


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...

- CO² 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

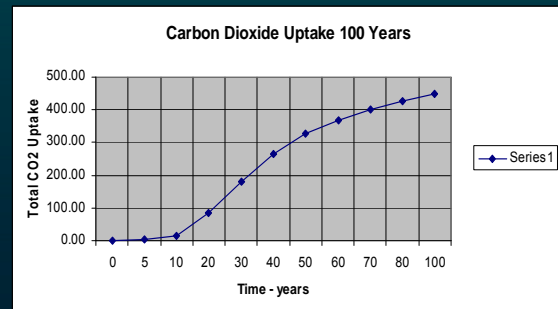
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The Competition

- 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 CO₂ 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 ₂ ac ⁻¹ yr ⁻¹)
High (30 m ³ ha ⁻¹ yr ⁻¹)	12.6
Med. (15 m ³ ha ⁻¹ yr ⁻¹)	6.2
Low (5 m ³ ha ⁻¹ yr ⁻¹)	2.1

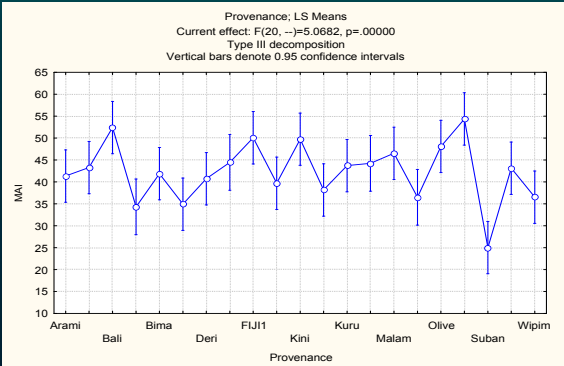
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Intensive silviculture for carbon will need to...

- 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

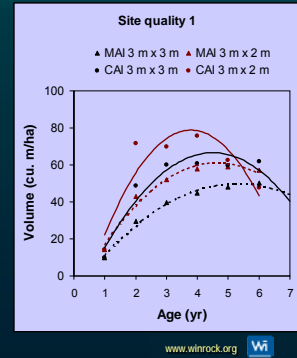
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MAI > 50m3



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 CO² 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

