



Can South China's Farmers and Communities Make Profit by Planting Eucalypts?

By Christian Cossalter, CIFOR

The Forests Dialogue
Dialogue on Intensively Managed Planted

Beihai, China 05 April 2006



Priorities of the 10th Five-Year Plan (2002-2005) in rural areas

- **Increase rice production / promote intensive agriculture**
improve drainage of agricultural land; improve quality of seedlings; improve technical knowledge of farmers.
- **Develop infrastructures of most remote villages**
 - ✓ access roads, electricity, TV coverage
 - ✓ health: clinics, drinking water, toilets
- **Strengthen farmer associations**
- **Promote education**
Primary schools and High schools



Per capita land availability

- *In rural areas of Zhanjiang^{1/}:
1 mu (670 m²) of arable land and 1.08 mu (720 m²) of forestland*
- *Ranges of variation^{2/} for 7 villages of Eastern Guangxi (Pu Bei county and Bo Bai county):*

Rice field

0.37 to 1 mu

= 250 to 670 m²

Dry agricultural land

0.1 to 0.4 mu

= 67 to 270 m²

Hill land / Forest land

1.75 to 10.8 mu

= 1,170 to 7,200 m²



Major agricultural crops

Most farm land in Hainan can be planted with **2-3 crop rotations each year**.

The **main food crops** with the largest area and the highest production value are paddy rice, dry rice (on hills and slopes), wheat, sweet potato, tapioca, taro, corn, jowar, millet, bean, etc.

The **main economic crops** includes: sugarcane, hemp, peanut, gingili, tea, etc.

Fruit crops include pineapple, litchi, longan, banana, mango, orange, watermelon, peach, rambutan, Bo Luo Mi, firedrake fruit, etc.

Additional **high economic value tropical plants** include rubber, coconut, oil palm, pinang, coffee, pepper, sisal, citronella, cashew, cocoa, etc.

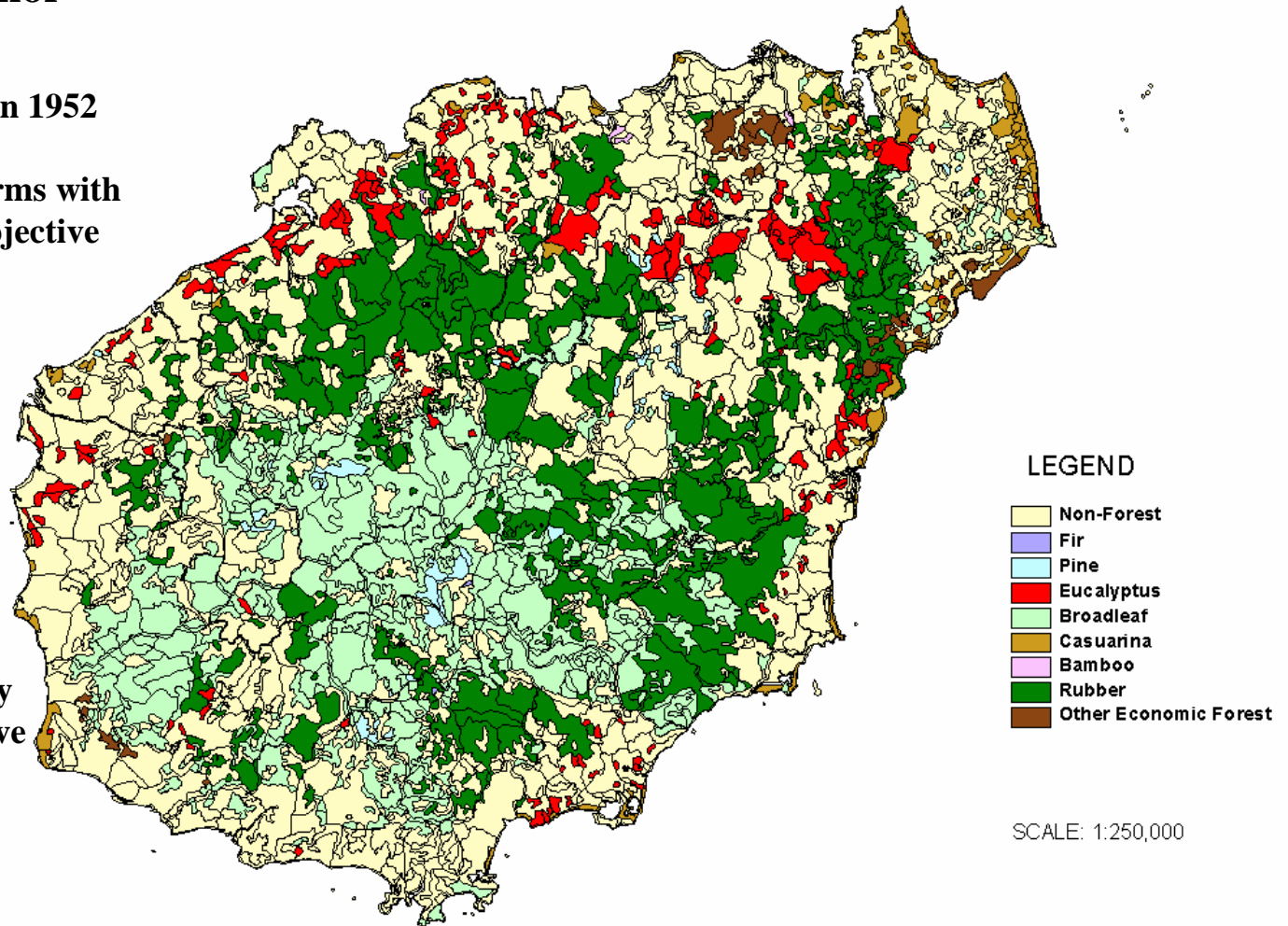
Hainan Nongken (Land Reclamation & Cultivation Bureau)

A unique case within China of an agricultural estate under the sole and direct authority of the Province's Governor

Hainan Nongken was created in 1952 to acquire land, establish and manage a network of forest farms with rubber trees as the primary objective

Hainan Nongken manages 853,000 ha of land (24% of Hainan total land area). Rubber plantations alone cover 246,000 ha

**Windbreaks and forest plantations cover 81,000 ha
Approximately 150,000 ha are scrubland, low productivity secondary forests and mangrove**



Hainan Nongken sustains one Hainan's inhabitant out of seven

133,000 ha of sugar cane fields in Zhanjiang Prefecture alone.



UPM – Kymmene Feasibility Studies indicated that:

- ❑ When the price of sugar cane is down to USD 19.5 / tonne and the price paid to farmers for eucalypt wood is up to USD 27 / tonne, planting eucalypts becomes more profitable;**
- ❑ With China being a WTO's member sugar import quotas are set to increase steadily. The domestic sugar production will have to go through substantial re-structuring ^{1/} . Production will logically come to an end in the less productive / more marginal processing plants and growing estates;**

^{1/} At the end of 2002 production costs of Zhanjiang sugar plants were assessed to USD 268 / tonne and price (CIF Zhanjiang) of imported sugar to USD 231 / tonne;



Most commonly, the earlier forest plantations yield between 1.5 and 5 m³ ha⁻¹ year⁻¹. Rotation length is 15 to 20 years



Most recent plantations use the best available technology. They yield between 10 and 25 m³ ha⁻¹ year⁻¹. Rotation length with eucalypt, acacia and casuarina is 5 to 6 years



Tree plantation by local communities and/or individuals



Danzhou County, Hainan

Plantation establishment:

Eucalyptus crebra,
Seed collected on existing village plantation

Investment in cash

Seedling, fertilizer, salaries = RMB 0 (**USD 0 /ha**)

Investment in time

Collective work



Plantation growth

1 to 1.5 m³/ha/year over 20 to 25 years

Tree plantation by local communities and/or individuals



Pu Bei County, Guangxi

Plantation Establishment:

Eucalyptus hybrid,
700 seedlings planted on approximately 0.5 hectares
Site preparation = hole digging; no fertilizer, no tending

Investment in cash

RMB 63 for 700 seedlings in 1996. (**USD 15.5/ha**)

Investment in time:

By household members. No salaries

Plantation growth:

Approximately 400 trees survived; Diameter of most trees was between 6 and 8 cm. Maximum diameter was 10 cm.

Revenues

320 trees were harvested and sold in 2002 at RMB 3 to 4 per tree.



Tree plantation by local communities and/or individuals



Bo Bai County, Guangxi

Plantation Establishment:

Eucalyptus hybrid,
8,000 seedlings planted in June 2001 on approximately 40 mu (approximately 2.7 hectares). Site preparation = grass cutting, hill burning, hole digging; no fertilizer, no tending. An other 300 ha of plantation of the same type in the township.

Investment in cash

RMB 1,900 for seedling including delivery to site and pesticide products (**USD 86/ha**) .

Investment in time:

By household members. No salaries

Plantation growth:

95 % survival. Diameter of most trees is between 4 and 8 cm.



Tree plantation by local communities and/or individuals



Zhanjiang Prefecture, Guangdong

Plantation Establishment:

Eucalyptus hybrid. 240 mu (16 hectares) planted in April 2004 on Leizhou Forestry Bureau land. Investment by a group of 6 employees of Leizhou F.B. Original stocking density was 148 trees per mu (2,222 trees per ha). Site prepared & plantation managed in the same way than Leizhou F.B. plantations

Investment in cash

RMB 370 per mu (**USD 676 per ha**) for labor, renting tractor, seedling, and fertilizer.

Investment in time:

Supervision

Plantation growth:

Expectation is to harvest 10 tones per mu (150 tonnes per ha) of pulpwood (diameter above 3.5 cm) at age 5. 2 tones per mu (30 tones per ha) to be delivered – free of charge – to Leizhou F.B. to pay for land use.

Rental value of the land:

RMB 80 per mu and per year (USD 146 /ha/year)



Tree plantation by local communities and/or individuals



Shan Lin County, Guangxi

Plantation Establishment:

Eucalyptus hybrid. 160 mu (approximately 10.5 hectares) of agricultural land on terrace planted in April 2004. 90 farmers involved. Original stocking density was 111 trees per mu (1,667 trees per ha). Site preparation = hole digging; no fertilizer, no tending.

Investment in cash

RMB 464 per mu (**USD 847 per ha**) for seedling, fertilizer and pesticide.

Investment in time:

By household members. No salaries

Plantation growth:

Survival is very variable. In average, between 41 and 42% survival after 1 year.

Rental value of the land:

RMB 100 per mu and per year (USD 182.5/ha/year)



Tree plantation by local communities and/or individuals



Shan Li County, Nanning Prefecture

Plantation establishment:

A 80% - 20% share agreement between respectively the Forest Technology Extension Station (FTES) under the County Forestry Bureau and a village committee over 500 mu planted in June 2004. All costs until harvest provided for by FTES. The village committee will own 20% of standing wood volume at end of rotation. A 30-year contract



Investment in cash (until end of rotation)

By village committee = RMB 0 (**USD 0 /ha**)

By FTES = RMB 867/mu (USD 1,583.1/ha)
compounded costs at 7% DR. Most seasonal workers (employed by FTES) were local residents

Investment in time

Village Committee (transaction costs)

Tree plantation by local communities and/or individuals



Pu Bei County Qinzhou Prefecture,

Plantation growth :

A high-cost inputs plantation. Unfortunately planting was followed by 4 months of exceptional drought (August to November 2004). First year-growth has been slow. M.A.I (recovered wood) at age 6 is expected to be 5.5 m³/mu. This is less than what it should have been under normal climatic conditions.

Costs performances (DR 7%)

Estimated community's net revenue provided by the sale of their 20% wood share at market price is RMB 46/mu/year (USD84/ha/year) a price which is well above the local current market price for renting land of equal value (RMB 10 to 15/mu/year).

Cost to FTES : RMB 202.3/m³ (USD 24.6/m³) for standing commercial wood at the end of the rotation. RMB 297.2/m³ (USD 36.2/m³) for wood delivered at road side. Market price for wood at road side: 150/ton for diameter between 3 and 6 cm; RMB 300/ton for diameter between 6.1 and 12; RMB 340/m³ for diameter between 12.1 and 18 cm. Profit for FTES expected to be low (IRR = 4%)

Tree plantation by local communities and/or individuals



Pu Bei County Qinzhou Prefecture,

Plantation establishment:

A 70% - 30% share agreement between respectively a pulp company and a village committee over 545 mu planted in August 2000. All costs until harvest provided for by the pulp Company. Village committee will own 30% of standing wood volume at end of rotation. A 30-year contract

Investment in cash (until end of rotation)

By village committee = RMB 0 (**USD 0 /ha**)

By Pulp company = RMB 699.2/mu (USD 1,276.7/ha) compounded costs at 7% DR
Most seasonal worker (employed by the pulp company) were local residents

Investment in time

Village Committee (transaction costs)

Tree plantation by local communities and/or individuals



Pu Bei County Qinzhou Prefecture,

Plantation growth :

A good quality and productive plantation. Expected volume of recovered wood at the end of the rotation is 8 m³/mu. This is equivalent to a M.A.I (standing volume) of 1.78/mu (26.7 m³/ha) at age 6.

Costs performances (DR 7%)

Estimated community's net revenue provided by the sale of their 30% wood share at market price is RMB 77.4/mu/year (USD 141.3/ha/year), a price which is well above the local current market price for renting land of equal value (RMB 25 to 30/mu/year).

Cost to the pulp company: RMB 124.7/m³ (USD 15.2/m³) for standing commercial wood at the end of the rotation. RMB 268/m³ (USD 32.6/m³) at mill gate (163 km between the plantation site and the mill)



Why share benefit agreements did not appeal to communities in Hainan?

- 70 % APP
 - 28% 'Land owner'
 - 1% Prefecture Forestry Bureau
 - 1% Township Forestry Bureau
-
- Local communities **lack technical expertise** in all areas and especially: cost assessment, yield prediction, estimation of income earning
 - **Lack of transparency.** There was no ground-truth checking of the wood volumes being harvested. All cost and benefit calculations were based on the result of a volume inventory (2% intensity) carried out by APP and the local Forestry Bureau
 - **Lack of trust:** Communities felt that APP's yield predictions were over-estimated



Why share benefit agreements did not appeal to communities in Hainan?

- **Strong belief** (supported by several cases) that growing pulpwood provides less benefits than many other land use options. In 2004, prices offered per green tonne of pulpwood in Zhanjiang (across the strait) were 40% above Hainan's prices
- **An obvious collusion** between APP and the provincial Government and its various institutions. Communities feared that provincial authorities would not have the capacity to resolve disputes in a fair manner should they enter in any conflict with APP



Partnership models proposed to Hainan's farmers in 2004

Model 1

- APP provides USD 640 per ha to 'land owners' – in 4 allocations – for plantation establishment and maintenance (6-year rotation)
- The 'land owner' buys APP' seedling (clones)
- Fertilizer: Either provided by APP and deducted from second cash allocation (paid after planting work has been done) or the 'land owner' buys fertilizers on the market.
- APP requests that commercial harvest (at age 6) on each hectare of plantation reaches at least 75 tons of green wood (solid under bark).
- For each hectare planted, the 'land owner' will deliver 42 tons of green wood (s.u.b.) - free of charge - to Yang Pu (APP mill gate)
- Additional production will be sold to APP at market price



Partnership models proposed to Hainan's farmers in 2004

Model 2

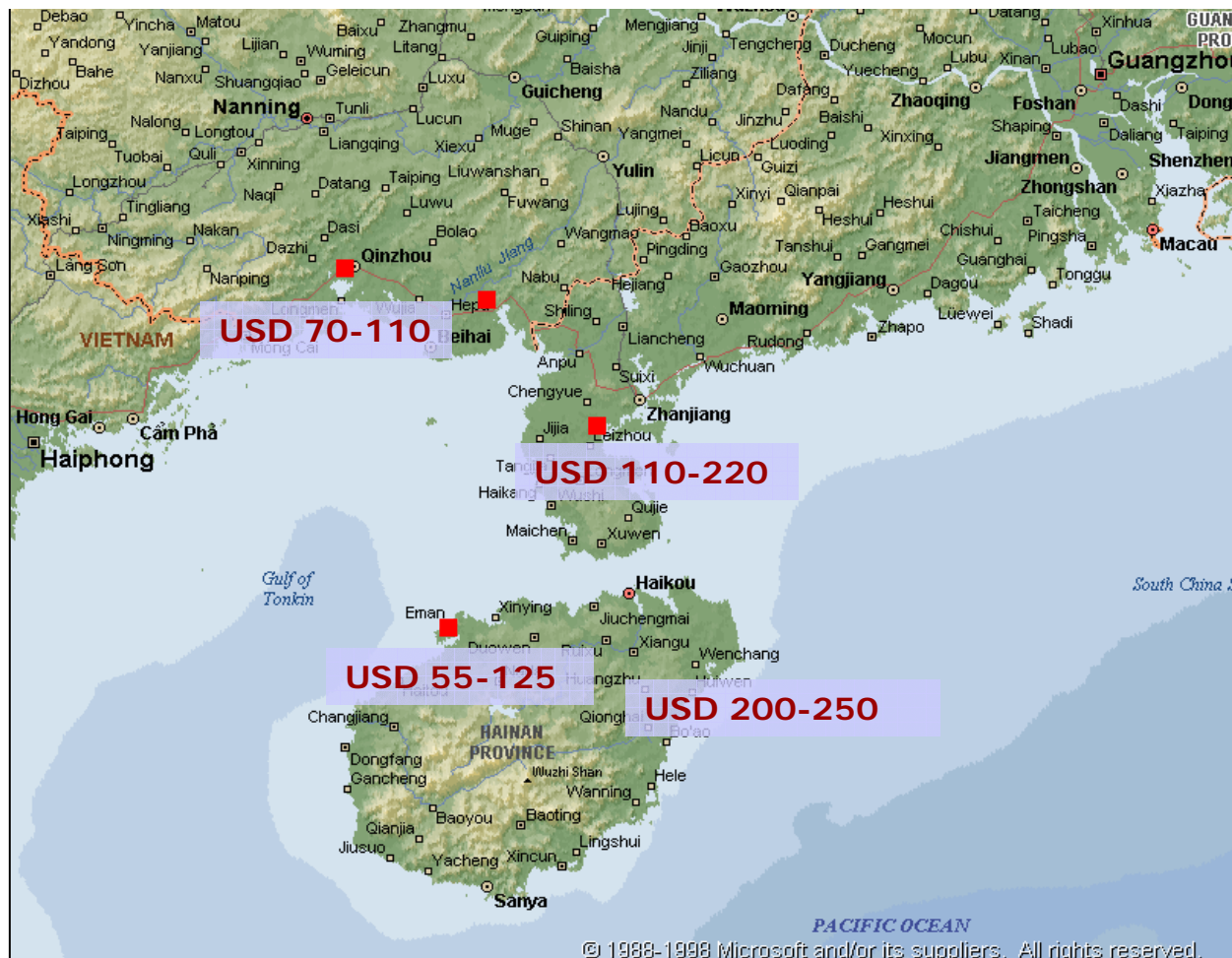
- APP provides seedlings and technical assistance to 'land owners' for plantation establishment and maintenance (6-year rotation)
- The 'land owner' buys APP' seedling (clones)
- APP provides fertilizers and claims reimbursement at time of harvest (based on market price for fertilizer at the time of harvest)
- At the time of harvest all wood is sold to APP at market price. In most situations APP will harvest and transport the wood and will deduct the corresponding costs
- However, the 'land owner' has the possibility to harvest and deliver the wood to Yang Pu (APP mill gate)

Land Leasing from communities and individuals



Flat land
Semi-mechanized

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

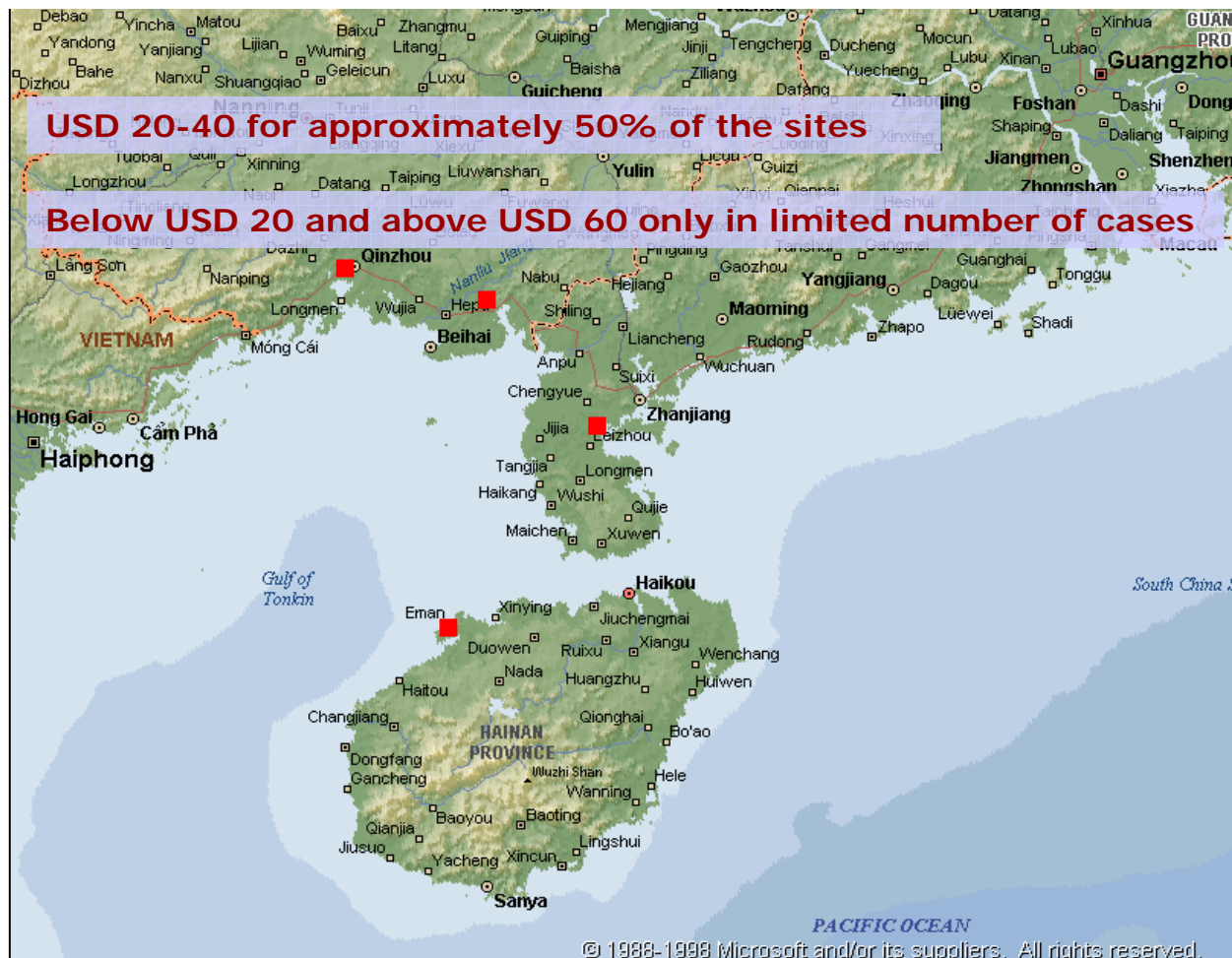


Land Leasing from communities and individuals



Hills
Labor-intensive

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



A black and white photograph of a forest. The image shows the silhouettes of many bare trees with intricate branch structures against a light, overcast sky. The trees are of varying heights and are densely packed, creating a complex web of dark lines. The overall mood is quiet and somewhat somber due to the lack of leaves.

Thank you

谢谢！