Teak Information

Ecological Requirements

Soil Requirements

Teak can grow in a variety of soils. The quality of its growth, however, depends on the depth, structure, porosity, drainage and moisture-holding capacity of the soil. It develops best on deep, well-drained and fertile soils, especially on volcanic substrata such as igneous and metamorphic soils or on alluvial soils of various origins. The optimal soil pH is between 6.5 and 7.5. The calcium content of the soil is also an important factor; calcium deficiency in the soil results in stunted growth of teak (Kaosa-ard, 1981).

Studies at FRIM indicate that good management techniques may be able to improve the performance of teak on problem soils.

New Plantings Under Plantation Management Regimes

Early growth results in trials to evaluate optimally managed teak on various soil types and under various ecological conditions support the suggestion that teak can perform well on problem soils if properly managed. To reduce costs and to ensure that optimal silvicultural practices would be followed, these trials have been carried out on small-scale farmers' plots under an arrangement termed "smart partnership": farmers benefit from free advice, good-quality seedlings, agricultural inputs from FRIM and the returns from the final crop harvest, while FRIM in turn benefits from the small holder's labor for the management of the plot and access to the growth data.

Temperature and Rainfall

Teak grows best when the minimum monthly temperature is above 13oC and the maximum monthly temperature is below 40oC. Optimal rainfall for teak ranges between 1,250 and 3,750 mm per year; however, for the production of good-quality timber the species requires a dry season of at least four months with less than 60 mm precipitation (Kaosa-ard, 1981).

A report from India (Kondas, 1995) shows that teak responds very well in terms of growth and girth increment in areas where the trees receive at least sufficient moisture for most of the year when compared with growth in monsoon areas.

There is a misconception that annual growth rings, which impart grain structure to the logs, occur only in teak trees growing in zones that have distinct rainy and dry seasons and not in those growing in regions where rainfall is received year round. It is probable that trees grown in zones with a long dry period will have very distinct, closely packed concentric rings owing to the inactivity of the cambium during the long dry spell. However, the growth ring continues to be formed in all climatic conditions, even where there is year-round high rainfall

Pricing of Teak

Prior to harvesting, it will be necessary to decide whether to sell the raw material in log form to local and export markets, or to process it for added value in a sawmill For the moment, processing capacities seem to be higher than raw material supply potential.

During the plantation establishment period, and before thinning is begun on a larger scale, the economic value of plantations can only be evaluated by estimating the accrued commercial value of trees in the growing process.

Our MAI is estimated at a conservative 12 m3 per hectare based on experiences in other locations and in Costa Rica. On some sites an annual growth rate of 20 m3 per hectare or higher has been observed (Camacho, 1998; de Camino, Alfaro and Sage, 1998; Herrera, 1998).

Prices of teak vary considerably depending on wood quality and whether you are dealing with plantation grown wood or old growth teak which is very expensive at this point. Our estimates are based on actual market prices of plantation teak (US$350 to $650 per cubic meter free on board [FOB] depending on diameter and wood quality) and are based on recent regional experiences.

Yearly average price of teak logs for girth class of 120 to 150 cm in India (Old growth teak)

Year	Price per m³ ($US)
1970	$86
1971	$108
1972	$127
1973	$110
1974	$172
1975	$150
1976	$169
1977	$193
1978	$343
1979	$365
1980	$377
1981	$452
1982	$487
1983	$479
1984	$604
1985	$630
1986	$663
1987	$469
1988	not available
1989	$614
1990	$768

Rotation Period

The age at final cut will depend on the stem form and diameter but is expected to be between 25 and 30 years. Pandey (1996) noted that the age of final harvest for teak differs among countries and even among sites, varying from 25 to 80 years, with an average of 50 years. But yield tables and the author's personal observations have shown that in many African plantations and also in Trinidad the growth of teak slows down after 25 years. Slower growth is favorable for formation of heartwood, and dark color. As modern processing techniques allow the use of smaller wood diameters, trees with a diameter at breast height (DBH) of 35 to 45 cm after a 20-year rotation are acceptable for cutting.

On some sites, however, the rotation period may be extended if the growth patterns show a higher mean annual increment (MAI) after the twenty-fifth year.

Conclusions

As the sustainable supply of teak from natural forests (now almost exclusively from Myanmar) diminishes and the demand continues to increase, the general trend in the future of teak growing will be towards increasing production and utilization of plantation-grown teak. This suggests a need for more private investment in plantations and enhanced knowledge regarding diverse aspects of teak plantation establishment as well as silviculture, management, utilization and ecological aspects of both plantations and natural stands. In particular in the move towards short-rotation plantation-grown teak. Research is being done on the effects of pruning on growth and wood quality, the effects on the site, of growing teak in mixed plantations (where experiments established in the past might be re-evaluated) and the environmental impacts and sustainability of productivity of short-rotation plantations, including the differences in yield or timber properties from second or subsequent rotations.

Several countries are interested in improving financial returns from teak plantations through utilization of thinnings and small round-wood. To this end studies are being conducted on conversion techniques for small round-wood, techniques for reconstituting small sawn wood as larger material, and market opportunities for small-dimension timber or components.

The increasing importance of plantations in teak production suggests varying prospects for other valuable hardwood species in terms of future commercial timber production. Species that adapt readily to plantation management, such as mahogany, should continue to be important sources of high-quality timber. Those that are less ecologically robust or that perform poorly under intensive management regimes are likely to be marginalized as commercial wood producing species. Thus, in the long term, it is likely that a handful of tropical hardwoods, including teak and mahogany, will occupy niches at the high end of solid wood markets, while the range of competing species is likely to be significantly reduced.

Information from Panama Teak Forestry, Inc.