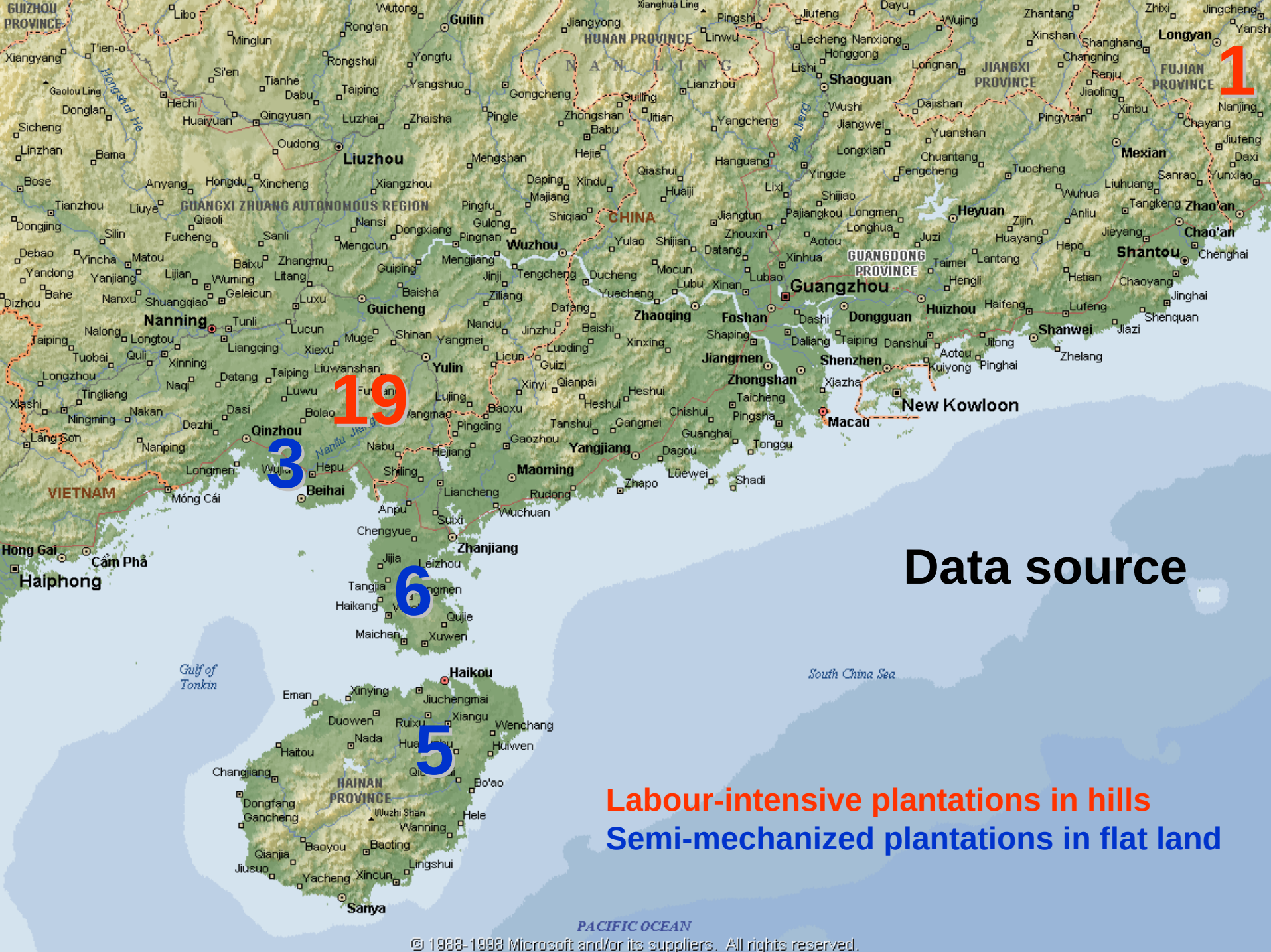
Competitiveness of Hill Plantations in Southern China

Current Situation and Future Scenarios

By Christian Cossalter, CIFOR

The Chinese Market: Supply, Demand and Trade

Beijing, June 6 and 7 2005



Discounted Cash Flow Analysis

Costs in RMB/mu

Years	0	1	2	3	4	5	6
Land Lease -	(15.00)	(15.00)	(15.00)	(15.00)	(15.00)	(15.00)	(15.00)
Silviculture: Labor							
Survey by the Forest Technology Extension Station	(5.00)						
Open a firebreak [10 m x 1.2 km]; Burn the land;clearing after burning - RMB 15 / mu	(15.00)						
Open square planting holes - 40 cm at bottom; 50 cm surface; 40 cm depth: RMB 0.25/hole	(27.75)						
Refilling holes, adding fertilizer, mixing fertilizer with soil: RMB 0.15/hole	(16.65)						
Unloading seedling; carrying seedling to planting hole and planting - RMB 0.1/hole	(11.10)						
Replace dead trees - if survival less than 98% - 8% were replanted. Cost included in planting costs	-						
Cutting grasses & 20 cm deep cultivation on a 1.2 m wide strip: RMB 30/mu [222 m of strip]	(30.00)						
Dig a trench 15 cm deep, 20 cm wide & 40 cm long 30 cm to the tree and distribute fertilizer	(20.00)						
Cutting grass on the strip and unloading & carrying fertilizer to planting hole included in above	-						
in March: dig similar trench unload, carry and distribute fertilizer, cut grass on a 1.5 m wide strip		(28.00)	(28.00)				
Supervision / Protection: 2 guards for 500 mu x RMB 300/month x 12 months	(14.40)	(14.40)	(14.40)	(14.40)	(14.40)	(14.40)	(14.40)
Silviculture: Materials							
Seedling cost - RMB 0.3 / seedling; purchase of 125 seedling per mu	(37.50)						
Fertizer at time of planting delivered to planting site - 600 g/hole = 66.6 kg/mu x RMB 750/tonne;	(49.95)						
Fertizer delivered at planting site at 3-4 months of age: 600g/tree = 66.6 kg/mu x RMB 1,300/tonne	(86.58)						
Fertizer delivered at planting site cost in year 1 and 2: 500g/tree = 55.5 kg/mu x RMB 1,300/tonne	(72.15)	(72.15)					
Silviculture: Transport							
Harvest/Debarking/Crosscutting/Transport to road side and piling: RMB 50/m3							(275.18)
Wood transport to mill							
Taxes: Abolished in Guangxi province for FGHY plantations							
Fees to Forestry Bureaux: 10% of amount of first transaction sale							(157.60)
Wood sale							1,733.60
Total	(401.08)	(129.55)	(57.40)	(29.40)	(29.40)	(29.40)	1,271.43
Present Value	(401)	(123)	(52)	(25)	(24)	(23)	949
Future Value of Costs	537	165	70	34	32	31	462
Future Value of Costs considered for calculation of stumpage value	537	165	70	34	32	31	29

Parameters	
Discount Rate	7.00%
MAI (m3/mu/y	1.22
Rotation (years)	6
Wood Recovery	75%
% Commercial volume below 14 cm diameter	80%
% Commercial volume above 14 cm diameter	20%
Tonne/m3	1.05
Transport distance	
Transport cost RMB/T/KM	
Harvesting/Bucking/Debarking/transport to road side and piling RMB/m3	50.00
Sale Price (RMB/m3) Standing trees at end of rotation	250.00
Sale Price (RMB/m3) after harvest, road side: Diameter above 14 cm	325.00
Sale Price (RMB/m3) after harvest, road side: Diameter below 14 cm	275.00
Sale Price (RMB/m3) after, harvest road side	

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Fertizer delivered at planting site cost in year 1 and 2: 500g/tree = 55.5 kg/mu x RMB 1,3

Silviculture: Transport

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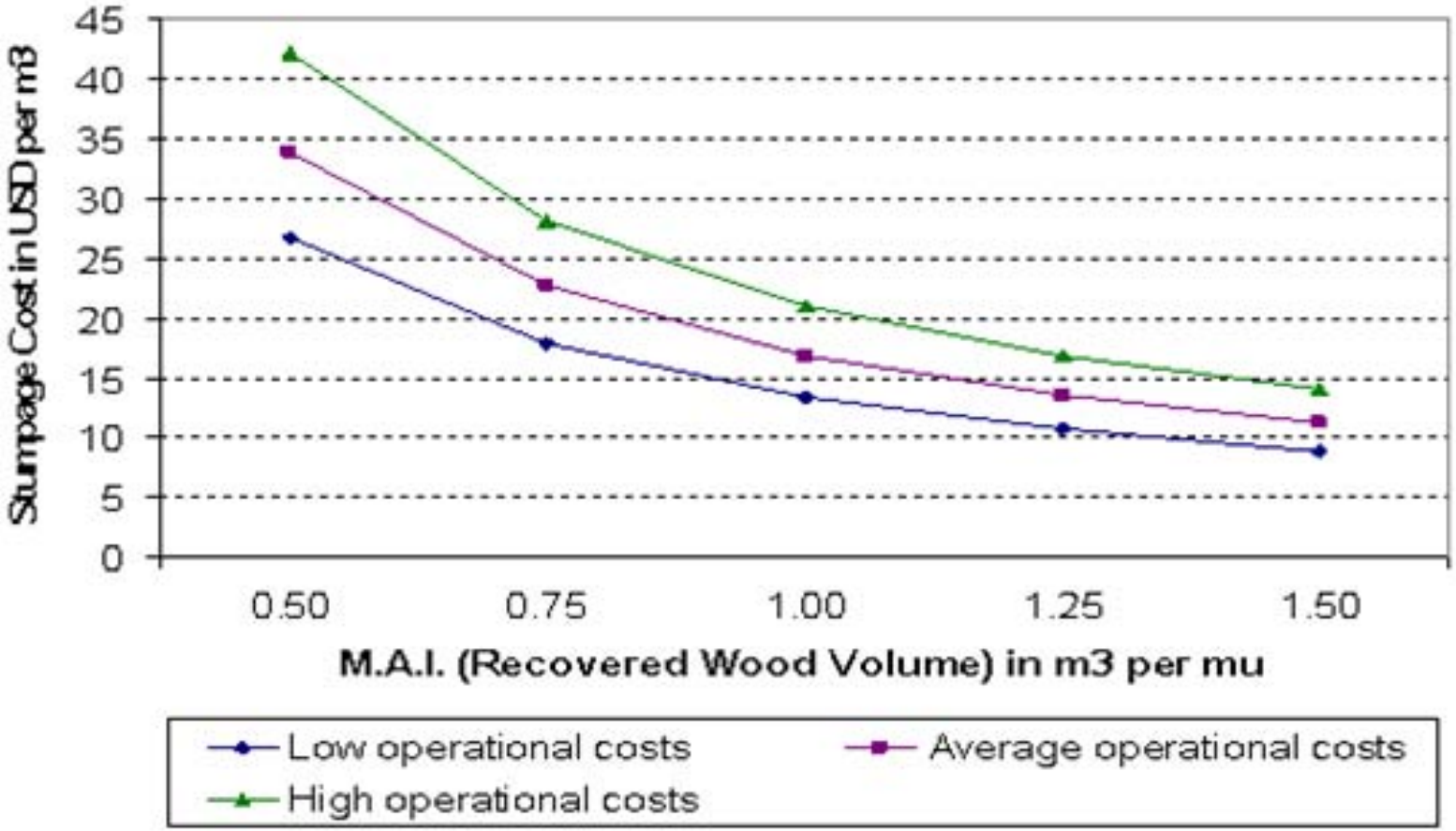
Net Present Value RMB/mu	207.53
IRR:	12.8%
Compounded Costs (RMB/m3) at road side	258.41
Stumpage Value (RMB/m3)	179.77

Net Present Value USD/ha	378.93
Coumpounded Costs (USD/m3)	31.46
Stumpage Value (USD/m3)	21.88

Labor-intensive plantations on hills - First rotation



M.A.I. Total Stem Volume	m3 per mu	0.67	1.00	1.34	1.67	2.00
	m3 per ha	10	15	20	25	30
M.A.I. Recovered Volume	m3 per mu	0.5	0.75	1.00	1.25	1.50
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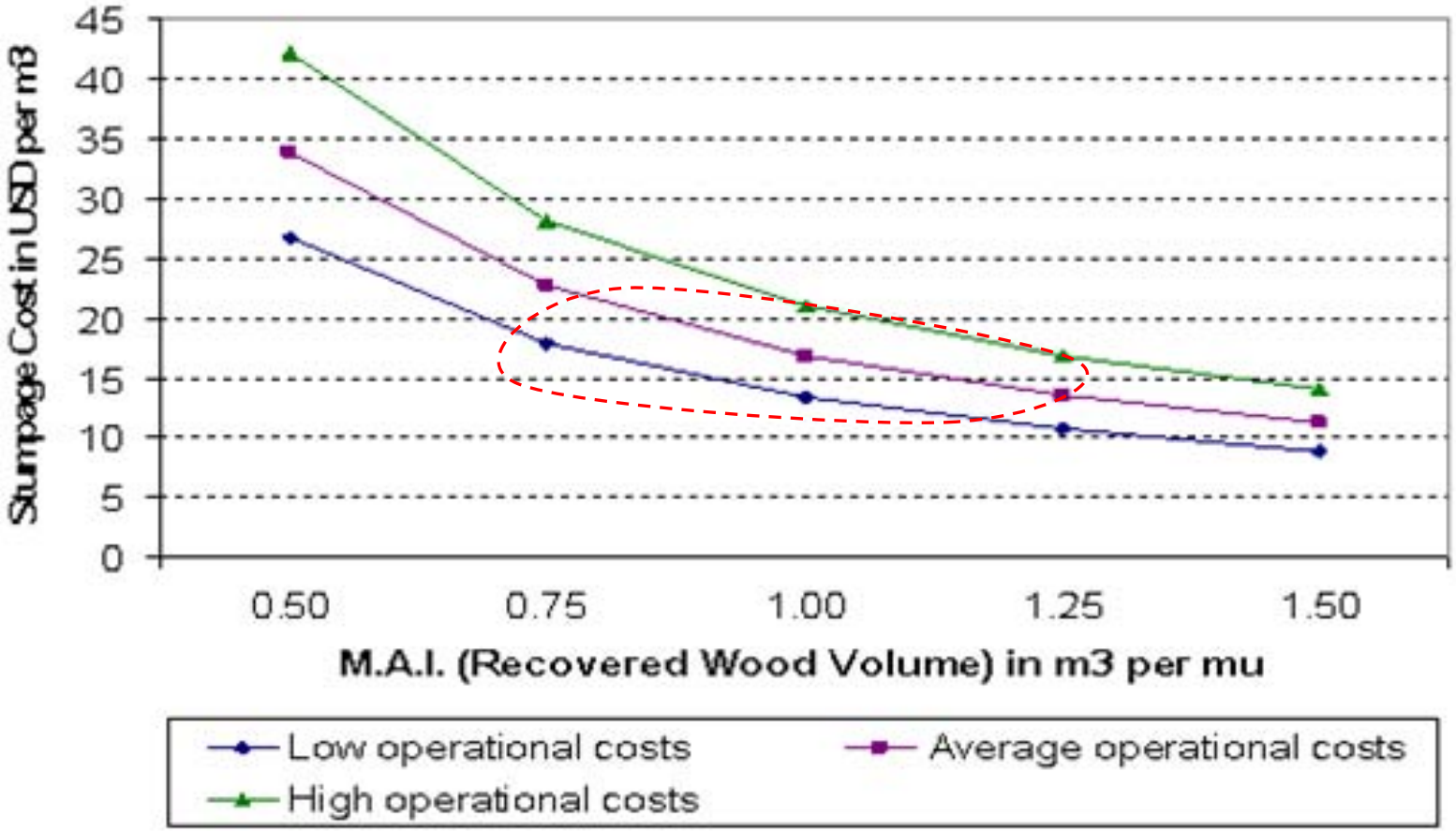

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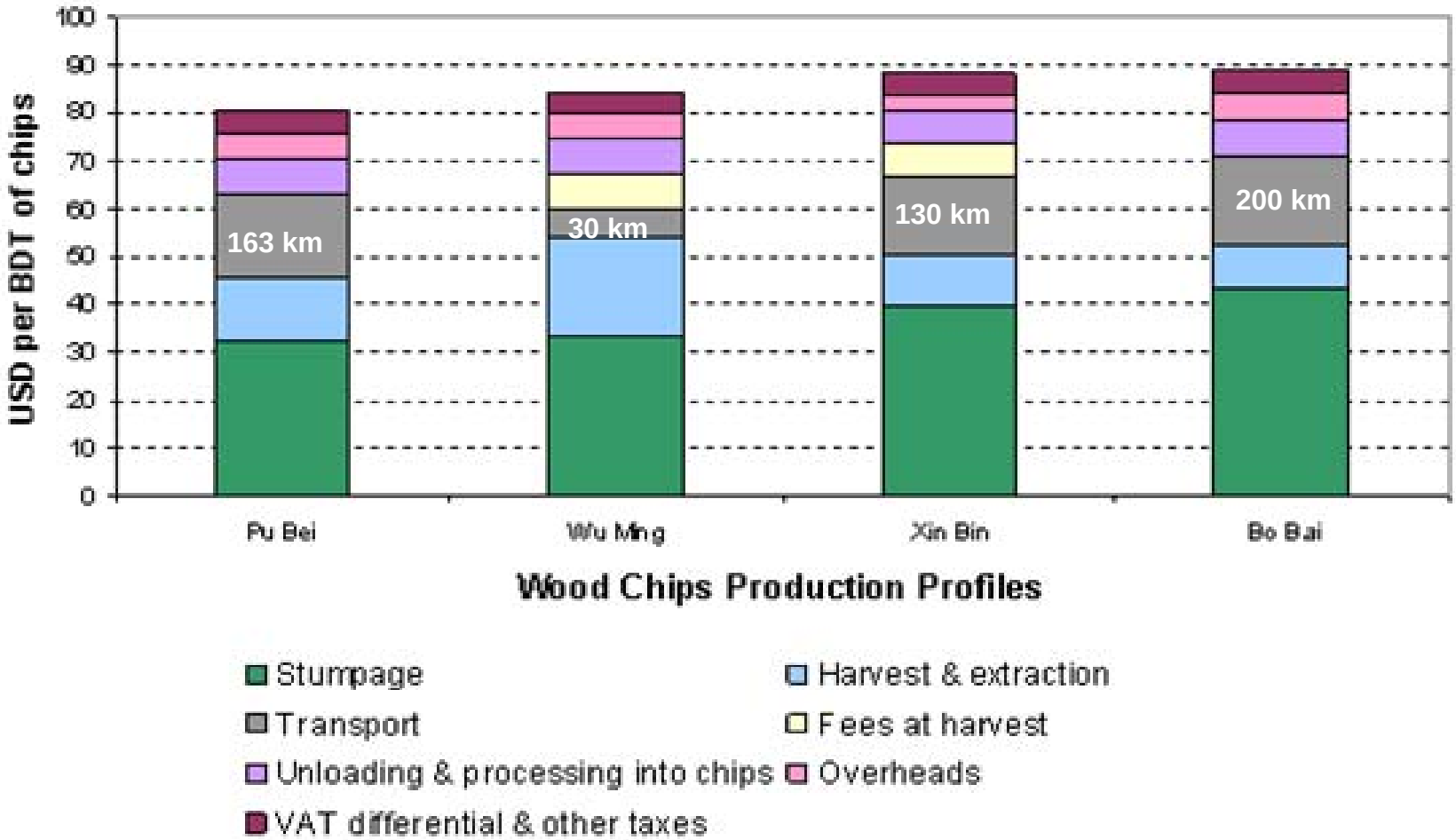
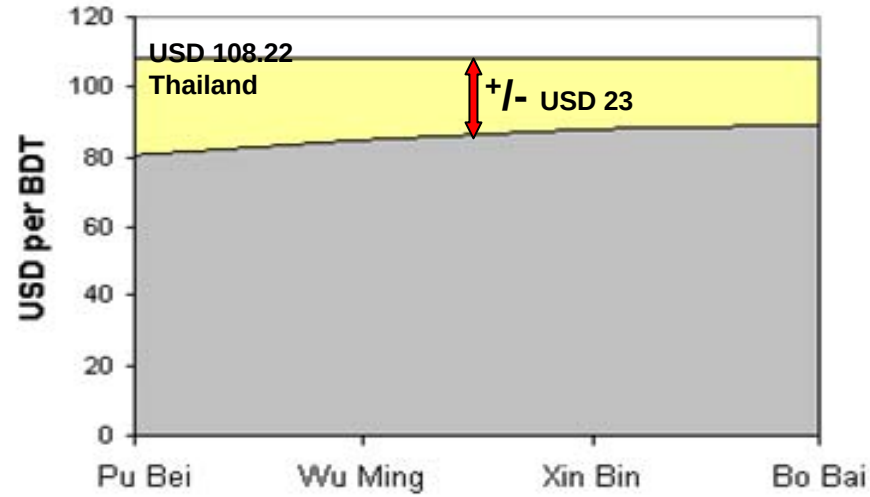
Wood chips costs using locally grown plantation wood (1st rotation)



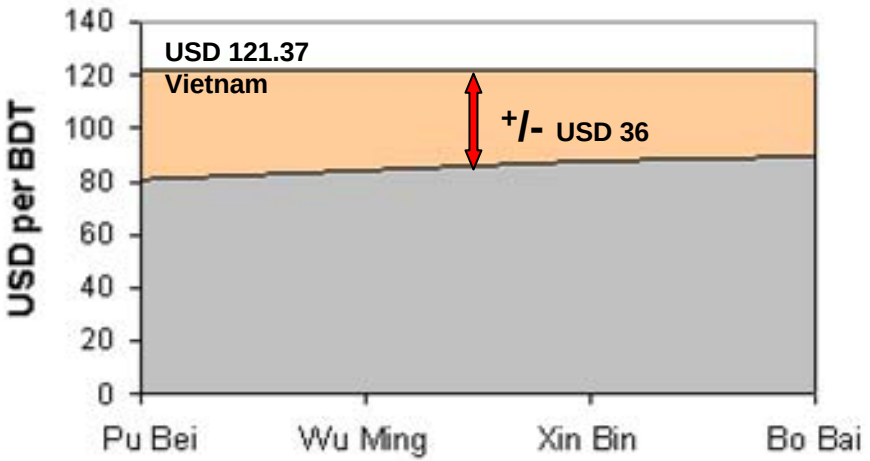
… and current cost advantage with imported hardwood wood chips



Cost margin with imported wood chips from Thailand

Cost of wood chips made with domestic wood (compounded at 7%DR)

Costs of imported wood chips are 2004 averages (China's Customs Administration)

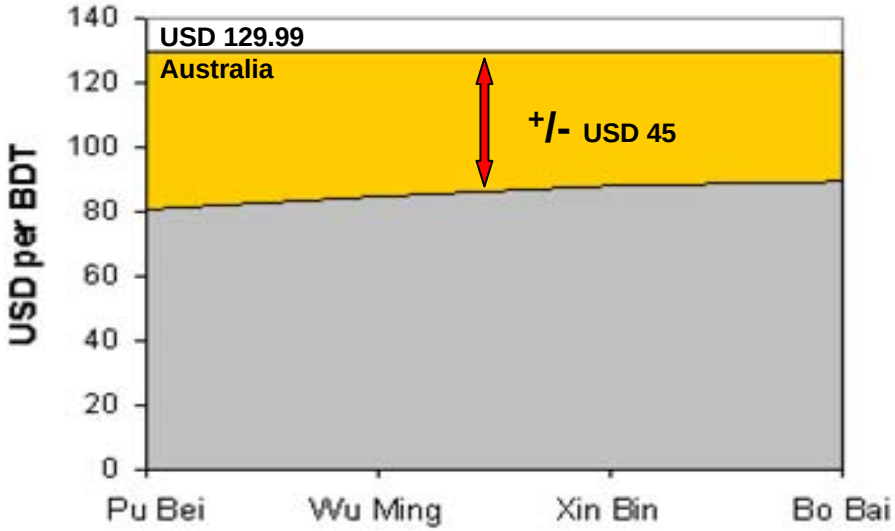


Cost margin with imported wood chips from Vietnam

Cost of wood chips made with domestic wood (compounded at 7%DR)

4 Profiles of domestic wood chips production

… and current cost advantage with imported hardwood wood chips



Cost margin with imported wood chips from Australia

Cost of wood chips made with domestic wood (compounded at 7%DR)

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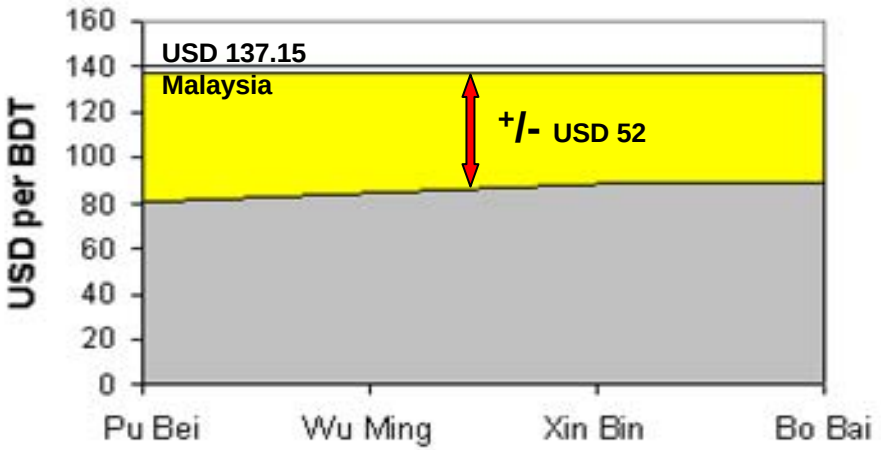
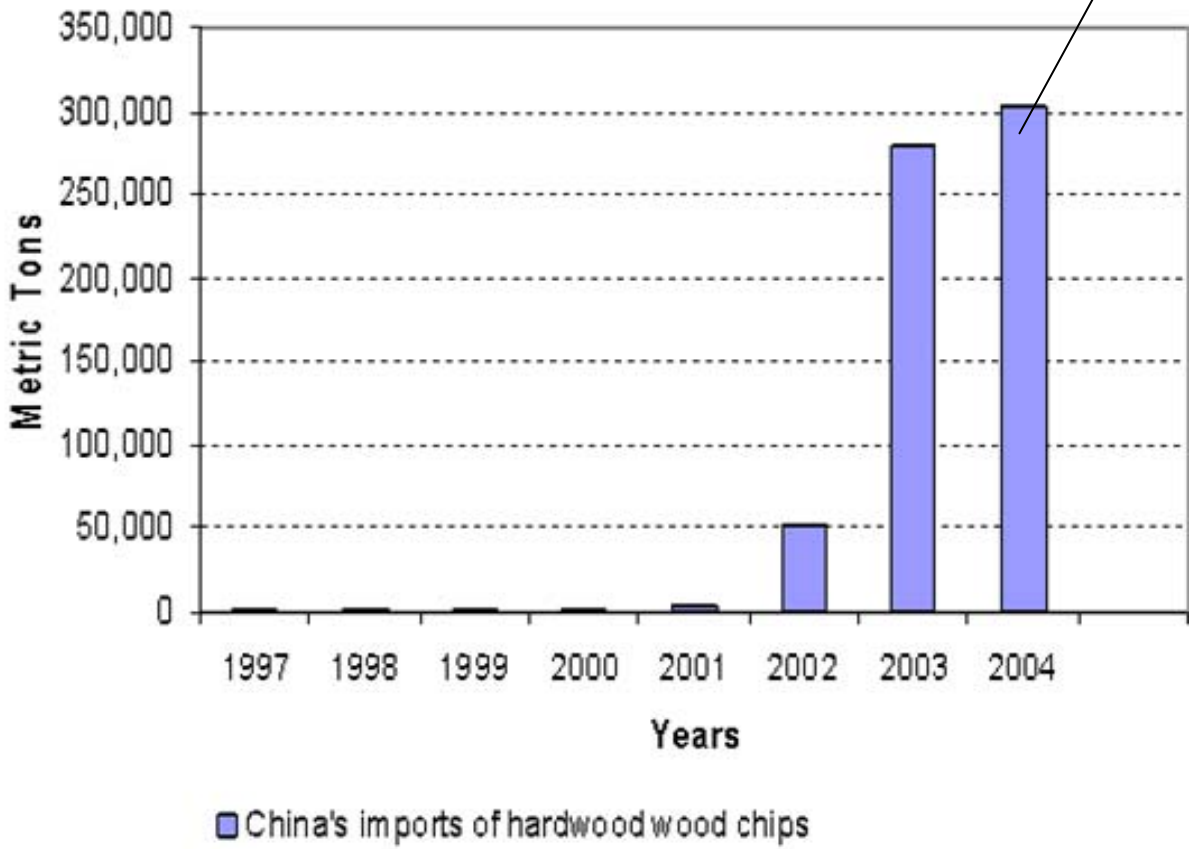


Cost margin with imported wood chips from Malaysia

Cost of wood chips made with domestic wood (compounded at 7%DR)

4 Profiles of domestic wood chips production

China's Imports of hardwood wood chips



99.53% of 2004 tonnage imported from:

- **Australia: 56.80%**
- **Thailand: 19.90%**
- **Vietnam: 17.36%**
- **Malaysia: 5.47%**

Corresponding USD value:

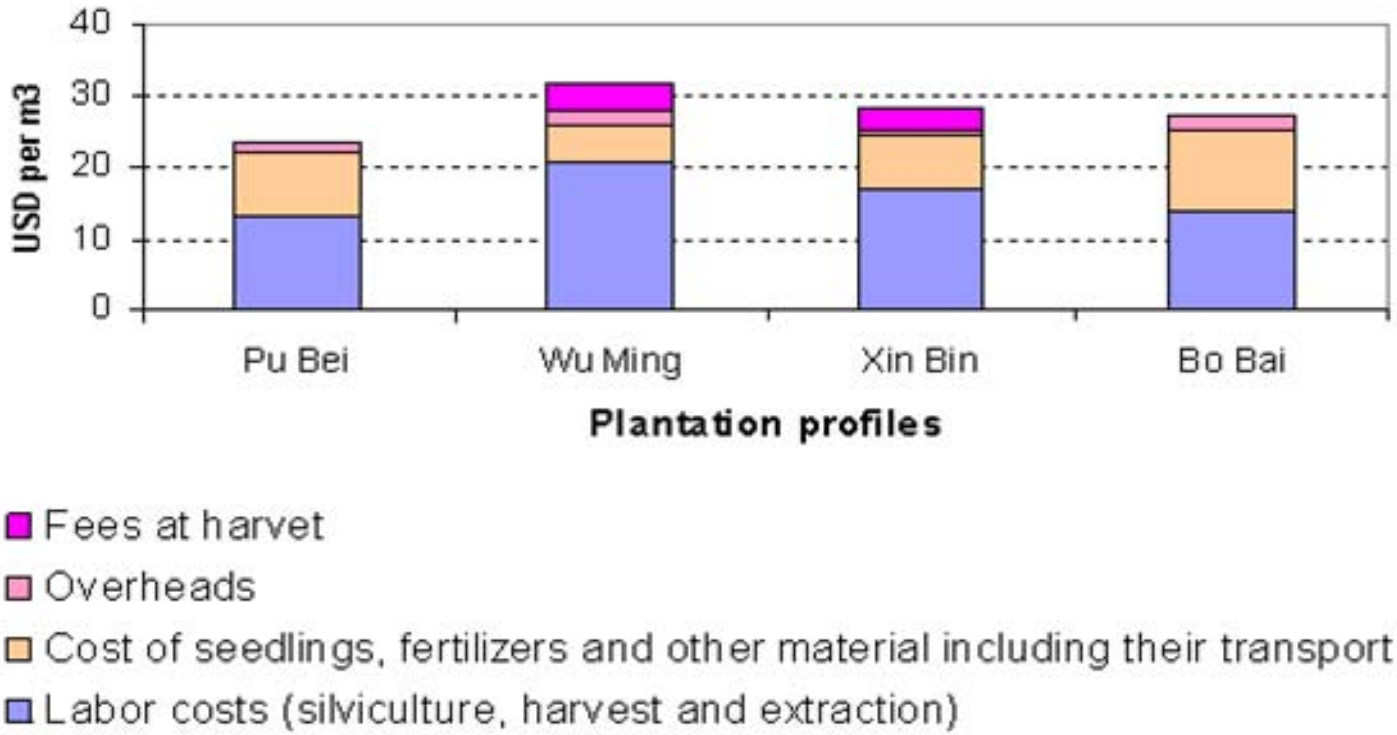
- **Australia: 56.00%**
- **Thailand: 16.32%**
- **Vietnam: 15.98%**
- **Malaysia: 5.60%**

Total: 93.90 %

Data source: China's Custom Administration

Impact of on-site labor costs

Doubling on-site labor costs – all other parameters remaining equal – would offset the current cost advantages versus imported wood chips, in most situations.



Labor-intensive plantations on hills - Coppice rotation

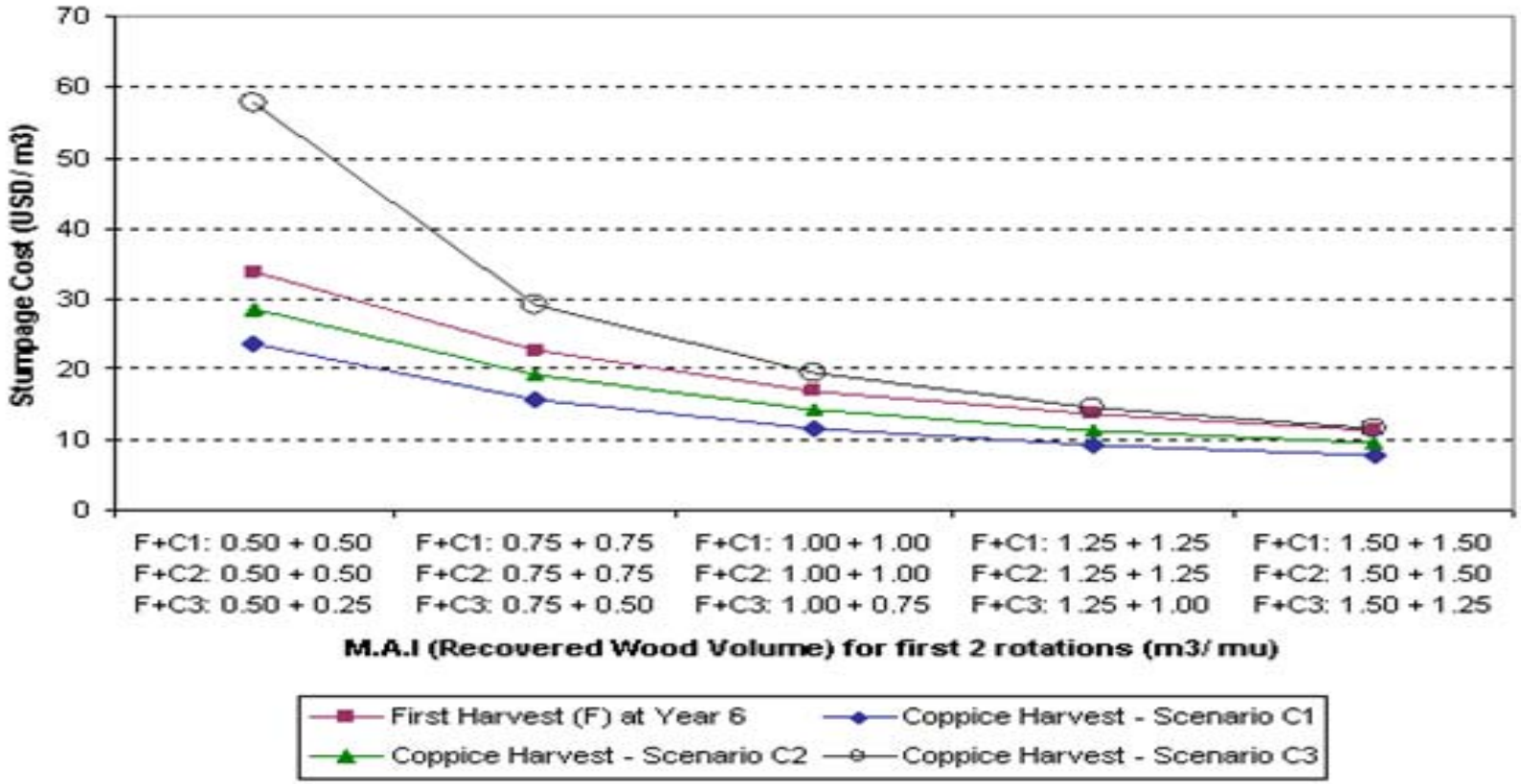
- **Scenario C1**: Land rental costs remain the same than in the first rotation (RMB 15/mu/year); No increase in labor cost. Coppices grow at same M.A.I. than during the first rotation;

- **Scenario C2**: Land rental costs have increased by 35% (to RMB 20.25/mu/year). Labor costs have increased by 50%. Coppices grow at same M.A.I. than during the first rotation;

- **Scenario C3**: Land rental costs have increased by 50% (to RMB 22.5/mu/year). Labor cost have increased by 50%. Coppice productivity is consistently lower than that of first rotation. Difference of M.A.I (for recovered wood volume) between the first rotation and the subsequent coppice rotation is 0.25 m3/mu

Operational costs used in this calculation consists of land rental and plantation operational costs

Wood costs from coppice rotations



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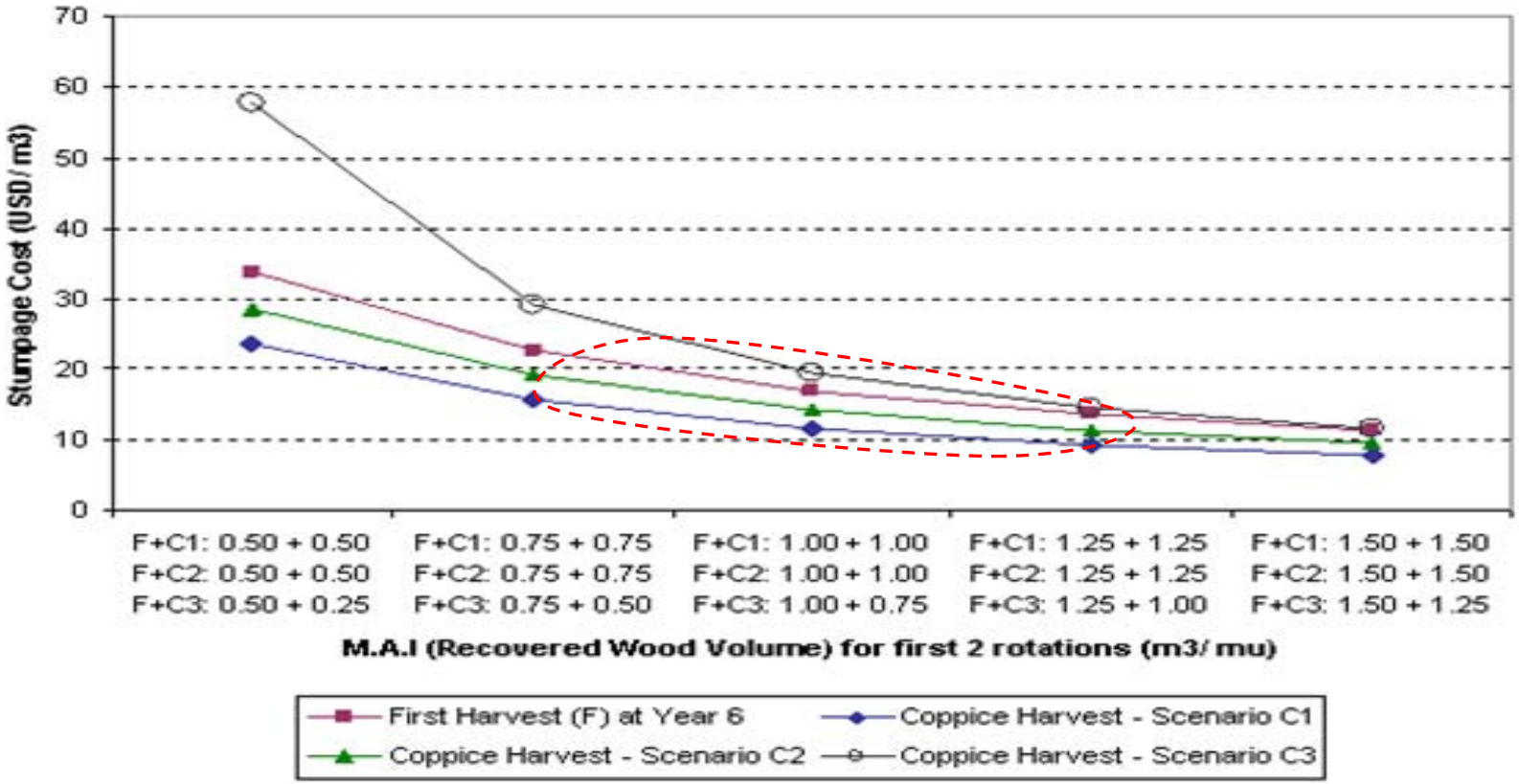

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Re-investment in a new cycle:

1 planted rotation followed by 1 to 2 coppice rotations

Main elements of uncertainties from an investor's perspective:

- Labor availability ?
- Land rental costs ?
- Minimum daily wage for field workers ?
- Cost of imported wood chips?

Conditions in 10 to 15 years from now likely to be less in favor of investors

Lack of labor appears to be a constraint in certain areas (Hainan).

There is still space for adoption of less labor-intensive practices for certain operations

However, the dispersion and relatively modest size of individual plantation blocks is likely to render mechanization a more expensive option.

On the other hand, manual work will continue to be the only option for a number of other operations: terracing, planting, fertilizer application, tending.

The capacity for an enterprise to mobilize workers in adequate numbers and at the right time will - in many instances - determine the economic viability of hill plantations


Thank you
谢谢！