	26.8	24.2	47.5
	14.9b	5.9a	10.3ab	12.1a
Shannon	2.605	1.491	1.074	0.735
	0.849c	0.336bc	0.261ab	0.344a
Simpson	0.768	0.615	0.386	0.241
	0.229c	0.085 ^{bc}	0.138 ^{ab}	0.150 ^a
Piélou	0.672	0.568	0.327	0.234
	0.199c	0.171 ^{bc}	0.069 ^{ab}	0.100 ^a

Note: In the same row, numbers with the same letter suffixes are not statistically different at the 5% level.

Table 2: Number of stems of endemic species in the forest blocks of West Africa

Species	Old-growth forest	Planted forest		
		Multispecies	Old teak	Young teak
<i>Cola caricaefolia</i>	3	2	-	-
<i>Diospyros chevalieri</i>	-	2	-	-
<i>Drypetes ivorensis</i>	-	2	1	-
<i>Hippocratea vignei</i>	1	5	3	2
<i>Milicia regia</i>	8	3	1	1
<i>Napoleonaea vogelii</i>	1	1	3	1
<i>Tiliacora leonensis</i>	3	2	2	2
<i>Vitex micrantha</i>	3	-	-	-

Table 3: Number of stems of tree species listed on the IUCN Red List

Species	IUCN status	Old-growth forest	Planted forest		
			Multispecies	Old teak	Young teak
<i>Azelia africana</i>	Vulnerable	3	-	-	-
<i>Baphia nitida</i>	Least concern	24	17	18	2
<i>Entandrophragma cylindricum</i>	Vulnerable	-	1	-	-
<i>Khaya ivorensis</i>	Vulnerable	1	-	-	-
<i>Milicia excelsa</i>	Lower risk	4	-	2	3
<i>Milicia regia</i>	Vulnerable	8	3	1	1
<i>Nesogordonia papaverifera</i>	Vulnerable	42	-	1	-
<i>Terminalia ivorensis</i>	Vulnerable	-	10	-	-
<i>Triplochiton scleroxylon</i>	Lower risk	25	118	-	-
Total		107	149	22	6

Table 4: Structural parameters of the different biotopes

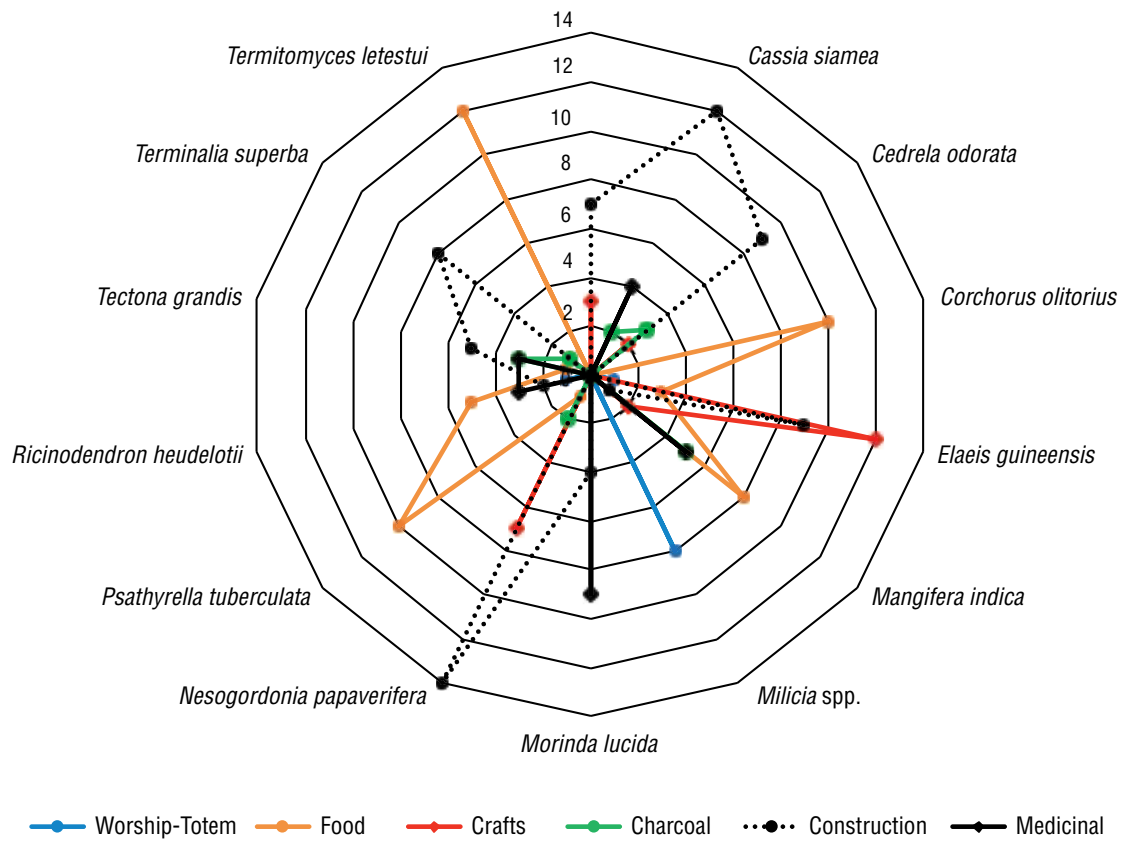
Forest type		Density (stems/ha)	Basal area (m ² /ha)	Biomass (t/ha)	Carbon content (t/ha)
Old-growth forest		758	29.52	283.95	141.97
Planted forest	Multispecies	698.46	29.18	232.02	116.01
	Old teak	865	23.92	214.94	107.47
	Young teak	934	24.04	189.90	94.95

Note: The biomass and carbon content were calculated for stems ≥ 10 cm dbh.

Table 5: Specific indexes of regeneration (%) for the most abundant species, by forest type

Species	Old-growth forest	Planted forest		
		Multispecies	Old teak	Young teak
<i>Cedrela odorata</i>	48.6	57.8	21.3	50
<i>Funtumia africana</i>	1.4	0	0	0
<i>Gmelina arborea</i>	0	12.5	0	0
<i>Nesogordonia papaverifera</i>	0	0	0	0
<i>Tectona grandis</i>	0.0	9.4	70.5	50
<i>Terminalia ivorensis</i>	0	0	0	0
<i>Terminalia superba</i>	0	0	0	0
<i>Trichilia monadelpha</i>	1.4	0	0	0
<i>Triplochiton scleroxylon</i>	0	0	0	0

Figure 1: Main local uses of species in the Téné gazetted forest



forests than in old-growth forests. Carbon stocks were higher in the multispecies planted forests than in old-growth forests.

Among the species used for reforestation, only *Cedreia odorata* exhibited a high capacity for natural regeneration (Table 5). This species is particularly well suited to dry, dense and semi-deciduous forests, as shown by Pennington (1981).

Local uses of plant species in the FCT area

The known uses of plant species, as indicated in interviews with people living in the vicinity of the FCT, are, in ascending order of frequency, worship and totems, charcoal manufacture, crafts, construction, medicinal, and food (Figure 1).

As in other regions of Côte d'Ivoire, species involved in worship and totems include *Elaeis guineensis*, *Ricinodendron heudelotii* and *Milicia* spp. Local people value the edible mushroom *Termitomyces* highly. Some trees—such as *Ricinodendron heudelotii*, *Mangifera indica*, *Nesogordonia papaverifera* and *Tectona grandis*—have multiple uses and may be viewed as priority species for the people living in the vicinity of the FCT. *Cedreia odorata* is the main species used for charcoal production.

Conclusion, prospects and recommendations

In the forest–savanna transition zone where this study was conducted, multispecies reforestation could be the most favourable option for maintaining plant diversity, and it also has high carbon-storage capabilities. However, additional work is needed in other gazetted forests in differing climatic conditions to develop a comprehensive guide to good silvicultural practices at the national level.

This study could serve as a basis for widely promoting the use of *Cedreia odorata* for charcoal production in agroforestry systems involving cocoa and coffee plantations. The species exhibits good natural regeneration, thereby avoiding the need for the replanting operations associated with some other indigenous species. In future reforestation operations conducted in forest–savanna transition areas, SODEFOR should focus on indigenous species capable of regenerating naturally rather than on exotic species.



Food stuff: The Téné gazetted forest provides local people with a wide range of foods, including a drink based on palm sap. *Photo: B.T.A. Vroh*

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Market trends

Western markets claw their way back to growth, but expansion slows in Asia

by Mike Adams

Compiled from the ITTO Tropical Timber Market Report

Conventional thinking is that growth in gross domestic product (GDP) is a good indicator of the prospects for timber consumption. Last year, this rule of thumb held true in the European Union (EU), Japan and the United States of America (US). In China, however, timber consumption was resilient, despite the slowing of GDP growth. How come?

For the past few years, the economic model behind the rapidly escalating GDP in China has shifted away from a dependence on exports; today, GDP growth (albeit slower than before) is driven by domestic consumption. In 2018, therefore, higher growth in the EU and the US spurred timber imports there; in Japan, stalled economic growth pushed down the country's imports; and, in China, domestically driven growth lifted timber imports.

Table 1: Year-on-year change in EU imports of tropical timber products from main supplier countries, 2017–2018

Product	Supplier country	Percent change, 2017 to 2018
Sawnwood	Brazil	24
	Congo	13
	Côte d'Ivoire	-10
	Democratic Republic of the Congo	5
	Gabon	14
	Ghana	15
	Indonesia	42
	Malaysia	3
	Myanmar	72
Logs	Suriname	-8
	Cameroon	-6
	Central African Republic	78
	Congo	7
	Democratic Republic of the Congo	20
	Equatorial Guinea	-21
	Guyana	56
	Liberia	69
Veneer	Suriname	-37
	Cameroon	28
	Congo	15
	Côte d'Ivoire	14
	Equatorial Guinea	-2
	Ghana	-10
Plywood	Indonesia	-18
	Brazil	-17
	Gabon	-22
	Malaysia	16

Source: ITTO/IMM analysis of Eurostat COMEXT.

GDP growth is still strong in India. Although timber demand is also still solid, there are early signs of a cooling housing market. On the one hand, home-buyers are finding it more difficult to secure mortgages and, on the other, builders are stuck with huge housing inventories and are having difficulty servicing loans.

European Union

Table 1 shows the EU's tropical timber imports in 2018, by main supplier country.

Partial rebound in EU tropical timber imports in 2018

EU imports of tropical wood products rebounded in 2018 following a dip in 2017, picking up in the second half of the year after a slow start. In total, the EU imported 2.09 million tonnes of tropical wood products (as listed in HS Chapter 44 excluding fuelwood, wood waste and chips) in 2018, 6% more than in 2017. The total value of imports was EUR 2.23 billion in 2018, an increase of 4.4% over 2017.

8% rise in EU imports of tropical sawnwood in 2018

Despite a slow start to the year, EU imports of tropical sawnwood grew by 8% in 2018, to 716 400 tonnes; import value increased by 10%, to EUR 720 million. A significant quantity of tropical sawnwood arrived into the EU from Cameroon in the second half of 2018, with total imports from that country amounting to 253 400 tonnes, up by 5% compared with 2017.

EU imports of tropical logs rise by 11%

After a sharp downturn in 2017, EU imports of tropical logs recovered some lost ground in 2018 (although they were still at historically very low levels), increasing by 11% to 111 700 tonnes. Most of the increase was in Belgium and France.

EU tropical veneer trade picks up in closing months of 2018

After a very slow start to the year, the pace of EU tropical veneer imports increased dramatically in the second half of 2018, particularly from Gabon, the largest supplier.

In total, EU imports of tropical veneer fell by 1.3% in 2018, to 140 400 tonnes, with total value declining by 4%, to EUR 180 million. Imports from Gabon dropped by 13% overall in 2018, to 61 100 tonnes, having plummeted by more than 30% in the first six months of the year, when Rougier's financial difficulties severely disrupted the trade.

EU imports of tropical plywood down

The EU imported 327 200 tonnes of tropical plywood in 2018, 2% more than in 2017, and import value also increased by 2%, to EUR 291 million. EU imports of plywood from tropical countries declined by 5%, however, to 192 100 tonnes; on the other hand, there were significant increases in tropical plywood imports from Viet Nam and Paraguay (up by 22%).

Japan

Imports of wood products in 2018

According to the Japan Lumber Importers Association, Japan's imports of most wood products (except panels and logs) fell in 2018, marking two straight years of decline, due mainly to a drop in housing starts. Sawnwood imports sank overall by 5%, with imports of European sawnwood down by 9%.

Japan imported 153 000 m³ of tropical logs in 2018, up by 4.5% compared with 2017. Log imports from Malaysia declined after Sabah banned log exports in May 2018, with an increase in imports from Papua New Guinea covering the shortfall from Malaysia.

Japan does not import large volumes of tropical sawnwood. Imports from Southeast Asian countries, the main suppliers, have fallen for the past ten years, and the import volume in 2018 was down by 30% compared with the volume in 2014.

Plywood supply in 2018

Japan imported 2.92 million m³ of plywood in 2018, the fourth straight year this volume has been less than 3 million m³. China, Indonesia and Malaysia accounted for more than 85% of Japan's plywood imports, but shipments from Viet Nam are increasing.

Major changes have been occurring in Japan's plywood production and imports because manufacturers in Sarawak, a major shipper of plywood to Japan, have had to reduce export production due to stricter log-harvesting regulations. The shortfall in Malaysia could not be made up quickly by either Indonesia or Viet Nam, putting pressure on Japanese plywood makers to source their logs from domestic forests, a move the government is actively encouraging.

United States of America

Table 2 shows the change in the US's tropical timber imports in 2018, by main supplier country.

US hardwood plywood and tropical sawnwood imports

The volume of US imports of hardwood plywood declined by 5% in December 2018; thus, US hardwood plywood imports totalled 2.66 million m³ in 2018, down by 10% from 2017. Cambodia, Indonesia, Malaysia and Viet Nam all gained market share in 2018 at the expense of China. Despite the decline in import volume, the value of US hardwood plywood imports increased by 10% compared with 2017, to USD 1.9 billion.

US imports of sawn tropical hardwood in 2018 declined by 9% (by volume) compared with the previous year. Imports of balsa, mahogany, virola and acajou d'Afrique all fell by more than 20% in 2018. On the other hand, imports of jatoba nearly doubled in 2018 and keruing imports rose by more than 30%.

Among the US's top trading partners, imports fell from Ecuador (-23%), Cameroon (-20%) and Brazil (-5%) in 2018; in contrast, imports from Malaysia climbed by 40%.

Strong December for tropical veneers and flooring

US imports of tropical hardwood veneer grew by 39% in December 2018, ending a string of monthly declines and lifting the 2018 import volume well above that for 2017. Imports of tropical veneers grew by 26% in 2018, with Italy, China and India (in descending order, by volume) showing the biggest increases. Imports from African shippers (Cameroon, Côte d'Ivoire and Ghana) all fell in 2018.

Imports of assembled flooring were up by 4% in December; overall, they grew by 11% in 2018. The biggest gains were for Chinese and Indonesian products, but imports from Brazil fell by 71%.

China

Table 3 shows the change in China's tropical timber imports in 2018, by main supplier country.

Many Chinese timber companies faced unprecedented challenges in 2018 after a good year in 2017. Businesses were confident that the market would still be up in 2018—but they didn't anticipate the sharp downturn in external demand in 2018.

Table 2: Year-on-year change in US imports of tropical timber products from main supplier countries, 2017–2018

Product	Supplier country	Percent change, 2017 to 2018
Sawnwood	Brazil	-4
	Cameroon	-20
	Congo	-14
	Côte d'Ivoire	21
	Ecuador	-22
	Ghana	11
	Indonesia	-1
	Malaysia	42
	Peru	39
Hardwood plywood	Cambodia	63
	China	-80
	Ecuador	15
	Indonesia	58
	Malaysia	67
	Russian Federation	5
	Viet Nam	400
Veneer	Cameroon	-14
	Côte d'Ivoire	-8
	Ghana	-6
	India	100

Source: US Census Bureau foreign trade statistics (www.census.gov/foreign-trade/index.html).

The combined effect of strict environmental inspections, the trade friction between China and the US, and the volatility of the renminbi had a big impact on trade volume and prices in 2018.

Any weakening in domestic demand for wood products would be of great concern to Chinese manufacturers and importers. The real-estate sector is the mainstay of the national economy, and it suffered a heavy blow in 2018 due to the economic downturn—and this proved fatal for many enterprises. Although the number of homes being built is falling, however, the overall value is still rising because home-buyers have more money to spend; to some extent, they are using it on decorative hardwoods for interior work.

The major issue for industries in China in 2018 was environmental protection. Many of the timber enterprises around Zhangjiagang Port are family workshops, and they lack effective pollution abatement. Such enterprises have become the focus of investigations by authorities: since the

beginning of 2018, about 60% of wood-processing enterprises in the Zhangjiagang Port area have been forced to close down because of excessive pollution.

Rise in log imports

China's log imports totalled 59.7 million m³ in 2018, a year-on-year increase of 8%. Softwood log imports rose by 8%, to 41.6 million m³, which was 70% of all log imports (a 1% increase).

The main imported hardwood log species were birch (12%), oak (7%), North American hardwood (5.5%), eucalypt (4.7%), redwood (i.e. rosewood, 4.4%), okoume (4.3%), beech (4.2%) and poplar (3.1%). Log import volumes increased by 17% for merbau and 16% each for birch and North American hardwood.

The volume of China's tropical log imports was 11.1 million m³ in 2018; although this was a year-on-year increase of 15%, the pace of growth was down compared with previous years. Tropical log imports accounted for 19% of all log imports (a 2% increase in the proportion compared with 2017).

Although volumes were small, Chinese log imports surged from the Central African Republic, Ecuador, Liberia, Sierra Leone and Suriname in 2018. Import volumes of tropical logs also rose from Cameroon, Equatorial Guinea, the Lao People's Democratic Republic (plantation timbers) and Papua New Guinea. Countries from which tropical log imports declined included Nigeria (-33%), the Congo (-30%) and Ghana (-15%).

Sawnwood imports slide

According to Chinese customs data, sawnwood imports totalled 36.7 million m³ in 2018, a year-on-year decline of 2%. The volume of sawn softwood imports, which accounted for 68% of all sawnwood imports, fell by 1%, to 24.9 million m³. The volume of sawn hardwood imports was down by 4% to 11.9 million m³, with volumes from Thailand and the US falling by 4% and 8%, respectively.

China imported 7.19 million m³ of tropical sawnwood in 2018 (about 20% of all sawnwood imports), a decline of 2%. China's sawn hardwood imports from Viet Nam plummeted by 73%, to 150 000 m³.

Thailand is still the main exporter of tropical hardwood sawnwood to China (mainly rubberwood), with China importing 4.44 million m³ in 2018 at a value of USD 1.41 billion. Nevertheless, this was down compared with 2017.

Five countries supplied 85% of China's tropical sawnwood requirements in 2018: Thailand (62% of the total volume of tropical sawnwood imports), Gabon (8%), Brazil (6%), Indonesia (5%) and the Philippines (4%). In 2017, the following five countries supplied 92% of China's tropical sawnwood requirements: Thailand (72%), Gabon (6%), the Philippines (5%), Indonesia (5%) and Malaysia (4%).

Tropical sawnwood imports increased from Myanmar (+70%), Nigeria (+69%), Gabon (+38%) and Cameroon (+33%) compared with 2017, but imports fell from Viet Nam (-73%), Malaysia (-9%) and the Philippines (-2%).

Table 3: Year-on-year change in China's tropical timber imports from main supplier countries, 2017–2018

Product	Country	Percent change, 2017 to 2018
Logs	Cameroon	33
	Central African Republic	108
	Congo	-30
	Ecuador	99
	Equatorial Guinea	17
	Ghana	-15
	Lao People's Democratic Republic	17
	Liberia	72
	Mozambique	-21
	Nigeria	-33
	Papua New Guinea	22
	Sierra Leone	218
	Solomon Islands	0
	Suriname	118
Sawnwood	Brazil	812
	Cameroon	33
	Gabon	38
	Indonesia	7
	Malaysia	-9
	Myanmar	70
	Nigeria	69
	Philippines	-2
	Thailand	-8
	Viet Nam	-73

Source: China Customs.

According to analysts, traders have concluded that there is little chance of a turnaround in demand in 2019—although they expect steady demand for sapelli and merbau logs. Sapelli is very popular for doors, and merbau is the first choice for outdoor furniture and the restoration of ancient buildings.

Prospects

In **Europe**, businesses anticipated many challenges at the beginning of 2019. Slow economic growth in the eurozone was just one factor expected to affect trade. Companies across Europe shared the view that, in the new year, the market was overstocked following the price and supply fluctuations of 2018 and that the situation could deteriorate if, as expected, the eurozone economy failed to pick up.

The outlook for **Japan's** imports of tropical timber is also bleak. Weak economic growth, slowing housing starts and depressed consumer confidence are not good signs. The government says it still intends raising the consumption tax in October, and analysts are warning that this could tip the economy into recession and undermine prospects for growth.

Japan's plywood sector has been dependent on imports from Sarawak, but the Sarawakian government is tightening the rules on log harvesting and this is undermining plywood exports to Japan. Coupled with the increased use of domestic timbers for construction, this will likely lead to realignment in the timber import sector.

The **US** economic outlook is healthy: GDP growth is expected to remain in the range of 2–3% and unemployment is forecast to stay within the normal range. Developments in the first quarter of 2019 confirmed that the US economy is transitioning from an above-trend growth phase driven by fiscal stimulus, lower corporate tax rates and deregulation, to a lower, more sustainable growth phase.

Consumer spending in the US is forecast to continue expanding in 2019 but at a slower rate than in 2018; housing will resume growth, boosted by rebuilding in the aftermath of recent hurricanes. Further moves toward trade protection carry large economic risks, however. Efforts to limit imports, particularly from China, would inevitably affect international supply chains in ways that would be highly disruptive to US domestic production.

It is clear that, in the past decade, **China** has been investing too heavily in construction. Housing starts have far exceeded actual housing sales—by as much as 40% in some areas.

A significant share of the logs and sawnwood imported into China are for export-oriented manufacturing; for many years it has seemed that China's exports of furniture, plywood, flooring and other products were unstoppable.

But this picture has now changed. Both production and exports of plywood and flooring began to decline two years ago and continued downward in 2018; now, wood furniture and joinery exports have also fallen. Some of the decline can be explained by strict environmental regulations imposed on wood processors and various trade restrictions by importing countries.

The **US–China trade negotiations** are unlikely to be settled quickly, and the impact of this will undermine growth and timber-sector profitability and could drive down consumer spending. It could also lead to a significant realignment of global supply chains.

For more on these and other stories, see the 15 March 2019 edition of the *Tropical Timber Market Report* and subsequent issues at www.itto.int/market_information_service

Compiled by
Ken Sato

Amazon group win court case against oil drilling

The Waorani, an indigenous people in a remote part of the Ecuadorian Amazon, won a court battle in April 2019, according to a news report by Rachel Riederer in *The New Yorker*. The Waorani and Ecuador's Ombudsman had jointly filed a lawsuit against the government, claiming it had not properly consulted the community before the auctioning of oil exploration rights. The three-judge panel ruled in the Waorani's favour, finding that the government's consultation process had not constituted free, prior and informed consent. The Waorani's lawyers said the case had implications for other indigenous communities in the southern Ecuadorian Amazon, which have been involved in similar consultation processes. The Ecuadorian Ministry of Energy and Non-renewable Resources has indicated it will appeal the court's decision.

More information: www.newyorker.com/news/news-desk/an-uncommon-victory-for-an-indigenous-tribe-in-the-amazon

Viet Nam's timber legality assurance system makes progress

Viet Nam's timber legality assurance system—a prerequisite for trading Forest Law Enforcement, Governance and Trade (FLEGT)-licensed timber under the country's voluntary partnership agreement (VPA) with the European Union—could be in place within two years, the FLEGT VPA Multistakeholder Core Group (MCG) heard at its fifth meeting in March 2019. The MCG was set up in 2018 to provide a forum for stakeholders to discuss VPA implementation and propose issues for consideration by the country's VPA Joint Implementation Committee.

More information: <https://bit.ly/2KpDyzb>

Even intact tropical forests may be losing mammals

A paper published recently in *PLOS Biology* quantified and mapped the spatial patterns of mammal defaunation in the tropics using a database of 3281 mammal abundance declines from local hunting studies. The authors, led by Ana Benítez-López, also accounted for population abundance declines and the probability of local extirpation of a population as a function of several predictors related to human accessibility in remote areas and species' vulnerability to hunting. They estimated an average abundance decline of 13% across all tropical mammal species, with medium-sized species reduced by more than 27% and large mammals by more than 40%. Mammal populations are predicted to be partially defaunated (i.e. declines of 10–100%) in about 50% of the pantropical forest area (14 million km²), with large declines (>70%) in West Africa. The authors say their findings underscore that forest cover alone is not necessarily indicative of ecosystem intactness.

More information: Benítez-López, A., Santini, L., Schipper, A.M., Busana, M. & Huijbregts, M.A.J. 2019. *Intact but empty forests? Patterns of hunting-induced mammal defaunation in the tropics*. *PLOS Biology* 17(5): e3000247. <https://doi.org/10.1371/journal.pbio.3000247>

Direct seeding might be better than planting

In a paper published recently in *Forest Ecology and Management*, Marina Guimarães Freitas and co-authors evaluated the outcomes (over ten years) of forest restoration efforts done by direct seeding (including broadcast seeding and sowing in rows using "grain

drills") and other techniques, such as seedling planting and natural regeneration. The study, which was conducted in the Xingu River Basin in northeastern Mato Grosso state, Brazil, found that, after four years, direct-seeded sites had formed multilayered canopies and were starting to be colonized by non-planted species. Overall, the authors concluded that direct seeding can be a successful method for the initial phase of forest restoration.

More information: Freitas, M.G., Rodrigues, S.B., Campos-Filho, E.M., Carmo, G.H.P. do, Veiga, J.M. da, Junqueira, R.G.P. & Vieira, D.L.M. 2019. *Evaluating the success of direct seeding for tropical forest restoration over ten years*. *Forest Ecology and Management* 438: 224–232.

New law in the Philippines requires students to plant 10 trees to graduate

CNN reported recently that a bill has been passed in the Philippines requiring all graduating elementary, high school and college students to plant at least ten trees each before they can graduate. "With over 12 million students graduating from elementary and nearly five million students graduating from high school and almost 500 000 graduating from college each year, this initiative, if properly implemented, will ensure that at least 175 million new trees would be planted each year. In the course of one generation, no less than 525 billion can be planted under this initiative," said congressman Gary Alejano in the bill's explanatory note. "Even with a survival rate of only 10 percent, this would mean an additional 525 million trees would be available for the youth to enjoy, when they assume the mantle of leadership in the future."

The trees can be planted in forests, mangroves and reserves, indigenous territories, civil and military reservations, urban areas, abandoned mining sites, and other suitable lands. They must be appropriate for the area's climate, and indigenous tree species are preferred.

Source: <http://cnnphilippines.com/news/2019/5/15/House-bill-plant-10-trees-graduation-requirement.html>



New Director appointed

ITTO is pleased to announce the appointment of Mr Hashiramoto Osamu to the ITTO Secretariat as Director of Forest Management. Mr Hashiramoto, a citizen of Japan, has a bachelor's degree in forestry and a master's in forest economics. He worked for Japan's Forestry Agency for more than 20 years, spent three years at FAO in Rome, and most recently was Deputy Assistant Minister of International Affairs in Japan's federal Ministry of Agriculture, Forestry and Fisheries. Mr Hashiramoto is an expert in international cooperation, trade negotiations and sustainable forest management.

Recent editions

Compiled by
Ken Sato

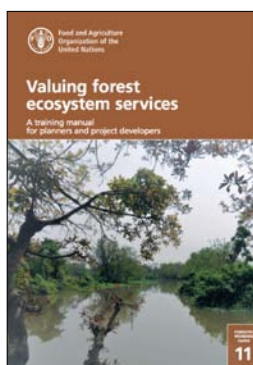


GSARS 2018. *Guidelines on data collection for national statistics on forest products. Global Strategy to Improve Agricultural and Rural Statistics (GSARS), Rome.*

Available at <http://gsars.org/wp-content/uploads/2018/12/GS-NFP-GUIDELINES-EN-06.pdf>

This publication presents best practices on the collection, compilation and dissemination of national statistics on forest products. The overall aim is to provide developing countries with technical direction in

developing or improving their national forest products statistical programmes. It is expected that the guidelines will serve as an instrument to assist countries in the identification of data gaps in national forest products statistics and provide them with operationally feasible options for producing and disseminating national forest products statistics. The publication is aimed mainly at staff and officials in government agencies responsible for collecting and compiling production and trade statistics on forest products at the national or regional levels.



Masiero, M., Pettenella, D., Boscolo, M., Barua, S.K., Animon, I. & Matta, J.R. 2019. *Valuing forest ecosystem services: a training manual for planners and project developers.* Forestry Working Paper No. 11. FAO, Rome.

Available at www.fao.org/3/CA2886EN/ca2886en.pdf

This manual is intended as a training tool for officers and field practitioners working in environmental and forest agencies and other relevant areas of government.

Although it focuses on forests and other tree-based ecosystems in Bangladesh, the concepts, methods and approaches described herein can be applied to a broad range of situations. It is directed at those who must consider the environmental costs and benefits of development projects but who don't necessarily have a strong background in environmental economics. The aim is to build robust knowledge of ecosystem services and their economic valuation through a step-wise approach. The manual explains the underlying concepts, provides definitions, sets out the principles of financial mathematics and economic valuation, and provides examples and exercises. Users will obtain knowledge on how to approach and deal with the valuation of ecosystem services and how to interpret valuation results and thereby inform development project design and decision-making.



Kenis, M., Hurley, B.P., Colombari, F., Lawson, S., Sun, J., Wilcken, C., Weeks, R. & Sathyapala, S. 2019. *Guide to the classical biological control of insect pests in planted and natural forests.* FAO Forestry Paper No. 182. Food and Agriculture Organization of the United Nations (FAO), Rome.

ISBN 978-92-5-131335-0

Available at www.fao.org/3/ca3677en/CA3677EN.pdf

Insect pests damage millions of hectares of forest worldwide each year. Moreover, the extent of such damage is increasing as international trade grows, facilitating the spread of insect pests, and as the impacts of climate change become more evident. Classical biological control is a well-tried, cost-effective approach to the management of invasive forest pests. It involves the importing of "natural enemies" of non-native pests from their countries of origin with the aim of establishing permanent, self-sustaining populations capable of sustainably reducing pest populations below damaging levels. A great deal of knowledge on classical biological control has been

accumulated worldwide in the last few decades. This publication, which was written by a team of experts, distils that information in a clear, concise guide aimed at helping forest-health practitioners and forest managers—especially in developing countries—to implement successful classical biological control programmes. It provides general theory and practical guidelines, explains the "why" and "how" of classical biological control in forestry, and addresses the potential risks associated with such programmes. It features 11 case studies of successful efforts worldwide to implement classical biological control.



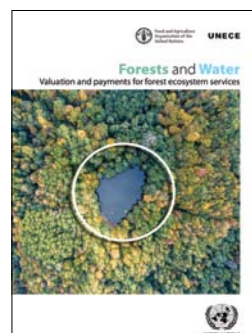
National Academies of Sciences, Engineering, and Medicine. 2019. *Forest health and biotechnology: possibilities and considerations.* The National Academies Press, Washington, DC.

Available at www.nap.edu/catalog/25221/forest-health-and-biotechnology-possibilities-and-considerations

ISBN: 978-0-309-48288-2

This publication examines the potential use of biotechnologies in mitigating

threats to forest tree health and identifies the economic, social and ecological implications of deploying biotechnologies in forests. The publication also sets out a research agenda for addressing knowledge gaps in the application of biotechnologies.

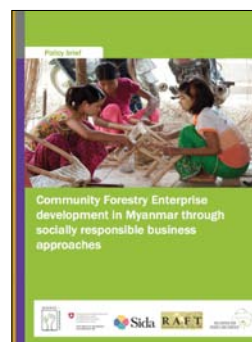


UNECE & FAO 2018. *Forests and water: valuation and payments for forest ecosystem services.* United Nations Economic Commission for Europe (UNECE) and Food and Agriculture Organization of the United Nations (FAO), Geneva, Switzerland.

Available at www.unece.org/index.php?id=50249

ISBN: 978-92-1-117175-4

The objective of this report is to further improve understanding of the ways in which payment schemes for ecosystem services can be applied in forests, focusing on the hydrological functions of forests for the mutual benefit of humans and the environment. The report addresses the advances and challenges of such schemes and provides practical guidance for policymakers and practitioners; it contains the most comprehensive set of case studies on water-related payment schemes for forest ecosystem services in Europe.



Grejijmans, M., Gritten, D., Naing, A.K., Htun, K.T. & Atkinson, J. 2019. *Community forestry enterprise development in Myanmar through socially responsible business approaches.* Center for People and Forests and Rights and Resources Group, Bangkok.

Available at www.recoftc.org/publications/0000328 (English and Myanmar language)

This brief provides an overview of the status of community forestry enterprise development in Myanmar by examining the challenges and opportunities that exist for various stakeholders, particularly government agencies, in promoting and supporting socially responsible business collaborations that contribute to the alleviation of rural poverty, community empowerment and sustainably managed forest resources. The brief was developed based on findings from a series of subnational and national multistakeholder workshops held in 2018, as well as field research in three townships—Gwa in Rakhine State, Yebyu in Tanintharyi Region and Paukhaung in Bago Region.

Meetings

ITTO meetings

28 August 2019

10:30–12:00 hrs

Sustainable Forest Management and the Sustainable Development Goals 2030

Pacifico Yokohama, Yokohama, Japan

Contact: itto@itto.int

At this side-event, which will focus on efforts to achieve the Sustainable Development Goals (SDGs) in Africa, experts and high-level dignitaries will share experiences, lessons learned and best practices on the sustainable management of tropical forests in Africa. Participants will discuss initiatives towards developing legal and sustainable supply chains from the forest to consumers and their impacts in moving towards achieving the SDGs. ITTO and Japan's Forestry Agency are co-organizing the event.

24–27 September 2019

Enhancing Conservation and Sustainable Management of Teak Forests and Legal and Sustainable Wood Supply Chains in the Greater Mekong Subregion

Yangon, Myanmar

Contact: Dr Ma Hwan-ok at ma@itto.int

Among other things, this first regional workshop on sustainable teak management, which is being convened by ITTO in cooperation with a number of other organizations, will review and share experiences on case studies, good practices and policy options for empowering local communities and smallholders in planted teak, teak management and agroforestry systems to support sustainable livelihoods.

22–25 October 2019

International Forum: Together Towards Global Green Supply Chains: a Forest Products Industry Initiative Shanghai and Huzhou, China

Contact: itto@itto.int

ITTO, in partnership with the China Timber & Wood Products Distribution Association (CTWPDA), the Centre for International Forest Products Trade of the National Forestry and Grassland Administration of China (CINFT/NFGA) and the International Tropical Timber Technical Association (ATIBT), will co-organize this event to highlight the importance of legal and sustainable wood product supply chains and promote the establishment of a joint platform to facilitate business information exchange and collaboration between wood product producers, buyers, processing industries and wood product market representatives, nationally and internationally. Up to 400 participants are expected to attend from the private sector, international donor agencies, governments, civil society and academia.

2–7 December 2019

55th Session of the International Tropical Timber Council and Sessions of the Associated Committees

Lomé, Togo

Contact: www.itto.int/events/event/id=5400

The International Tropical Timber Council is ITTO's governing body. It meets once a year to discuss issues related to the legal trade of tropical timber and the sustainable management of tropical forests. Council sessions are open to official delegates and accredited observers.

Other meetings

9–18 July 2018

High-level Political Forum on Sustainable Development

New York, USA

Contact: <https://sustainabledevelopment.un.org/index.php?menu=4444>

1–3 August 2019

Forestrise 2019: Wood Industries International Exhibition

Nagano, Japan

Contact: www.forestrise.jp

28–30 August 2019

7th Tokyo International Conference on African Development

Yokohama, Japan

Contact: <https://ticad7.city.yokohama.lg.jp/english>

3–4 September 2019

Workshop on Pro-active Management of Forests to Combat Climate Change Driven Risks

Istanbul, Turkey

Contact: <https://foresteurope.org/event/14917>

7–8 September 2019

9th China Global Wood Trade Conference

Chongqing, China

Contact: www.gwtchina.org

9–12 September 2019

30th Session of the North American Forestry Commission

Missoula, USA

Contact: peter.csoka@fao.org

10–12 September 2019

LegalSource Expert Course

Peru

Contact: www.nepcon.org/events/legalsource-expert-course-peru-september-2019

11–13 September 2019

LIGNUM Latin America

Curitiba, Brazil

Contact: <https://lignumlatinamerica.com>

23 September 2019

Climate Action Summit 2019

New York City, USA

Contact: www.un.org/en/climatechange

24–27 September 2019

21st International Nondestructive Testing and Evaluation of Wood Symposium

Freiburg, Germany

Contact: <https://ndtesymposium.org>

29 September–5 October 2019

XXV IUFRO World Congress

Curitiba, Brazil

Contact: www.iufro2019.com

8–10 October 2019

UK Construction Week

Birmingham, UK

Contact: www.ukconstructionweek.com

16–18 October 2019

67th International Softwood Conference

Antwerp, Belgium

Contact: <https://ettf.info/isc2019>

21–25 October 2019

ATIBT Forum

Shanghai, China

Contact: www.atibt.org/en/why-the-next-atibt-forum-will-be-organized-in-china

28 October–1 November 2019

7th International Wildland Fire Conference (WILDFIRE 2019)

Campo Grande, Brazil

Contact: www.ibama.gov.br/wildfire2019-eng

4–7 November 2019

Forêt2019: Joint Session of the ECE Committee on Forests and the Forest Industry and the FAO European Forestry Commission

Geneva, Switzerland

Contact: www.fao.org/forestry/etc/72568

11–15 November 2019

PEFC Forest Certification Week 2019

Würzburg, Germany

Contact: www.pefc.org/events-training/pefc-forest-certification-week-2019

20 November 2019

Exploring Pathways to Verified Sustainable Tropical Timber

Berlin, Germany

Contact: www.europeansttc.com/20-november-2019-conference-exploring-pathways-to-verified-sustainable-tropical-timber

21–22 November 2019

International Hardwood Conference

Berlin, Germany

Contact: <https://ihc2019.berlin>

30 November 2019

Global Landscapes Forum Investment Case Symposium

Luxembourg

Contact: <https://events.globallandscapesforum.org/glf-luxembourg-2019>

2–13 December 2019

25th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change

Santiago, Chile

Contact: <https://cop25.cl>

11–19 June 2020

IUCN World Conservation Congress

Marseille, France

Contact: www.iucncongress2020.org

