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*

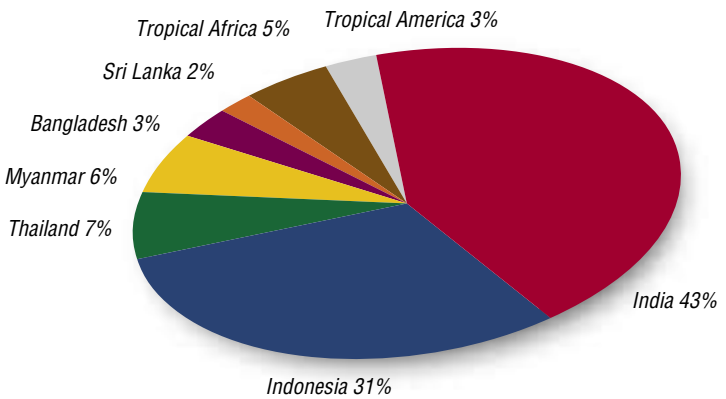
Extent of teak plantations in the tropics

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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