

Silviculture and Management of Teak in Panama



Presentation Overview

- Teak: The most precious wood
- History of Panama
- Why Grow Teak in Panama?
- Ecology of Teak
- Plantation Establishment
- Growth & Yield
- Pest & Disease Risk
- Products
- Final Thoughts

Teak: The Most Precious Wood

"Teak is a close grained hardwood with high natural oil content. It is one of the hardest, strongest and most durable of all timbers, highly resistant to any rotting and almost impervious to the effects of hot sun, rain, frost or snow. These characteristics combine to make it the ideal timber for all outdoor applications. It has been the number one choice of boat builders for centuries".



Where is Panama?



Where is Panama?



History of Panama



- Part of Gran Columbia (1819-1831)
- Gained independence November 3, 1903
- Treaty signed in 1977 for Canal handover

History of Panama



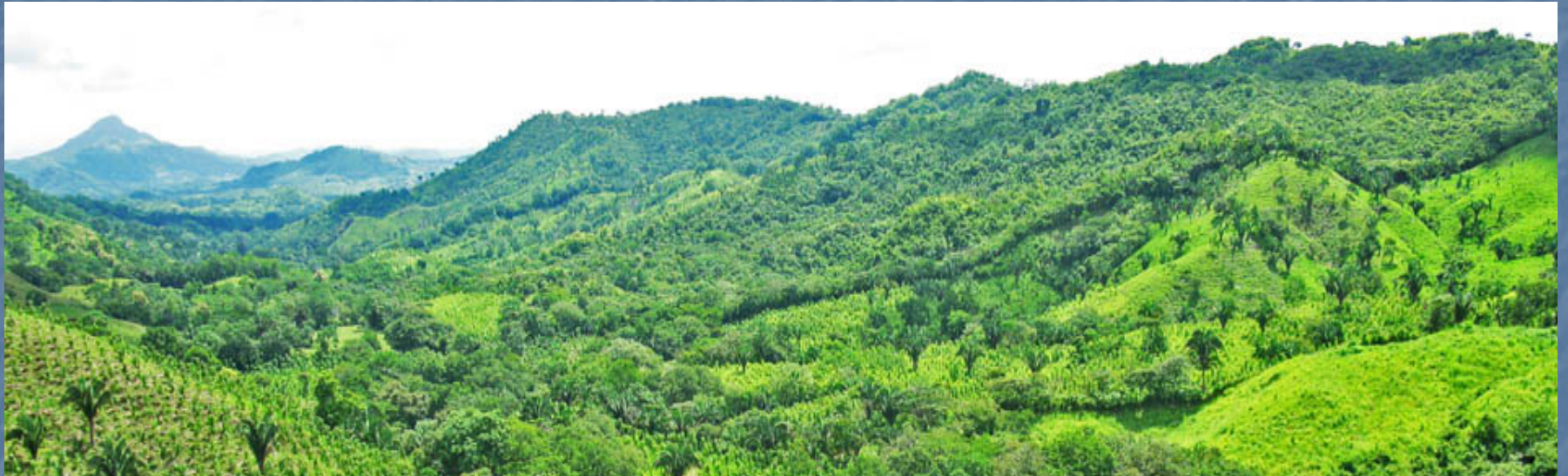
- 1983 – Manuel Noriega seizes power
- 1989 – American invasion of Panama
- 1999 – Panama takes control over Canal

Why Grow Teak in Panama?



- Strategically located, politically stable
- Affordable land and labour
- Ideal Climate for growing teak

Why Grow Teak in Panama?



- Major economic expansion underway
- GDP growth 2008 – 9.2%
- Panama Canal 3rd Lane expansion

Plantation Forestry Can Help Reduce the Pressure on Natural Forests



Distribution of Teak in the World

- **Distribution:** Native to India, Burma, Thailand, Indochina, including Indonesia, particularly Java. Extensively cultivated in plantations within its natural range as well as in tropical areas of Africa and Latin America.



Estimate of World Teak Plantations

■ Indonesia	1,100,000 ha's
■ India	1,000,000 ha's
■ Myanmar	250,000 ha's
■ Thailand	160,000 ha's
■ Asia (Other)	170,000 ha's
■ Africa	200,000 ha's
■ Central America	250,000 ha's
■ Total World Teak	3,130,000 ha's
(or approx. 3% of British Columbia)	

Ecology of Teak (*Tectona Grandis*)

- Rainfall 125 – 375 cm/yr
- Min Temp 13 – 17 Celcius
- Max Temp 39 - 43 Celcius
- Wet/dry season
- Grown on the "Pacific" side of the divide
- Mostly found within 10 degrees latitude of equator



Ecology of Teak (*Tectona Grandis*)

- Soil sampling important to identify well drained sandy soils
- pH 6.0 – 7.0
- Rolling topography
- Avoid flat depressions



Plantation Establishment



Plantation Establishment

- 3m X 3m spacing most common (1111 sph)
- Brush must be controlled the first 2 years of establishment
- Pruning up to 6m height (up to 50% of crown)



Plantation Establishment



Plantation Establishment



Plantation Establishment



March 2005



February 2007



February 2008

Plantation Establishment



2005



2006



2008

Llano Grande Plantation – Planted 1997



Mature Teak Tree @ Age 25



Volume of approx. 1 m³ @ age 25

Agro Forestry Opportunities



Mucuna

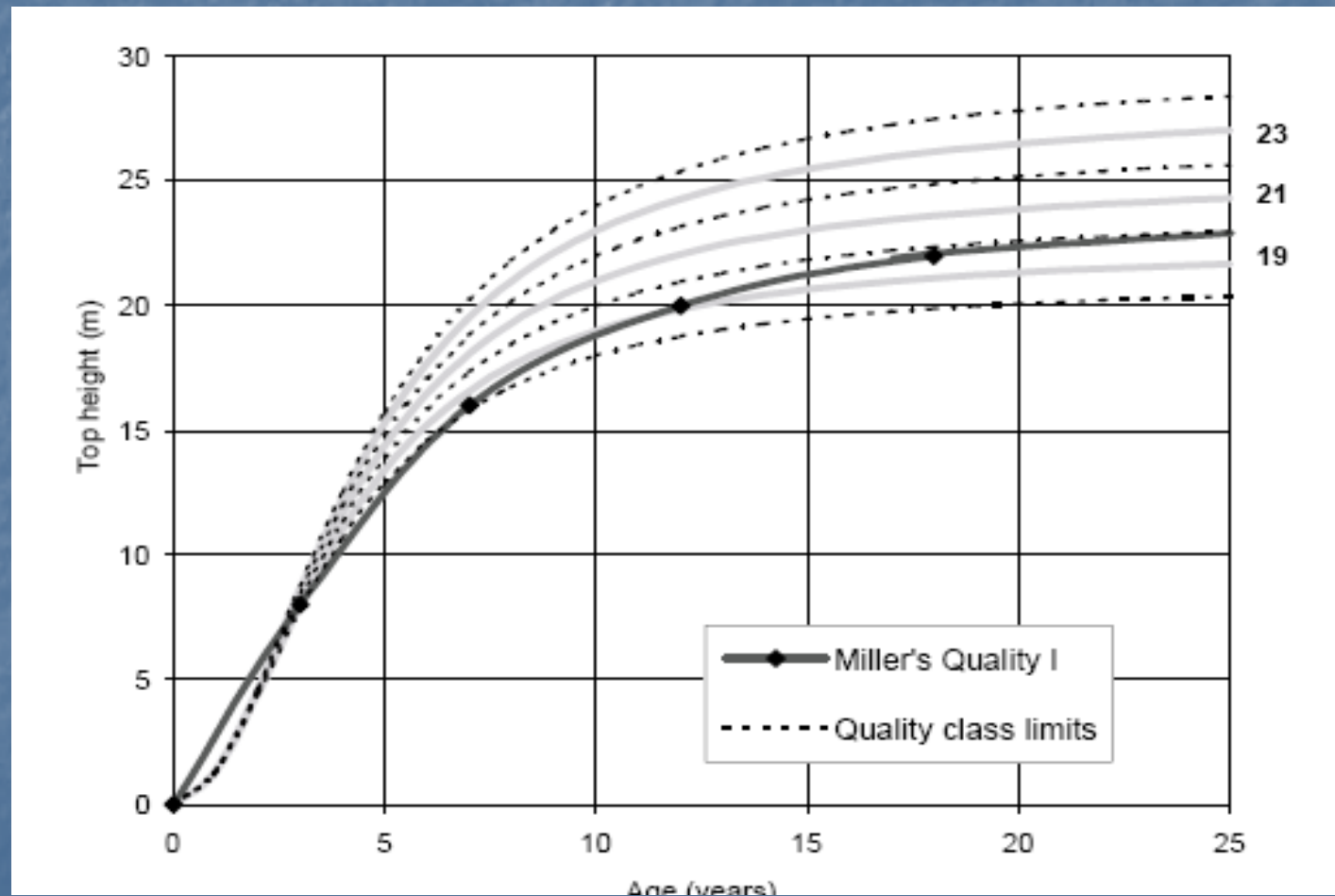


Leucana

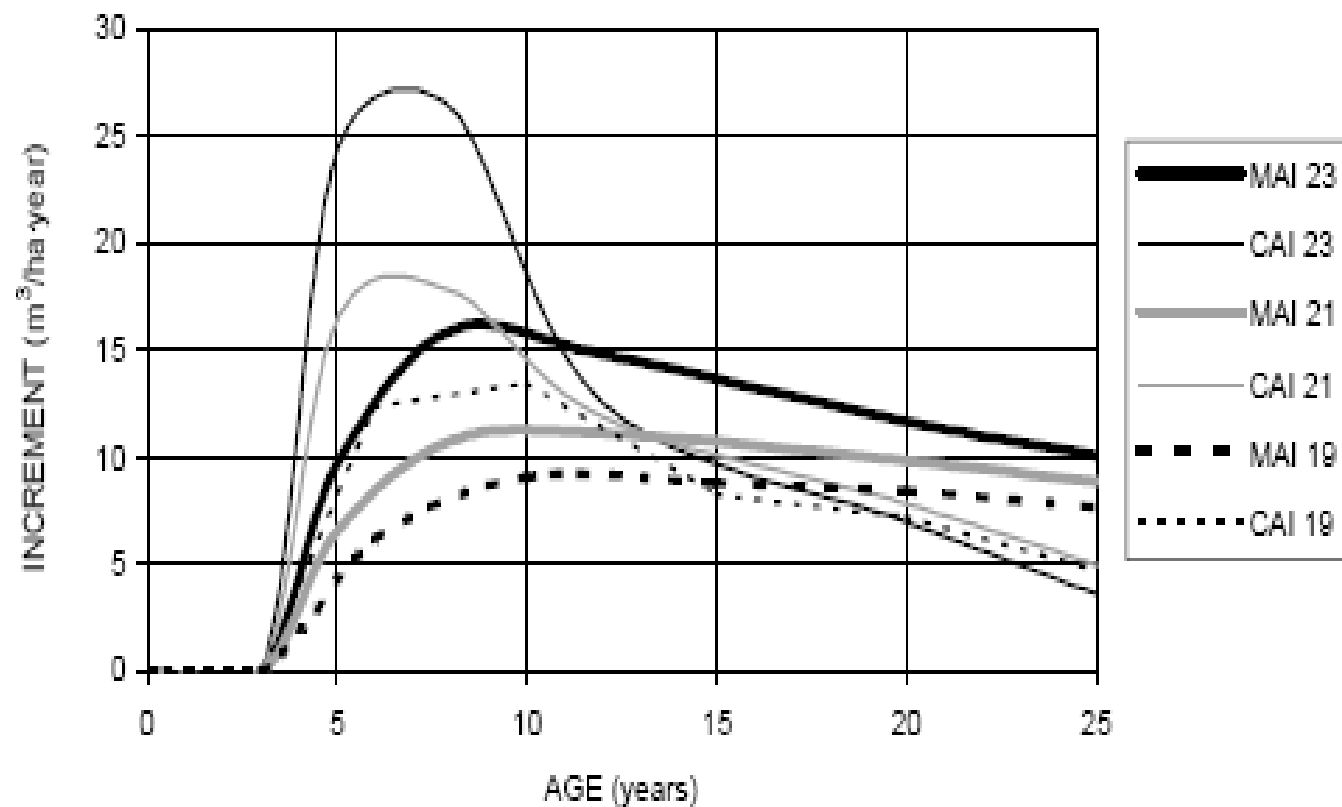


Brushing Crew

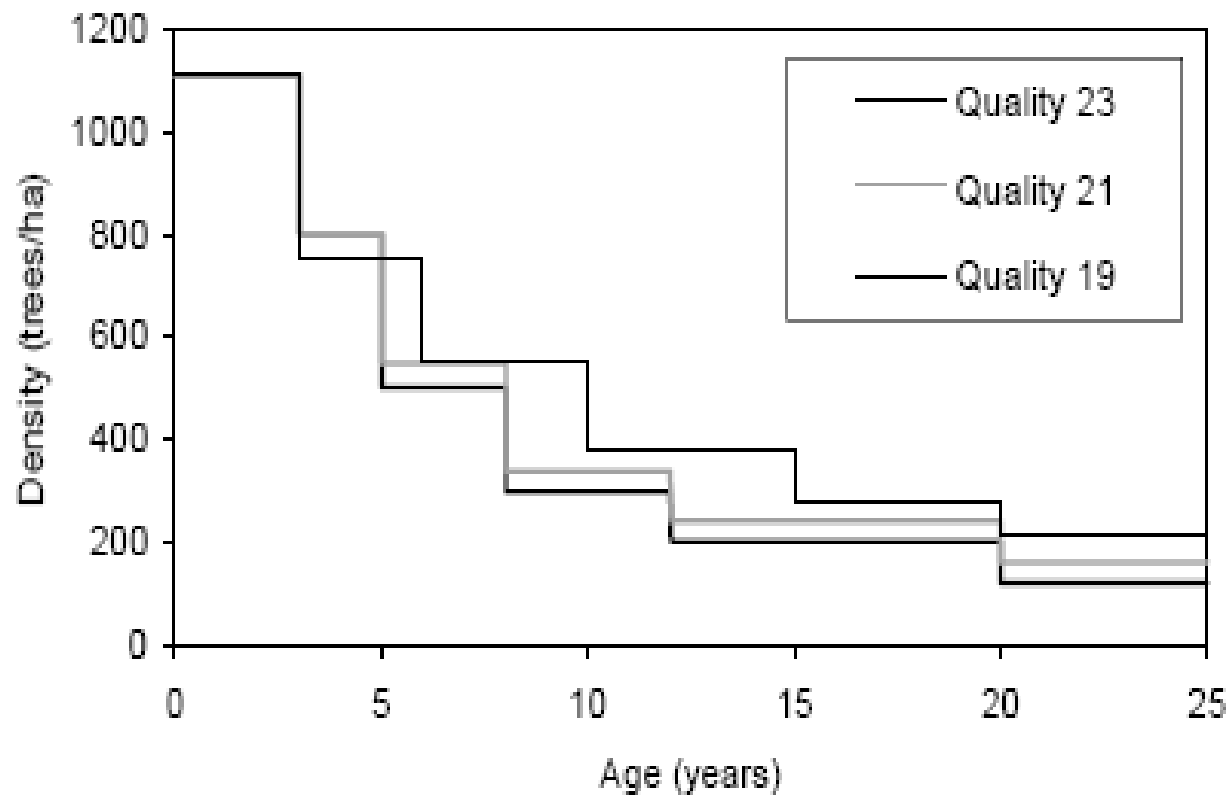
Growth and Yield of Teak



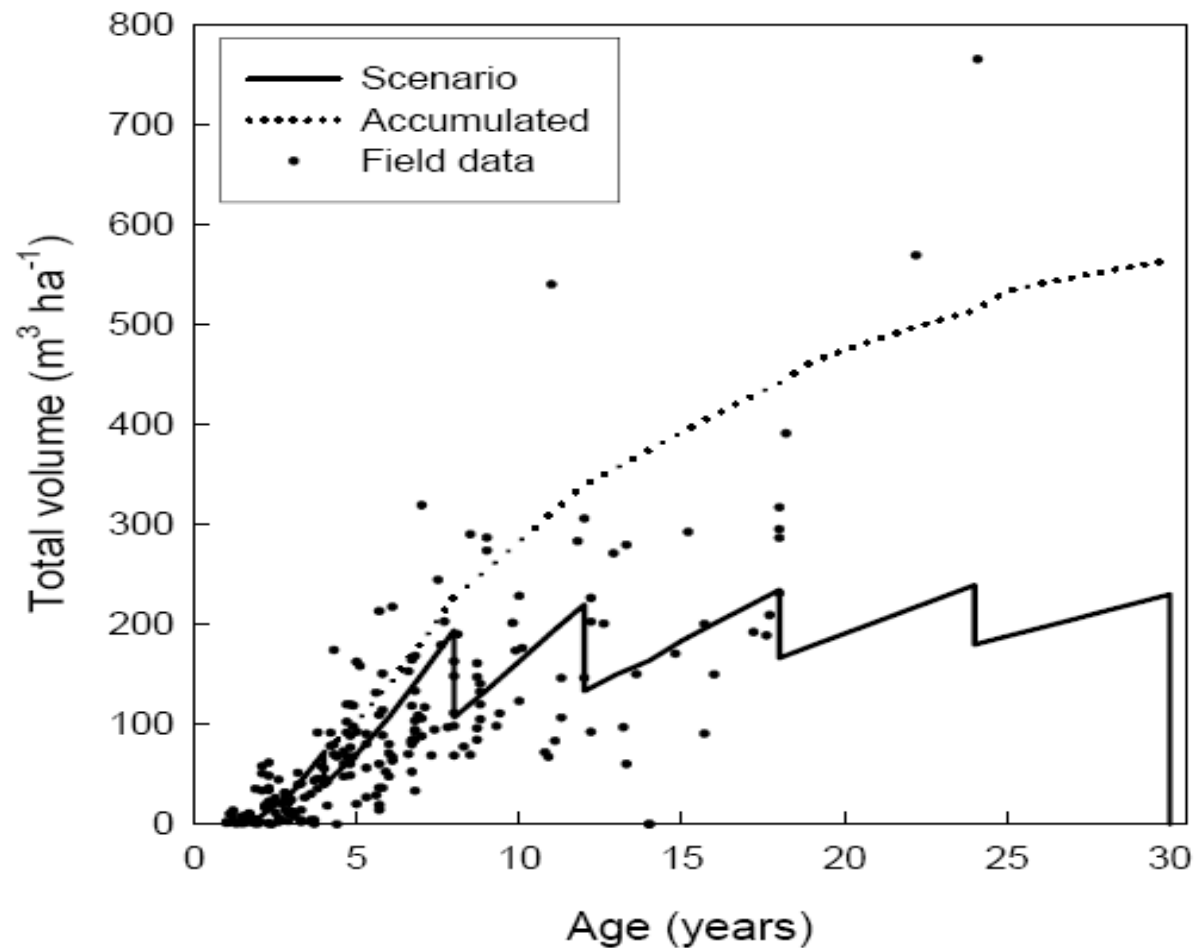
Growth and Yield of Teak



Growth and Yield of Teak



Growth and Yield of Teak



Pest & Disease Risk

- Overall very little that can harm teak
- Fire risk until age 4
- Root rots can be a problem in asia
- Leaf Cutter Ants
- Termites
- Volcanoes, earthquakes and hurricanes almost zero risk in Panama



Investment Risks

- Market (decline in teak prices, fluctuations in exchange rates, increase of input costs)
- Political (Disposition, change in legal conditions)
- Natural (insects, disease, drought, mudslides, flooding, climate change)
- Management (death of key persons, poor silvicultural treatments, liquidity, bad debts)

Storage of Teak Logs

- Teak very stable dimensionally
- Can be stored for 1 year with minimal checking
- Logging season is Jan – April
- Black stain develops if left outside too long



Low Tech Manufacturing Facilities



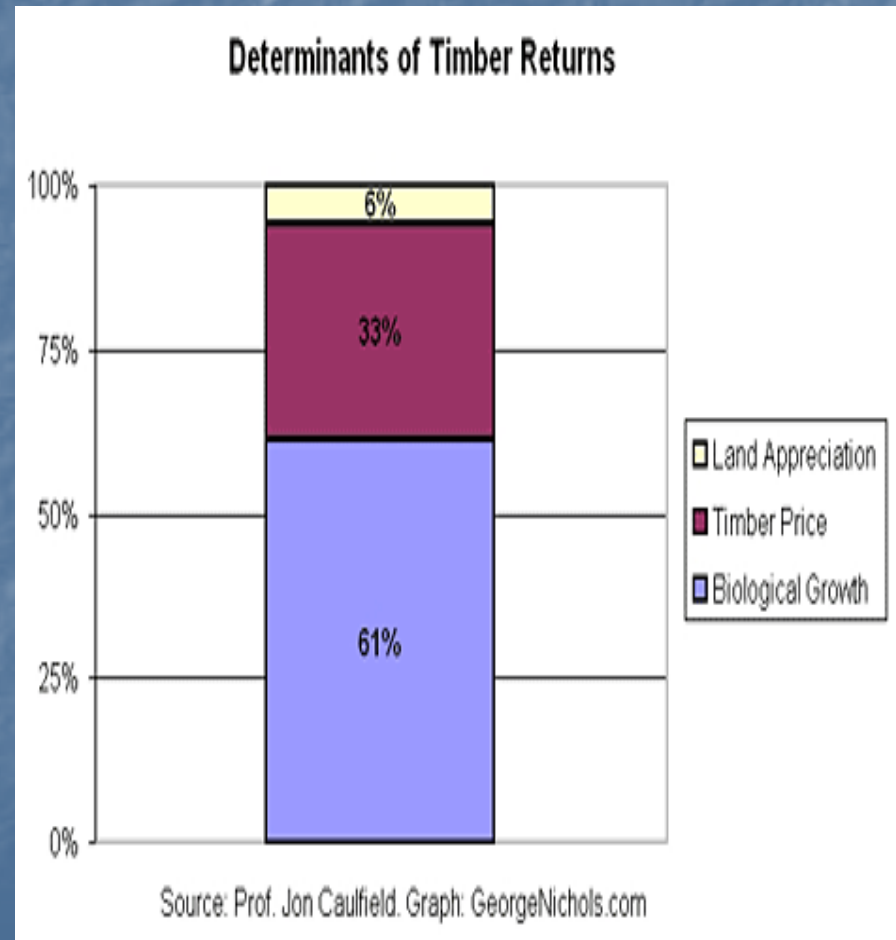
4" Bandmill combined with De-Humidification Kiln

Wood Products made from Teak



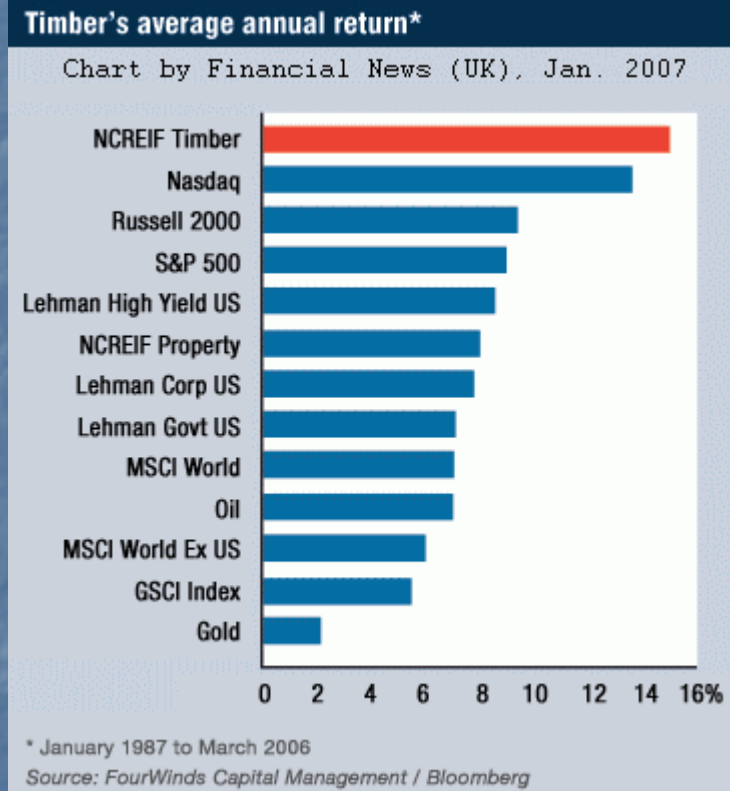
Why Invest in Teak Forestry?

- “Green” investment
- Value Added (ecosystem assets, cows, energy).
- Biological growth
- Harvest decision can be altered.
- Trees still grow in a recession!



Why Invest in Teak Forestry?

- Stable, Long Term returns
- Inflation Hedge
- Portfolio diversification
- Historical returns uncorrelated with financial assets



Final Thoughts

- Teak is a high value Precious Wood that grows best near the equator.
- Drastic growth reduction occurs if not thinned properly



Final Thoughts

- Properly managed it can provide long lasting benefits to the people of Panama and to investors who see the opportunity.



www.panamateakforestry.com