Intensively Managed Forest Plantations in Southern China
Issues and Challenges

By Christian Cossalter, CIFOR

The Forests Dialogue
Dialogue on Intensively Managed Planted

Beihai, China 04 April 2006
The Context

China’s Government is promoting domestic wood pulp production.

However, many observers – especially financial analysts – estimate that the supply of wood raw material is the weak part of this strategy.

<table>
<thead>
<tr>
<th>Low Cost Advantage</th>
<th>Source: Merrill Lynch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>Assets</td>
</tr>
<tr>
<td>China</td>
<td>X</td>
</tr>
<tr>
<td>SE Asia</td>
<td>X</td>
</tr>
<tr>
<td>Latin America</td>
<td>XX</td>
</tr>
<tr>
<td>Russia</td>
<td>X</td>
</tr>
</tbody>
</table>

Source: Merrill Lynch

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The Context

China’s Government is also promoting the development of fast-growing tree plantations during the period 2001-2015.

Overall target area: 13.1 million ha to be planted
Pulpwood plantations will account for: 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 / 0.8 million ha
- Middle/Lower Yangtze: 3.0 million ha / 1.3 million ha
- South Coastal: 1.9 million ha / 1.4 million ha
Main pulpwood production area in Southern China
Wood Chips Exports + Supplies to APP–Hainan

Situation in 2005

- Guangxi: 30,000 Bdt
  100% eucalypts

- Zhanjiang: 100,000 Bdt
  100% eucalypts

- Hainan: 500,000 Bdt
  Eucalypts, acacias, casuarinas, others

The 3 provinces exported approximately 0.85 million Bdt

and supplied APP – Hainan with approximately 0.63 million Bdt

Bdt: Bone-dry tonne

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Wood Chips Exports + Supplies to APP–Hainan

An increase of nearly 0.38 million Bdt in 2 years (+35 percent)
Mostly coming from Hainan

In 2003 Hainan had 7 wood chips plant. Two State C\textsuperscript{i}es had full control on the 0.2 million Bdt yearly export. 48\% was sold to Japan (eucalypt and acacia); 38\% to Korea (all casuarina) and 14\% to Taiwan (eucalypt and acacia)

In 2005 Hainan had approximately 40 wood chips plant with a cumulated capacity of 2 million Bdt. Their cumulated yearly production was 0.5 million Bdt.

Bdt: Bone-dry tonne
Wood Chips Imports
Growing exponentially

Bone Dry Metric Tons

June 2002: Rizhao, Shandong (220,000 ADT of pulp) came on stream
March 2005: APP, Hainan (1.2 million ADT of pulp) started production

Data source: China’s Custom Administration
Wood Chips Imports

... and this trend is due to continue and even increase sharply with new wood pulp expansions

The additional pulp line on the Rizhao site (1 million ADT per year) will require between 1 and 2 million Bone Dry tonnes of hardwood wood chips, depending on the pulp process which will be adopted

A recently approved joint venture of APRIL (90% of the share) with Shandong Rizhao SSYMB Pulp & Paper Co. Ltd

100% of the wood supply will come by sea transport:

- Purchase of wood chips from Southern China will continue;
- APRIL’s plantations in Indonesia will provide most of the new demand;
- In the medium term wood chips from own plantations in Meizhou (North East Guangdong). Area established so far is still limited (13,000 ha)
## Wood Chips Imports

### Main Supplier Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>2004 Share (%)</th>
<th>2005 Share (%)</th>
<th>2004 Delivered Costs (CIF) USD per Bdt</th>
<th>2005 Delivered Costs (CIF) USD per Bdt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>56.8%</td>
<td>31.9%</td>
<td>130</td>
<td>142.7</td>
</tr>
<tr>
<td>Chile</td>
<td>-</td>
<td>2.3%</td>
<td>-</td>
<td>148.4</td>
</tr>
<tr>
<td>Indonesia</td>
<td>-</td>
<td>9.1%</td>
<td>-</td>
<td>155.2</td>
</tr>
<tr>
<td>Malaysia</td>
<td>5.5%</td>
<td>0.9%</td>
<td>137.2</td>
<td>139.5</td>
</tr>
<tr>
<td>Thailand</td>
<td>19.9%</td>
<td>6.9%</td>
<td>108.2</td>
<td>127.9</td>
</tr>
<tr>
<td>USA</td>
<td>-</td>
<td>2.2%</td>
<td>-</td>
<td>193.1</td>
</tr>
<tr>
<td>Vietnam</td>
<td>17.4%</td>
<td>46.6%</td>
<td>121.4</td>
<td>132.6</td>
</tr>
<tr>
<td>Total</td>
<td>99.6%</td>
<td>99.9%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Imports in the year (Bdt)**

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>302,474</td>
<td>870,336</td>
</tr>
</tbody>
</table>

Data source: China’s Custom Administration

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Challenges for China’s Wood Pulp Industry

- Secure Adequate Wood Supply & Contain Wood Costs
- Secure Sufficient Land of Adequate Quality to Build Up an Integrated Plantation Resource Base
- Manage On-site / Bio-physical Risks
- Produce at Competitive Costs
- Secure sufficient labor forces / Improve labor conditions
Secure Adequate Wood Supply & Contain Wood Costs

In a context of:

- **Overall shortfall of round wood**
- **Continuous increase in local (Southern China) market prices for pulpwood and export-quality wood chips**
Secure Adequate Wood Supply & Contain Wood Costs

_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**

<table>
<thead>
<tr>
<th>Plantation Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-managed plantations</td>
<td>50,000 ha of plantation established aiming to produce 40% of the wood requirement. A 9-year cycle with 2 harvests: year 5 (planted crop) and year 9 (coppiced crop). Wood delivery: 122 tonnes at age 5 and 97 tonnes at age 9</td>
</tr>
<tr>
<td>‘Membership Programme’</td>
<td>90,000 ha delivering 12.5% of the overall wood requirement as re-payment of loans &amp; assistance. The rest of the production sold at market price</td>
</tr>
<tr>
<td>Contracted plantations</td>
<td>60,000 ha: Wood sold at market price</td>
</tr>
</tbody>
</table>

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Secure Adequate Wood Supply & Contain Wood Costs

Fuxing – UPM Kymmene case: Economic efficiency of various wood supply models

Weighted Mean Costs of Overall Wood Procurement under various scenarios

Sources of wood supplies

<table>
<thead>
<tr>
<th></th>
<th>Self Managed</th>
<th>Out-grower Scheme</th>
<th>Local Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>scenario 1</td>
<td>30%</td>
<td>8%</td>
<td>62%</td>
</tr>
<tr>
<td>scenario 2</td>
<td>35%</td>
<td>10%</td>
<td>55%</td>
</tr>
<tr>
<td>Base scenario</td>
<td>40%</td>
<td>12.5%</td>
<td>47.5%</td>
</tr>
</tbody>
</table>

Local market prices for pulpwood (mill gate prices)

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At the time UPM took the decision to withdraw from the Zhanjiang project the local market price per delivered green tonne of debarked pulpwood was approximately USD 41.5 / tonne. The weighted mean cost of wood to the mill, under the best scenario (Base scenario) was estimated to be slightly above USD 26 per metric tonne of green wood.

Since then local market prices have continued to escalade.

In November 2005 the local market price per delivered green tonne of debarked pulpwood had jumped to USD 46. Under the best scenario the weighted cost of the overall wood delivery to the mill (approximately 3.05 million metric tonnes) would have been in the order of USD 29 per green metric tonne.

The above figures might give an idea of where the viability line stands for multinationals searching for investment opportunities in China’s wood-based pulp production sector.
Secure Sufficient Land of Adequate Quality to Build Up an Integrated Plantation Resource Base

Density and Distribution of Human Population in China

Year 2000

Habitants per square km

Source: Deng Xiang Zheng, Chinese Center for Agricultural Policy, 2004
Secure Sufficient Land of Adequate Quality to Build Up an Integrated Plantation Resource Base

Per capita land availability in rural areas

- **In rural areas of Zhanjiang**:  
  1 mu (670 m²) of arable land and 1.08 mu (720 m²) of forestland

- **Ranges of variation** for 7 villages of Eastern Guangxi (Pu Bei county and Bo Bai county):

<table>
<thead>
<tr>
<th>Rice field</th>
<th>Dry agricultural land</th>
<th>Hill land / Forest land</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.37 to 1 mu</td>
<td>0.1 to 0.4 mu</td>
<td>1.75 to 10.8 mu</td>
</tr>
<tr>
<td>= 250 to 670 m²</td>
<td>= 67 to 270 m²</td>
<td>= 1,170 to 7,200 m²</td>
</tr>
</tbody>
</table>

Sources

1/ Fuxing – UPM Kymmene feasibility study, Nov. 2003  
2/ CIFOR survey, March 2005  

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Secure Sufficient Land of Adequate Quality to Build Up an Integrated Plantation Resource Base
Land Potentially Available for New Plantations is a Scarce Resource

Western Guangdong

Land totally or partially unused \(^1\) (expressed in % of total land area)

\(^1\) Sparsely stocked forest stands, shrub areas, and bare/degraded forest land

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Land totally or partially unused ¹/ (expressed in % of total land area)

¹/ Sparsely stocked forest stands, shrub areas, waste land and degrade land (mostly bare land)
Land Potentially Available for New Plantations is a Scarce Resource

Hainan

Land totally or partially unused (expressed in % of total land area)

1/ Sparsely stocked forest stands, shrub areas and bare / degraded forest land

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... and the Pulp Industry owns only a portion of the new fast-growing plantations being created
Most of plantation expansion driven by the new fiber demand is on collective Land
Most of plantation expansion driven by the new fiber demand is on collective Land

Hainan
Most of plantation expansion driven by the new fiber demand is on collective Land
Manage On-site / Bio-physical Risks

Fire
Perceived as the major risk by plantation managers

Diseases
Not enough clones for mass propagation. Turnover of clones also insufficient.

Unusual Drought
Immediately after planting season

Soil Quality
Granites or sedimentary infertile sands

Typhoons
1 force 11-12 typhoon once every 7-8 years

Illegal logging
Produce at Competitive Costs

Hills
Labour-intensive

Flat land
Semi-Mechanized
Produce at Competitive Costs

Data source

Semi-mechanized plantations in flat land
Labor-intensive plantations in hills

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Produce at Competitive Costs

+ Lower Plantation operational costs (road infrastructure already in place
+ Easier logistics for field work
+ Better soils and higher wood yields, in most cases

- High prices for land rental

Usually, the best conditions for production of wood fiber at competitive costs:

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Produce at Competitive Costs

Range of prices (USD/ha/year) for land rental

- Flat land: USD 70-110
- Semi-Mechanized: USD 110-220
- Flat land: USD 55-125
- Semi-Mechanized: USD 200-250
Produce at Competitive Costs

Cost structure of locally-made wood chips

Wood Chips Production Profiles

- Stumpage
- Harvest & extraction
- Transport
- Fees at harvest
- Unloading & processing into chips
- Overheads
- VAT differential & other taxes

Flat land
Semi-Mechanized
A pulp wood plantation with adequate areas of coastal flat land could, possibly become one of the world-class eucalypt pulp producers.
A pulp wood plantation with adequate areas of coastal flat land could, possibly become one of the world-class eucalypt pulp producers.

Source: Louis Carbonnier, Jaakko Pöyry

Produce at Competitive Costs

Source: Louis Carbonnier, Jaakko Pöyry
Produce at Competitive Costs

Range of prices (USD/ha/year) for land rental

USD 20-40 for approximately 50% of the sites

Below USD 20 and above USD 60 only in limited number of cases
Produce at Competitive Costs

Cost structure of locally-made wood chips

Hills
Labor-Intensive

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Produce at Competitive Costs

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
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.

Secure sufficient labor forces / Improve labor conditions

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Several rural areas in southern China already experience shortage of manpower for seasonal unskilled jobs.

There is still room 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.
Key Findings

- Feasibility of pulp wood projects is very much dependent on the possibility for pulp companies to build up sizeable plantation estates as a guaranty to maintain full control, over time, on wood yield and wood costs;

- Access to new plantation land is a slow and complex process as most of the land suitable for new plantations is held by farmer households or communities;

- 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 consequently there is not much room for many projects of this kind;

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

- **Currently**, in most instances, ‘Labor-intensive plantation on hills’ can produce small-diameter round wood (wood fiber) at competitive costs compared to imported wood fiber;
Key Findings

- Among the three southern provinces, Guangxi has substantial ecological/geomorphological comparative advantages with respect to intensive plantation forestry;
Thank you
谢谢！