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Wood quality of Teak from Natural and Planted forests

P.K. Thulasidas

TEAKNET Secretariat
Kerala Forest Research Institute
Peechi – 680653, India

Introduction

Teak – the most preferred potential species top listed by FAO in 2014 for the conservation and management of forest genetic resources.

Supply from natural forest is on continues decline and the genetic resource base is fast shrinking

Log export ban in the producer countries

Availability of quality teak logs in the market is scarce accompanied by unprecedented price rise

The estimated market share of teak logs < 2% of total tropical roundwood production

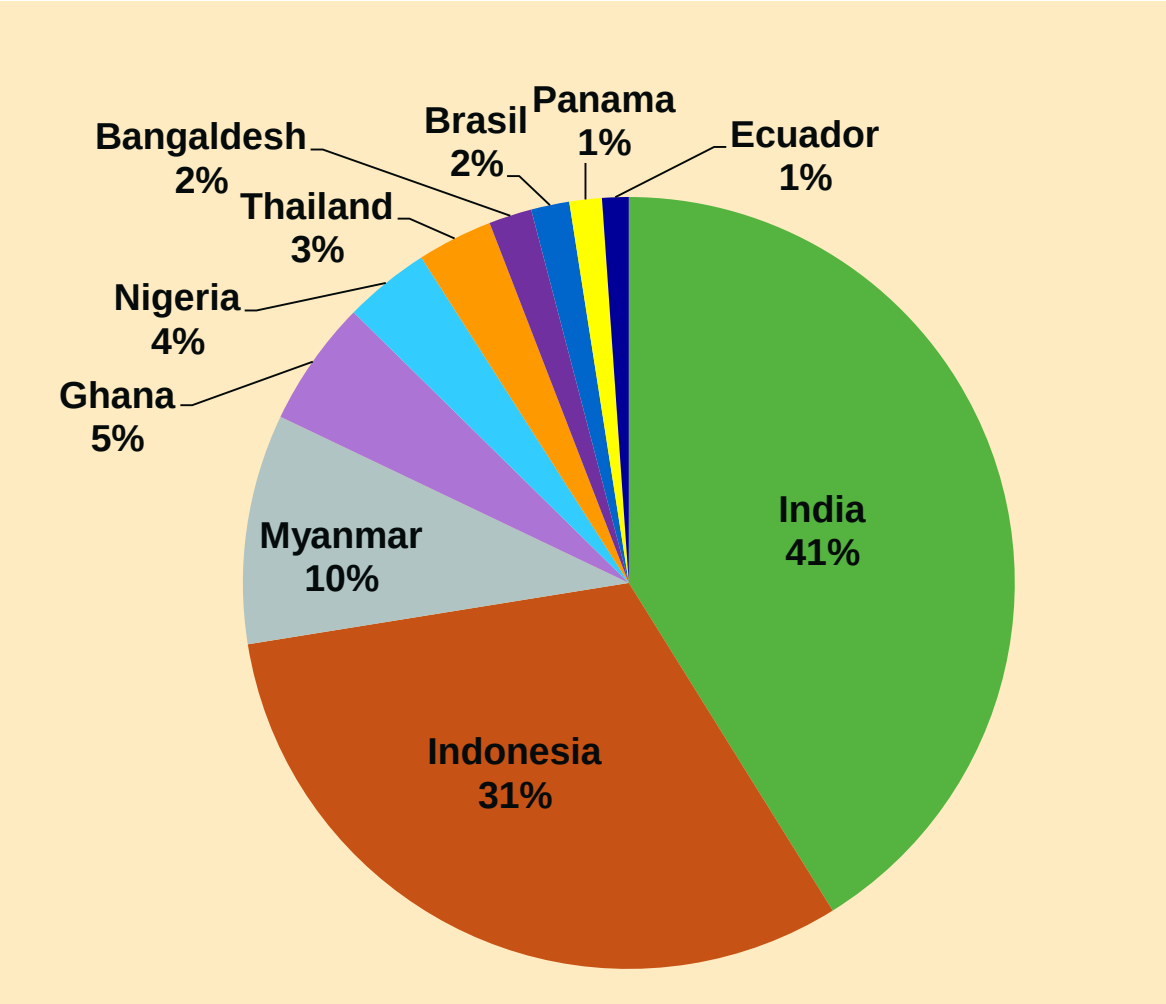
Planted Teak distribution in 10 major countries

Natural teak – 29. 0 million ha
Planted teak – 4.35 -6.89 million ha in 70 countries

About 77% of the planted teak forests fell within the age class from 0 – 20 years.

Another 17% - 21 to 40 yrs

Productivity is low due to use of germplasm of unknown seed origin



Factors influencing wood quality

Teak prices are very closely related to wood quality

Wood quality factors	Wood properties
1. Aesthetic properties	➢ Colour ➢ Grain ➢ Texture
2. Physical	➢ Shrinkage ➢ Ratio tangential /radial shrinkage ➢ Absorption properties (fibre saturation point)
3. Mechanical	➢ Modulus of Elasticity (MOE) ➢ Modulus of Rupture (MOR) ➢ Maximum crushing stress (MCS) ➢ Hardness ➢ Growth stresses
4. Geometrical	➢ Heartwood/sapwood ratio ➢ Bole shape ➢ Knots characteristics
5. Biological	➢ Decay resistance ➢ Insects resistance ➢ Weather resistance

Wood properties of Natural teak

The good reputation of teak was built originally upon durable high-quality timber from natural forests

- Medium density (620-650 kg/m^3)
- Very high natural durability
- Exceptional stability
- High level of mechanical properties
- Appealing aesthetic properties and oily to touch

Uniform golden brown colour of heartwood of Malabar teak

Most outstanding characteristic of teak are : durability & high resistance to water absorption, hence wide use in ship/boat building

Quality concerns of planted teak

Plantation-grown teak does not yet have a high-quality image on the international market

- Short-rotation timber cannot boast of the wood quality with regard to its durability of teak from that of natural forests.

Small dimensional teak for export

The color, grain and texture and density are slightly different and fetches lower price.

Teak exhibits wide variation in wood quality traits

Plantation- grown small dimensional teak is not inferior in terms of density, strength and shrinkage of trees of the same age.

Teak attains optimum strength at about 21 years of age

Strength property variation among five age groups of teak

Property	Age (years)				Natural teak
	13	21	35	55	65
Specific gravity	0.63^{a}	0.63^{a}	0.63^{a}	0.64^{b}	0.64^{b}
MOE, N/mm^2	11468^{a}	14129^{b}	9709.9^{a}	10564^{a}	12335^{a}
MOR, N/mm^2	108^{a}	134^{b}	111.2^{a}	104^{a}	100^{a}
MCS, N/mm^2	49^{a}	56^{b}	60.6^{b}	51^{a}	59^{b}

Future belongs to Teak Plantations

- HW% increased with growth rate of trees with increasing DBH
- Effect of growth rate on HW-SW ratio decline with age
- It is possible to produce large diameter logs with greater proportion of durable heartwood by accelerating growth rate through silvicultural interventions.

10 yr old teak with wide sap

In short- rotation plantations, wood quality can be improved through the selection of superior planting material, proper site selection and best management practices, that helps to achieve yield to about 8-10 m3/ha/yr.

Teak trees should be retained for 60 yrs or more to obtain a high quality durable heartwood meant for specialty products and exterior use.

Log grading systems of teak logs

For trading and marketing of teakwood, an internationally accepted standardized log grading and measurements systems should be followed

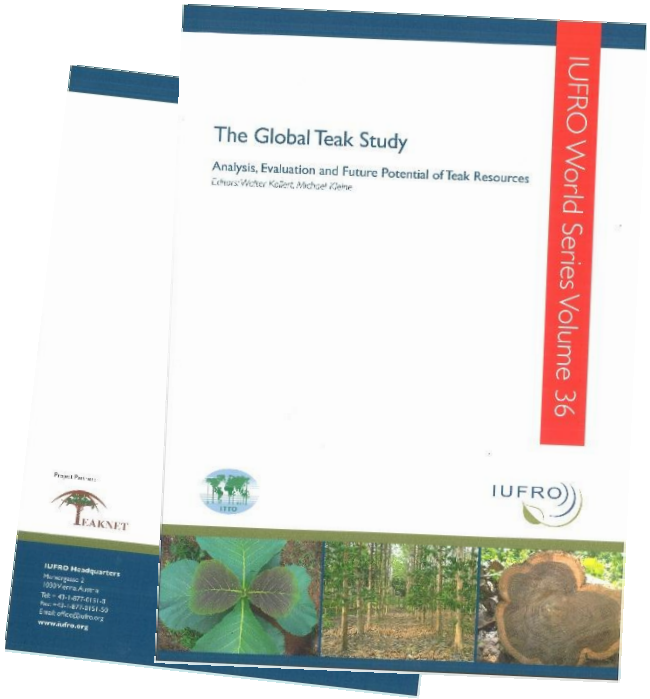
Increase in the price of teak is the major attraction in investment of teak plantations.

Breeding for wood quality

- Production of genetically improved quality planting stock is a pre-requisite for increased productivity of teak plantations.

- The natural teak gene pool should be protected from depletion for future tree breeding programmes.

- TEAKNET is joining hands with IUFRO and FAO and initiated a Global Teak Support Programme for genetic conservation of teak gene pool before it perishes.



Conclusions

For the Global Teak Support programme

- The international partners should come forward to strengthen the conservation and sustainable use of teak genetic resources for the benefit of teak growers, the forest industries, investors and local communities in different country contexts in Africa, Asia/Oceania and Latin America.
- Also to promote their sustainable use and management and contribute to develop and promote *in-situ* and *ex-situ* conservation programs through development assistance and research collaboration.
- Support high quality timber production in planed forests.
- Monitor genetic improvement programs and international trade in clones
- Strengthen international collaboration and regional networks on forest genetic resources

Thank you !