How Cost Competitive is Wood Pulp Production in South China?

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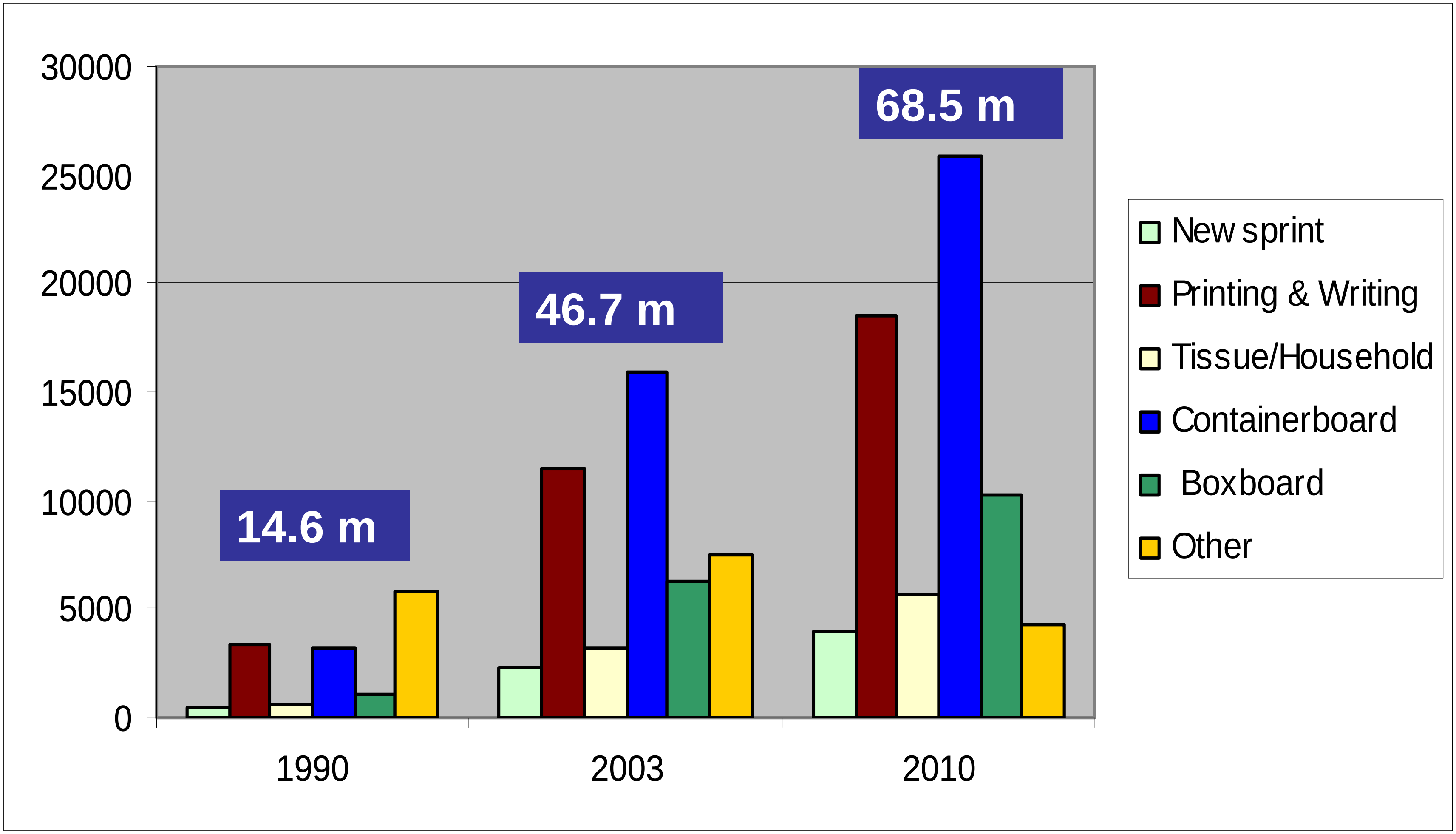
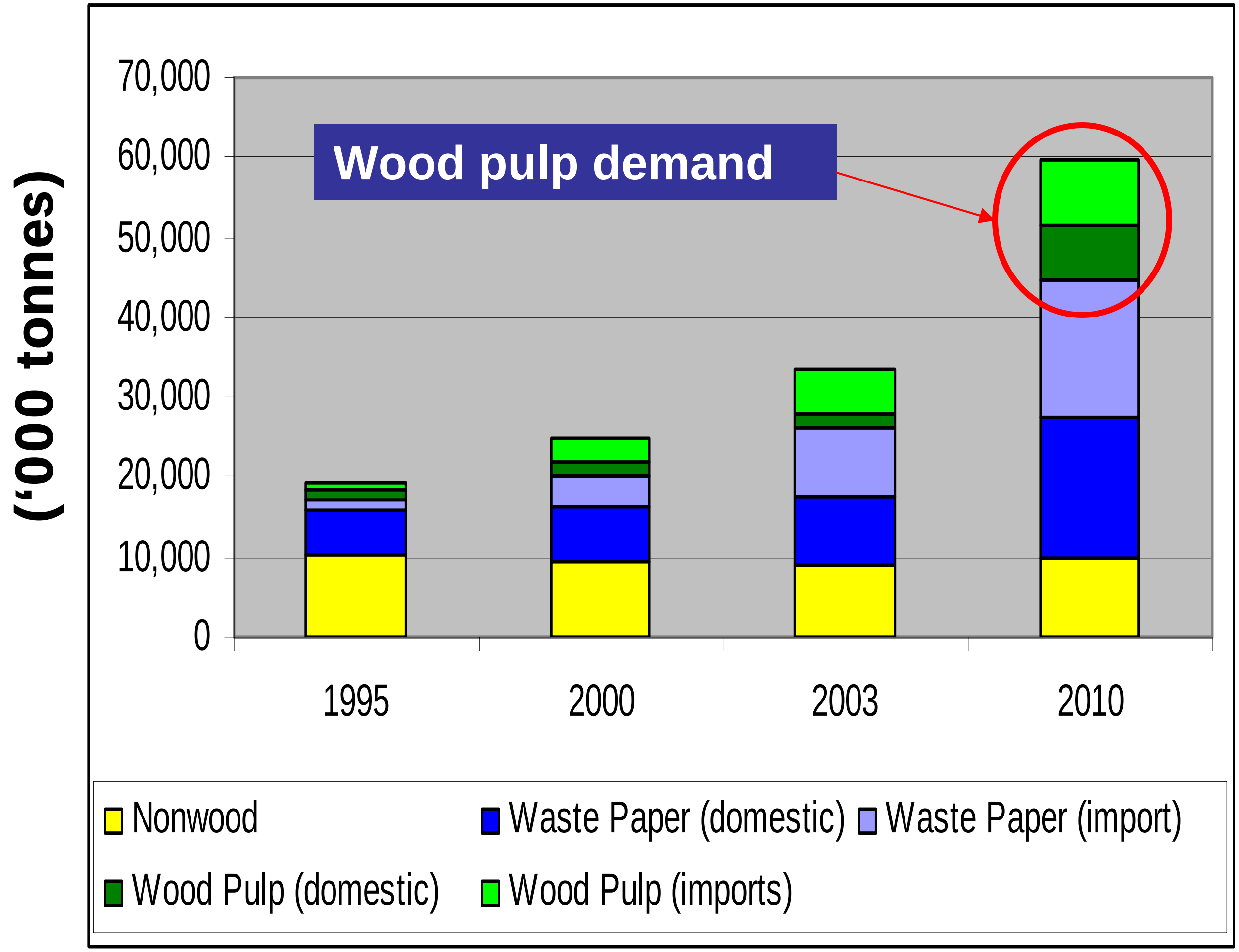
China's growing demand for paper…



***Source:* China Economic Consulting, 2004**

… means growing demand for wood pulp and other types of fiber



During 2000-2010:

- Nonwood fiber declining from 40% to 15% of total
- Waste paper growing from 40% to 58% to reach 35 m tonnes/yr in 2010
- Wood pulp growing from 20% to 25%, to reach 15 m tonnes/yr in 2010

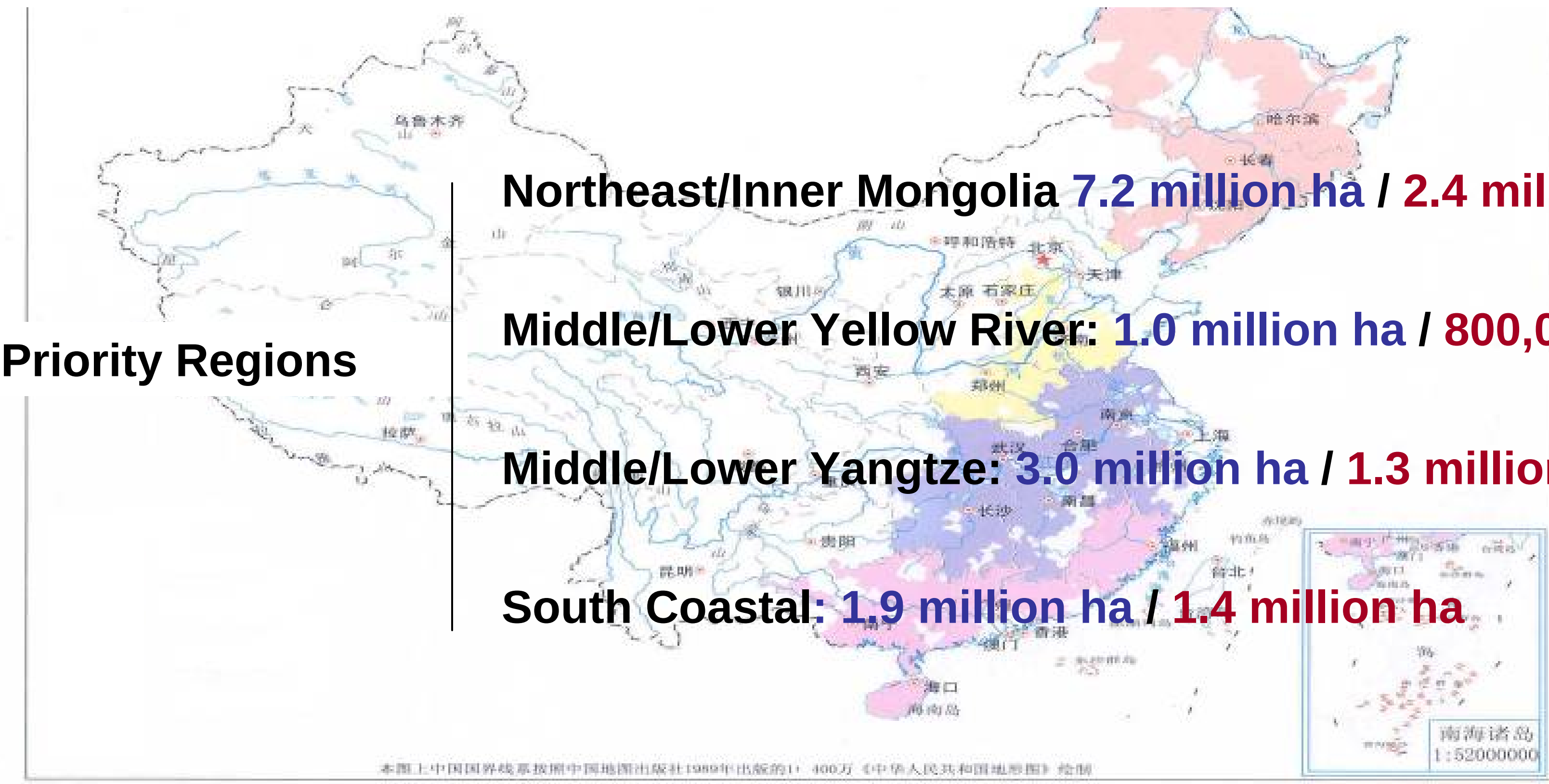
Source: **China Economic Consulting, 2004**

China’s government is promoting development of wood pulp industry fed by fast-growing plantations

FGHY Plantation targets for 2001-2015

Overall area: **13.1 million ha**

Pulpwood plantations: **5.9 million ha (45%)**

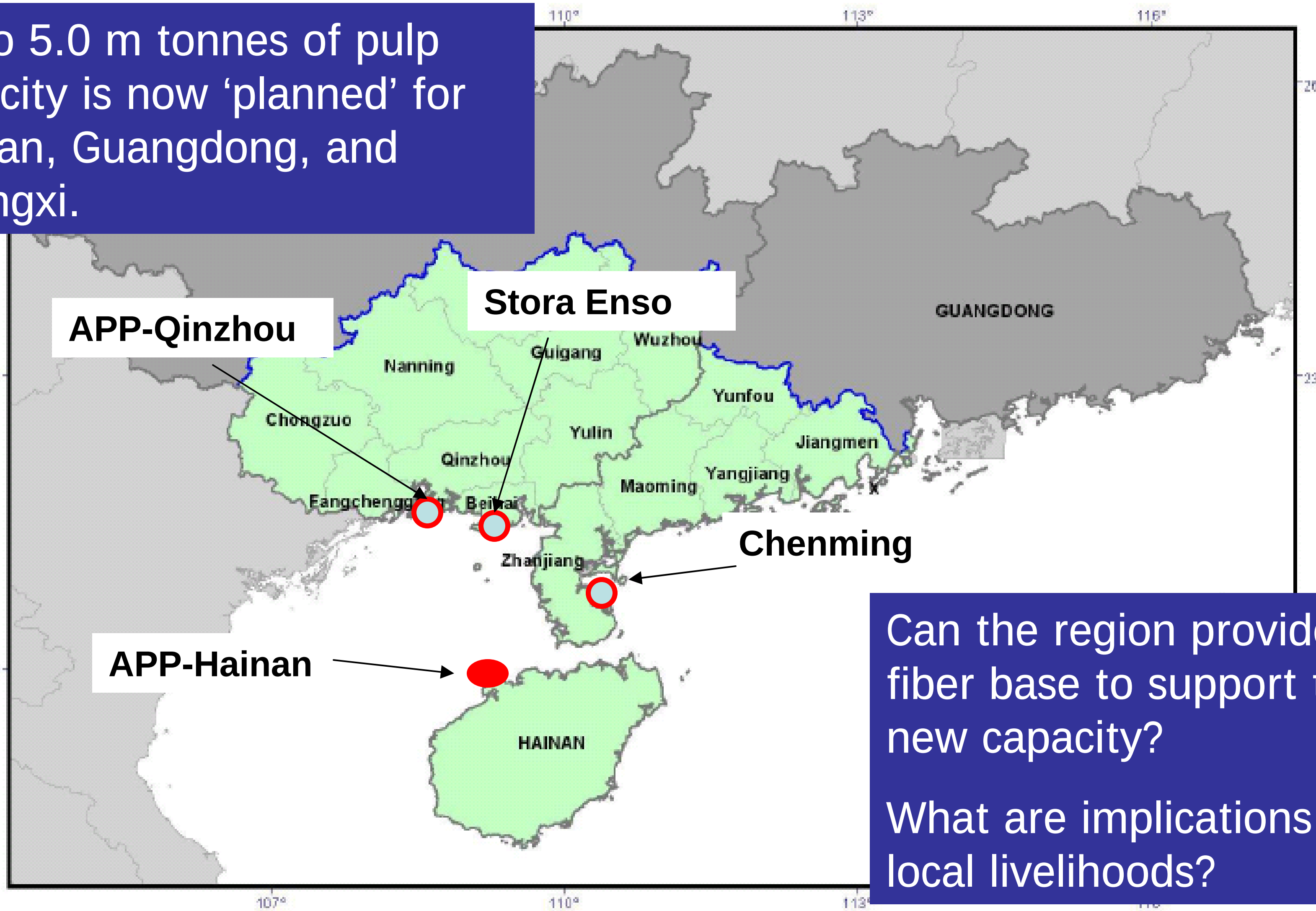


4 Priority Regions

- **Northeast/Inner Mongolia 7.2 million ha / 2.4 million ha**
- **Middle/Lower Yellow River: 1.0 million ha / 800,000 ha**
- **Middle/Lower Yangtze: 3.0 million ha / 1.3 million ha**
- **South Coastal: 1.9 million ha / 1.4 million ha**

Coastal South China is the leading region for wood pulp industry development

Up to 5.0 m tonnes of pulp capacity is now ‘planned’ for Hainan, Guangdong, and Guangxi.



Can the region provide a fiber base to support this new capacity?

What are implications for local livelihoods?

Eucalyptus plantations are expanding rapidly in Hainan, Guangdong, and Guangxi

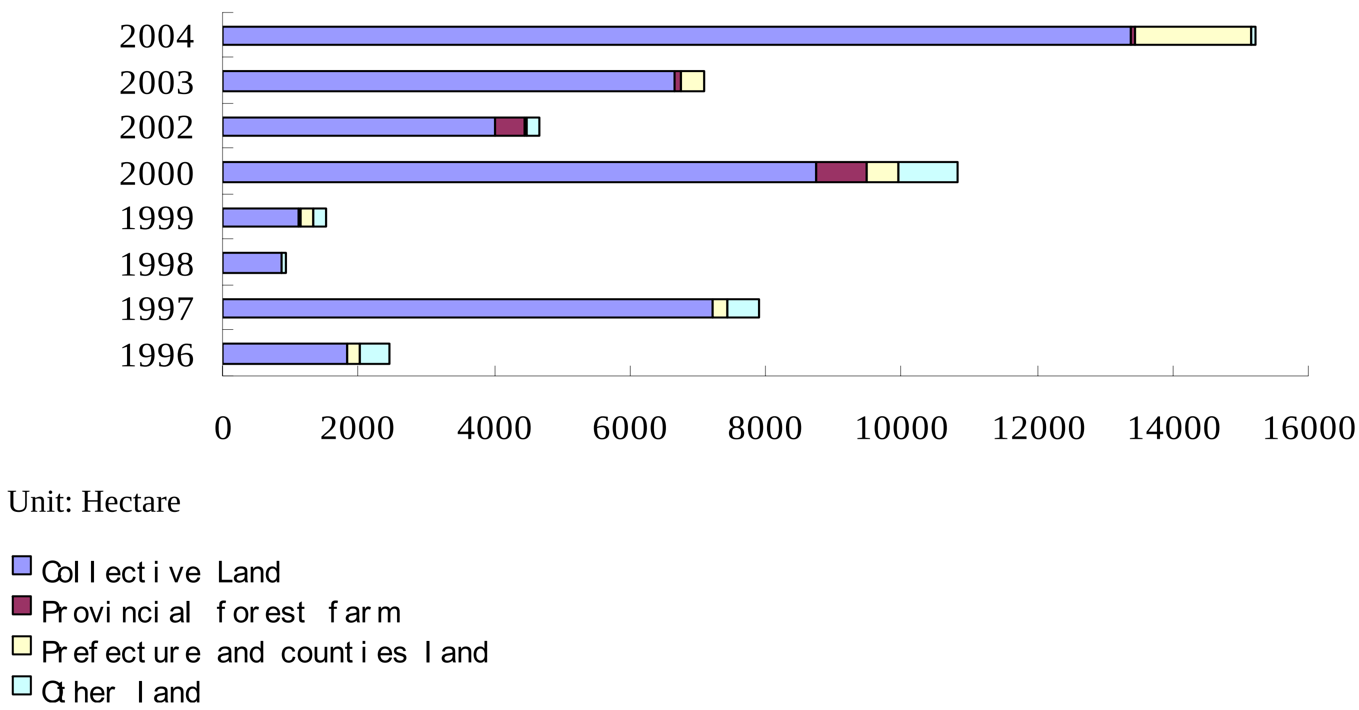
Most expansion is occurring on collectively owned land, held by farmers and communities

Productivity levels are highly variable. MAI’s range between 10-20 m3/ha/yr depending on site conditions and management practices.

Plantations are spread out and in small blocks, with poor infrastructure.

Most plantation expansion is now occurring on collective land

Guangxi: Asia Pulp and Paper



<u>Key Question</u>: How competitive is the delivered wood cost?

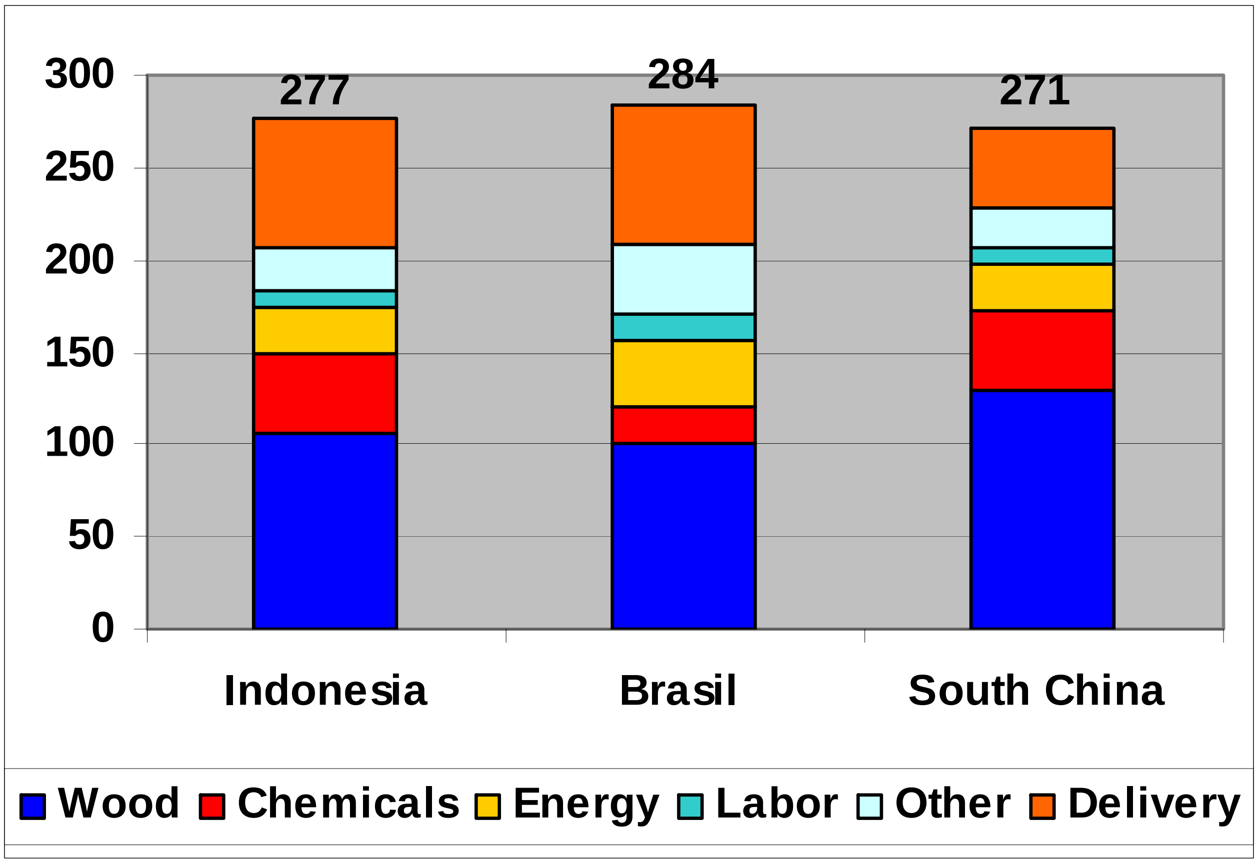
- Wood costs typically account for at 40-50 % of pulp production costs, so are key to determining competitiveness vis-à-vis market pulp

- Eucalypt plantations in South China are generally cost effective compared to other regions in China

- However, wood costs in South China are considerably higher compared to Indonesia and Brasil – both of which export pulp to China

- Increasingly, domestic pulp producers need to be competitive in a global market

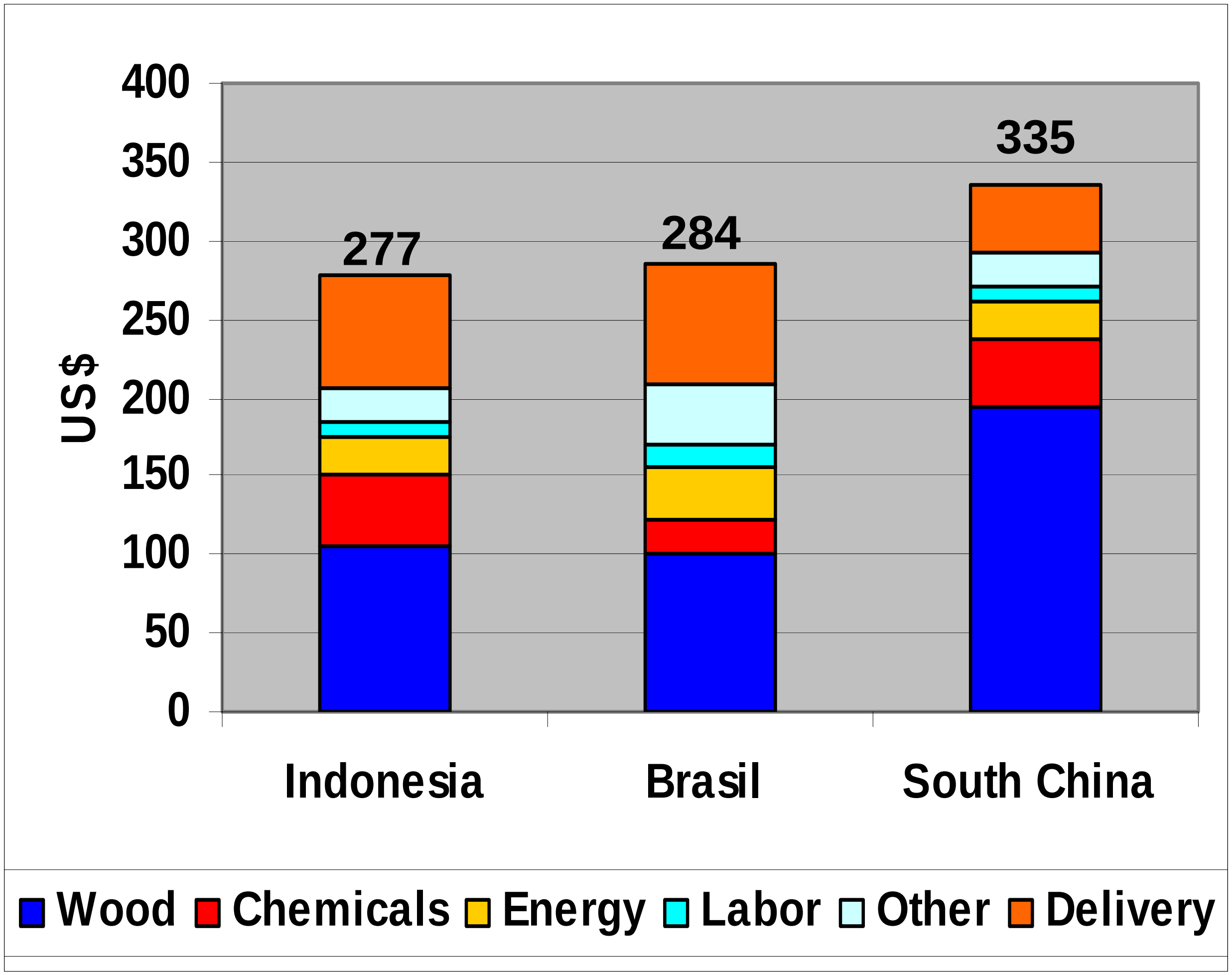
Estimated BHKP production and delivery cash costs, 4Q05 – Assumes US$ 30 per ton wood in S. China



At US$ 30 per ton of wood, South China producers are competitive with imports from Indonesia and Brasil

Source: RISI for Indonesia and Brasil. China costs assume same costs as Indonesia for chemicals, energy, labor, and other; and 60% for delivery

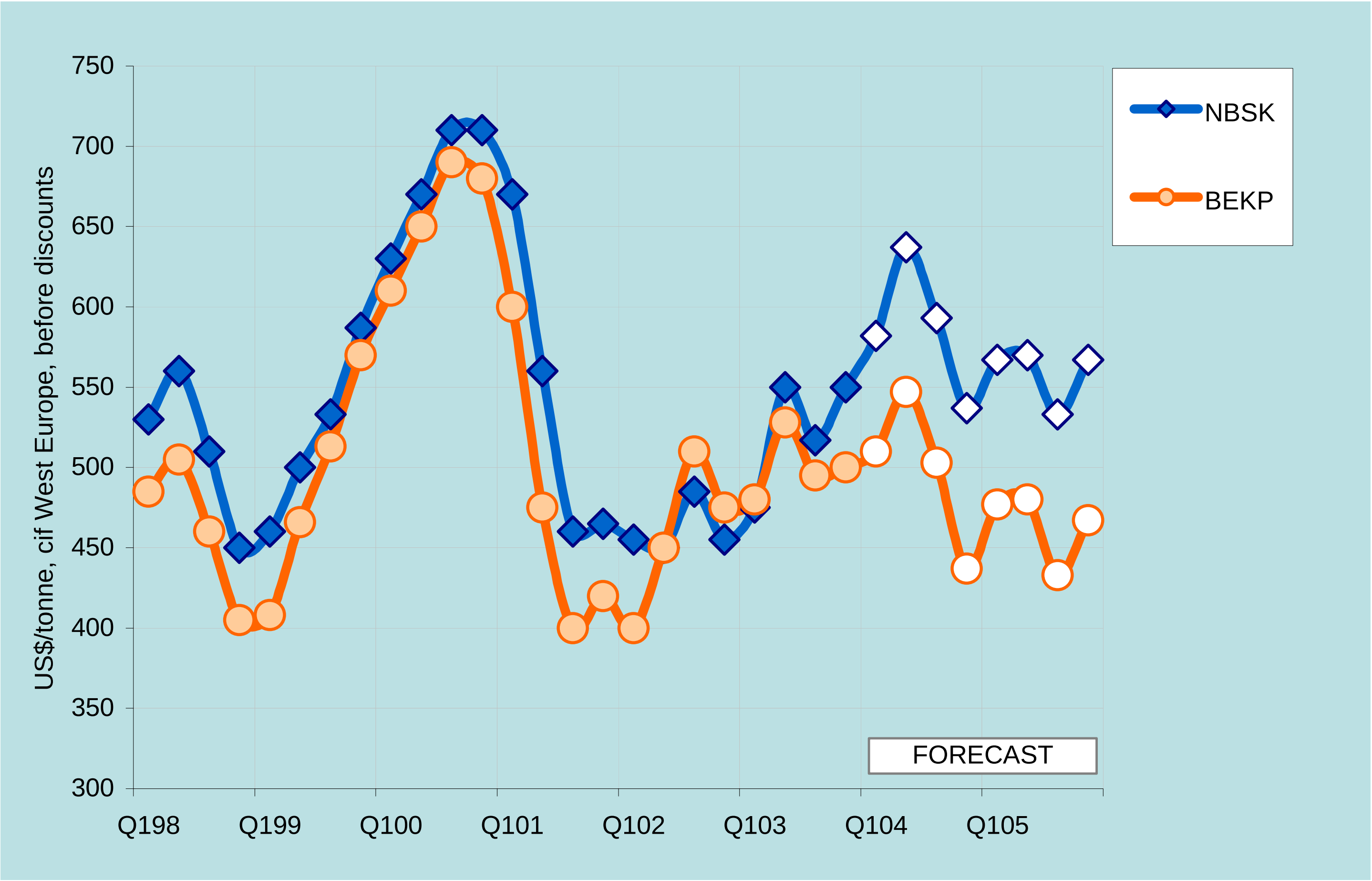
Estimated BHKP production and delivery cash costs, 4Q05 – Assumes US$ 45 per ton wood in S. China



If wood costs are US$ 45 per ton, South China producers will have difficulty competing with imports from Indonesia and Brasil

Source: RISI for Indonesia and Brasil. China costs assume same costs as Indonesia for chemicals, energy, labor, and other; and 60% for delivery

Pulp is a highly volatile commodity – high-cost producers will have difficulty competing during market down-cycles



Source: Hawkins Wright March 2004 Outlook

Prices are c.i.f. delivered, forecast assumes constant exchange rates

Wood cost in South China (1/2)

- In coastal South China, flat land suitable for mechanized plantation management is scarce
- Depending on site, cost of land rent = US$ 70 – 220/ha/yr

• These sites generally have lower development costs, easier logistics, and higher wood yields

<u>Production costs of recovered wood</u>
US$13 -18/m3 (standing, 1st rotation)
US$ 20 - 28 per tonne at mill gate in 2004-2005

For land rental price below RMB 55/mu/yr (approx US$ 100 /ha/yr)

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Wood cost in South China (2/2)

• Most future plantation development will occur on labor-intensive hilly sites

• Cost of land rent is normally in the range of US$ 20-50 /ha/yr

- These sites generally require much more labor and higher fertilizer inputs

<u>Production costs of recovered wood</u>
US$13 -28/m3 (standing, 1st rotation)
US$ 32-44+ per tonne at mill gate in 2004-2005

For average land rental price of RMB 15/mu/yr (approx US$ 27/ha/yr)

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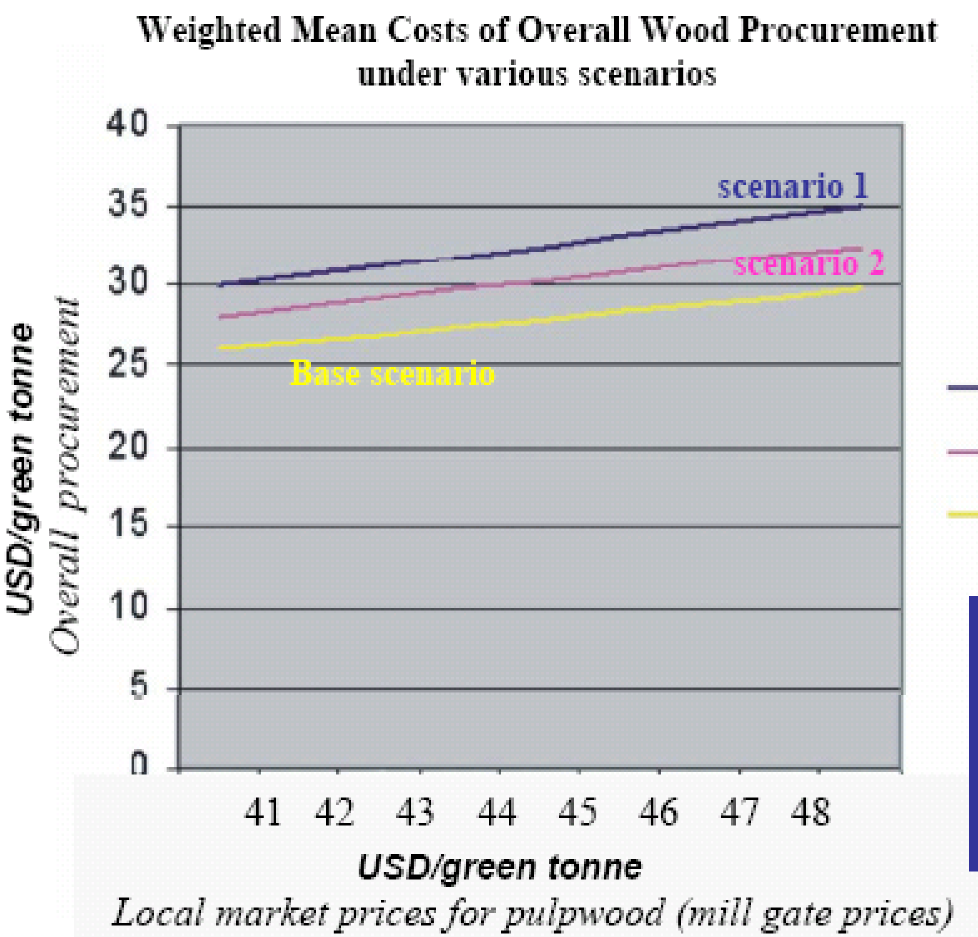
Pulp mill competitiveness is heavily dependent on who controls the wood supply

Fuxing – UPM Kymmene's recent experience shows that a too high reliance on outside wood supply may render an entire wood pulp project non-viable

Base Scenario

Self-managed plantations	*50,000 ha of plantation established aiming to produve 40% of the wood requirement* *9-year cycles with 2 harvests: year 5 (planted crop) and year 9 (coppiced crop)*
'Membership Programme'	*Wood delivery:_122 tonnes at age 5 and 97 tonnes at age 9* *90,000 ha delivering 12.5% of the overall wood requirement as re-payment of loans & assistance. The rest of the production sold at market price*
Contracted plantations	*60,000 ha: Wood sold at market price*

Pulp producers seek to control costs by maximizing self-managed areas



Sources of wood supplies

Self Managed	Out-grower Scheme	Local Market
30%	8%	62%
35%	10%	55%
40%	12.5%	47.5%

An increase of USD 5 per green tonne of wood means an increase of USD 21 per tonne of pulp

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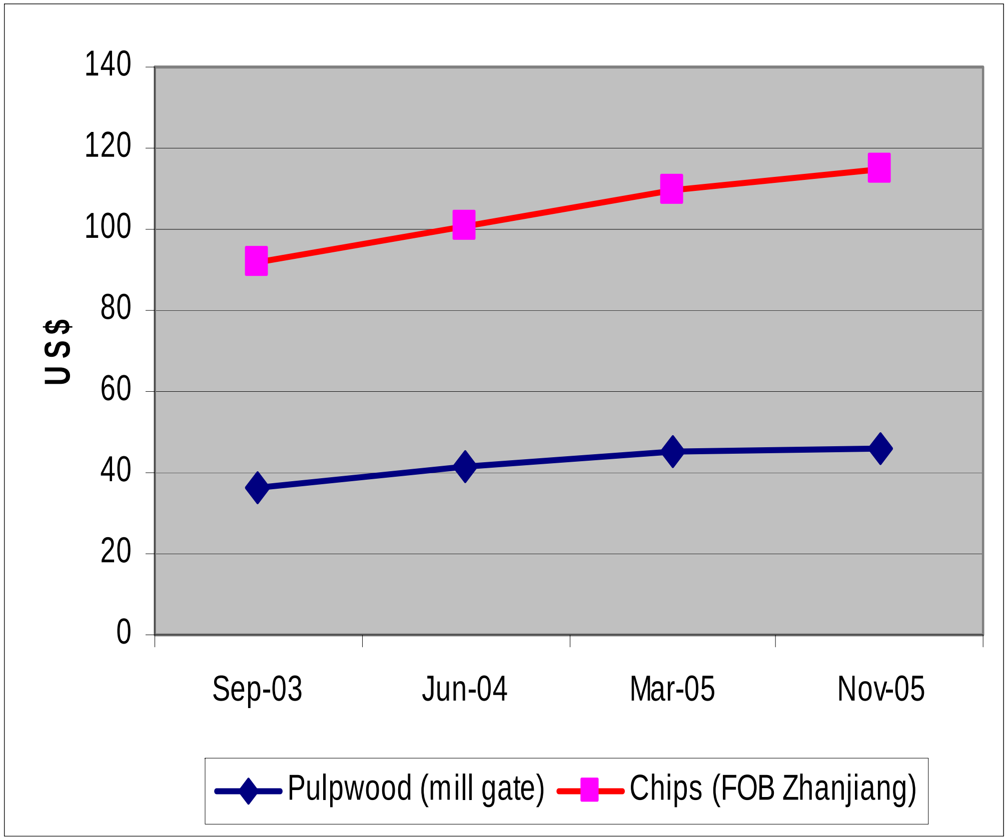
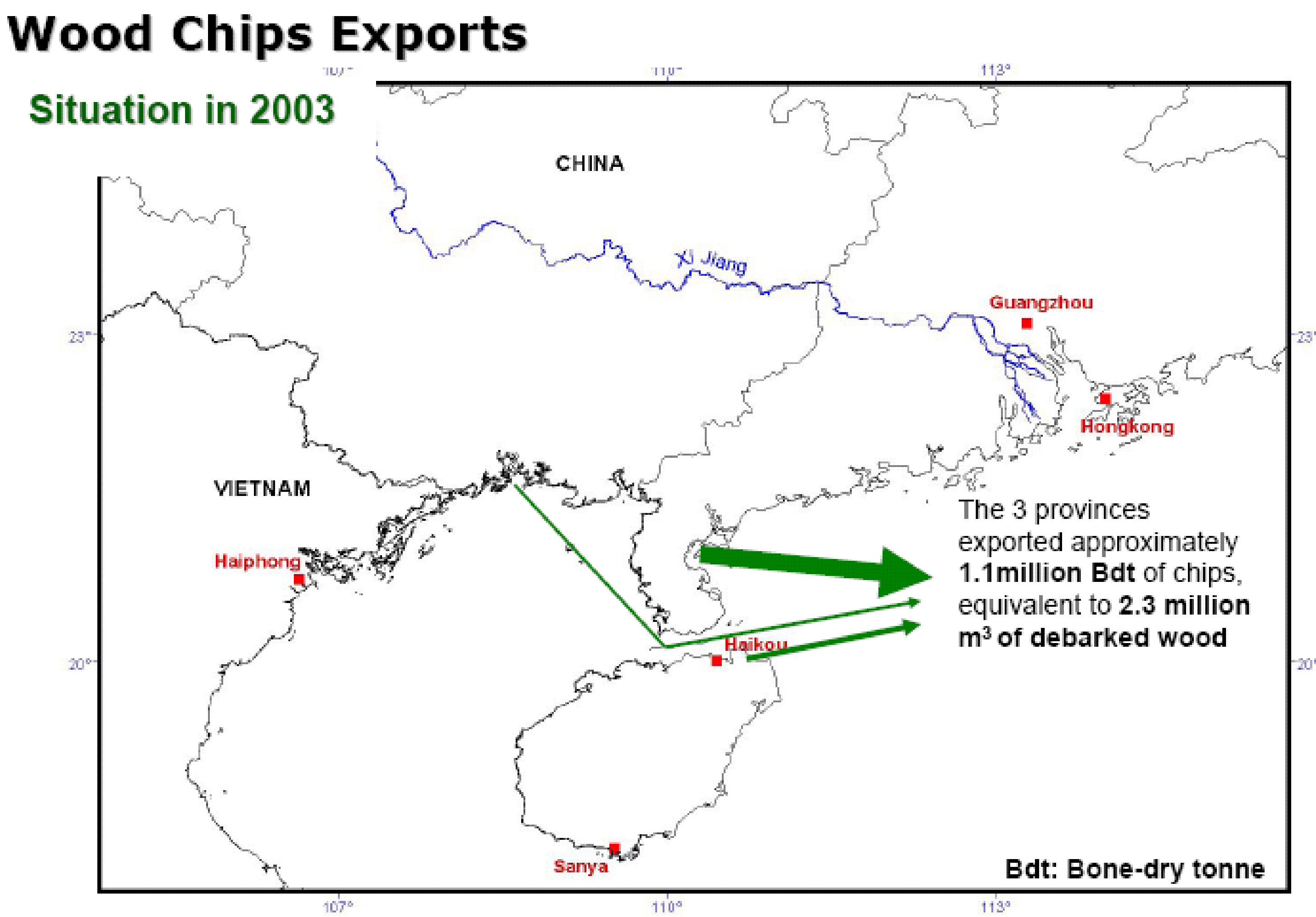
Local market prices for pulpwood and export-quality chips have risen steadily



Between September 2003 and November 2005:

- **Wood chip price has increased from US$ 92 to US$ 115 per Bdu (bone-dry unit)**
- **Pulpwood price at mill gate has risen from US$ 36.5 to US$ 46 per ton**

How much competition will there be for land and pulpwood?



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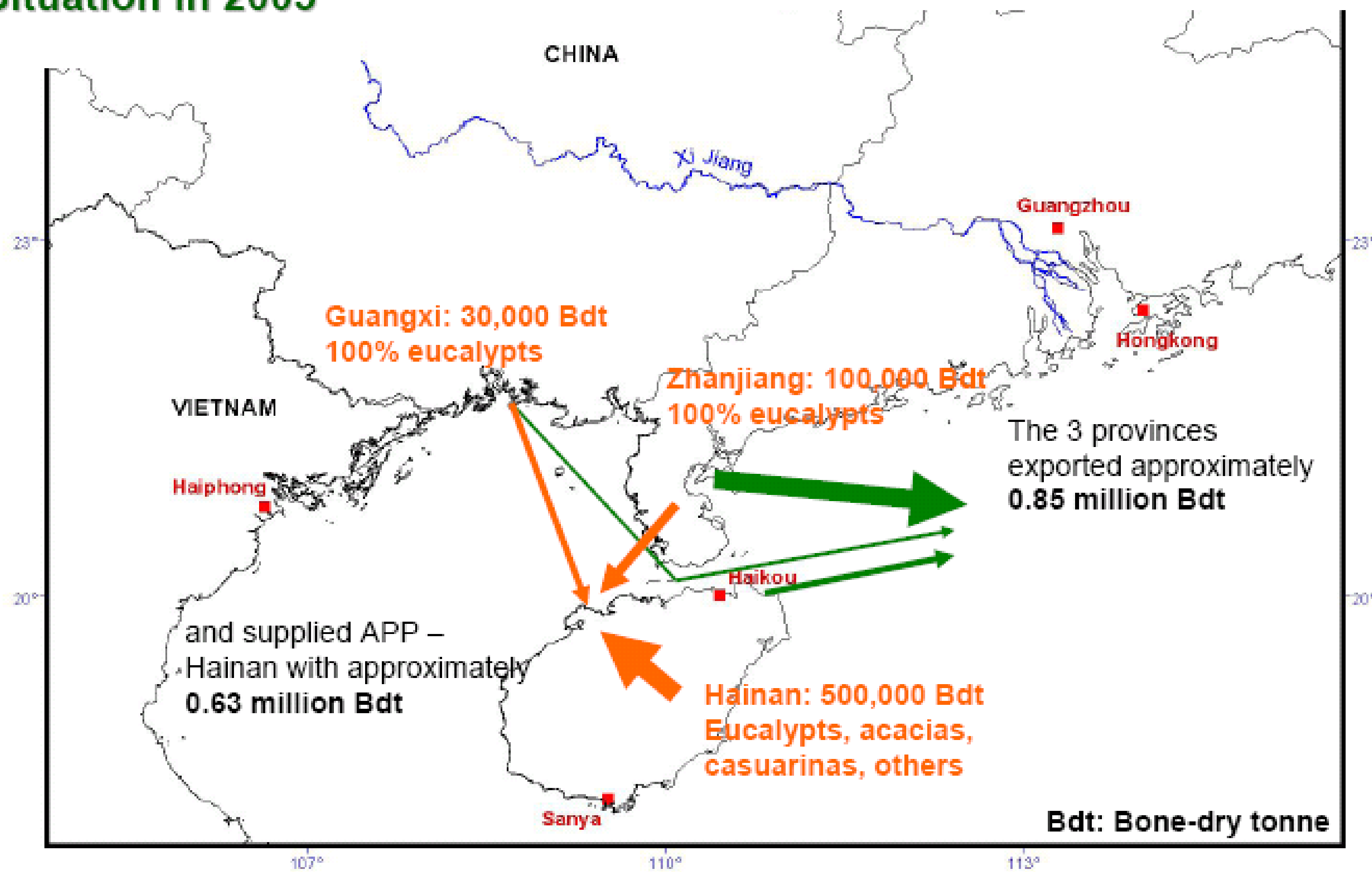
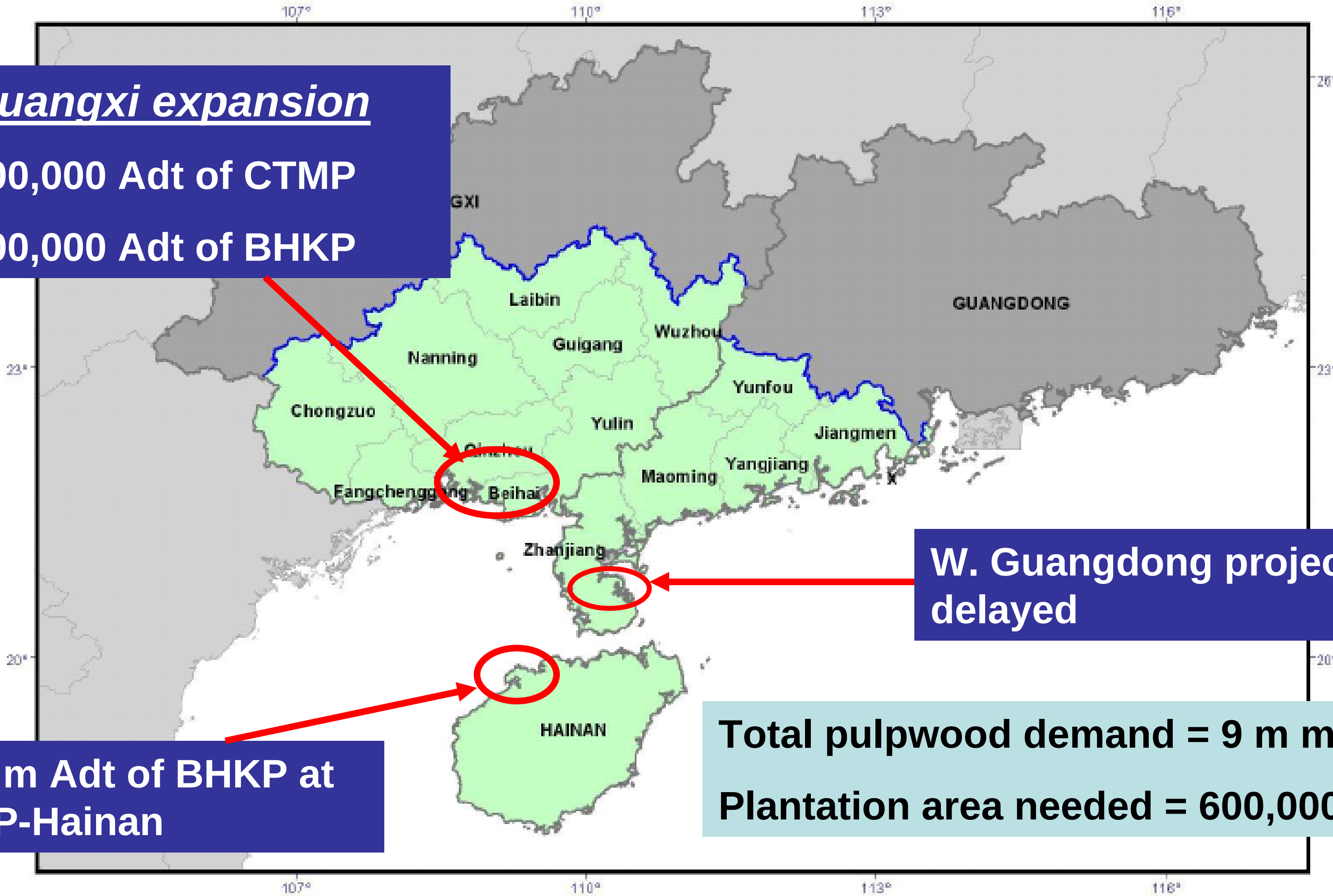
Wood Chips Exports + Supplies to APP–Hainan

Situation in 2005



South China Pulpwood Demand -- Scenario 1



Guangxi expansion

600,000 Adt of CTMP

600,000 Adt of BHKP

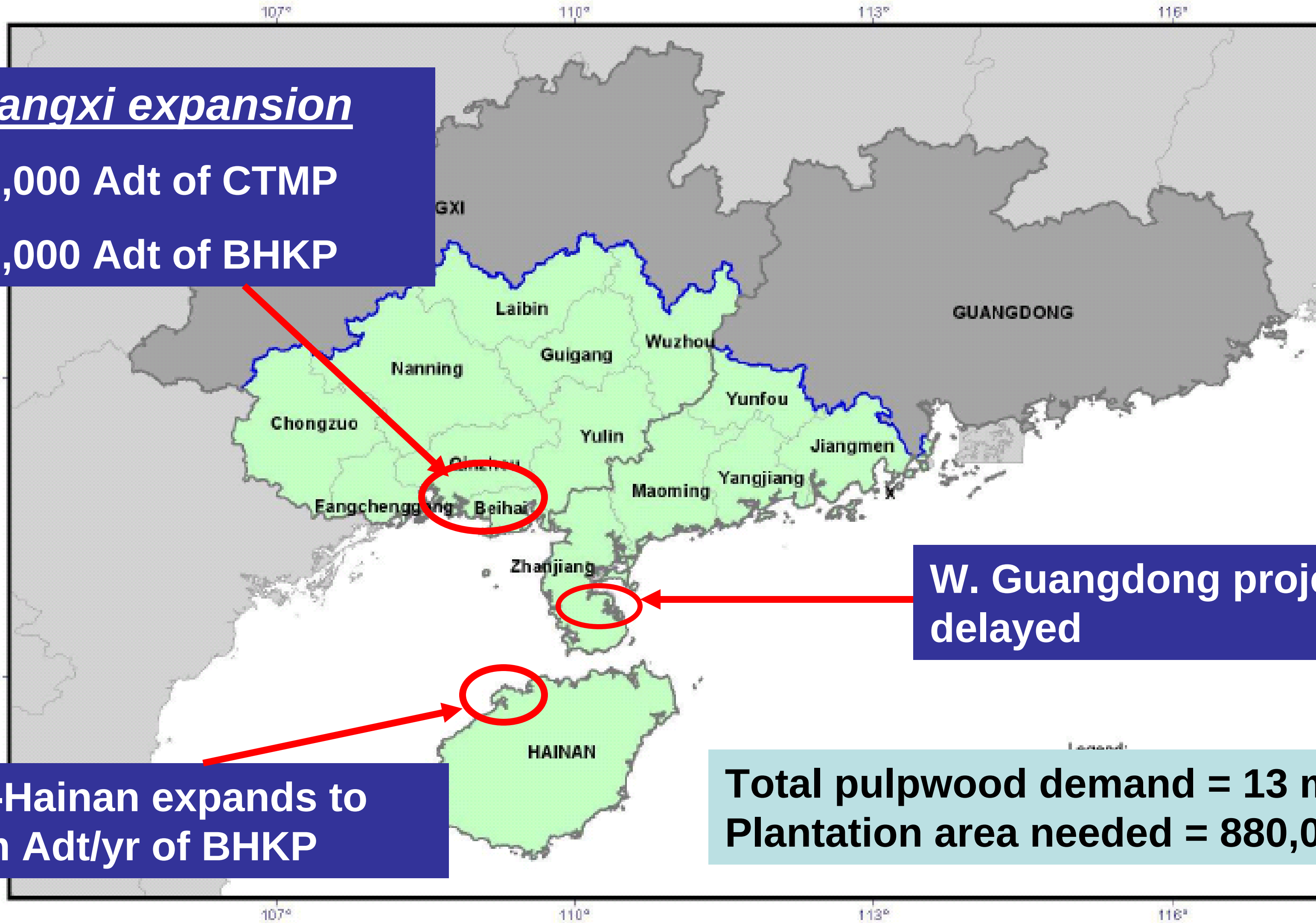
W. Guangdong project delayed

1.2 m Adt of BHKP at APP-Hainan

Total pulpwood demand = 9 m m3/yr

Plantation area needed = 600,000 ha

South China Pulpwood Demand -- Scenario 2



Guangxi expansion

600,000 Adt of CTMP

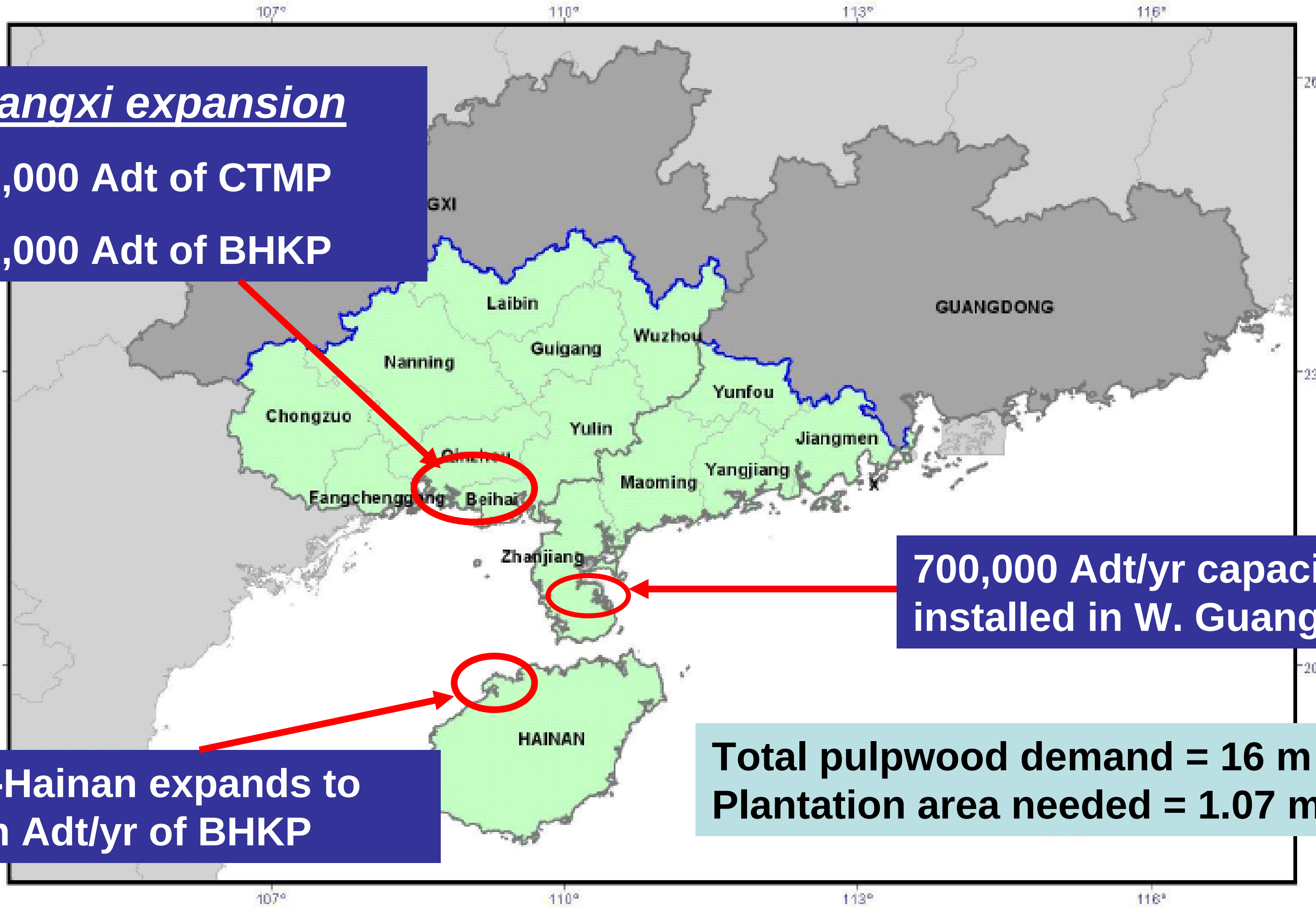
600,000 Adt of BHKP

W. Guangdong project delayed

APP-Hainan expands to 2.2 m Adt/yr of BHKP

Total pulpwood demand = 13 m m3/yr
Plantation area needed = 880,000 ha

South China Pulpwood Demand -- Scenario 3



Guangxi expansion

600,000 Adt of CTMP

600,000 Adt of BHKP

700,000 Adt/yr capacity installed in W. Guangdong

APP-Hainan expands to 2.2 m Adt/yr of BHKP

Total pulpwood demand = 16 m m3/yr
Plantation area needed = 1.07 m ha

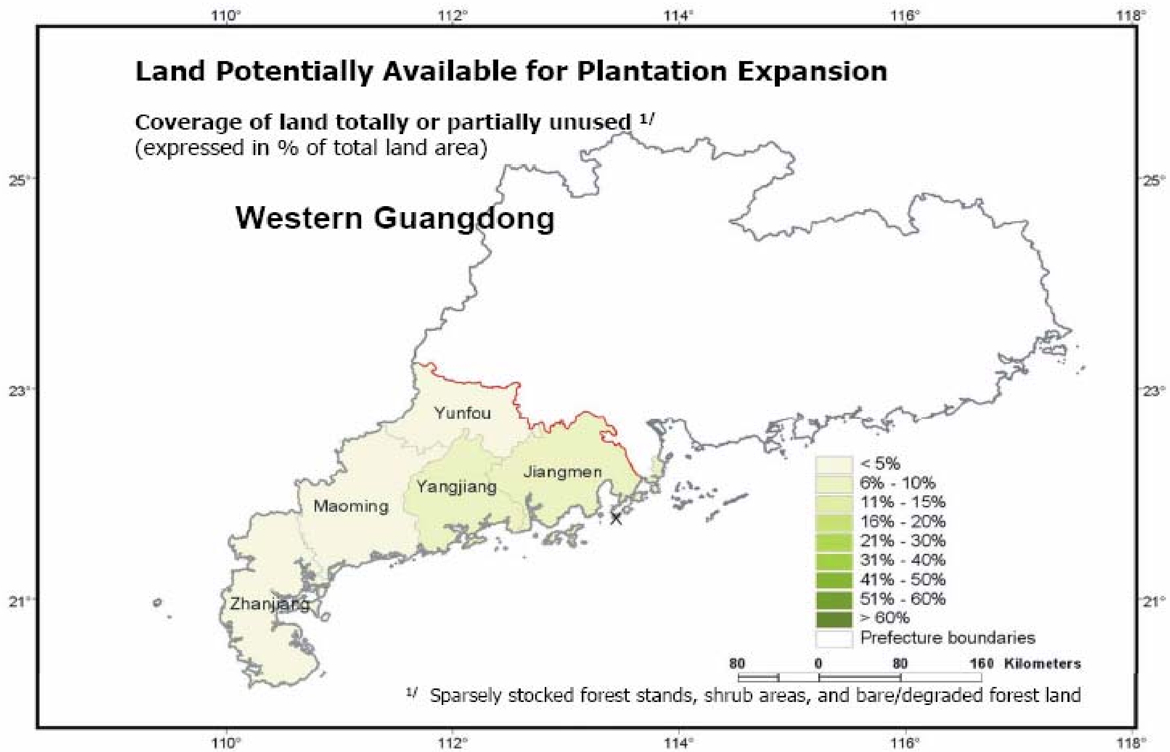
Eucalypt & acacia resources within 'economic distance' of planned & existing pulp mills

		Guangxi	Western Guangdong	Hainan
Prefectures involved		Chongzuo, Fangchenggang, Nanning, Qinzhou, Beihai Laibin, Guigang, Yulin, Wuzhou	Zhanjiang, Maoming, Yangjiang, Jiangmen, Yunfou	The entire province
Corresponding total land area	ha	10,567,925	4,905,400	3,390,768
Area of eucalypt and acacia stands/ woodlots at end of 2005	ha	Approx. 300,000 [1)]	Approx. 245,000 [2)]	Approx. 230,000 [3)]
Rate of yearly planting	ha/y	40,000 - 45,000	10,000 - 15,000	Extremely variable
CIFOR's assessment of Harvestable Volume in 2010	m^3	4.5 million	3.8 million	2 million

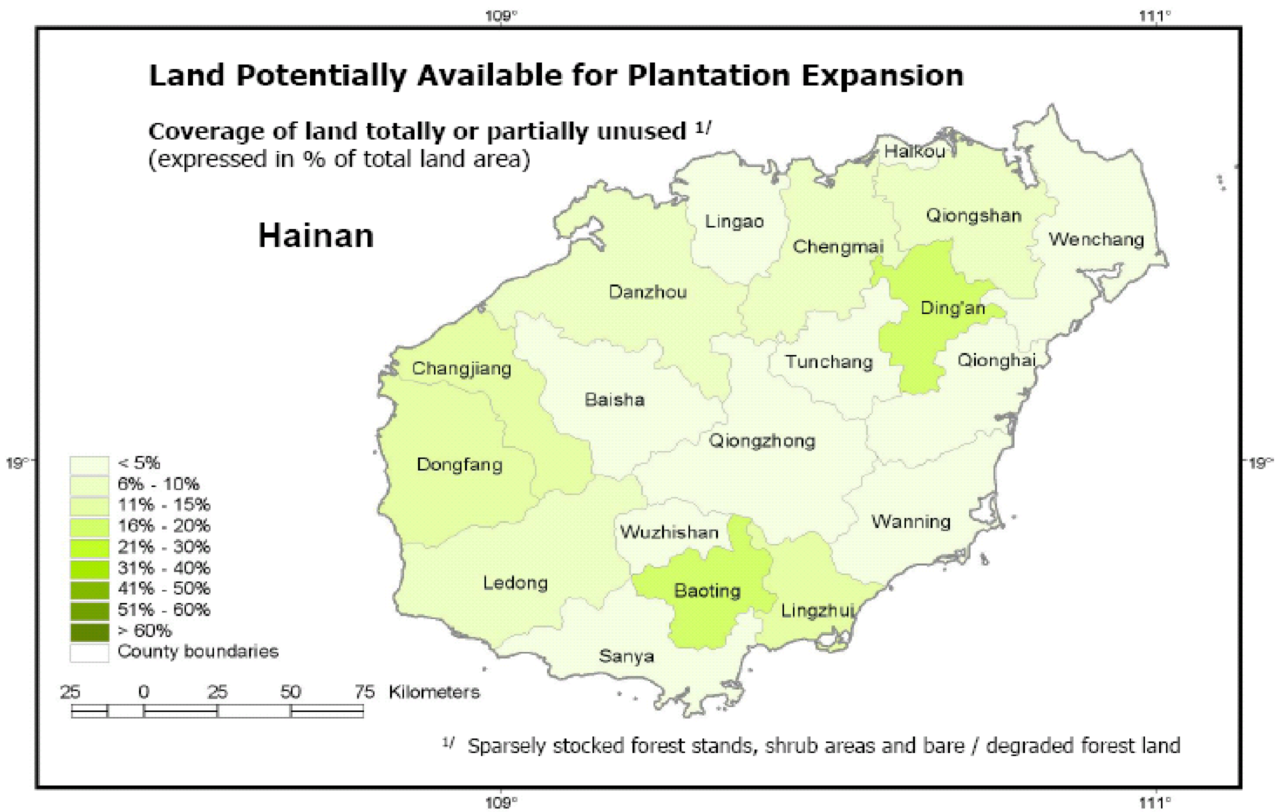
Sources

1) 2000 Provincial Forest Inventory and Guangxi Forestry Bureau statistics on FGHY Plantation Development between 2001 and 2005
2) Zhanjiang Pulpmill Project – Proposal for Establishing a Resourse Base, SFA Nov. 2002 and CIFOR's assessment for 2003-2005
3) 2002 Provincial Forest Inventory , APP-Hainan , CIFOR's assessment for the period 2003 - 2005

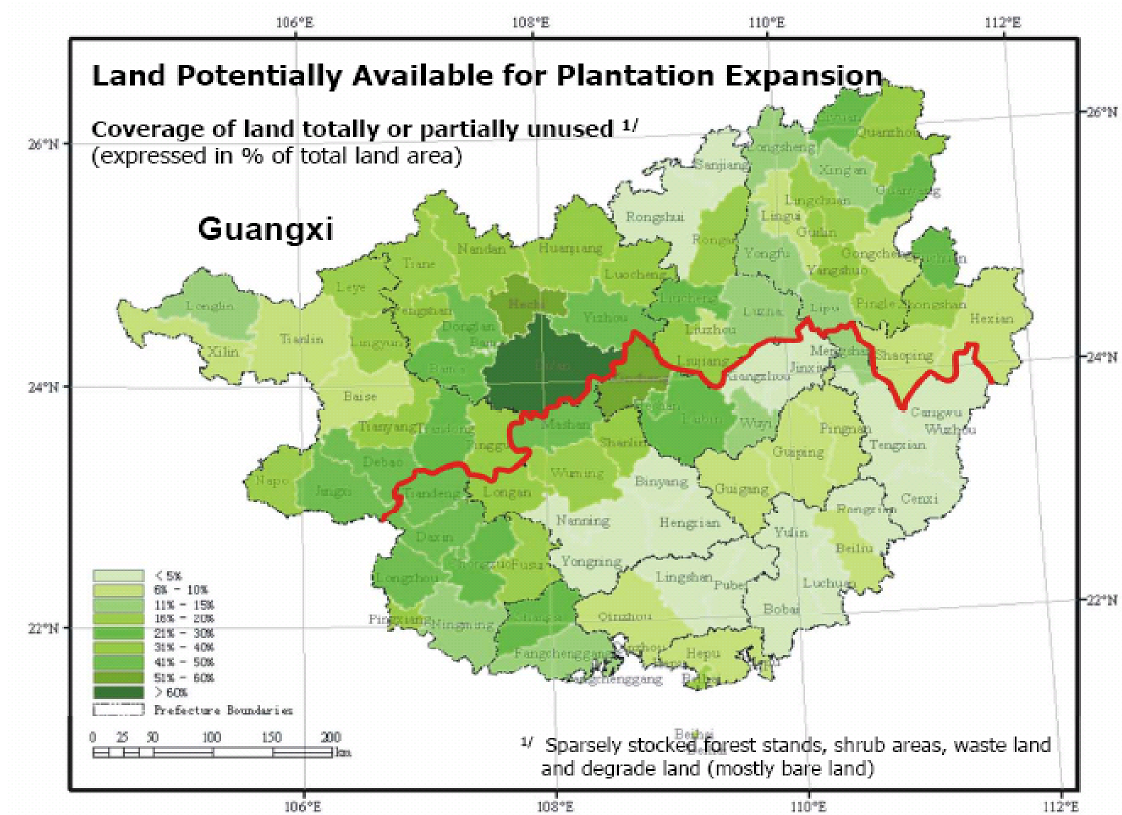
Land for new plantations is very limited in Guangdong…



… and in Hainan



Land for new plantations is much more available in Guangxi



Summary of key messages

- Feasibility of large pulp mills depends on building a sizeable plantation base to control yields and wood costs.

- Access to new plantation land is a slow and complex process, as most suitable land is held by farmer households or communities.

- On a limited basis, coastal Southern China could potentially become a new “world-class eucalypt pulp producer”. However, the type of land which is required for this is in very short supply and can support limited capacity.

- At present, the most common plantation type is ‘*labor-intensive plantation on hills*’. Most of the future plantation development is expected to occur on hill sites.

- <u>Currently</u>, *‘labor-intensive plantation on hills’* can produce small-diameter round wood (wood fiber) at competitive costs compared to imported wood fiber – but this could change if local wood prices rise by US$ 10-15 per ton

Summary of key messages

- Increasing competition for land and fiber is already pushing up wood prices in local markets, and this can be expected to continue as new pulp capacity comes online -- although price increases may be partially offset by increasing supply and/or government subsidies

- Overall, pulp production in South China is now only moderately competitive versus market pulp imports from Indonesia and Brasil

- Increased production costs will make it harder for Chinese producers to compete with imports, particularly when world pulp prices are low