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The prospects for plantation teak

TEAK has a centuries-old reputation as the king of timbers. It is highly durable, easily worked, attractive, strong and relatively light. It has been used as both a structural and decorative timber in the temples, palaces and houses of the Indian sub-continent for perhaps 2000 years, where its durability has been proved: though popular with priests, princes, carpenters and the common man, termites and fungi tend to shun it.

Nor is its popularity limited to its Asian home ground. Teak plantations are being established throughout the tropics as growers are attracted by the high prices that (natural) teakwood can fetch in global markets. The rotation lengths of these plantations vary—from 20 to about 80 years—but the trend is towards the shorter end of the time scale and short-rotation plantation teakwood is entering the market in increasing volumes.

Is it as good? As Bhat and Ma (page 3) and Oteng-Amoako (page 6) point out in this edition, short-rotation teakwood cannot hope to match mature-aged teak for beauty or durability, although it

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Cover image Teak plantation in Java, Indonesia. *Photo: A. Compost*

... Editorial continued

does possess some valuable properties. Nor is it available in the large dimensions of old-growth teak.

Nevertheless, teak plantations have many proponents because of the reputation of teakwood in the marketplace, the vast amount of information available on its management, and the apparently excellent market prospects. Saw Eh Dah (page 12) reports on a program in Myanmar to double the area of teak plantations there over the next few decades; if managed on a 40-year rotation as planned, this new resource will produce a minimum of 600 000 m^3 of teakwood per year. Keogh (page 8) suggests that private-sector/community partnerships in teak plantation establishment and management could be a powerful development tool. Sylvio de Andrade Coutinho (page 10) tells of efforts by his company, Floresteca, to provide profits to shareholders and benefits to local communities via well-managed teak plantations in Brazil.

Profitability will indeed be an important factor in the future role of plantation teak as an agent of sustainable development: efforts to provide social and environmental benefits will be wasted if the operation flops through bad management or adverse market conditions. One of the determinants of profitability will be price, which will depend on the extent to which such wood can be differentiated in the market from other commodity-grade timber; this in turn will be determined mostly by wood quality. Measures such as correct site selection, the use of high-quality seed sources, and attentive silviculture will all help increase the quality of this new resource. Genetic improvements could also provide significant gains, as could advances in processing technology. But, almost certainly, fast-grown, short-rotation teakwood will never match old-growth teak for the price it can command.

Longer rotations will generally produce better timber and should therefore earn higher prices. But longer rotations also mean a longer wait for a return on investments (of time, money and labour). Some small-scale growers are adopting a dual approach: growing some trees for early returns and others for the longer term, to benefit not only themselves but their children and grandchildren—a smart solution to a problem that has vexed foresters for centuries.

Other articles in this edition take a look at broader forest-sector developments in India. Bose and Saigal (page 16) sketch out the economic role of small-scale forestry enterprises there and say that understanding and facilitating this role should be a research and policy priority. Muthoo (page 32) enthuses about the general prospects for the Indian timber-processing sector, suggesting that the country's strategic location for in-transit milling and its enormous wealth of human resources place the sector in an enviable position to exploit high-value markets in the US, Europe and elsewhere—with possible benefits for the tropical timber trade. To take full advantage of this position, he says, the sector needs to become better organised and more visionary. He advocates building multi-stakeholder, private-public partnerships as part of a strategy for the development of a sustainable sector. A fast-grown timber sector, perhaps, faces similar risks to fast-grown timber; without due care, the gains could be of little value. Well-managed, there are many social and economic benefits to be won.

Alastair Sarre

Hwan Ok Ma

Teak growers unite!

Teak is one of the pre-eminent timbers of the tropics, but growers and processors need to work together if that status is to be maintained

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"AMONG timbers, teak holds the place which diamond maintains among precious stones and gold among metals".

This is what Dietrich Brandis, the renowned German forester, observed about teak (*Tectona grandis* L.f.) some 150 years ago. Since then, teakwood has been the standard against which the quality and utilisation potential of other tropical hardwoods have been compared. The genus name 'Tectona' is derived from the Greek word *tekton*, which means 'carpenter'; teakwood has long been considered the 'carpenter's pride'. But as the supply of teak shifts from natural forests to plantations, many would-be teak-growers are posing the question: will teakwood remain a star? We believe it will, although there are some uncertainties and challenges ahead.

What's it worth? Auctioneers sell teak logs near Mumbai, India. *Photo: H.O. Ma*

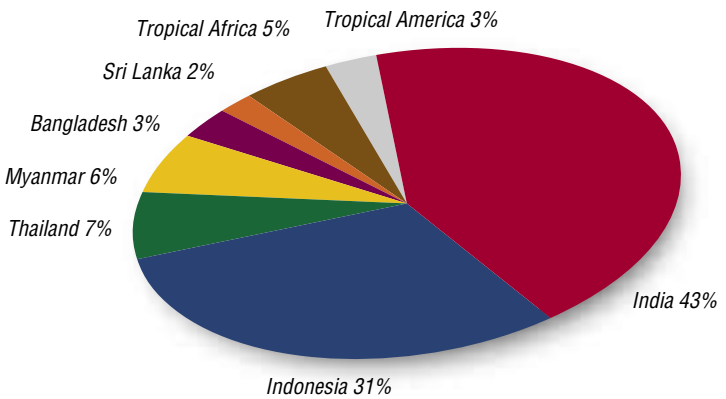
Extent of teak plantations in the tropics

Teak forests occur naturally in the Asia-Pacific region over an area of about 23 million hectares in India, Laos, Myanmar and Thailand. About one-third (8.9 million hectares) of the natural teak forest is in India.

Teak is being grown in plantations in at least 36 tropical countries across the three tropical regions. Of the estimated 187.1 million hectares of global forest plantations in 2000, about 5.7 million hectares (3%) were teak (FAO 2001). Other genera such as *Eucalyptus* (30% of hardwood plantations) and *Acacia* (12%) are grown more widely, but teak constitutes about 75% of the world's high-quality tropical hardwood plantations (Keogh 1999). About 92% of the global teak plantation estate is in tropical Asia, including about 43% in India and 31% in Indonesia (see *figure*), while 4.5% is in tropical Africa (mostly Côte d'Ivoire and Nigeria, see *table*) and about 3% is in Central and South America, especially Costa Rica, Trinidad and Tobago, and Brazil. The production of high-quality wood in relatively long rotations of 50–70 years has been the usual practice ever since the world's first teak plantation was established at Nilambur in India's Kerala state in 1842. However, shorter rotations of 20–30 years for both veneer and sawlog production for relatively quick returns are now being employed in many countries (Ball et al. 1999).

Teak growth rates in plantations are reasonably slow compared to *Eucalyptus* but by no means glacial. Relatively high mean annual volume increments (MAIs) of above 20 m³/hectare/year have been reported in Indonesia and Trinidad and Tobago (Ball et al. 1999). In Indonesia, the average actual MAI at harvest age, with rotations varying between 40 and 80 years, is estimated to be 2.91 m³/hectare/year. In India, an average yield in 70-year plantations of 172 m³ per hectare (giving an MAI of about 2.46 m³/hectare/year) has been reported (FAO 1985), while the MAI in teak plantations of 40–50 year rotations in Benin and Côte d'Ivoire was 8–11 m³/hectare/year. A yield of 10.2–13.3 m³/hectare/year has been recorded in Central America for a plantation with a rotation length of 25–28 years (Arias 2003). The current status of teak plantations for the main teak-growing countries is given in the table.

Asia dominates
Global distribution of teak plantations by country/region



Role of teak in the livelihoods of rural communities

Teak is considered a multipurpose tree for agroforestry in many parts of Asia, Africa and tropical America; in Java, for example, Maturana (pers. comm.) reports that farmers are increasingly planting teak as an investment for the future: "Despite certain disincentives, people have planted teak in their gardens to supply their own requirements of wood, as a 'savings account' for their children and to use in special cases of need," he says. These small woodlots may become an important supply of high-grade teak in the future: even

a few dozen trees, left for 50 or more years, will generate real wealth for a farmer's children or grandchildren. In addition, more and more farmers and other small landholders in countries like Malaysia, Thailand, India, Brazil (see de Andrade Coutinho this edition) and Costa Rica are planting teak in rotations of 20–30 years with a view to providing a supply of industrial wood. In India, the annual national target for teak plantation establishment by different states is 50 000 hectares.

Promises of wood quality from woodlots

There has been plenty of debate over the future of teak plantations and their ability to produce timber that approaches the quality of that grown in natural forests (see also Oteng-Amoako this edition). Recent research indicates that short-rotation teakwood is not significantly inferior in density and strength compared to natural-grown teak, although with lower heartwood and extractive contents it is less durable and attractive. The findings of recent studies (summarised in Bhat 2000) offer the following hope to plantation-growers, including smallholders:

- without altering timber strength, plantation managers can aim to produce logs with higher yields of naturally durable heartwood per individual tree by accelerating tree growth in short rotations with judicious fertiliser application and genetic improvements on suitable sites;
- the MAI for teak plantations is generally relatively high in short rotations of 20–25 years. Teak yield tables indicate that MAI usually peaks within 20 years of plantation establishment;
- teak can produce timber of optimum strength in relatively short (eg 21-year) rotations; and
- fast-growing provenances/clones can be selected for teak management without reducing the wood's specific gravity. However, matching the provenances for specific site conditions and product requirements appears to be most crucial in tree improvement programs.

Even with genetic and silvicultural improvements, the appearance of the teakwood produced by fast-grown trees is likely to continue to be different from slow-grown natural-forest teak in terms of colour, grain and texture. Given that one of the main criteria for the market price of a timber is its appearance (another is durability), fast-grown teak is therefore unlikely to ever fetch the sorts of prices commanded by old-growth teakwood. Oteng-Amoako (page 6) shows that today's plantation teak sells at a significantly lower price than does natural-forest teak and there is little reason to expect this to change in the future. Growing teak fast—and/or on the wrong site—risks diminishing the quality of the timber such that the market starts to treat it as it treats any other commodity timber.

Teak table

The current status of teak plantations in the main teak-producing countries

COUNTRY	EXTENT OF PLANTATIONS *(hectares)*	INITIAL SPACING *(m)*	TRADITIONAL ROTATION *(years)*	MAI *(m^3/hectare/year)*
ASIA PACIFIC				
Bangladesh	73 000	1.8 x 1.8	40	7.4
China	9000			
India	2 450 000	1.8 x 1.8, 2 x 2, 2.5 x 2.5, 3.6 x 2.7/ 3.6	50–80	2–7
Indonesia	1 760 000	3 x 3	60–80	5–6; 20
Lao People's Democratic Republic	3000			
Malaysia	3990	2.4 x 2.4 / 3 to 4 x 4.5	35–40	4–10
Myanmar	139 000	2 x2		
Sri Lanka	38 400	3 x 3	40	7
Thailand	836 000	2 x 4, 4 x 4	40–60	13.52
Viet Nam	1500			
AFRICA				
Ghana	170 000	1.8 x 1.8; 2 x 2	20	8–10
Côte d'Ivoire	62 500			8–11 to 10–16
Nigeria	70 000	2.44 x 2.44 to 2.96 x 2.96		27
Tanzania	3000			
Togo	4500			
CENTRAL/SOUTH AMERICA				
Brazil	45 000		25	10–13
Costa Rica	33 000	3 x 3	25–28	10–13
Ecuador	8000–12 000			
El Salvador	4000–5000			
Guatemala	4000–50 000			
Panama	30 000			
Trinidad and Tobago	10 000–15 000	2.1 x 2.1	50	4–8
Venezuela	10 000–15 000			

Source: KFRI unpublished

Challenges ahead

Financial viability

It is difficult to predict the financial viability of teak plantations because this depends on many factors, including the costs of establishing and managing the plantations, growth rates, the prices that can be obtained, the location of the plantation relative to markets, and so on. All these factors depend on other variables that may change over time; price, for example, will depend on the supply of teakwood relative to demand, the quality of the wood, and other factors.

Nevertheless, improving data for assessing the long-term demand, supply and price trends for teakwood at the global level would help. Global, regional and national studies are therefore needed; these should take into account the segmented nature of the market and variations in wood quality and dimensions. Such studies may help to diminish the controversy surrounding the financial claims of some teak investment companies, which have plagued the sector in recent years. Some of these controversies have arisen because of overly optimistic predictions of growth rates and unrealistic assumptions about price.

Carbon markets, should they become more firmly established, could add to the financial viability of teak plantations established since 1989; reforestation and afforestation are eligible activities in the Clean Development Mechanism (CDM) and may attract investors because of the relatively high public profile and reputation of teak and the durability of its timber. According to Robledo (page 18 this edition), the inclusion of a CDM component in projects aimed at the sustainable management of plantations and agroforestry can improve their financial feasibility; however, the potential market for certified emission reductions—the tradable carbon certificates from the CDM—produced in the forestry sector in developing countries appears for the moment to be relatively small.

Smallholders

National and international agencies should strive to promote best-practice in teak management, especially to ensure the ability of small-scale growers to manage woodlots sustainably, to access markets and to make profitable returns on their investments (of labour, land and capital). As Keogh (page 8) argues, partnerships between such small-scale growers and those operating at an industrial scale could be of mutual benefit.

Processing skills to improve production efficiency

Training programs are needed to improve skills and productivity and to reduce waste in the processing of teakwood, including sawing and drying but also in other value-adding processes such as the design and manufacture of fine furniture. Moreover, given the changing nature of the teak resource from one that is generally slow-grown and large-diameter to one that is fast-grown and small-diameter, teak-growers and manufacturers will need to find new technologies, products and markets. Expect that the grand teak furniture we know today made of solid teak boards will eventually be replaced by 'new age' teak products that use technologies such as finger-jointing, glue-lamination and even additives to overcome the limitations of the new resource.

Environmentally and socially responsible management

With forest certification becoming increasingly important for maintaining access to certain export markets, many teak producers will seek to make their operations compatible with the various criteria of sustainable forest management and certifiable under credible certification schemes. They will therefore need to address both environmental issues, such as those related to soil, water and biodiversity conservation, and the way their operations interact with and benefit local communities.

Conclusion

Few timbers excite as much interest among the general public as teak. In India in particular it seems to have an almost spiritual importance; India, indeed, is the world's biggest market for teak and will almost certainly continue to be so in the future (see Muhtoo on page 32 for an insight into the potential of India as a market for tropical timber). It is little wonder, then, that teak plantations are proving popular with growers. The teak plantations already established could, if well managed, supply the world with a huge quantity of teak and new plantations continue to be established; as silviculture and the genetic stock improve, we can expect the volume of teak available in the market to increase.

This rapid expansion of the plantation estate poses a risk, however: a wide variation in wood quality could undermine the reputation of teak in the global marketplace, with the net effect of reducing the prices it can command and therefore the financial viability of many teak producers. To avoid this, teak-growers—at the community and industrial levels—must ensure that the wood they produce is of the highest possible quality, which will mean choosing sites carefully, using good genetic stock, and employing rotations of as long a duration as possible. Teak-growers must unite in this endeavour: it is in the interest of the entire sector to take a coordinated and professional approach to the growing, processing and marketing of this beautiful and valuable timber. Networks such as Teaknet (see page 13) and Teak 21 (page 8) are good starting points; how these are resourced in the future will have a major bearing on the future of teak and those who are right now investing in it.

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Making the grade

The challenge for teak-growers is to improve the wood quality of fast-grown trees

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Carpenter's pride: a tradesman applies his craft to this teakwood panel. *Photo: H.O. Ma*

WOOD quality is the cumulative effect of wood properties on the end-use of a timber species (Zobel & van Buijtenen 1989). These wood properties impact either negatively or positively on the recovery, utilisation and market price of timber and wood products. For example, in timbers with a clearly demarcated sapwood and heartwood, those with a high percentage of heartwood will yield more saleable timber; conversely, a high proportion of sapwood is not a problem in treated poles because sapwood is easily penetrated by preservatives and thereafter may be more resistant to pests and fungal infections than the heartwood itself, which may not be treatable or durable (Graham 1973; Oteng-Amoako & Lawer-Yolar 1999; see *figure*).

Natural forest teak: quality and uses

Teak (*Tectona grandis*) timber produced in the natural forests of Myanmar, India and Thailand has exalted status in international markets, commanding prices as high as US$2000/m^3 for logs (ITTO 2002). This status is due, at least in part, to the inherent quality of the natural-grown timber: it has a high proportion of heartwood, which tends to be dark and of a uniform golden-brown colour, a medium texture, straight grain, streaky to uniform figure, and a small microfibril angle which means that there is minimal shrinkage on drying. The wood's density is medium (in the range 600–750 kg/m^3), its strength moderately high and it is dimensionally stable. Teak timber peels, nails and screws well and takes good sanding and varnish. The heartwood contains an extractive—sesquiturpine—which renders it very resistant to fungal attack and immune to *Lyctus*, a wood-boring beetle, and other insects (Chandrasekharan 2003). Teak products therefore have a long service life, making the timber a long-term prospect for carbon storage (Bhat 2003; Keogh 2003).

Teak is not a perfect timber, though. For example, natural-grown teak has high lipid deposits—between 4.7% and 8.6%—which give the wood an oily feeling and makes it more difficult to glue with standard glues (Nobuchi et al. 2003). Teak's high silica content of about 1.4% may have a dulling effect on saws, and special carbide- or tungsten-tipped saws are usually recommended for milling (Chandrasekharan 2003; Kajar et al. 1999).

Such relatively minor faults not withstanding, natural-forest teak remains one of the most sought-after and highly valued timbers in the world, being used for flooring, interior and exterior furniture, joinery, musical instruments, poles and piles, structural applications, vehicle- and ship-building, sporting goods, veneer and plywood.

Plantation teak as substitute for natural forest teak

The high prices paid for teak, which can be attributed to the limited availability of natural teak in the international market, have prompted the establishment of a large and growing teak plantation estate across the tropics. Unfortunately, this has resulted in sacrifices in wood quality. Compared to its natural-forest counterpart, plantation teak grown on rotations of 21–30 years often has a high proportion of sapwood and juvenile wood, while wood figure including colour, grain and texture are supposedly inferior. Plantation teakwood has lower density and strength than natural teak, a larger microfibril angle (leading to greater shrinkage) and less durable heartwood. Some studies suggest that these differences may not always be great: Bailleres and Duran (2000), for example, reported that 21-year-old plantation teakwood can have similar strength to mature-aged teakwood from natural forest. Nevertheless, the cumulative effect of differences in various wood properties, coupled with the much smaller dimensions on offer in plantations, is that plantation teakwood is no match for mature-aged natural teak in the marketplace.

Determining factors for market price

Differences in export prices are a good indicator of this: the US$300/m^3 fetched on average by plantation teak logs is markedly less than the average price of US$700/m^3 for

natural forest teak. Even within natural-grown teak the wide range of prices reflects differences in quality: at the end of 2003, FOB (free-on-board) prices for natural teak sawlogs ranged between US$420 and US$1615/m³ depending on log grade (ITTO 2003/2004). While prices for plantation teak tend to hover in a narrower range, variations in quality can still have an effect on price. For example, the export price of teak boules from Ghana is in the range US$200–350/m³ depending on wood quality, which is far superior in the country's deciduous forest zone compared to products sourced from the savanna forests, where bushfire and grazing are major problems (Oteng-Amoako & Sarfo 2003). In Côte d'Ivoire, the average export price of plantation teak logs between 2000 and 2001 was US$180/m³, while in Myanmar it was US$470/m³ (ITTO 2002).

The way forward

The challenge for teak-growers is to raise the quality of plantation-grown teakwood under fast-growth regimes. Extending the rotation length would yield better quality, but most investors demand a faster return on their money. Genetic selection and manipulation through tissue culture techniques and prudent silvicultural practices will help: Mandal and Chawhaan (2003), for example, advise that efforts should be made to increase specific gravity, since any small gains will have a positive impact on wood quality; they found a low but positive correlation between specific gravity and height, heartwood and diameter at breast height. Specific gravity is an inherited trait and is therefore amenable to genetic improvement (Zobel & Talbert 1984). Silvicultural treatments like thinning and pruning, if carried out judiciously, should also improve wood quality, producing timber with fewer knots and bends, less taper and more heartwood.

The question of how to optimise wood quality under fast-growth regimes in teak plantations will continue to tax the plantation-forestry community. Efforts to address this question through genetic and silvicultural improvement should continue, and there will also be an increasing need for technological interventions that allow the efficient and value-added processing and use of tomorrow's teakwood.

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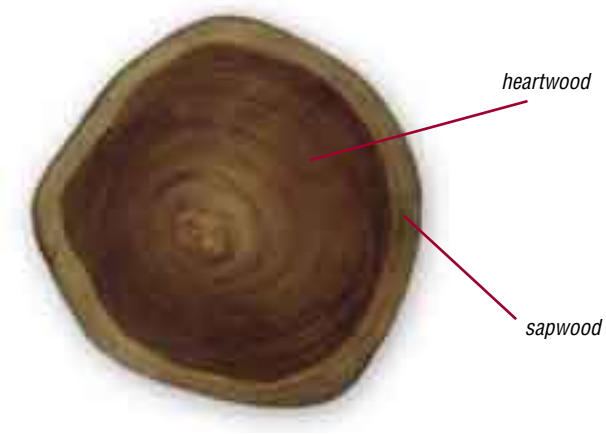
Big hearted?

Cross-section of a plantation-grown teak log. Depending on end-use, the extent of sapwood can have a positive or negative impact on the marketability of the wood.



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How communities can cash in on teak

Community plantation teak initiatives should link with private-sector ventures to increase their access to high-value markets

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THE current supply of hardwood timber from natural tropical forests exceeds 100 million m^3 per year (ITTO 2003). Demand for such timbers will increase as populations increase, but there are clear limitations to the volumes that can be produced under regimes of sustainable natural forest management. These are imposed by the increasing inaccessibility of the resource, problems related to the marketing of lesser known species, the need for an adequate infrastructure and well-trained personnel in remote areas, questions of economic and financial viability, and, indeed, the current rarity of sustainable forest management today.

Yet alternative sources of supply are not satisfactory, nor are they being developed in sufficient quantities. Improvements can certainly be made in the efficiency with which the current supply is used, but this will not meet the shortfall between sustainable supply and rising demand. Substitution by non-timber alternatives is also possible but hardly desirable from an environmental point of view; softwood and hardwood timber can be imported, but this would be an irony in the traditionally highly forested countries of the humid and sub-humid tropics. I contend, therefore, that there is a crisis in the sustainable supply of hardwoods in many countries in the tropics, although it is obscured for the moment in some countries by the relative abundance of non-sustainable raw material.

Domestic hardwood plantations can help avert this crisis. Sustainable, high-grade hardwood plantations that employ best-management practices can produce 20 times more volume (or more) of timber than natural forests on the same area of land. More such plantations are needed in the tropics.

Teak (*Tectona grandis*) is the world's most cultivated high-grade tropical hardwood. While Asia contains most (94%) plantations, Latin America—with only 3% of the global teak estate (FAO 2001)—hosts more than 75% of the world's teak plantations certified under the Forest Stewardship Council. This amounts to about 20% (25 000 hectares) of the area planted to the species in the region (see www.fsc.org).

The private sector

Successful plantations have come about in Latin America mostly under private ownership. These plantations depend, to a large extent, on inward investments. Best-practice guidelines are often applied in their management and some initiatives address environmental issues by, for example, assisting in the management and protection of adjacent natural forests. Certified plantations provide appropriate conditions and salaries for their workers as well as supporting development initiatives in local communities. Injections of foreign capital into rural areas have provided many benefits to local communities.

This is not to say that commercial teak plantation operations are without problems. A number have run marketing campaigns over-stating their advantages, particularly with regard to projected growth rates and prices and therefore profitability; an array of literature has brought this to public attention (eg Centeno 1996, Chaturvedi 1995, Romeijn 1999, Scholtens 1998, Balooni 2000). Problems of this sort can be addressed, at least partially, by introducing a financial audit of claims, leading to a type of 'financial certification' of the investment. Better data on teak prices would also assist in reducing the potential for fraud.

Community plantations

Private plantations tend to be exotic monocultures geared to the generation of wealth for a relatively limited number of (often) overseas investors. As such, donors and NGOs tend to regard them as falling outside the scope of development initiatives.

On the other hand, the quality of community plantation developments tends to lag well behind private-sector initiatives and the gap is widening. Community plantations are often less well-managed and it has proven difficult for smallholders to obtain certification. In addition, small-scale plantations often cannot guarantee consistency of supply. This means reduced access to the more lucrative markets and serious consequences in terms of the prices that communities can receive for their products. Even in those cases where the quality of the timber is comparable to that produced by commercial entities, large differences in value have been recorded for standing teak belonging to village communities—up to fourfold in West Africa, for example.

Linking the private and community sectors

One way for communities to overcome their disadvantages is to link with private-sector initiatives. The private and community sectors, working in unison, are the most appropriate entities for the development of new plantations. Unconventional schemes that incorporate rich and poor are likely to succeed if arrangements can be made for mutual gain. Synergy between large-, medium- and small-scale cultivators can, if the conditions are right, provide greater benefits to society and the environment as a whole than can segregated developments.

The orchestrating of mutually beneficial and workable schemes between private and community organisations requires a new order of cooperation. The latent power of community stakeholders could be harnessed by creating the right catalytic forces and organisational frameworks; this could have a major developmental impact. With greater linkages to community initiatives, certified private-sector plantations could emerge beyond their current status as

Teak 21

Many possible schemes may be applied to bridge the gulf between the private and community sectors. TEAK 21 is offered as one possible solution. Its basic design feature is the Consortium Support System (CSS), details of which are provided elsewhere (eg Keogh 2002). As the name suggests, it is a system under which support (financial, technical, quality control) is given, directly or indirectly, to groups (consortia) of growers to enable them to produce more and better high-grade tropical hardwood timber in an economically beneficial, socially acceptable and environmentally friendly manner.

TEAK 21 is, essentially, a forum that provides complementary support from a number of facilitators, thereby allowing private and community growers to work together to gain mutual benefits. The approach is open-ended, innovative and flexible.

For more information contact the author.

money-spinning devices for a few to become a powerful development tool—with an increased capacity to provide a sustainable output of high-grade hardwoods to satisfy local and international markets.

There are many possible mechanisms for linking the private and community sectors in mutually beneficial arrangements. For example, development banks could provide low-interest loans to the private sector for the development of plantations and processing mills on the condition that the surrounding communities benefit from private-sector technology transfer and participation in collective harvesting and marketing mechanisms. These measures would raise revenues substantially for communities, thus providing real poverty alleviation at little cost—and, in fact, at potentially considerable benefit in increased resource supply—to the private grower. At the same time, loans to the private sector would create further local benefits, including employment. Many other mutually beneficial arrangements are conceivable, including mass certification schemes and out-grower mechanisms.

Development support

Financial resources are key to linking the private and community sectors. In view of the hardwood crisis and the poor use of many existing funds, a radical re-appraisal of development funding is required.

Development funds have been associated with many project failures in the past (Byron 1997). At least a partial use of such funds to entice even greater flows to the high-grade tropical hardwood sub-sector would be doubly effective by withdrawing money from the type of project that has provided few benefits and moving it into initiatives with a high probability of success.

Although development money is relatively small in relation to what is required to solve the hardwood crisis, it is potentially significant as a catalyst for the creation of enabling conditions for capital investments. As such it could result in the mobilisation of many times the scale of current investments.

Creating enabling conditions for capital investments could be realised in several ways. As a first step, it is recommended that development assistance agencies provide resources for facilities designed to support and encourage private and community growers to work together and ensure that all activities reach set technical, environmental, social and financial standards.

Donors are continually being encouraged to incorporate the private sector into development schemes but many agencies tend to feel out of their depth when dealing with commercial entities. The main problem arises for the agencies where the community sector is not involved. However, if the agenda changes in favour of cooperation between private and community sectors, thus allowing the aid agencies to participate fully, the impact will be substantial, particularly for communities. Fears on the part of some aid agencies and NGOs of supporting multi-nationals that wield massive powers must be replaced with a reliance on the counterbalancing forces of certification programs that contain strong social and environmental dimensions.

Beyond conventional silviculture

Best-practice guidelines are well known to conventional teak-growers who aspire to excellence. However, conventional plantations have their limitations and opposition to pure plantations is increasing. It is in the interest of growers to explore how species like teak might be cultivated in alternative arrangements—where conventional planting is inadvisable—in order to allow high-grade hardwoods to expand across a range of sites that are currently off-limits, including high-potential agricultural land and sloping ground where erosion is currently a serious problem in teak monocultures. These arrangements could include the mixing of cash crops and trees (industrial and community agroforestry). Other management techniques beyond the limits of conventional silviculture may be found by looking to the natural forest: in natural ecosystems teak is encountered individually, in dense thickets, in groups, in patches or in pure stands depending on a range of site factors and stand history (Troup 1921).

It is also wise to incorporate high-grade tropical hardwoods other than teak into schemes as soon as possible. This will ensure variety of output in the long run and avoid oversupply. Nonetheless, there is some way to go before the oversupply of teak, especially large-dimension mature timber, becomes a serious issue.

The exploration of non-conventional practices will open the way for the production of high-grade hardwoods from a much wider spectrum of society than was possible previously. Under such circumstances, linking the private and community sectors becomes an even higher priority.

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Teak as social engineer

Floresteca says that its teak operations are performing significant social services in a poor region of Mato Grosso

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***Grandis* production:** the Floresteca nursery has supplied sufficient seedlings for the planting of 17 000 hectares of teak plantation. *Photo: Floresteca*

In contrast to the thousands of years of history behind the production and trade of teak in Asia, this wood-producing species was first introduced to Brazil less than 80 years ago. Nevertheless, it has proven to be well suited to Brazilian conditions and the area of teak plantations has expanded significantly in recent years.

The first person to experiment with teak in Brazil was Mr Navarro de Andrade, a railway engineer who sought species that could meet future demand for sleepers and firewood. Mr de Andrade was also responsible for the introduction of *Eucalyptus*, which has now become the principal raw material for the paper industry.

Private landowners, companies and big investors in Brazil have invested heavily in forestation in the last 50 years. While most of southern Brazil's plantations comprise fast-growing tropical pines, elsewhere *Eucalyptus* has been the predominant species because of its high growth rates and suitability for the manufacture of paper.

Teak has been less favoured than pine or *Eucalyptus* because of its relatively low growth rates and therefore length of time before harvest and return on investment. Nevertheless, Brazil's teak plantation estate now exceeds 45 000 hectares, the largest in South America. Most of this has been established in the last ten years, but substantial quantities of teak logs and sawn goods are already being exported to India, Southeast Asia, Europe and the United States.

The Floresteca operations have brought significant social benefits to several small village communities, providing employment for more than a thousand people.

Floresteca

Floresteca is a forestry company created in 1994 with the financial support of more than 10 000 private Dutch investors. It aims to exercise social and environmental responsibility while optimising the economic return in the production and marketing of high-quality teakwood. Already the company has established 17 000 hectares of plantation teak, in the process becoming the single-largest teak plantation owner in the Americas; plantations are continuing to be established at the rate of about 3000 hectares per year. In total Floresteca manages an area of about 50 000 hectares, including plantations and about 10 000 hectares of nature reserves; in the latter, ecologists and biologists from the region help in identifying and monitoring rare and threatened species, and a ban on hunting and fishing is ensuring that these reserves serve a valuable conservation function.

Certification

All of Floresteca's plantations have been certified since 1997 by SGS Forestry under the Forest Stewardship Council scheme with the aim of reassuring customers (and investors) that the plantations are managed to high ecological and social standards. It is true that certification raises the cost of operations. However, Floresteca believes that the cost is worthwhile, particularly for maintaining and improving market share in Europe and the United States.

Social benefits

Poverty is widespread in the region in which the Floresteca plantations are growing; there is no significant industrial or commercial activity and cattle-raising dominates the local economy. The Floresteca operations have brought significant social benefits to several small village communities, providing employment for more than a thousand people. It also provides a range of facilities for employees, including transportation from the villages to the plantations, meals, safety equipment, ongoing training and medical care. The company also offers financial assistance to local schools and medical centres and promotes health and environmental education. The company benefits from its positive relationship with communities: employees are highly motivated, have a high level of job satisfaction and are very productive.

The company's commitment to environmental and social responsibility would be much harder to meet if the teak operation was not profitable. The future of the operation therefore hinges to a large extent on the price that can be commanded by our teak in the market place. Fortunately, prices are reasonable at the moment and the global demand for plantation teak shows no sign of diminishing. Teak has always been a valuable timber, one that is sought after and valued by the international market. Teak grown in Brazilian plantations looks capable of living up to the reputation of its natural-grown kin.

Kerala conference calls for action on teak

The International Conference on Quality Timber Products of Teak from Sustainable Forest Management, held in Peechi, Kerala, India, on 2–5 December 2003, made wide-ranging recommendations to the teak-growing community and its supporters

THIS conference, hosted by the Kerala Forest Research Institute under the auspices of ITTO, was attended by 175 participants representing 14 teak-producing countries and twelve teak-consuming countries. A total of 69 oral presentations and 26 poster presentations were made on various conference themes. Among other things, the conference established a set of goals for teak development. These are to:

- regain the pre-eminence of teak in view of its sterling properties;
- reduce production cost and improve the quality of teakwood and adjust to changing market requirements and specifications;
- meet the existing and emerging demand for teakwood at prices fair to the consumer and remunerative to the producer;
- keep forest land under appropriate use 'where it will produce most and deteriorate least' by adopting species/provenances/varieties for their productivity, socioeconomic benefits and utility;
- install equity (social/gender) and sustainability as prime considerations without compromising the imperative of efficiency (ie input-output relationship);
- facilitate the involvement of different categories of investors for mobilising resources and ensure adequate returns on investment;
- involve people, communities, non-governmental organisations and other stakeholders in the process of planning and development of teak;
- continuously enhance technology, management, value adding, marketing systems and institutional support;
- add incremental doses of competitive advantage (eg reflected in the efficiency of technology, human resources and governance) to the natural comparative advantage of teak, and guide the dynamism of the situation in positive and appropriate directions; and
- benefit from the valuable experience of other countries and institutions with the aim of avoiding duplication and supporting sustainable forestry development.

The Kerala Call for Action

The conference also strongly urged and called upon national governments, research institutions and agencies, international assistance and donor organisations, investors and other funding agencies to strive, collectively and collaboratively, to address the following 13 actions aimed at promoting a tropical timber development program for meeting societal needs for quality timber products.

Policy

- Formulate and enforce appropriate (sub-)policies on teak within national forest, land-use and economic policies ensuring sustainability and the long-term security of investments.

Research and technology

- Evaluate and document the present condition of the teak crop/resource and critically appraise the technology in use in the context of new developments in research and linkages of research findings on teak with field practices.
- Undertake appropriate steps to refine and package up-to-date technology for application in realistic field conditions involving, for example, seed technology, plant genetics, silvicultural practices, agroforestry systems, protection, harvesting, product development, processing and value adding.
- Direct research efforts towards improving productivity with fast-grown and quality timber and designing new products for new markets. Address technology-transfer issues and the commercialisation of innovative and new products and services in the context of intellectual property, patents and licensing practices for better encouragement and support.
- Recognising the need for new teak-producer countries to be aware of the dangers posed by potential outbreaks of the teak defoliator, *Hyblaea puera*, implement appropriate pest monitoring systems (teak-growers), and support basic research and work towards preventing outbreaks and developing suitable non-chemical methods for controlling the pest by taking advantage of research already carried out in Asia (national and international organisations).
- Conduct comprehensive studies on the socioeconomics of teak under different technological systems (monoculture, mixed planting, agroforestry, etc) in comparison to other forest crops/products to demonstrate teak's economic viability/superiority and potential (in terms of competitive and comparative advantages) as a means of attracting increased investment.

Sustainable management of the timber resource

- Design and disseminate guidelines and codes of best-practice relating to various steps and stages of teakwood production and utilisation through adequate extension mechanisms.
- Develop integrated research and education—and the link between education and sustainable forest management (SFM)—with multidisciplinary and multifaceted approaches that establish SFM and build partnerships for training and evaluation.
- Identify and analyse unsolved and emerging problems (both technical and non-technical) and initiate and implement measures to address them adequately in a coordinated and collaborative manner.
- Collect, develop and disseminate trade/market information to promote and facilitate market access and success for teak products.
- Establish and implement a comprehensive system of planning (involving long-, medium- and short-term plans, and a range of sites/locations, systems, markets and so on) to avoid arbitrariness and ad hoc-ism in teak resource development.
- Promote/facilitate establishment of targeted financing (in terms of adequacy and timeliness) to ensure that plans on teak development are supported financially.

Networking

- Strengthen the system of regional and international collaboration, coordination and networking to promote the exchange of research results and experiences, training and human resource development between countries of tropical Asia, Africa, Latin America and the Caribbean, supported by the private sector, including communities and relevant international agencies.

Teak and forest management in Myanmar

Myanmar's natural teak forests are being supplemented increasingly by plantations

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THE harvesting of teak (*Tectona grandis*) from natural forests has been a major source of export earnings for Myanmar for many decades. Although the sustained yield concept was introduced as early as 1752, it has been officially recorded that scientific forest management started in 1856 with the introduction of the so-called Brandis management system, which has evolved gradually to what is now known as the Myanmar Selection System (MSS), still the main system practised in the management of natural teak-bearing forests in Myanmar.

Treading softly: elephants are still used widely for log extraction in Myanmar's teak forests.
Photo: Myanmar Forest Department

Under the MSS, forest lands are organised into felling series, each of which is divided into 30 blocks of approximately equal yield capacity. One block per year is harvested and the whole felling series is worked in the course of a 30-year felling cycle. In each block due for harvest, marketable trees with diameter at breast height (dbh) at or above the fixed exploitable limits (which vary depending on forest type; see below) are selected and cut; the extracted volume must be within the bounds of the annual allowable cut, which is determined for each felling series based on the principle of sustained yield management.

For teak, which is usually girdled and left standing to dry and season for three years before felling, the exploitable limit varies with the type and condition of the forests: 73 cm dbh in moist forests with good growth rates and 63 cm dbh in drier types. The limits for other hardwoods, which are felled green, vary by species. Exploitable limits are determined and fixed at sizes beyond which trees are not expected to put on appreciable increment and where their retention would interfere with the growth of young trees and impede regeneration. However, some trees at or above the exploitable limit may be retained; where seed-bearers are scarce, for example, superior trees at and above the exploitable limits may be kept as seed trees, while unhealthy trees below the limits can be removed if they are marketable and unlikely to survive through the next cycle. Trees retained at the time of selection are recorded to provide a reliable basis for calculating future yield.

Apart from the extraction of mature and senescent trees, which itself can be considered a cultural operation, various kinds of silvicultural treatments are provided for a range of conditions to improve the natural regeneration of teak and to protect immature stock and assist it in attaining a healthy maturity. These include improvement felling, natural regeneration felling, thinnings in congested naturally regenerated stands, felling of nyaungbat (*Ficus*-bound teak), climber-cutting, etc.

We believe that the MSS system is an excellent and also the only feasible way of working the multi-species, complex natural teak-bearing forests of Myanmar. It not only lends itself well to forest in which close to a thousand tree species grow but only a few are extracted, but also causes little ecological damage. Most log extraction is done by elephant, a practice which minimises disturbance and complements the silvicultural regime. The present annual allowable cut for teak and other hardwoods is 460 528 m^3 and 2 533 608 m^3 respectively; production for the decade 1990–2000 is shown in the table.

However, as in other countries, Myanmar is experiencing forest degradation due to an increasing population and

Teak take

Harvested volume (m^3) of teak and other hardwoods from natural teak forests in Myanmar, 1990–2000

YEAR	TEAK	OTHER HARDWOODS
1990–91	534 858	578 751
1991–92	469 682	711 948
1992–93	503 439	743 054
1993–94	458 042	717 435
1994–95	473 620	861 432
1995–96	414 719	1 122 993
1996–97	366 113	1 323 219
1997–98	431 038	1 493 153
1998–99	454 084	1 559 768
1999–00	470 365	1 533 192

growing demand for timber and agricultural land. Myanmar is, therefore, faced with the challenging task of restoring its degraded forests and enhancing the existing natural stock of teak not only by natural but also artificial means.

The Myanmar Forest Policy of 1995 stipulates that the natural forest of Myanmar shall never be substituted by plantations, although cultural treatments to assist immature stocks and natural regeneration may include supplemental plantings of various types and extents. Tree-planting is carried out on a moderate scale to enrich degraded areas and prevent inbreeding depression, while larger-scale plantations are being established to replenish deforested areas in an effort to create an additional future timber resource.

Plantation forestry

The first recorded attempt to establish a teak plantation by the *taungya* method was made in 1856. Previously, plantations had been established more with a view to increasing the natural stock of teak rather than creating fully stocked large stands. Silvicultural treatments, especially thinning, were provided up to the age of 40 years, after which planted areas were left to merge with the natural surroundings and treated as such under the MSS. Plantation forestry had its ups and downs for a number of reasons and it was not until the early 1980s that extensive teak plantations were established with a well-defined rotation (initially of 80 years and later of 60). To date, some 332 844 hectares of teak plantations have been established throughout the country.

Complementary to the extensive normal plantation effort, a special teak plantation program was introduced in 1998. This program is being implemented on the basis of past experiences and the ITTO guidelines for planted forests; it aims to maximise timber production within the limits of environmental best-practice. These plantations will have a rotation of 40 years and the establishment phase is structured with a series of eight consecutive stages of five years each. The annual rate of planting is 8100 hectares, so that by the end of the 40-year rotation a total of 324 000 hectares would be established. Thereafter, 8100 hectares will be available annually for harvesting; the sustainable annual production may be as high as 1.8 million m^3 but certainly not less than 0.6 million m^3.

Qualitative improvement is also being made through the selection of seed production areas for the immediate future and the establishment of clonal seed orchards to ensure long-term teak improvement. More efficient propagation methods such as vegetative cuttings and tissue culture are also being developed and practised with the establishment of teak hedges or multiplication gardens.

Community participation

Community participation in forest management is also being encouraged. The recently completed ITTO PROJECT PD3/98 REV. 1(F): 'Teak-based multistoried agroforestry system: an integrated approach towards sustainable development of forests', which demonstrated the compatibility of teak with other tree species and cash crops, is expected to be the forerunner of a more widely applied system in which communities participate more fully in teak-forest management and use.

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Teaknet (Asia-Pacific Region)

The Second Regional Seminar on Teak held in Myanmar in 1995 unanimously endorsed the establishment of 'Teaknet Asia-Pacific Region', a network designed to strengthen interaction among all those concerned about the conservation, management, utilisation and trade of teak. The Forest Department of Myanmar, with its vast experience in the management of teak forests, was given the privilege and honour of hosting the secretariat of this network, which was inaugurated in June 1995 with the approval of the Government of Myanmar.

The specific objectives of Teaknet are to:

- facilitate the exchange of technology and information on silviculture, management, harvesting, processing and trade of teak;
- assist in the exchange of genetic material, plant and wood samples and the standardisation of trials for international comparison; and
- promote collaborative studies on critical areas of common interest to member countries or institutes.

Teaknet's activities comprise: the organisation of seminars in collaboration with international organisations and related government agencies; the publication and distribution of a newsletter, proceedings and other publications of interest; the collection of information and compilation of a database and library; the arrangement of visits by Teaknet members; and responding to enquiries on teak and related matters, among other things.

Anyone interested in participating in Teaknet should contact the author.

Status of forest management in Myanmar

Myanmarese forestry must meet a number of challenges if it is to retain its reputation for excellence*

MYANMAR'S natural forests are still the country's primary source of forest products, providing teak and other hardwood timber and performing valuable protective services. The important forest types are: mixed deciduous forest, including teak (38% of the total forest area of about 34.4 million hectares); hill and mountable evergreen forest (26%); tropical evergreen forest (16%); dry forest (10%); deciduous dipterocarp forest (5%); and tidal swamp forest (4%). Forests are owned by the State and are categorised legally as reserved forests (30%) and public forest or unclassified forests (70%).

Permanent forest estate: of the total forest area, 13 million hectares (37.8% of the total forest area and 19% of the country's land area) are categorised as permanent forest estate (PFE), of which 3.3 million hectares are in designated conservation reserves. It is claimed that 62.2% of the boundary of the PFE has been demarcated. Within the PFE, 9.7 million hectares are designated as production forest, comprising 8.3 million hectares of mixed deciduous and 1.4 million hectares of evergreen forests. The natural forests are managed under the Myanmar Selection System, which is described by Saw Eh Dah on page 12. The Myanmar Timber Enterprise (MTE), a state-owned company, is responsible for the harvesting of both teak and other hardwoods. It operates 38 extraction and rafting agencies throughout the country.

The dragging of logs is done mainly by elephants and, to a lesser extent, water buffalo. The use of animals in log extraction has a low impact on the environment and biodiversity, and wastage is low compared to mechanical logging. The MTE has about 3000 elephants and hires an additional 2000 from private owners for timber extraction. Heavy machinery is used mainly for road construction, the loading and unloading of logs, and transportation.

In addition to logging carried out by MTE under the supervision of the Forestry Department, the State Peace and Development Council and State Law and Order Restoration Council (SPDC/SLORC) have granted logging concessions as part of ceasefire deals in some border regions.

Logging plans: it is reported that the area covered annually for wood harvest is about 411 000 hectares. Logging activities are guided by the National Code of Forest Harvesting Practices, which gives detailed guidelines for activities such as the alignment and construction of extraction roads, skid trails and stream crossings; the marking of tree position on maps; climber-cutting before felling; and the directional felling of selectively marked trees.

Institutional arrangements

Forest laws and rules: the Burma Forest Act 1902 and subsequent amendments were in use until SLORC promulgated new forest legislation in November 1992. The important instruments for implementing the Myanmar Forest Policy 1995 are:

- Forest Law (1992);
- Forest Rules (1995);
- Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law (1994);
- Community Forestry Instructions (1995);
- Myanmar Agenda 21 together with Environmental Policy;
- National Forestry Action Plan (1995);
- Criteria and indicators for sustainable forest management (1999);
- Format and guidelines for district forest management plans (1996);
- National Code of Practice for Forest Harvesting; and
- National Framework for Environmental Law.

The 1992 forest law emphasises the importance of people's awareness and participation in the conservation and sustainable utilisation of forest resources. It also stresses the importance of collecting and updating resource information, planning, the continuous monitoring of all forest operations, and maintaining the ecological balance and environmental stability.

Organisation for policy implementation: the Ministry of Forestry has the primary responsibility for the administration and management of the forestry sector. The organisational structure comprises a combination of government agencies (such as the Planning and Statistics Department, the Forest Department, MTE, the Dryzone Greening Department and the National Commission on Environment Affairs), government-sponsored non-governmental organisations (NGOs) such as the Forest Resource, Environment, Development and Conservation Association, and private bodies such as the Timber Merchants Association.

The initial adoption of a market economy in the country was announced in September 1988 and, as a result, many private timber companies became involved in timber industries. However, MTE retains a monopoly on the harvesting, processing and export of teak and the private sector is not allowed to export logs of any species. With a view to stepping up the manufacturing of forest products and to promote internal and external distribution, a Forest Products Joint Venture Corporation has been established jointly by MTE, the Forest Department and private enterprises.

Criteria and indicators: Myanmar adopted a set of criteria and indicators for sustainable forest management in 1999. It comprises seven criteria, 76 indicators and 257 activities at the national level and seven criteria, 73 indicators and 217 activities at the forest management unit level.

Civil society involvement: the participation of civil society in Myanmarese forestry takes place through government-sponsored NGOs such as those noted above. Others, such as

farmers' and women's income-generation groups (FIGGs), are being formed. The FIGG initiative aims to raise off-farm incomes and help sustainable forest management with a positive effect on social well-being. Some 38 million people are dependent on forests in Myanmar, for whose benefit an area of 6 749 000 hectares of local-supply working circle has been set aside. About 260 agreements between social groups and the Forest Department are in force.

Resource mobilisation: fund mobilisation for forestry development is mainly a government responsibility. Despite the existence of a long-term national forest action plan (1995) and district forest management plans, resource planning for program implementation has not gone well. Little foreign assistance is available: overseas development assistance for Myanmar was recently estimated to be about US$1 per capita, compared to US$35 per capita for Cambodia and US$68 for Laos.

Status

Myanmar has long enjoyed a reputation for good forest management, particularly in its teak forests. Planned management for timber production dates back about 150 years and the continued productivity of its forests is testament to its quality. However, there are signs that sustainability is under threat from a number of sources and significant parts of the country's forest resources are in a critical and degraded condition. Issues that need to be addressed include:

- timber extraction is concentrated on only a few species, particularly teak. The 'creaming' of the forest, if not abated, might lead to the devaluation of the forests in the long run through a decrease in valuable species. There is limited knowledge on how to market lesser used species and not much is done to promote non-wood products and the non-timber benefits of forests;
- forest management and forest health are further affected by illegal logging and poaching, particularly in border forests, and by encroachment for agriculture and infrastructure development. An estimated 5.2 million hectares of forest were cleared in the 1990s (FAO 2001); and
- the Forest Department is working to conserve the natural forests in the PFE, including through inventories, surveys, boundary demarcation, fire protection, logging codes, forest reservation, the establishment of the PFE, and increased community involvement. However, the effectiveness of these interventions is limited due to, among other things, chronic budget shortages in the Department, very limited private-sector and civil-society involvement, an insufficient and inadequate manpower resource, existence of illegal activities, and inefficient utilisation.

Border areas: Global Witness (2004) cites considerable conflicts in natural resource management in Myanmar, particularly in border areas. These include: serious misuse/abuse in logging activities; uncontrolled logging in Kachin state and the cross-border movement of logs into China; in Karen state, the cross-border movement of logs into Thailand; and the unsustainable and destructive activities of logging companies operating in ceasefire areas. The management of forests by insurgent groups has been poor or non-existent and much of the resource has already disappeared.

Part of the problem in border areas arises from cross-border demand. The Government of Thailand imposed a ban on logging in 1989, which increased demand for timber produced in the border areas of Myanmar. Likewise, the demand for forest products in southern China is also increasing the harvesting of forests in northern Myanmar. This increased demand, if not matched by enhanced forest law enforcement, will cause the further degradation of timber resources in Myanmar and threaten the conservation of biodiversity, suggesting the need for a joint border conservation program.

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Thinking big about small-scale enterprises

Small-scale forest enterprises play a significant role in India's forestry sector, but their role and full potential is not completely understood

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SMALL-SCALE forest enterprises (SSFEs) are small companies, community groups and collectives involved in the growing, harvesting, processing and marketing of timber and non-timber forest products. They play a significant role in India's forestry sector, supporting the livelihoods of millions of people in rural areas and generating revenue and foreign exchange for the country. But exactly how significant is their role, and how can national and sub-national policies best facilitate them? We believe that answering such questions should be a research priority.

Is she an SSFE? Millions of people in India support their families through the processing and sale of firewood, but data are difficult to obtain. *Photo: H.O. Ma*

How big is the small-scale sector?

In India, SSFEs are officially part of a group called small-scale industries (SSIs), which are defined in terms of value of investment in plant and machinery. At present, industrial enterprises are designated as SSIs if they have a total investment in plant and machinery of less than 10 million rupees[1] (about US$220 000; NCAER 2001).

The SSI sector in India accounts for around 95% of all industrial units, 40% of the manufacturing sector output and 36% of exports and provides direct employment to about 18 million persons in around 3.2 million registered SSI units in the country (NCAER 2001).

The bulk of forest-produce processing in India is carried out by SSFEs. For example, 98% of sawmills (Maccinnes 1979 in Tewari 1995), 87% of plywood factories (Federation of Indian Plywood and Panel Industry nd) and 94% of paper mills fall into this category (Pradhan & Barik 1999).

As the capacity of agriculture to generate additional livelihoods declines over time, we expect more and more rural people to turn towards employment in SSFEs and other SSIs in the future. As the sector grows it will become increasingly important to ensure a policy environment in which the sector is facilitated rather than hindered. However, it is difficult to get an accurate picture of even the total number of SSFEs in the country or their output, although some data are available for some segments of the sector. The table summarises available data for medium-sized and large forest enterprises.

Regular and jumbo

Number of units of medium-sized and large wood-based industries

INDUSTRY	No OF UNITS
Paper mills	21
Newsprint	5
Rayon grade pulp	5
Paper grade pulp	1
Paperboard	305
Plywood	61
Veneer	14
Blockboards and flushdoors	98
Particleboard	11
Fibreboard	5
Safety matches	5

Source: GoI 1999

Some key features characterising SSFEs

A feature of India's SSFE sector is that while the government owns most of the forests, the bulk of SSFEs are in private hands. Major forest industries operating mostly at the small scale include: sawmills; those involved in the manufacture of safety-matches, wood-based panels, sporting goods and pencils; woodcarving; pulp-and-paper mills; and non-timber forest products (NTFPs) such as *beedi* (an indigenous cigarette in which tobacco is rolled in a tendu leaf and tied with a cotton thread), lac, resins, *katha* (*Acacia catechu*), *agarbatti* (a kind of incense stick), medicinal plants, etc. Some SSFEs—such as the medicinal-plant and woodcarving industries—earn valuable foreign exchange. More importantly, a large number of household-based production (eg farm forestry) and processing (eg leaf plate-making) enterprises provide livelihood support to millions of rural people. India has a very large number of poor (about 260 million) and indigenous (about 80 million) people, many of whom depend on forest-based livelihoods such as the collection, processing and sale of fuelwood and NTFPs (note though that many such activities are not included in official statistics on SSIs or SSFEs). It is estimated that NTFP-based SSFEs alone provide up to 50% of the income of 20–30% of the rural labour force in India (GoI 1999).

[1]The ceiling for qualification as an SSI unit keeps on changing. The ceiling was raised from 6 million to 30 million rupees on 10 December 1997 but was subsequently reduced to 10 million rupees on 24 December 1999 (NCAER 2001).

Many very small enterprises cater to local demand. For instance, it is estimated that 2.1 million bullock carts are constructed each year, as are 50 million yokes, 100 million wooden ploughs and 30 million wooden seeders (Tewari 1995).

Generally, SSFEs are location-specific, and their nature is determined on the basis of the availability of resource, labour and markets (Campbell 1991). For instance, most safety matches are manufactured in Tamil Nadu, whilst the bulk of sporting goods are manufactured in just two cities.

While it is difficult to obtain national figures, data from sub-sectors suggest that SSFEs are extremely important generators of employment. It is estimated, for example, that over 3 million people are employed in the *tendu*-leaf collection and *beedi*-rolling industry (www.uohyd.ernet.in/sss/dhistory/beedi/beedi.html) and nearly half-a-million people are employed in safety-match making, sawmilling and woodcarving.

Policy scenario

Like many other sectors in India, the SSFE sector is subjected to various financial, economic, trade, labour and environmental policies and regulations, some of which act to promote the sector and some to hinder it. In recent years a flurry of court rulings has also had an impact on the sector.

Overall, the policy environment for SSIs is very favourable and they enjoy protection and a number of concessions. For example, many SSIs are entitled to special excise concessions and receive preferential treatment from banks for obtaining credit and various export incentives. However, with economic liberalisation and changes in the trade policy, SSIs are now facing increased competition from foreign companies.

Threats and opportunities

The SSFE sector faces a number of opportunities and threats. Some of the main opportunities include:

- *government incentive schemes*, which are available to SSIs in general, and *government protection measures* such as the reservation of a large number of items that must be purchased exclusively from SSIs;
- *tax incentives and promotional schemes:* these include concessions for a range of excises, sales' taxes and customs' duties;
- *emerging or rapidly growing markets* such as herbal medicines and packaging, where SSFEs can play an important role;
- *dwindling supplies of raw material* from government forests on account of degradation and/or green felling bans. This is creating opportunities for farm and community producers (but is also a threat to the sector, see below); and
- the growth of farm forestry in certain areas such as the *Tarai* and coastal Andhra Pradesh, which has, in turn, opened up opportunities for establishing new processing industries there (Saigal et al. 2002).

The key threats faced by SSFEs in India are:

- a *growing shortage of quality raw material* due to felling bans and restrictions on extraction in several states;
- growing *concerns over environmental and labour issues:* in recent years, for example, court rulings have resulted in the closure of many forest-produce processing industries on account of environmental concerns;
- since economic liberalisation there has been growing competition from cheap imports and a trend towards removal of protective policies, such as reservation; and
- the stringent application of an international intellectual property rights' regime is also likely to adversely affect Indian SSFEs, especially processing industries.

Federations

The role played by industry federations and associations in the SSFE sector is not fully understood, but they remain relatively weak and do not appear to coordinate their efforts. A strong network of such federations and associations, on the other hand, could greatly strengthen the ability of SSFEs to influence policies and to create a policy environment in which they can prosper.

Conclusion

Given the immense importance of SSFEs in improving the livelihoods of the poor and managing forest resources, the relative dearth of information about them must be viewed with concern. At present, information—when it exists at all—is mostly scattered among various departments or else is out of date or incomplete. A greatly increased research effort is needed to illuminate the current situation and the various opportunities and constraints faced by SSFEs. Otherwise, the great potential of SSFEs to contribute to sustainable development in India may not be fully realised.

This article arises from a wider study carried out by Winrock International India in New Delhi in collaboration with the International Institute for Environment and Development in London, UK, which also coordinated the overall initiative.

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Small change from climate-change negotiations?

The latest Conference of the Parties to the UN Framework Convention on Climate Change has set the rules for applying the Clean Development Mechanism to forest-related activities

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ACCORDING to the bulk of scientific opinion, the world is getting warmer, due, at least in part, to increasing concentrations of greenhouse gases (GHGs) in the atmosphere. This warming phenomenon, and its effects on the global climate, is what is referred to as human-induced climate change, or global warming. A large part of the build-up of GHGs in the atmosphere has been contributed over the last couple of centuries by industrialisation processes and by changes in land-use, particularly deforestation.

The parties to the United Nations Framework Convention on Climate Change (UNFCCC) accept that human-induced climate change is occurring and that there is a need to reduce its adverse effects. Two main strategies have been identified: mitigation and adaptation. The mitigation strategy concentrates on reducing GHG emissions and on enhancing sinks (the means by which GHGs are removed from the atmosphere); adaptation refers to any adjustment in ecological or social systems in response to the actual or expected impacts to climate change.

Carbon sticks: if established since 1990, reforested lands such as these in Java, Indonesia, could be eligible to earn carbon credits under the CDM. *Photo: E. Müller*

Tropical forests

The implementation of both strategies has some important implications for the production and trade of tropical forest goods and services and therefore for ITTO activities.

Mitigation

The Kyoto Protocol (agreed in 1997 but yet to come into force) established reduction commitments for so-called Annex I countries (mainly industrialised countries) and created three flexible mechanisms that could help these countries to achieve their reduction objectives; the mechanisms are known as Joint Implementation, International Emissions Trading, and the Clean Development Mechanism (CDM; see the Protocol for definitions of each).

The CDM is of special importance for ITTO because it is the only flexible mechanism that allows the trading of carbon certificates between developing (non-Annex I) countries and industrialised (Annex I) countries. However, until 2012 the CDM includes just two activities in land-use, land-use change and forestry (LULUCF): reforestation and afforestation. The Marrakech Accords (2001) defined these as follows:

- 'afforestation' is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources; and
- 'reforestation' is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land.

For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989. Note that natural forest management and conservation were not included as eligible activities in the first commitment period.

Many ITTO producer members have expressed their interest in promoting CDM/LULUCF activities as a complement to their own sustainable development goals. However, the negotiation process has been extremely difficult due both to political interests and to some misunderstanding of realities in the forestry sector and such activities are yet to be undertaken on a significant scale.

Adaptation

Negotiations regarding adaptation have been slower than those for mitigation. During the UNFCCC's 8th Conference of the Parties (COP 8) in New Delhi in 2002, many parties expressed the urgent need to understand the potential impacts

of climate change and to promote corresponding adaptation measures. This call was reinforced during the World Summit on Sustainable Development in Johannesburg in August 2002 in recognition of the higher vulnerability to climate change of many poorer and less-developed countries.

The extent to which climate change will affect the availability and quality of tropical forest goods and services is still unclear, although it seems likely that some important tropical forest ecosystems will be threatened. Mexico and Indonesia, for example, have both indicated that an increase in forest fire is one of their major vulnerabilities. In other cases, predicted changes in the morphology of forests and declines in water sources in the next two decades would threaten timber production. Besides the negative impacts on forest ecosystems, the importance of such ecosystems in reducing vulnerability to climate change (eg by supplying environmental services) is rapidly gaining recognition within the UNFCCC.

How to reforest: participants at an ITTO regional workshop on applying the *ITTO Guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests* conduct a field exercise in cooperation with a local community in Tarapoto, Peru. *Photo: E. Müller*

Outputs and implications of COP 9

The UNFCCC's COP 9 took place in Milan, Italy during the first two weeks of December 2003. It focused, among other things, on decisions regarding the participation of forestry activities in the CDM until 2012. Decision -/CP.9 on 'Modalities and procedures for afforestation and reforestation project activities under the CDM in the first commitment period of the Kyoto Protocol' is a set of rules for LULUCF/CDM projects until 2012. It not only prescribes eligible activities for the CDM but also how carbon will be accounted, monitoring requirements, the duration of LULUCF/CDM projects, the carbon certification process, and the consideration of socioeconomic and ecological issues.

Due to the nature of the definitions and modalities agreed in this decision and because of the cap for LULUCF/CDM projects defined in the Marrakech Accords[1], the potential market for certified emission reductions (CERs)—the tradable carbon certificates from the CDM—produced in the forestry sector in non-Annex I countries appears to be relatively small. However, previous experience demonstrates that the inclusion of a CDM component in projects aimed at the sustainable management of rehabilitation activities, plantations and agroforestry can improve their feasibility.

Regarding adaptation, COP 9 made some advances concerning the continuation of financing for national studies in which the vulnerability to climate change at the national level is analysed. Further, COP 9 invited the Global Environment Facility to start the experimental application of adaptation capacity-building and other measures.

ITTO experiences, opportunities and challenges

During the past five years ITTO has gained insight into the potential and limitations of the CDM in forestry activities through the financing and monitoring of pilot projects[2], particularly ITTO PROJECT PD 54/99 (F): 'Alternative financing model for sustainable forest management in San Nicolás forest, Colombia'. Recently, too, ITTO has participated more actively in UNFCCC negotiations, allowing greater analysis of the implications of such negotiations for ITTO's work and a greater understanding of the potential future role of ITTO in the UNFCCC.

It is important that ITTO's practical experiences and knowledge in tropical forestry be introduced into the UNFCCC negotiations. In some areas, such as sustainable tropical forest management and its monitoring, certification and market development, ITTO input could enlighten and enrich the negotiation process.

ITTO could also support its members in understanding the potential of CDM projects for making sustainable tropical forest management more economically viable. Pilot projects can provide experience, training and valuable case-studies and data on the critical issues in LULUCF/CDM. This helps to create capacities and reduce the costs of larger-scale projects.

Finally, ITTO could assist member countries to understand the potential impacts of climate change on the availability and quality of tropical forest goods and services and to prepare corresponding adaptation measures.

[1] *"for the first commitment period the total of additions to a Party's assigned amount resulting from eligible land use, land use change and forestry project activities under the Clean Development Mechanism shall not exceed one per cent of base year emissions of that Party, times five" (UNFCCC Dec17/CP7 Num.7b).*

[2] *eg PD 54/99 (F): 'Alternative financing model for sustainable forest management in San Nicolás forest'; PPD 42/02 (F): 'Promotion of the Clean Development Mechanism in the framework of sustainable management with local communities involvement'; PD 174/02 (I): 'International workshop on the Clean Development Mechanism: opportunities for the forest sectors in tropical countries' .*

Council's latest grants

Initiatives in forest conservation, management planning, forest statistics and the development of small-scale forest industries, among others, received funding at the 35th session of the International Tropical Timber Council, held in Yokohama, Japan, in November 2003

Training and application of ITTO criteria and indicators for sustainable forest management at the forest unit level in natural production forests of Ecuador (PD 5/00 Rev.4 (F))

Budget	ITTO:	$252 991
	Juan Manuel Durini Forest Foundation:	$117 436
	Total	**$370 427**

Implementing agency Juan Manuel Durini Forest Foundation in cooperation with the private sector, Chachi indigenous communities, non-governmental organisations and the Ministry of Environment
Funding source Japan

This project will strengthen and promote sustainable forest management in Ecuador by providing training in and applying the *ITTO Criteria and Indicators for the Sustainable Management of Natural Tropical Forests (C&I)* at the forest management unit (FMU) level to 13 830 hectares of Ecuadorian coastal production forests. The project will train about 100 people from both public and private sectors in the application and monitoring of C&I at the FMU level and in sustainable forest management techniques. It will also implement a permanent computerised monitoring system for C&I in order to assess progress towards the sustainability of management activities in selected Ecuadorian forests over time.

Conservation of biological diversity through sustainable forest management practices (Malaysia; PD 165/02 Rev.3 (F))

Budget	ITTO:	$526 401
	Government of Malaysia:	$568 891
	NGO:	$136 320
	Total	**$1 231 612**

Implementing agency Forest Research Institute Malaysia
Funding sources Japan, USA, Norway

This project will assist in biodiversity conservation in Malaysia's natural forests by formulating improved tools for the integration of biodiversity considerations into forest management decisions. Its specific objectives are to: develop improved methods for assessing biodiversity and developing a better understanding of the impacts of forest management practices on it; develop improved stand-level models for predicting the impacts of forest management systems on biodiversity; and enhance the capacity of targeted stakeholders in tropical regions and disseminate tools and techniques developed by the project.

To establish a national monitoring information system for the effective conservation and sustainable management of Thailand's forest resources (PD 195/03 Rev.2 (F))

Budget	ITTO:	$677 743
	Government of Thailand:	$382 677
	Total	**$1 060 420**

Implementing agency Thailand Department of National Parks, Wildlife and Plant Conservation (DNP)
Funding sources Japan, Switzerland, Australia

This project will build on ITTO PROJECT PD 2/99 REV.2 (F) to generate information in support of informed policy decision-making by DNP and other agencies involved in forest conservation and sustainable forest management. Specifically, it will set up a national monitoring system to provide change and trend data on timber and non-timber forest resources. When linked with socioeconomic information, these data will provide a basis for sound policy decisions and for measuring progress toward sustainable forest management by reporting on the national criteria and indicators.

Support for the implementation of a sustainable forest development master plan in Eco-floristic Area IV, Togo (PD 197/03 Rev.2 (F))

Budget	ITTO:	$317 093
	Government of Togo:	$128 390
	Total	**$445 483**

Implementing agency Department for the Control and Protection of Flora Utilization
Funding sources Japan, Norway

Eco-Floristics Area IV is located in the southern part of Mt Togo, where forest degradation has been accelerated by unsustainable agricultural practices and logging and by wildland fire. This project, an output of ITTO PRE-PROJECT PPD 11/00 REV.2 (F), will enhance the capacity of local communities to manage the remaining natural forests and extend the area's plantation estate in a sustainable manner.

Harmonisation of forest-related terms and definitions (Philippines; PD 222/03 Rev.1 (F))

Budget	ITTO:	$21 200
	Forest Management Bureau:	$16 841
	Total	**$38 041**

Implementing agency Forest Management Bureau, Department of Environment and Natural Resources (DENR)
Funding source Australia

One of the issues confounding sustainable forest management in the Philippines is the lack of standard terms and definitions, which causes, among other things, considerable confusion among users of statistics. This small project aims to harmonise Philippine forest-related terms and definitions with international standards through the review and revision of existing forest-related terms and definitions.

Transboundary biodiversity conservation: the Pulong Tau National Park, Sarawak State, Malaysia (PD 224/03 Rev.1 (F))

Budget	ITTO:	$740 781
	Government of Malaysia:	$805 782
	Total	**$1 546 563**

Implementing agency Forest Department of Sarawak
Funding sources Japan, Switzerland, USA, Norway

The Pulong Tau National Park in Sarawak is an important conservation area because of its high biodiversity and unique ecosystems. The development objective of the project is to contribute to the conservation of natural ecosystems in the Kelabit Highlands of the State of Sarawak and to the sustainable development of local communities through the implementation of biodiversity conservation activities and support for local socioeconomic development initiatives. The specific objectives are to: initiate a process of sustainable conservation and management of the PTNP; and improve cooperation between Sarawak and Indonesia for the conservation of the transboundary ecosystem shared by Pulong Tau and the Kayan Mentarang National Park in Indonesia.

Adoption and implementation of an appropriate system of criteria and indicators for the Philippines (PD 225/03 Rev.1 (F))

Budget	ITTO:	$520 076
	DENR:	$100 000
	Total	**$620 076**

Implementing agency DENR
Funding sources Japan, USA

This project will promote the sustainable management of the Philippines' tropical forests through the adoption and implementation of a system of criteria and indicators for sustainable forest management (C&I). Its specific objectives are to: adopt and institutionalise an appropriate system of C&I at the national and forest management unit levels using the results of ITTO PRE-PROJECT PPD 29/01 (F) on the development of C&I; and test and adopt an auditing system for C&I on a pilot basis.

Development and installation of a forest resources monitoring system (FORMS) by utilising the forest canopy density (FCD) model developed in ITTO project PD 66/99 Rev.1 (F) (Philippines; PD 239/03 Rev.1 (F))

Budget	ITTO:	$347 118
	Government of the Philippines:	$96 380
	Total	**$443 498**

Implementing agency DENR Region IV—Calabarzon
Funding sources Japan, Republic of Korea

This project will support the efficient management of forest resources by enabling decision-makers to access information on the status of forest conditions in a timely manner. Its specific objectives are to: establish a remote sensing-based system for the assessment and monitoring of forest resources; implement skills' development programs for the analysis of remote sensing data by personnel from the regional, provincial and community offices of DENR IV; and produce and distribute updated maps of forest status.

Alternative financing model for sustainable forest management in San Nicolás—Phase II: non-Kyoto rehabilitation areas (Colombia; PD 240/03 Rev.1 (F))

Budget	ITTO:	$555 429
	CORNARE:	$408 825
	EMPA:	$88 500
	Total	**$1 052 754**

Implementing agency Regional Autonomous Corporation of Rionegro-Nare (CORNARE) in cooperation with the Swiss Federal Institute for Materials and Technology Research and Testing (EMPA)
Funding sources Switzerland, Japan, USA

In agreement with the communities, this project, a follow-up to ITTO PROJECT PD 54/99 REV.1 (F), will implement forest management systems in pilot areas using financial instruments such as payments for environmental services (particularly mitigation, adaptation to climate change and conservation of biodiversity) with the aim of improving the ability of communities to develop sustainable land-use alternatives. Expected outputs include: connected biological corridors; sustainable management practices targeted at the extraction of timber and non-timber forest products; communities trained in strategic areas for the implementation of the forest management plan including forest extension, business ventures and forest ecology; a proposal for a regional legal framework promoting restoration and rehabilitation of forest lands and sustainable management submitted to competent authorities; and availability of financial instruments for the payment of environmental services.

Alternative mixed plantation systems and restoration strategies for conservation and sustainable production of native timber species in Ghana (PD 256/03 Rev.1 (F))

Budget	ITTO:	$301 750
	Government of Ghana:	$84 896
	Northern Arizona University:	$48 378
	Total	**$435 024**

Implementing agency Forestry Research Institute of Ghana
Funding sources Japan, USA

An estimated 80–90% of Ghana's 75 000 hectares of forest plantation consists of exotic species. The lack of interest in native species is due to a high incidence of pests and disease in monoculture plantations caused by poor site selection and silvicultural practice. This project will promote the sustainable production of native tropical timber species and the conservation of biodiversity in Ghana by developing ecologically stable plantation systems with native species that offer sufficient protection for high-risk timber trees and are acceptable in Ghana. It will also promote restoration within the Bobiri Forest Reserve through the biological suppression of an invasive weed.

Expanding and improving the Global Mangrove Database and Information System (GLOMIS) and its networking (Japan; PD 194/03 Rev.2 (M))

Budget	ITTO:	$484 865
	Total	**$484 865**

Implementing agency International Society for Mangrove Ecosystems
Funding source Japan

This is an extension of a project that has been implemented since 1997 to construct a global database on mangroves (GLOMIS). Data are collected by four regional centres (Brazil, Fiji, Ghana and India) and disseminated worldwide from GLOMIS headquarters in Okinawa, Japan. One of the main objectives of this project is to develop the capacity of the regional centres in their roles as focal points for data collection and processing.

Upgrading and strengthening of the national forest statistical information system in Venezuela (PD 196/03 Rev.1 (M))

Budget	ITTO:	$384 265
	Total	**$384 265**

Implementing agency Dirección General del Recurso Forestal (DGEF) del Ministerio del Ambiente y de los Recursos Naturales (MARN)
Funding source Japan

This project will align the National Forest Statistical Information System with the various institutions generating information in the country. The project will identify information needs, strengthen existing information modules, and develop new modules on forest plantations, non-timber forest products, forest management, forest management monitoring and control, and local communities. It will also establish four regional nodes to decentralise the gathering, processing and validation of forest statistical information.

Training of forest practitioners for the improvement of forest industry in Cambodia (PD 131/02 Rev.2 (I))

Budget	ITTO	$290 842
	Government of Cambodia	$27 520
	Total	**$318 362**

Implementing agency Department of Forestry and Wildlife
Funding source Japan

This project will implement a training program for logging practitioners with a minimal educational background. During project implementation, 72 practitioners will be trained in general aspects of forest management, harvesting techniques and wood processing in cooperation with the private sector.

Support for the sustainable development of small forest industrialists through the use of appropriate intermediate technologies in forest harvesting (PD 233/03 (I))

Budget	ITTO	$552 089
	FONDEBOSQUE	193 818
	Total	**$745 907**

Implementing agency Forest Development Promotion Fund (FONDEBOSQUE)
Funding source Japan

This project will help strengthen the forest concession process initiated by the Peruvian government, and particularly small-scale forest industrialists who wish to participate in the process but lack the necessary infrastructure or financial resources. Through training, information dissemination and technical assistance the project will promote the use of appropriate intermediate technologies for forest harvesting in forest concession areas under the management of small and medium-sized timber producers and native communities located in the major Amazon regions of the country (Madre de Dios, Ucayali, San Martín, Huanuco, Loreto, Selva Central and Cuzco).

In addition to the projects described above, funds from donors, the Bali Partnership Fund and the Special Account were committed to a wide range of activities (including cooperation with FAO on the development and dissemination of guidelines for improving law compliance in the forest sector, the convening of ten national workshops to promote the implementation of its Guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests, *and the organisation of a panel to debate illegal logging and trade) and five pre-projects.*

**The prefix PD in the bracketed code denotes project. The suffix F denotes Committee on Reforestation and Forest Management, M the Committee on Economic Information and Market Intelligence, and I the Committee on Forest Industry. Budget amounts are in US dollars.*

Producers

Africa
Cameroon
Central African Republic
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Gabon
Ghana
Liberia
Nigeria
Togo

Asia & Pacific
Cambodia
Fiji
India
Indonesia
Malaysia
Myanmar
Papua New Guinea
Philippines
Thailand
Vanuatu

Latin America
Bolivia
Brazil
Colombia
Ecuador
Guatemala
Guyana
Honduras
Mexico
Panama
Peru
Suriname
Trinidad and Tobago
Venezuela

Consumers

Australia
Canada
China
Egypt
European Union
Austria
Belgium/Luxembourg
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Netherlands
Portugal
Spain
Sweden
United Kingdom
Japan
Nepal
New Zealand
Norway
Republic of Korea
Switzerland
United States of America

Fellowship report

With the assistance of an ITTO fellowship the author has developed a systematic approach to the assessment and monitoring of forest biological diversity

by
Dr Karan Deo Singh

Ashoka Trust for Research in Ecology and Environment (ATREE)
B-80 Shivalik, Malviya Nagar
New Delhi 110017, India

Earning their wings: school children enjoy a lesson in biodiversity monitoring in the buffer zone of the Kaeng Krachan National Park in Thailand. The Thailand Environment Institute and communities are implementing ITTO Project PD 16/97 there with the aim of improving local livelihoods and protecting and restoring forest adjacent to the national park. *Photo: A. Compost/ITTO*

DEMAND for the evaluation of the environmental functions of forests has grown rapidly over the last 30 years. The environmental conventions that arose from the 1992 United Nations Conference on Environment and Development (UNCED), for example, added significantly to the reporting obligations of countries. Chapter 15 of Agenda 21 (another product of UNCED), which focuses on biodiversity, calls on countries and their internal organisations to:

- develop efficient methodologies for baseline surveys and inventories as well as the systematic sampling and evaluation of biological resources;
- promote, where appropriate, the establishment and strengthening of the national inventory, … [and] promote national efforts with respect to survey, data collection, sampling and evaluation; and
- produce regularly updated reports on biodiversity based on national assessments.

However, such reporting with respect to forest biodiversity is confounded by a lack of knowledge and very limited assessment capacity in many countries.

This ITTO fellowship was implemented to meet some of the objectives listed in Chapter 15 of Agenda 21, particularly to develop a systematic approach to the assessment of forest biodiversity from local to global levels. The methods and examples described here are based on country experiences, a literature review, and techniques I developed during my tenure in the Forestry Department at FAO in Rome. The final product of the fellowship was a report that should be published shortly and is described here briefly.

Contents of the report

The report comprises three parts:

- an introduction to basic concepts, tools and techniques for making biodiversity assessments at genetic, species' and ecosystem levels;

Fellowship reports available

The following ITTO Fellowship reports are available on request form the authors:

Philippine termites: handbook for homeowners and pest control operators. ***Contact:*** *Dr Menandro N. Acda, College of Forestry and Natural Resources, University of the Philippines Los Baños, College, Laguna 4031, the Philipines; mna@mudspring.uplb.edu.ph*

El análisis de las políticas forestales en Bolivia, como referente al caso Peruano *(Masters thesis).* ***Contact:*** *Mr Juan Carlos Guzmán Carlín, Agrupamiento Risso Block F, Departamento 302, Lince, Lima 14, Peru; jcguzman@gmx.net*

Key techniques of continuous cover forestry and their possible applications in tropical forest management in China. ***Contact:*** *Mr. Qinglin Huang, Box 33, Chinese Academy of Forestry, Wan Shou Shan, 100091, Beijing, P.R. China; huangql@caf.ac.cn*

Evaluation of the context and assessment of the basic elements for consideration in a sui generis access and benefit sharing law in Cameroon. ***Contact:*** *Mr Marcelin Tonye Mahop, Queen Mary Intellectual Property Research Insitute, John Vane Science Centre, Charterhouse Square, London EC1M 6BQ, UK; t.m.marcelin@qmul.ac.uk*

- the application of techniques for making assessments at local, sub-national, national and global levels; and
- the use of collected data for planning the conservation and sustainable use of biodiversity components.

Chapter 1 defines biodiversity and connects it with major global phenomena such as biological evolution, the interdependence among organisms, and similarities in the forest formations of the world across the continents. It develops the subject further by describing the current status of forest biodiversity assessment and the commitments made by governments and other contracting parties towards national and global biodiversity reporting.

Chapter 2 describes the interaction between genetic factors and the environment and how the two interact in space and time to produce the myriad lifeforms we see around us. Methods for assessing genetic diversity are described briefly and inferences are drawn about forest management measures for conserving genetic diversity at the stand, species' and ecosystem levels.

Chapter 3 introduces tools and techniques commonly used in the assessment of biodiversity, including ecological zoning, forest-cover change assessment, field measurements, and modelling. One or more of these could be applied in combination depending on the problem to be solved. The chapter also presents some estimators of biodiversity, including species-area and species-individual relations, biodiversity indices and modelling techniques.

Chapter 4 describes methodologies for baseline surveys and change assessments based on the tools and techniques presented earlier. In a purely ecological survey, one would have chosen 'landscape' as the reference area of assessment. Here the level chosen corresponds to political units such as 'sub-national/national' with the idea that to be useful for the policy-making process, biodiversity assessments need to be integrated into a country's current forest inventory systems.

Chapter 5 presents an approach to producing reports on biodiversity at a global level based on existing country information. In view of the low level of capacity in most tropical countries, I consider it pragmatic to use a modelling approach in conjunction with existing reliable country data. Following or parallel to this, efforts could be made to improve estimates by collecting new information on a globally consistent basis.

Chapter 6 covers issues related to planning the conservation and sustainable use of biodiversity components and recommends a three-pronged forest management strategy including:

- the delineation of protected areas of adequate size by ecological zone to conserve biodiversity in an effective manner;
- the planning of multiple-use forests to meet local and national needs and, at the same time, to serve as habitat for diverse species of plants, animals and microorganisms; and
- intensive forestry and agroforestry plantations to meet growing local, national and international needs for timber, fuelwood, fodder and other products.

Chapter 7 stresses that capacities for the assessment, study and systematic observation and evaluation of forest biodiversity needs to be reinforced at national and international levels in order to design and implement surveys and to make effective use of the collected data for preparing comprehensive forest-sector plans.

The report emphasises the conservation of 'total' forest biodiversity, including that contained in protected areas and production forests. I hope that biodiversity and forest inventory specialists will find the report useful for developing cost-effective approaches for assessments and that it will contribute to sustainable forest management and the conservation of biological diversity.

Copies of the report can be obtained from the author.

ITTO Fellowships offered

ITTO offers fellowships through the Freezailah Fellowship Fund to promote human resource development and to strengthen professional expertise in member countries in tropical forestry and related disciplines. The goal is to promote the sustainable management of tropical forests, the efficient use and processing of tropical timber, and better economic information about the international trade in tropical timber.

Eligible activities include:

- participation in short-term training courses, training internships, study tours, lecture/demonstration tours and international/regional conferences;
- technical document preparation, publication and dissemination, such as manuals and mongraphs; and
- post-graduate studies.

Priority areas: eligible activities aim to develop human resources and professional expertise in one or more of the following areas:

- improving transparency of the international tropical timber market;
- promoting tropical timber from sustainably managed sources;
- supporting activities to secure tropical timber resources;
- promoting sustainable management of tropical forest resources;
- promoting increased and further processing of tropical timber from sustainable sources; and
- improving industry's efficiency in the processing and utilisation of tropical timber from sustainable sources.

In any of the above, the following are relevant:

- enhancing public relations, awareness and education;
- sharing information, knowledge and technology; and
- research and development.

Selection criteria: Fellowship applications will be assessed against the following selection criteria (in no priority order):

- consistency of the proposed activity with the Program's objective and priority areas;
- qualifications of the applicant to undertake the proposed fellowship activity;
- the potential of the skills and knowledge acquired or advanced under the fellowship activity to lead to wider applications and benefits nationally and internationally; and
- reasonableness of costs in relation to the proposed fellowship activity.

The maximum amount for a fellowship grant is US$10 000. Only nationals of ITTO member countries are eligible to apply. The next deadline for applications is **7 May 2004** for activities that will begin no sooner than 1 September 2004. Applications will be appraised in July 2004.

Further details and application forms (in English, French or Spanish) are available from Dr Chisato Aoki, Fellowship Program, ITTO; Fax 81–45–223 1111; fellowship@itto.or.jp (see page 2 for ITTO's postal address) or go to www.itto.or.jp

On the conference circuit

C&I implementation on the agenda

International expert consultation on criteria and indicators for sustainable forest management

2–4 March 2004
Cebu City, the Philippines

Nearly 50 experts from over 30 countries gathered in Cebu City, the Philippines in March to make recommendations on how to enhance the implementation of criteria and indicators for sustainable forest management (C&I), including improving liaison and communication between the nine C&I processes and promoting a common understanding of terms.

The meeting, hosted and chaired by the Government of the Philippines and sponsored by ITTO and FAO, arrived at a series of recommendations, including: the establishment of an international advisory group on C&I to address technical and policy issues common to the processes; assistance from established to newer processes; and support for the establishment of process secretariats where these do not already exist.

When finalised the report of the meeting will be posted on the ITTO and FAO websites. It will also be presented at the 4th Session of the United Nations Forum on Forests in May this year, where C&I are among the key agenda items.

For more information contact Dr Eva Müller, muller@itto.or.jp, or Dr Steven Johnson, johnson@itto.or.jp; Tel 81–45–223 1110; Fax 81–45–223 1111.

China considers accounting for forest benefits

Research on value accounting for tropical forest environmental resources—bringing them in line with national economic accounting systems in China

3–5 March 2004
Beijing, China

This workshop was hosted by the Chinese Academy of Forestry under ITTO PROJECT PD 39/98 REV 2 (M). It was attended by about 60 people, including representatives of the Chinese State Forestry Administration, China's State Statistics Bureau and the Chinese Ministry of Commerce, and participants from eight ITTO member countries.

During the last decade many countries have adopted policies in which environmental protection has taken a prominent place. However, despite such efforts, environmental degradation continues in many parts of the world. One of the problems is the lack of monetary value that conventional economics places on the global, regional and local-scale services provided by ecosystems. Forest resource accounting, or 'green' accounting, is an attempt to address this problem by including environmental values in national economic accounts.

This workshop allowed the ITTO project team from the Chinese Academy of Forestry to present its findings in four key reports: a framework for tropical forest resource accounting, a framework for intergrating tropical forest assets into the national accounting system, and two case-studies that examined the potential for forest-resource accounting in Hainan Province. The workshop also heard papers from other Chinese and international experts on experiences in natural resource accounting.

Participants agreed with an independent evaluator who reported that the ITTO project had produced a significant impact during its four years of implementation, particularly in raising awareness among Chinese economists and policy-makers of the role of ecosystem products and services in national well-being and of the need to account for these in mainstream economics. The project has stimulated debate in China's mass media about the social and environmental values of the country's tropical forests, helped to train several research students, and facilitated close links between key government agencies at the national and provincial levels. Through its case-studies it has also opened the way for provinces to adopt natural resource accounting into their accounting systems and should therefore encourage greater efforts to 'balance the books' in environmental health. Although change to national accounts could take some time, the level of interest in China in this sort of approach looks set to grow quickly.

The Chinese versions of the project's four main reports are now being printed, and English, French and Spanish versions are under preparation. For more information and copies of the project documents contact: Mr Hou Yuanzhao or Ms Wu Shuirong, Research Institute of Forestry Policy and Information, Chinese Academy of Forestry, Wanshoushan, Haidian District, Beijing 100091, China; Tel 86–10–6288 9731; Fax 86–10–6288 4836; houyuanzhao@tom.com; yuling@forestry.ac.cn, wushr2000@263.netp. Visit www.itto.or.jp to view the workshop papers.

Biodiversity talks

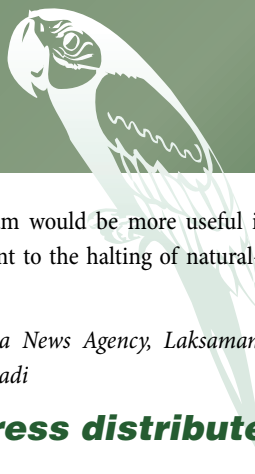
7th Conference of the Parties to the UN Convention on Biological Diversity

9–20 February 2004
Kuala Lumpur, Malaysia

This conference was attended by over 2300 people, representing 161 governments as well as United Nations agencies, non-governmental organisations, intergovernmental organisations, Indigenous and local communities, academia and industry. Delegates adopted 33 decisions on, among other things: biodiversity and tourism; monitoring and indicators; the ecosystem approach; biodiversity and climate change; sustainable use; invasive alien species; the Strategic Plan; mountain biodiversity; inland water ecosystems; marine and coastal biodiversity; protected areas; access and benefit-sharing; technology transfer and cooperation; Article 8(j) (traditional knowledge); incentive measures; communication, education and public awareness; scientific and technical cooperation and the clearing-house mechanism; financial resources and mechanism; and national reporting. A Ministerial Segment convened on two days and adopted the Kuala Lumpur Ministerial Declaration, in which ministers commit, among other things, "our governments to integrate biodiversity conservation and sustainable use of its components into socioeconomic development".

Adapted from the summary report of the Earth Negotiations Bulletin, www.iisd.ca. Texts of decisions are available at www.biodiv.org

Tropical and topical



Edited by Alastair Sarre

Joint forest management growing

According to a pamphlet published in 2002 by the Joint Forest Management Monitoring Cell of India's Ministry of Environment and Forests, India boasts 14.1 million hectares of forest under joint forest management (JFM), most of which has come about in the last 15 years. The pamphlet defines JFM as a forest management strategy under which government and village communities enter into an agreement to jointly protect and manage forestland adjoining villages and to share responsibilities and benefits. The village community is represented through an institution formed specifically for the purpose; this institution is known by different names in different states but is most commonly referred to as the Forest Protection Committee (FPC). States with the most land under JFM are Madhya Pradesh (4.3 million hectares), Chattisgarh (2.8 million hectares) and Andhra Pradesh (1.7 million hectares).

For copies of the pamphlet contact: *Winrock International India, 7 Poorvi Marg, Vasant Vihar, New Delhi 110057, India; Fax 91–11–641 6004; rupfor@winrock.ernet.in; www.winrockindia.org*

Canada led world growth in forest certification in 2003

According to Forest Certification Watch's *2003 Year in Review*, certified forest areas worldwide grew by 31% in 2003 to reach 173 million hectares (427 million acres), mainly due to a doubling of certified lands in Canada, which reached 56 million hectares. The three dominant North American forest certification programs—Forest Stewardship Council, Canadian Standards Association and Sustainable Forestry Initiative—all contributed significantly to the Canadian surge in certified areas.

For more information contact: *Jean-Pierre Kiekens, Editor, Forest Certification Watch; Tel 1–514–273 5777; www.CertificationWatch.org*

Megawati launches national forest and land rehabilitation campaign

According to Indonesian President Megawati Soekarnoputri, there is plenty of talk about combating crimes in Indonesia's forestry sector, but little to show in terms of actual results. "Ways to combat forest crimes have only become topics of discussions," she said. "Forest crimes cannot occur without the knowledge of the people and cooperation among certain parties. I thus ask all Indonesians to maintain our forests."

President Megawati was speaking at a ceremony to launch Indonesia's National Forest and Land Rehabilitation Movement in Gunung Kidul district, Yogyakarta last January. Gunung Kidul was chosen as the venue for the launch of the regreening campaign because of its success in turning barren areas into arable land.

During the ceremony, President Megawati and about 100 local people planted teak seedlings in the village of Karang Duwet. Megawati expressed hope that the campaign would improve the people's welfare and reduce environmental destruction.

The National Forest and Land Rehabilitation Movement is designed to rehabilitate a total of 3 million hectares of forests and lands by 2007. The government has allocated a budget of Rp1.26 trillion (about US$150 million) to the program, which will focus on re-greening at least 29 river basin areas in 15 provinces. To many environmental organisations, however, the rehabilitation program would be more useful if it is regarded as a complement to the halting of natural-forest destruction.

Sources: *Kompas, Antara News Agency, Laksamana.Net; reported by Budhita Kismadi*

Peru's congress distributes revenues

The Peruvian Congress enacted a law last December to allow the distribution of revenues generated from illegal timber confiscated by the country's National Institute for Natural Resources (INRENA). INRENA will receive 30%, Fondebosque 20%, the Program of Registration of Lands and Rural Census (PETT) 10% and the National Commission of Andean and Amazonian Towns (CONAPA) 5%. The regional government in whose jurisdiction the forest resource was extracted will receive 20% of revenues and the local district government will receive 15%. Each recipient institution will be required to use the funds for programs linked with sustainable forest management; for example, local and regional governments will invest their proceeds in projects linked to environmental conservation and the development of ecotourism.

In another development, the governments of Peru and Brazil have signed a protocol under which they will cooperate on the implementation of projects, training and technology and knowledge transfer aimed at creating a control system for forest fires in Peru. As part of the protocol, Brazil will send a specialist to assess the current status of Peru's forest fire warning, monitoring and control systems, assign specialists to assist in the training of Peruvian technicians, and provide background materials to assist in the training. The two countries will share the costs of implementing the protocol.

Reported by Mauro Rios

ITTO launches new website

ITTO recently launched a newly designed website. The new site contains detailed information on ITTO's program of work, as well as downloadable *TFU* articles, a large library of reports, news releases and other resources, and more. Intuitive navigation along with keyword searching in English, French and Spanish make finding information easy. The site is updated regularly, with recent updates and upcoming events featured on the home page. Bookmark www.itto.or.jp today!

Recent editions

Edited by Alastair Sarre

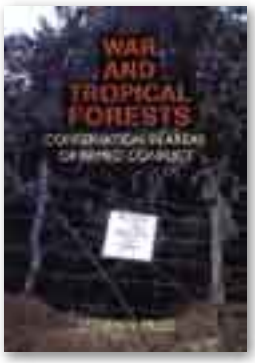
Mbatchou, G. 2004.* Plant diversity in a Central African rain forest: implications for biodiversity conservation in Cameroon. *Tropenbos International, Wageningen, the Netherlands. ISBN 90 5808 987 8. €20 + postage

Available from: *Tropenbos International, PO Box 232, 6700 AE Wageningen, the Netherlands.*

This book comprises the author's doctoral thesis and reports the results of botanical surveys in the Campo-Ma'an area in southwest Cameroon.

Price, S. (ed) 2003.* War and tropical forests: conservation in areas of armed conflict. *Haworth Press, New York, USA. ISBN 1 56022 099 6. US$24.95 + postage (paperback)

Available from: *Haworth Press, 10 Alice St, Binghamton, New York 12904–1580, USA; orders@HaworthPress.com*



The chapters of this book emerged from a conference on the topic held in 2000 at the Yale School of Forestry and Environmental Studies. Also published simultaneously in the *Journal of Sustainable Forestry* (Vol 16, No 3/4, 2003), they cover the impacts on forest conservation of conflicts in Nicaragua, Colombia, Rwanda, the Democratic Republic of Congo and Indonesia.

Gómez-Pompa, A., Allen, M., Fedick, S. & Jiménez-Osornio, J. (eds) 2003.* The lowland Maya area: three millennia at the human-wildland interface. *Haworth Press, New York, USA. ISBN 1 56022 971 3. US$79.95 (paperback)

Available from: *Haworth Press, 10 Alice St, Binghamton, New York 13904–1580, USA; orders@HaworthPress.com*

The civilisation of the ancient Maya, which flourished about fifteen hundred years ago, continues to fascinate the modern world and, in particular it seems, the modern biologist. The chapters of this book are based on papers presented at the 21st Symposium of Plant Biology and explore subjects as diverse as the role of fungi in past and

present Mayan culture, the use of an algal mat called periphyton as an ancient agricultural fertiliser, and ancient and contemporary Mayan concepts about forests. A question that continues to intrigue scientists and which biological study may help answer is how the Maya fed their people—who, at the peak of the civilisation, numbered several million people—in a lowland tropical environment with soils that today are thought of as infertile. Perhaps the lessons learned from the study of the ancient will inform the decisions we make about present land-use; that, at least, is the hope of the collaborators in this book.

INRENA/ITTO 2003.* Información estratégica para el desarrollo forestal maderero del Perú. *Informe del taller, Iquitos, Perú, March 2003. INRENA, Lima, Peru and ITTO, Yokohama, Japan.

Available from: *ITTO Information Officer, ahadome@itto.or.jp*

This document contains the proceedings of a workshop held in Iquitos, Peru and is an output of ITTO PROJECT PD 27/95 REV.3 (M): 'Creation and operation of a Centre for Strategic Forestry Information (CIEF)'. The aims of the workshop were to determine the real information needs of the various actors involved in the productive use of Peru's forests, and to investigate ways of standardising reporting formats so that the information fed into the CIEF can be easily understood, processed, analysed and disseminated.

Strehlke, B. 2003.* How we work and live: forest workers talk about themselves. *ILO Sectoral Activities Programme Working Paper. International Labour Office, Geneva, Switzerland. ISBN 92 2 114390 2.

Available from: *ILO Publications, International Labour Office, Ch-1211 Geneva 22, Switzerland; www.ilo.org.publns*

This interesting little book contains short personal notes by forest workers in different parts of the world (including Ghana, Brazil, India, Gabon and Cameroon among ITTO producer countries) about their working lives. Ownav

Bvakye, for example, first worked as a plantation worker for the Forestry Department in Ghana. Then he became an assistant forester at a natural forest reserve, where his main tasks are "measurement and patrolling activities to prevent and detect illegal logging". He likes his work, he says, although the salary is modest—194,000 cedis per month (about US$26). There are also risks, he says, "should I meet illegal loggers during patrols. These people sometimes get very aggressive and I once had a serious fight with one of them".

International expert meeting on the development and implementation of national codes of practice for forest harvesting: issues and options. *International Forestry Cooperation Office, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries of Japan, Tokyo, Japan.*

Available from: *International Forestry Cooperation Office, Forestry Agency, Ministry of Agriculture, Forestry and Fisheries of Japan, 1–2–1 Kasumigaseki, Chiyoda-ku, Tokyo, 100–8952 Japan; Fax 81–3–3593 9565; www.rinya.maff.go.jp*

This publication contains papers presented at an expert meeting on national codes of logging practice held in Chiba, Japan, in November 2003. Participants recommended, for example, that policy-makers identify, in a transparent way and with the involvement of all stakeholders, common principles and approaches to guide the formulation and implementation of such national codes.

Bubb, P., May, I., Miles, L. & Sayer, J. 2004. **Cloud forests agenda. *UNEP-WCMC, Cambridge, UK.***

Available from: *UNEP World Conservation Monitoring Centre, 219 Huntingdon Rd, Cambridge CB3 0DL UK; Fax 44–1223–277136; info@unep-wcmc.org. The report can be downloaded free of charge from: www.unep-wcmc.org/resources/publications/UNEP_WCMC_bio_series/20.htm*

This report contains maps showing the potential distribution of cloud forests (using data on topography and vegetation cover), reviews the ecological role of cloud forests, examines factors that threaten them, and urges all

international agencies and environmental agreements to provide adequate financial resources for their conservation and management.

Wardle, P., Jansky, L., Mery, G., Palo, M., Uusivuori, J. & Vanhanen, H. (eds) 2003. **World forests, society and environment: executive summary. *United Nations University, Tokyo, Japan. ISBN 92 808 8016 0.***

Available from: *UNU Publications, United Nations University, 53–70, Jingumae 5-chome, Shibuya-ku, Tokyo 150–8925, Japan; mbox@hq.unu.edu. The report can be downloaded free of charge from www.unu.edu/env/forests/WFSEexecutive-summary.pdf*

This short publication summarises the findings of a project on 'world forests, society and environment' published previously by Kluwer Academic Publishers in three volumes. It draws four main conclusions on the social, environmental and economic issues confronting forests and makes several recommendations for improving forest policy and management.

Sarojam, N. 2003. **An annotated bibliography on bamboos of the world. *Kerala Forest Research Institute, Peechi, India. ISBN 81 85041 50 4. Rs 550 (US$50) + postage (included in the price within India)***

Available from: *The Librarian, Kerala Forest Research Institute (KFRI), Peechi, Thrissur 680 653 India; Tel 91–487–269 9037; Fax 91–487–269 9249; kspillai@kfri.org*

This comprehensive annotated bibliography contains a total of 2800 references arranged under broad subject categories indexed by author and subject. It should be a useful tool for researchers, students, teachers, farmers, entrepreneurs, foresters and policy-makers. *From the publisher's notes.*

Write to the KFRI librarian at the address above for a catalogue of all the Institute's priced publications, which cover topics such as bamboo, rattan, teak, plantation management, natural forests, wood and non-wood forest products, weeds and socioeconomics.

Noticeboard

Toolkit for phased approach to certification

ProForest recently published what it calls the Modular Implementation and Verification (MIV) Toolkit. According to ProForest, the toolkit is a practical tool for the phased or stepwise implementation of forest management standards and certification, providing a set of predetermined modules which, like the standards themselves, cover legal, technical, environmental and social issues. Each of the modules covers a topic or issue such as management planning, health and safety and conservation and all the modules together cover all the requirements of the standard. Through these modules, says ProForest, the MIV Toolkit provides the basis for a consistent and credible phased approach to certification.

Copies of the MIV Toolkit can be downloaded free of charge from www.ProForest.net.

RIL software available

RILSIM, the 'Reduced-Impact Logging SIMulator', is financial modelling software designed to permit users to estimate the cost and net revenue associated with logging operations so that they can compare the short-term financial costs and returns expected from reduced impact logging (RIL) with those expected from conventional logging under identical local site conditions. The purpose of the software is to help users learn about RIL and its potential financial advantages as compared to conventional logging. RILSIM is available free of charge: while supplies last, a CD-ROM with a printed user's guide can be obtained from Tan and Associates (4/20 Vongsdhavi Gardens, Samakee Road, Nontaburi 11120, Thailand, tlc@loxinfo.co.th), the distributor, or from Thomas Enters (Thomas.Enters@fao.org) at the FAO Regional Office in Bangkok, Thailand; in either case please provide your complete mailing address. The software can also be downloaded from http://blueoxforestry.com/RILSIM/rilsim-download.htm.

Plantations on show

A recent edition of *Bois & Forêts des Tropiques* contains articles on various plantations in the tropics, including teak in Tanzania, *Eucalyptus* in Congo, *Khaya senegalensis* in Benin and *Gmelina arborea* in Costa Rica. The journal can be subscribed to (at a cost of €85.85/year) by contacting: Lavoisier abonnements, 14, rue de Provigny, 94236 Cachan Cedex, France; abo@lavoisier.fr; www.lavoisier.fr

Forest resource accounting

The latest edition of *C&I India Update* (Vol 2, No 1, October 2003), an output of ITTO PROJECT PD 8/99 (F), contains articles on forest resource accounting by Madhu Verma, Katar Singh, P.C. Kotwal, Narvin Horo and Kirin Mali. The newsletter is part of the project's strategy to facilitate debate on criteria and indicators for sustainable forest management (C&I) in India and to make progress in their implementation. The project's two key objectives are: to develop and operationalise a functioning system of C&I, with community participation, through refinement of the Bhopal-India Process for Sustainable Forest Management following the guidelines contained in the ITTO C&I; and to establish institutional capability for implementing C&I.

For a free subscription to C&I India Update *contact: IIFM-ITTO Project Cell, Indian Institute of Forest Management, Nehru Nagar, Bhopal 462003, India; Tel 91–755–277 5716; Fax 91–755–277 2878; www.iifm.org/sfmindia; itto@iifm.org*

New appointments in Gabon

In February 2004 Mr Michel Mbomoh Upiangu was appointed Gabon's Secretary-General in the Ministry in Charge of Forests. Mr Mbomoh Upiangu had previously served as Regional Coordinator of the Environmental Information Development Association and Deputy Secretary-General of the Ministry in Charge of Forests. He replaces Mr. Jean-Boniface Memvie, who retired recently. In addition, Mr Paul Koumba Zaou was appointed GeneraI Inspector in the ministry; previously he was a technical adviser to the Minister. Ms Célestine Ntsame Okwo was appointed technical adviser in charge of international cooperation.

Another kind of teak

Tectona grandis is the teak species with which most of us are familiar. However, Professor Anacleto M. Caringal is urging protection for a much lesser known species, *T. philippensis*, which is endemic to southern Batangas in the Philippines. He reports that this species, once used in the construction of the giant treasure-ship galleons that plied the Manila-Acapulco route during the 1700s and 1800s, is now listed as endangered by IUCN and that there may be as few as 4300 specimens in the wild. Recognising this and partly as a result of the awareness-raising efforts by Professor Caringal and his colleagues in the Philippine Teak Tree Conservation Project, the local government in Batangas has just passed legislation designed to protect the habitat of this important species.

Professor Caringal would like to hear from people interested in the conservation of this species; write to him c/o the Faculty of Tropical Forestry, College of Agriculture, Batangas State University, Masaguitsit, Lobo Batangas 4229, the Philippines; prince_tectona@yahoo.com

Splitters

Writing in the January 2004 edition of *NFT News* (a newsletter on the improvement and culture of nitrogen-fixing trees), Turnbull reports on an imminent division of the present *Acacia* genus into at least five genera. According to Dr Turnbull, there are about 1350 species of *Acacia* distributed throughout the world in tropical and warm-temperate countries. The details of the split are still being debated, with some botanists proposing that the largest subgenus *Phyllodineae* (960 species, including *A. mangium*, *A. Auriculiformis* and *A. mearnsii*) take on the *Acacia* genus name to minimise the number of species for which renaming would need to occur.

Expo in Mexico

Mexico, which recently became a member of ITTO, is hosting its annual Forestry Expo in Guadalajara on 1–4 July 2004. The Expo, which is being organised by the National Forestry Commision (CONAFOR), aims to enable the exchange of experiences, information, knowledge and forestry technology within Mexico and between Mexico and other countries. It is part of CONAFOR's strategy to promote sustainable forest development as the fundamental objective of Mexico's new forest policies. *See page 30 for contact details.*

Courses

Rural development management

3–21 May 2004 **Cavite, the Philippines**
Cost: US$2500

This course, for senior and mid-level development managers, covers development issues, managing sustainable and people-centred development programs, and managing development organisations. It addresses aspects of program and project planning, implementation and evaluation. Participants are introduced to real-life experiences in rural development. The course is built around observations of community-level development efforts in the Philippines.

Contact details below.

Policy development and advocacy

24–29 May 2004 (1-week face-to-face portion) and
June–July 2004 (4-week on-line instruction)
Cavite, the Philippines
Cost: US$1000 (face-to-face portion) + US$550 (online instruction)

In this course, senior and mid-level development professionals will deepen their understanding of the ways in which public policy is made and will enhance their skills in influencing policy processes and outcomes. The course will examine the political role of civil-society organisations in those processes, explicitly focusing on policy advocacy efforts in different political-cultural contexts of the South and the global North. The course will be conducted in two parts: the first will be a 1-week face-to-face course aimed at achieving greater understanding and insights about the basic concepts, principles and process of policy advocacy. The on-line portion aims to apply what was learned during the first portion to a concrete policy issue selected by the participant.

Contact details below.

Designing development training systematically

2–13 August 2004 **Cavite, the Philippines**
Cost: US$2000

Designed for trainers of community development professionals such as extension officers, doctors, social workers, community organisers, etc, this course focuses on how to conduct training needs' assessment as a basis for systematically formulating development training designs. Participants will examine and analyse performance gaps of sample individuals or groups in the light of the organisation or community in which the identified roles and functions are performed.

Contact details below.

Gender mainstreaming: from programmatic to organisational transformation

4–15 October 2004 **Cavite, the Philippines**
Cost: US$2250

Designed for mid- and senior-level development professionals, this 2-week course will provide participants with tools to influence decision-makers within their organisation towards systematic gender mainstreaming. Using a 'gender audit' tool, participants will deepen their understanding of previous gender mainstreaming efforts within their own organisation. The audit will focus on: political will, technical capacity, accountability and organisational culture. Participants will undertake real-life exercises in preparation for the planned change process to mainstream gender within their own organisations.

Contact details below.

Community-based integrated watershed management

8–26 November 2004 **Cavite, the Philippines**
Cost: US$2500

This course offers a new approach for integrating technologies and participatory strategies within the natural landscape or 'watershed' for resource conservation, production and sustainable use. It is intended for planners, field staff, technicians and others working with government and non-government organisations in areas such as food security, sustainable agriculture, water resource management and natural resource management. Course content includes: concepts and framework of watershed development, elements of community-based integrated watershed management, technology options, participatory approaches and strategies for watershed development.

Contact: *Monette Pacia, Education & Training Strategic Team, International Institute of Rural Reconstruction, YC Yen James Center, Km 39 Aguinaldo Highway, Silang, Cavite 4118, the Philippines; Tel 63–46–414 2417; Fax 63–46–414 2420; www.iirr.org*

Participatory action research for community-based natural resource management

13–28 September 2004 **Bangkok, Thailand**
Cost: US$2650

This course, a joint undertaking of the International Institute of Rural Reconstruction, the Regional Community Forestry Training Center and the International Development Research Centre, is geared specifically to senior decision-makers working on community-based natural resource management (CBNRM). Participants will have the opportunity to reflect upon and share experiences of CBNRM, explore principles of participatory action research (PAR), experiment with a range of tools for examining different perspectives relevant to CBNRM with stakeholders in the field, critically analyse the PAR approach in relation to CBNRM, and document their insights to add to the discourse on PAR for CBNRM.

Contact details below.

Community forestry: principles and practices today

7–25 June 2004 **Bangkok, Thailand**
Cost: US$2950

Community forestry has become a mainstream component of many national forestry programs. However, several countries that have introduced community forestry concepts are still struggling with the complex challenges of adapting their forestry programs to be more responsive and relevant to the needs and interests of communities. To address common issues faced at this stage of development, this 20-day introductory course will enable participants to identify and analyse key community forestry concepts, strategies and principles. Through this course, participants will gain the confidence and skills needed to support local institutions in effectively devolving forest management in their home country.

Contact: *The Regional Community Forestry Training Center for Asia & the Pacific, PO Box 1111, Kasetsart University, Bangkok 10903, Thailand; Tel 66–2–940 5700; Fax 66–2–561 4880; contact@recoftc.org; www.recoftc.org*

International seminar on forest and natural resource management

22 August–9 September 2004 **Colorado, Wyoming, North Carolina and Washington, DC, USA**
Cost: US$5600

Co-hosted by USDA Forest Service International Programs and Colorado State University, this course presents a broad spectrum of natural resource management techniques and institutional arrangements so that participants may selectively gather ideas that can assist in the management of their lands. The seminar focuses on strategies and methods to develop, manage and conserve natural resources for the sustained delivery of goods and services to meet the full range of human needs.

For more information go to www.fs.fed.us/global/is/welcome.htm

Forest and certification summer training program

12–16 July 2004 **Oxford, UK**
Cost: per course

This program provides a range of up-to-date courses dealing with current issues for those involved in forest management, certification and sustainable natural resource management. Training courses are available in subject areas such as: forest certification in practice and practical auditing (5 days); responsible purchasing in practice, illegal logging, product tracing and chain of custody (2 days); high-conservation-value forests and biodiversity monitoring (1 day); climate change policy and forests (1 day); and small forests and group schemes (1 day). Participants can select the combination of courses that suits their needs and attend them in one integrated event.

Contact: *ProForest, 58 St Aldates, Oxford OX1 1ST, UK; Tel 44–1865–243439; Fax 44–1865–790441; www.proforest.net; info@proforest.net*

Courses are in English unless otherwise stated. By featuring these courses ITTO doesn't necessarily endorse them. Potential applicants are advised to obtain further information about the courses of interest and the institutions offering them.

Meetings

26–29 April 2004. International Conference on the Integration of Forest-based Development in the Western Amazon. Rio Branco, Acre, Brazil. ITTO PROJECT PD 94/90 REV.3 (1). *Contact: Ms Nesia Maria da Costa Moreno, Project Manager, Avenida das Acácias Zona "A", Distrito Industrial, Caixa Posatl 395, CEP: 69.917-100, Rio Branco, Acre, Brazil; Tel 55–68–229 2313; Nesiamcm33@bol.com.br*

27–30 April 2004. The Interlaken Workshop on Decentralization, Federal Systems in Forestry and National Forest Programmes. Interlaken, Switzerland. *Co-sponsored by ITTO. Contact: Ms Sophie Rosse, Forest-Environment Team, Intercooperation, Maulbeerstr. 10, CH-3001 Bern, Switzerland; Tel 41–31–382 0861; Fax 41–31–382 3605; srosse@intercooperation.ch; www.itto.or.jp*

27 April–1 May 2004. Machines and People, the Interface: Council on Forest Engineering 27th Annual Meeting. Hot Springs, Arkansas, USA. ***Contact:** Jim Sorenson, jim.sorenson@weyerhaeuser.com;www.cofe.us*

3–14 May 2004. **4th Session of the United Nations Forum on Forests**. Geneva, Switzerland. ***Contact:** Mia Söderlund, UNFF Secretariat; Tel 1–212–963 3262; Fax 1–212–963 4260; unff@un.org; www.un.org/esa/forests.htm*

18–21 May 2004. ITTO Workshop on Capacity-Building for Implementation of CITES Appendix II Listing of Mahogany (*Swietenia macrophylla*). Pucallpa, Peru. *Contact: Dr Steven Johnson; johnson@itto.or.jp; www.itto.or.jp*

20–22 May 2004. **International Conference on Economics of Sustainable Forest Management**. Toronto, Canada. ***Contact:** Shashi Kant, Conference Secretariat; Tel 1–416–978 6196; Fax 1–416–978 3834; shashi.kant@utoronto.ca; www.forestry.utoronto.ca/socio_economic/icesfm/*

9–11 June 2004. **Applications of Satatistics, Information Systems and Computers in Natural Resources Monitoring and Management**. Taipei, Taiwan Province of China. ***Contact:** Dr Bing T. Guan; btguan@ntu.edu.tw; http:// ccms.ntu.edu.t/~btguan/*

10–11 June 2004. The Effects of Forest Certification in Developing Countries and Emerging Economies: a Symposium. Yale, USA. Sponsored by ITTO. *Contact: Elizabeth Gordon, Symposium Coordinator, Yale Program on Forest Certification; Tel 1–203–432 3034; www.yale.edu/forestcertification/symposium; elizabeth.gordon@yale.edu; www.itto.or.jp*

13–18 June 2004. **11th United Nations Conference on Trade and Development**. Sao Paulo, Brazil. ***Contact:** Mr Rubens Ricupero, Secretary-General, UNCTAD; Tel 41–22–907 1234; Fax 41–22–907 0043*

26–29 June 2004. **Forest Genetics and Climate Change**. IUFRO 7.01.04. Vernon, Canada. ***Contact:** Alvin Yanchuk; Tel 1–250–387 3338; Fax 1–250–387 0046; alvin.yanchuk@gems4.gov.bc.ca*

27 June–2 July 2004. **1st World Congress of Agroforestry: Working Together for Sustainable Land-Use Systems**. Orlando, Florida, USA. ***Contact:** Mandy Padgett, Office of Conferences & Institutes, PO Box 110750, Gainesville, Florida 32611-0750, USA; mrpadgett@mail.ifas.ufl.edu; http://conference.ifas.ufl.edu/wca*

27 June–3 July 2004. **The Evaluation of Forest Policies and Programmes**. Epinal, Vosges, France. ***Contact:** Gérard Buttoud (Science program), French Institute of Forestry, Agricultural and Environmental Engineering (ENGREF); buttoud@engref.fr; Brita Pajari (other issues), European Forest Institute; brita.pajari@efi.fi*

1–4 July 2004. **Expo Forestal Mexico Siglo XXI. Forest and Rainforest Forever**. Guadalajara, Mexico. ***Contact:** CONAFOR, Att'n: Mayra de la Torre, Carr. Nogales esq. Periférico Pte, Guadalajara, Jalisco, Mexico; Tel 52–33–3777 7000; Fax 52–33–3110 0820; mdltorre@conafor.gob.mx; www.conafor.gob.mx*

20–23 July 2004. 36th Session of the International Tropical Timber Council. Interlaken, Switzerland. *Contact: Collins Ahadome; Tel 81–45–223 1110; Fax 81–45–223 1111; itto@itto.or.jp; www.itto.or.jp*

26–30 July 2004. UN Conference (1st Part) for the Negotiation of a Successor Agreement to the ITTA, 1994. Geneva, Switzerland. *Contact: Collins Ahadome; Tel 81–45– 223 1110; Fax 81–45–223 1111; itto@itto.or.jp; www.itto.or.jp*

1–10 August 2004. **2nd Worldwide Symposium on Gender and Forestry**. Arusha, Tanzania. IUFRO 6.18.00. ***Contact:** Ann-Merete Furuberg, Department of Forestry and Natural Resources, Hedmark College, N-2256 Grue Finnskog, Norway; Tel 47–9016 3092; Fax 47–6294 5753; merete.furuberg@hedmark-f.kommune.no*

15–20 August 2004. **Forest Diversity and Resistance to Native and Exotic Pest Insects**. IUFRO 7.03.07. Hammer Springs, New Zealand. ***Contact:** Andrew Liebhold, Northeastern Research Station, USDA Forest Service, 180 Canfield St, Morgantown, WV 26505, USA; Fax 1–304–285 1505; aliebhold@fs.fed.us; http://iufro.boku.ac.at/iufro/*

15–21 August 2004. **XII International Congress of Entomology**. Brisbane, Australia. ***Contact:** Ashley Gordon, Congress Director; Ashley@ccm.com.au; www.ccm.com.au/icoe/index.html*

24–26 August 2004. **World Conference on Ecological Restoration**. Victoria, Canada. ***Contact:** R. Seaton, Conference Chair, Silvicultural analyst, Brinkman & Associates Reforestation Ltd, 520 Sharpe St, New Westminster BC, Canada; Fax 1–604–520 1968; Robert_Seaton@brinkman.ca*

1–2 September 2004. **Forest Information Technology Congress and Exhibition**. Jyväskylä, Finland. ***Contact:** Finpro Marketing Oy, Porkkalankatu 1, FIN-00181 Helsinki, Finland; forestit@finpro.fi; www.forestit.net*

6–10 September 2004. **Ad hoc Expert Group on Consideration with a View to Recommending the Parameters of a Mandate for Developing a Legal Framework on all Types of Forests**. New York, USA. ***Contact:** Ms Luz Aragon, United Nations Forum on Forests; Tel 1–212–963 1393; Fax 1–212–963 4260; www.un.org/esa/forests*

12–16 September 2004. **Regenerating Mountain Forests**. Koster Seeon, Germany. IUFRO 1.05.14, 1.05.08, 1.05.00, 1.14.00. ***Contact:** Chair of Silviculture, TU Munich, AM Hochanger 13, D-85354 Freising, Germany; rmf2004@wbfe.forst.tu-muenchen.de*

20–24 September 2004. **6th International Flora Malesiana Symposium**. Los Baños, the Philippines. ***Contact:** Dr. Edwino S. Fernando, Chair, Organizing Committee, 6th International Flora Malesiana Symposium, Makiling Center for Mountain Ecosystems, University of the Philippines Los Baños, Laguna, Philippines; Tel 63–49–536 3572; secretariat@floramalesiana6.ph; www.floramalesiana6.ph*

21–23 September 2004. International Workshop on Climate Change and the Forest Sector: Clean Development Mechanism in Tropical Countries. Seoul, Republic of Korea. ITTO PROJECT PD 174/02. *Contact: Professor Dr Yeo-Chang Youn, Seoul National University, Department of Forest Resources, Silim-dong san 56-1, Gwanak-ku, 151-742, Seoul, Republic of Korea; Tel 82–2–88 4754; Fax 82–2–875 476; youn@snu.ac.kr www.itto.or.jp*

27–30 September 2004. **The Economics and Management of High Productivity Plantations**. Lugo, Galicia, Spain. IUFRO 4.04.06. ***Contact:** Juan Gabriel Alvarez; Tel 34–982–252303; or Chris Goulding, New Zealand Forest Research Institute, Private Bag 3020, Sala Street, Rotorua, New Zealand; Tel 64–7–343 5641; Fax 64–7–348 0952; www.lugo.usc.es/iufro/*

2–14 October 2004. **13th Meeting of the Conference of the Parties to CITES**. Bangkok, Thailand. ***Contact:** Willem Wijnstekers, Convention on International Trade in Endangered Species of Wild Fauna and Flora; Tel 41–22–917 8139; 41–22–797 3417; cites@unep.ch; www.cites.org*

17–21 November 2004. **International Symposium on Ecological Restoration**. Santa Clara City, Cuba. ***Contact:** Grecia Montalvo, Empresa Nacional para la Protección de la Flora y la Fauna, Carretera Central km 306, Banda Placetas, Santa Clara, Villa Clara, Cuba Cp: 50 100; Fax 53–42–208430; sisre@ccb.civc.inf.cu or grecia_montalvo@yahoo.es*

17–25 November 2004. **People and Nature—only one world. 3rd IUCN World Conservation Congress**. Bangkok, Thailand. ***Contact:** Ursula Hiltbrunner, IUCN – The World Conservation Union, 28 rue Mauvernay, CH-1196 Gland, Switzerland; Tel 41–22–999 0232; Fax 41–22–999 0020; www.iucn.org; ursula.hiltbrunner@iucn.org*

22–25 November 2004. **International Conference on Multipurpose Trees in the Tropics: Assessment, Growth and Management**. Jodhpur, India. ***Contact:** Dr V.P. Tewari, Organising Secretary; Tel 91–291–272 2588; Fax 91–291–272 2764; vptewari@afri.res.in*

6–17 December 2004. **10th Session of the Conference of the Parties to the UN Framework Convention on Climate Change**. Buenos Aires, Argentina. ***Contact:** UNFCCC Secretariat, PO Box 260124, D-53153, Bonn, Germany; Tel 49–228–815 1000; Fax 49–228–815 1999; secretariat@unfccc.int; unfccc.int*

13–18 December 2004. 37th Session of the International Tropical Timber Council. Yokohama, Japan. *Contact: Collins Ahadome; Tel 81–45–223 1110; Fax 81–45–223 1111; itto@itto.or.jp; www.itto.or.jp*

28 February–5 March 2005. **17th Commonwealth Forestry Conference: Forestry's Contribution to Poverty Reduction**. Colombo, Sri Lanka. ***Contact:** Libby Jones; Tel 44–131–314 6137; Fax 44–131–334 0442; forlib@sltnet.lk or libby.jones@forestry.gsi.gov.uk*

4–7 April 2005. **Sustainable Forestry in Theory and Practice: Recent Advances in Statistics, Modelling and Knowledge Management**. Edinburgh, Scotland. IUFRO 4.11.00, 4.02.00, 6.12.00. ***Contact:** Keith Reynolds, usda Forest Service, Pacific Northwest Research Station, Corvallis, OR, USA; Tel 1–541–750 7434.*

8–13 August 2005. **Forests in the Balance: Linking Tradition and Technology**. XXII IUFRO World Congress. Brisbane, Australia. ***Contact:** Congress Manager, PO Box 164, Fortitude Valley QLD 4006, Australia; Level 2, 15 Wren St, Bowen Hills QLD 4006, Australia; Tel 61–(0)–7–3854 1611; Fax 61–(0)–7–3854 1507; iufro2005@ozaccom.com.au; www.iufro2005.com/*

20–24 September 2005. **VII Plywood and Tropical Timber International Congress and VI Machinery and Timber Products Fair**. Belém, Brazil. ***Contact:** WR São Paulo; Tel 11–3722 3344; wrsp@wrsaopaulo.com.br*

Per capita timber consumption is quite low, but with the Indian economy poised to grow at 7% per year and higher, this is likely to also increase in coming years. At the same time, rural populations will also grow, as will their demand for fuelwood—or possibly charcoal, a product of fuelwood—along with the risk of degradation in natural forests.

All this and the potential for re-exporting timber products after adding value to them suggests an opportunity both for the Indian forest sector and for the tropical hardwood timber trade. Trade liberalisation should provide India with opportunities to vie for value-added timber markets around the world. It could become a very competitive player by making use of the innovations, technology and market skills so abundant in the country.

Strategic location

India has another advantage: its physical location between dynamic markets in East Asia, the oil-rich Middle East and Europe. If this is coupled with appropriate eco-labelling and certification, the Indian timber industry should have little difficulty in putting finished products into the display rooms of Castorama, IKEA and Kingfisher, for example. The shelves of Home Depot and other retailers in the USA should also be within reach: such companies already source over 40% of their wood products from China, mostly manufactured with imported timber. Bamboo and rattan furniture and wooden handicrafts could also find significant market niches in the industrialised countries.

India can count on its strategic location not only as a potential exporter but also (and importantly) as an importer of tropical timber. Outsourcing from near and far is becoming more common as part of the globalisation process, with importers taking advantage of diverse timber types, comparative prices and the overall balance of trade. Timber has already started rolling into India from Africa, Latin America and Oceania. India's growing demand and the ability of the tropics to supply timber suggest the possibility of much more mutually beneficial trade across the oceans; the medium-term potential for tropical timber exports to India could be as high as 10 million m^3 per year. This is a challenging prospect for ITTO producer countries, which collectively export to the entire world barely 14 million m^3 of tropical industrial roundwood per year.

Data shakeout

Consumption, production and price data are prerequisites for the serious evaluation and monitoring of the timber industry and its prospects. These data are not readily available in India, either coherently or from any single source. Secondary data sources are plagued by discrepancies, serious time lags and a general lack of robustness. Even in the case of production data, validation mechanisms do not exist. The international trade data are relatively reliable in terms of collection and dissemination but also suffer from a lack of clarity and appropriate categorisation. Sadly, India has been unable to respond regularly to the ITTO/FAO/UNECE Joint Forest Sector Questionnaire; the country's forest-sector statistical system and institutions are in urgent need of modernisation. India's timber market is dispersed and disorganised, suffering from shrouded statistics and a lack of economic intelligence. The fact that it is still relatively prosperous (although with diminishing market share) is due to trade and economic reforms and the consumer appetite rather than to the professionalism of the sector.

What needs to be done

There is scope for converting the current weaknesses of the Indian timber sector into exciting opportunities for tropical timber trade and marketing. Measures are needed to organise the timber industry, to build multi-stakeholder, private-public partnerships and international alliances, to raise awareness about the comparative advantages and environmental appropriateness of wood and wood products, and to draw upon the inherent competitiveness of such products in the market. None of that can be done unless there is a willingness to open up and provide readily accessible and reliable economic information, market intelligence and an efficient forest-sector statistical system.

Globalisation has come to stay, warts and all. How can India remain unaffected, since WTO agreements are legally binding? Indian timber tariffs are mostly quite high (except for logs, chips and particles), and non-tariff barriers and custom duties also need to be further reduced (IIFM 2003). That would help make the value-adding timber industry more competitive as an exporter and allow it to flourish as it should.

A visionary approach is needed; in an expanding economy with wide-open market opportunities, a complacent, business-as-usual approach simply will not do. The pressures of globalisation and the evolving policies of a player in the international arena are unlikely to let sector stalwarts lie low. The sooner there is solid support for the development and implementation of a strategic vision in the timber sector, the sooner will India play the role that it merits in the global timber marketplace.

References

IIFM (Indian Institute of Forest Management) 2003. National forest policy review. In: *An overview of forest policies in Asia*. FAO-EC, Bangkok, Thailand.

ITTO 2003. *Annual review and assessment of the world timber situation*. ITTO, Yokohama, Japan.

*Review of the Indian Timber Market *(PPD 49/02 (M)) is part of ITTO's ongoing program to bring more transparency to the tropical timber trade and to report on trends, prospects, constraints and opportunities for the trade. It can be obtained from: Amha bin Buang, eimi@itto.or.jp*

Out on a limb

India could become a dominant player in the global forest products trade—if its timber sector becomes more transparent

By Maharaj Muthoo

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Roman Forum
Rome
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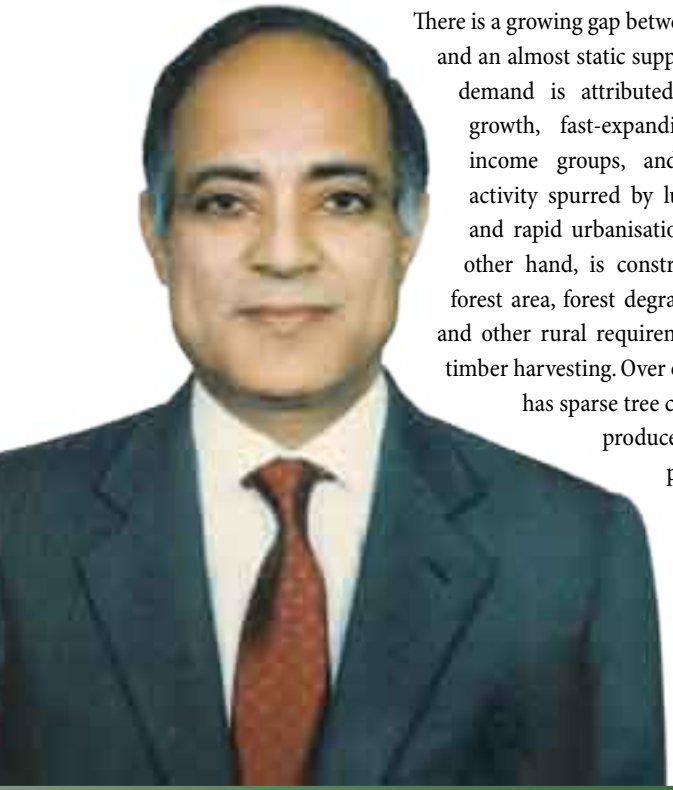
AS WAS apparent at the Cancun meeting of the World Trade Organization (WTO) in 2003, India is emerging as a promising player alongside Brazil, China, Colombia, Malaysia, Nigeria, South Africa and others on issues related to globalisation and as an advocate of tropical-country concerns. Concurrently, India is taking strides and making commitments towards advancing global accords for economic reforms, the liberalisation of trade and commerce, and the implementation of Agenda 21 (the agenda created at the United Nations Conference on Environment and Development in 1992). Parallel to this emergence on the world stage is an awakening interest within India in the conservation of the country's forests for the environmental services and local community benefits they provide, among other objectives. The government recently established a national forest commission comprising eminent persons to review such issues.

However, nothing less than the comprehensive reform of the forest sector is needed if India is to both meet its future timber needs and conserve its remaining natural forest estate. In this, the timber trade can play a substantial, positive role.

Forests and timber

India's forest estate of over 67 million hectares represents about 20% of the country's land area. The national policy sets a target of 33% of land area under forests, but plans to regenerate the degraded forests, reclaim wastelands and raise plantations have so far had limited impact.



There is a growing gap between increasing demand for and an almost static supply of timber. The dynamic demand is attributed to resurgent economic growth, fast-expanding middle and upper income groups, and intensive construction activity spurred by lucrative housing schemes and rapid urbanisation. Timber supply, on the other hand, is constrained by low per capita forest area, forest degradation, massive fuelwood and other rural requirements, and restrictions on timber harvesting. Over one-third of existing forest has sparse tree cover and the predominant produce is fuelwood. Forest produce is supplemented by supplies from trees outside the forest; these barely cover 2.5% of the land area but are an increasingly important resource for the panel, pulp and paper industries. The production of industrial roundwood, estimated at little over 15 million m^3, cannot meet the national need, now or in the future; a recent ITTO review of the Indian timber market* conducted by the present author in collaboration with national experts and institutions projected that the annual urban consumption alone will grow by almost 8.5 million m^3 during the next ten years.

Timber imports

India already imports industrial roundwood volumes of around 1.7 million m^3 annually, mainly (around 95%) tropical hardwoods from Malaysia, Myanmar and Indonesia and also from Africa and Latin America (ITTO 2003). Though much less in volume, imports of sawnwood and plywood have also multiplied. The ITTO review mentioned above suggests that timber imports could triple by 2012, as they have during the last decade.

Tropical timber imports are generally of a high quality and are price-competitive compared to domestically produced timber. Nevertheless, timber substitutes pose a threat to the timber market and reconstituted and composite wood-based materials are also becoming common. In the exterior joinery sector, metals are the main competing material, whereas plastics are serious competitors in interior joinery and furniture, despite their generally inferior environmental performance.

Opportunity for the timber sector

An efficient and dynamic domestic timber industry could head off this challenge: using imported tropical and other timber, it could become a major producer of secondary processed, value-added wood products that could be sold both domestically and internationally.

India has over a billion people and is expected to take the mantle of the world's most populous country from China by about 2040. India's urban population already exceeds the population of the entire European Union, and a massive movement of people is taking place into new townships and existing urban centres. With this urban growth comes the need for extensive household and commercial construction countrywide, which requires greatly increased wood volumes.

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