


## Silvicultural Implications of High Impact Carbon Sequestration

or

Competing for the sequestration market with high yield plantation management

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## Today's Presentation

1. Competitiveness of a global market for forestry-based offsets
2. Intensive silviculture options
3. Addressing the competition by thinking ahead

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## Carbon market realities...

- CO<sup>2</sup> is a global pollutant, global commodity
- Competition for this market is already global, will become even more so...
- Multiple regulatory and voluntary schemes exist for mitigation
- Trend will be to harmonization of standards

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## Competition for fun and profit

- Just as Thai farmers compete (and lose) with Illinois farmers for soybean markets...
- ... so will U.S. forest land managers compete (and lose?) with low cost, high productivity silviculture in the tropics

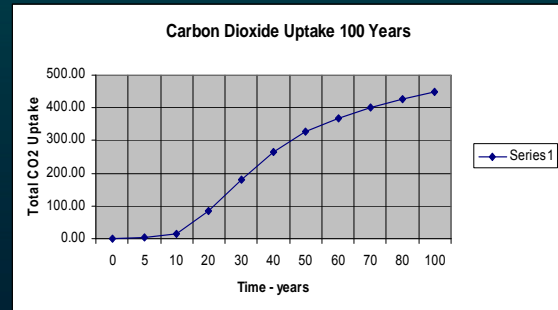
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## The Competition

- Energy, transportation, agriculture
- Non-U.S. producers with lower costs and higher productivity plantation sites
- Lower cost, higher productivity sites in U.S.

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## Lower Mississippi plantation uptake rates (t CO<sub>2</sub> per ac)



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## How much carbon can you grow through intensive silviculture in the tropics?

Site quality and management intensity	Total (t CO <sub>2</sub> ac <sup>-1</sup> yr <sup>-1</sup> )
High (30 m <sup>3</sup> ha <sup>-1</sup> yr <sup>-1</sup> )	12.6
Med. (15 m <sup>3</sup> ha <sup>-1</sup> yr <sup>-1</sup> )	6.2
Low (5 m <sup>3</sup> ha <sup>-1</sup> yr <sup>-1</sup> )	2.1

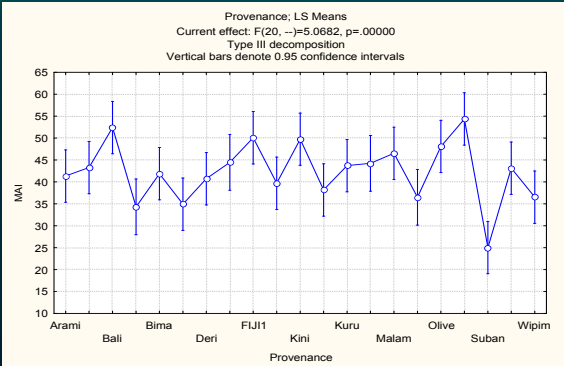
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## Intensive silviculture for carbon will need to...

- Improve rotation-end stocking rates through:
  - Higher quality planting stock, site prep, more efficient maintenance
  - Reduced pest and disease losses
- Increase volume per tree
  - Testing and deploying to maximize yield at all times
  - Fertilization, thinning
- Optimize wood properties
  - More durable products
  - Higher root biomass
  - Selecting for high basic density, higher C concentration

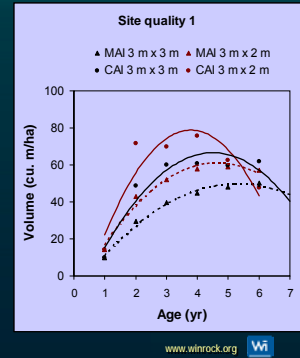
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## MAI > 50m3



## Shortening the rotation

- CAI peaks early – for *A. mangium* at about 4 years at 3 x 2 m spacing
- Moving from 7 years to 6 years may add >20% increase in MAI



## Competing on the basis of cost

- Cost
  - Direct project costs per ton of carbon
  - Transaction costs
  - Risk
- Sustainable development benefits

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## International competitors costs

- <\$400 per acre, including 3 weedings in first year, fertilization
- Pulp example: U.S. wood costs per t of pulp are about 2 x that of low cost foreign producers
- Lower costs in rotations 2+ with coppicing
- Carbon at \$6 per t CO<sup>2</sup> earns >\$400 at moderate levels of productivity, without forest products
- Low regulatory compliance costs
- "Warm and fuzzy" development benefits – poverty alleviation, biodiversity

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## Time to give up?

- Not yet
- Risks are generally higher abroad, resulting in domestic/temperate premium
- High domestic R&D potential for yield improvement
- Likelihood of subsidies?
- Lack of highly productive arable land available for forest plantations in most countries

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## Addressing the competition


### Keeping costs reasonable

- Making approval processes simple, inexpensive for producers and aggregators
- Finding low-cost carbon production opportunities
  - Good tree growth potential
  - Large scale tracts of land
  - Appropriate silviculture
  - Learn from energy and pulpwood plantation experience
- Work toward more supportive infrastructure
  - Financing of project development/processing costs
  - Subsidized technical support, planting materials
  - R&D targeted to improved competitiveness
  - Risk guarantees

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## Summary

- Competition for offsets is global, and will become increasingly so
- Growing conditions and cost structures favor tropical and sub-tropical growers
- Near term prospects still good for domestic plantations – medium term not so clear
- Better growth rates and lower production costs will be key to domestic producer survival

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## Thanks...

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Putting Ideas to Work

