



**Australia China Agricultural Cooperation Agreement Program**

# **Salt tolerant eucalypts for the dual role of landscape recovery and commercial forestry**

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## Executive summary

The Exchange covered the Provinces of Guangdong, Guangxi and Fujian plus Beijing and incorporated:

- Twelve business meetings to explore the opportunities and interest for commercialisation of Saltgrow's existing products and technology in China, to understand operational constraints and potential for development of new products, and to discuss issues regarding protection of Saltgrow's intellectual property;
- Five formal scientific presentations to large groups of scientists and forestry practitioners aimed at communicating Saltgrow's research background and results and the commercial application of its products, with the aim of both establishing links with potential research partners to support the adoption of Saltgrow's products in China and to investigate opportunities for new commercially focussed research based on Saltgrow's existing technology and expertise;
- Eight field inspections incorporating forest plantations, plantation trials, forestry nurseries and a eucalypt veneer processing facility, providing an insight into the status of commercial forestry in China, the status of eucalypt breeding and propagation methods, and developments with processing of small diameter, plantation grown eucalypts.

All meetings and presentations helped establish a dialogue to better understand natural resource management issues in forestry and agriculture, and the potential for commercial, stress tolerant eucalypts to play a role in addressing environmental issues. The meeting and presentations also helped understand the relative importance of forestry production constraints, and identified of cold tolerance, tolerance to bacterial wilt, and wind-firmness, as the three major traits of current interest for genetic improvement work in eucalypts.

Commercial and new product development opportunities identified include:

- Potential to establish collaborative trials of Saltgrow hybrids with established foreign forestry companies Stora Enso, Sino Forests and Asia Pulp and Paper;
- Strong interest from research institutions including RITF, Guangxi Forest Research Institute, China Eucalypt Research Centre, Fujian Forestry Research Institute and the Chinese Academy of Forestry to collaborate on any trials of Saltgrow established in China, supporting the adoption of Saltgrow hybrids in China;
- Interest from the Fujian Provincial Forestry Department re licensing of Saltgrow's products for introduction to China;
- Interest in collaboration from RITF, Guangxi Forest Research Institute, China Eucalypt Research Centre, Fujian Forestry Research Institute and Chinese Academy of

Forestry on the breeding and selection of cold tolerant varieties to extend the northern limits to the range of eucalypts;

- Potential interest from the Chinese Academy of Forestry to introduce Saltgrow's patented salt tolerance gene into cold tolerant forestry species for use in northern China;
- Potential to develop managed forestry plantation investment projects that may utilise a combination of Saltgrow hybrids and existing Chinese germplasm;
- Opportunities and avenues to raise significant investment capital within China for forestry plantation investment;
- Opportunities to extend Saltgrow's products to develop varieties tolerant to the shock cold conditions that limit the potential range of eucalypts in China;
- Identification of specific land parcels in eastern and western China of interest to China Cotton for rehabilitation of degraded land with commercial forestry crops (requires further investigation with respect to climatic conditions);
- Potential to collaborate with the Dalian Province on both introduction of cold tolerant ornamental and commercial varieties to northern China, and the potential interest to introduce Saltgrow's patented salt tolerance gene into cold tolerant forestry species for use in northern China.

A number of these opportunities require further investigation to ascertain their feasibility, particularly suitability of climatic conditions in the regions for afforestation identified by China Cotton. Others, such as the opportunity for managed plantation investment projects require preparation of a business plan, presentation to potential investors and identification of appropriate Chinese partners. Opportunities with the major foreign pulp companies operating within China are relatively straightforward, but require further consideration of IP protection issues. Similarly, licensing of Saltgrow's existing products to the Fujian Provincial Forestry Department is relatively straightforward, but requires continued commercial negotiations. One of the greatest challenges facing eucalypt forestry in China is breeding for tolerance to the shock cold conditions limiting the northern range of the genus. Extension of Saltgrow's approach to salt and drought tolerance to address this problem of cold tolerance is a potentially fruitful area for research investment.

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## 1. Terms of reference

The terms of reference for the delegation's visit to China were to investigate opportunities to establish a market for Saltgrow's technology, intellectual property and products in China. This scope of this mission included exploring opportunities for direct export of plants to China, investigating the feasibility for establishment of plant propagation facilities in China, and gaining an understanding of the opportunity for provision of land assessment and capability services, sub-contracting of landscape assessment and hydrological design services, provision of forestry project management services, and establishment of research project consulting services using pooled Chinese and Australian expertise to undertake specific investigations or strategic research to underpin the adoption of Saltgrow technology into China.

## 2. Project objectives

To fulfil the stated terms of reference, the specific objectives of the mission as originally stated were:

- Meet with natural resource management researchers at the Chinese Academy of Sciences and subsidiary Institutes to gain an appreciation of: salinity, land degradation and other environmental problems; current research status in degraded land management and rehabilitation; the potential to address land degradation issues using commercial forestry; and, the potential to establish new research links that will facilitate and underwrite the adoption of Saltgrow's technology in China.
- Meet with forestry researchers at the Chinese Academy of Forestry and other forest research centres to gain an appreciation and understanding of: the status of eucalypt forestry research in China; the current level of eucalypt productivity; environmental limits to commercial forestry; the current application of trees to address environmental issues; and the potential to establish new research links that will facilitate and underwrite the adoption of Saltgrow's technology.
- Meet with private forestry companies with interests in commercial plantation establishment specifically, Sino Forests and Stora-Enso and its joint venture partner, Gao Feng Forest Co., to discuss the potential for extending commercial plantations to address environmental issues, and the interest in adopting Saltgrow's technology.
- Where possible, meet with government officials responsible for the environment and forestry in provinces of southern China facing salinity, erosion and other land degradation issues.
- Establish an improved understanding of environmental issues related to salinity and land degradation, as well as timber supplies and forest resources.

As the final itinerary for the mission was developed, this range of objectives was expanded to include meeting with representatives of a range of agricultural groups and organizations to better understand issues of environmental sustainability facing the agricultural sector, and the potential to incorporate forestry as a component of agricultural practice in order to improve sustainability and profitability.



Anticipated outcomes from pursuing these objectives were:

- Establishment of research alliances with both the Chinese Academy of Forestry and other forest research centres, and the Chinese Academy of Sciences, and involvement of these organizations in providing the background research expertise to underpin management and monitoring of proposed trials established in conjunction with the private forest companies. This work will ensure the appropriate and sustainable deployment of Saltgrow technology in China.
- Development of a three way alliance between Saltgrow, Chinese research institutions and private forest companies that would provide a strong basis for attracting additional research funding for further development and support of product commercialisation.
- Commercial adoption of Saltgrow technology following a successful trial program, initially by the private companies, and subsequently by other forestry organisations and environmental re-afforestation programs.
- Commercial forestry development on lands in need of environmental rehabilitation works, but currently considered difficult or economically marginal.
- Development of working relationships with key research bodies in the areas of forestry and salinity/environmental management, and with commercial forestry organisations in China.
- Agreements with the commercial forestry companies to trial Saltgrow technology in China, and linked agreements with the forestry and salinity research bodies to be involved in the development and monitoring of these trials, and to undertake additional research necessary to underpin the commercial adoption of Saltgrow technology in China.

### 3. Itinerary

A summary of the trip itinerary is presented below. A fully detailed itinerary is presented in APPENDIX 1

#### **Guangzhou (Guangdong)**

- Meeting with member of the South China Institute of Botany, Academy of Sciences.
- Meeting with the Managing Director, Conghua Agricultural Investment Project and farm inspection.
- Dinner meeting with representatives of the Conghua Municipal Government.
- Meeting with Director of Science and Technology, the Provincial Forestry Department of Guangdong.
- Presentation to scientists from the Research Institute of Tropical Forestry, plus representatives from Sino Forests Corporation and Asia Pulp and Paper.

### **Nanning (Guangxi)**

- Joint meeting with Mr Risto Vuokko, Stora-Enso and Mr Zheng Bai, Gao Feng Forest Company.
- Presentation to scientists from the Guangxi Forest Research Institute and inspection of nursery facilities.
- Inspection of Dongmen Forest Farm, plantation trials, nursery and veneer processing facilities

### **Zhanjiang (Guangdong)**

- Inspection of Stora Enso plantations and nursery.
- Inspection of Chinese Academy of Forestry nursery facilities.
- Presentation to scientists of the China Eucalypt Research Centre, CAF Nursery, Ahaniang Forest Research Institute, and managers from the Leizhou Forestry Bureau.
- Inspection of Leizhou Forestry Bureau plantations and nursery.

### **Zhengzhou, Fujian**

- Dinner meeting with representatives of Fujian Sub-tropical Horticultural Botany Research Institute, China Horticultural Industry Development Centre, China Young Entrepreneurs Association, Fujian Forestry Bureau.
- Inspection of Zhengzhou forest plantations.
- Lunch meeting with representatives of the Zhengzhou Municipal Government and Zhengzhou Forestry Bureau

### **Fuzhou, Fujian**

- Meeting with representatives of the Fujian Provincial Forestry Department and the Fujian Forest Research Institute.
- Presentation to scientists from the Fujian Research Institute of Forestry, Chinese Academy of Forestry.

### **Beijing**

- Dinner meeting with Managing Director of DiaMed China and General Manager of Zhuhai Biomed Co Ltd.
- Meeting with representatives of PSY Pty Ltd, Da Bei S&T Development Co and Henan Bureau of Agriculture
- Meeting with Vice Minister and ranked leaders in the Ministry of Agriculture.
- Presentation to scientists from the Chinese Academy of Forestry, and Beijing Forestry University.
- Lunch meeting with representatives of the Dalian Forest Administration Bureau.
- Meeting with Chairman and Vice President of China Cotton Industries Limited.
- Dinner meeting with scientists from the Centre for International Forestry Research.

## 4. Exchange achievements

### 4.1 Business Meetings

As can be seen from the itinerary, the exchanged engaged in a very ambitious program of meetings, technical presentations and site visits across the main eucalypt growing regions of Guangxi, Guangdong and Fujian, plus administrative and research organizations in Beijing. Outcomes from specific business meetings are summarized below.

#### 4.1.1 Conghua Agricultural Investment Project, Conghua

This project, recently launched in Hong Kong, is an example of the type of large, private agricultural projects being developed in China. The project covers approximately 20,000 ha of cultivated land, and includes approximately 133,000 ha of native forest land. Conghua experiences an average annual temperature of 20°C, with 5 to 10 days of frost in winter, and an average annual rainfall of 1900 to 2100mm, of which 81% falls between April and September.

While there may be limited opportunities for commercial forestry within this project, it provides an example for development of foreign investment agricultural enterprises in China, the processes of establishing such enterprises, and the policies established by local governments to encourage such investment.

#### 4.1.2 Provincial Forestry Department of Guangdong

An abbreviated presentation on Saltgrow was given to Mr Chen Youhuai and Mr Zhang Xinjie of the Forestry Department of Guangdong Province. Within Guangdong Province, salinity is not considered a problem. Rather, the major focus is on breeding for cold tolerance, which is principally being approached using *E. dunnii*.

Plantations in Guangdong are relatively advanced, with a total area of around 333,000 ha, a maximum rotation of 6 years, and a productivity range of 10 to 50 m<sup>3</sup>/ha/yr. The main area of plantations is in the Leizhou peninsula and nearby coastal areas.

Advantages of eucalypts to Guangdong are: short rotation, high productivity and better economic returns than alternative forestry options.

Outside of government plantations, there is a growing interest in private forestry investment in the province. Private investment falls into three categories:

- Companies with the aim of establishing pulp mills
- Companies with fibreboard mills
- Individuals with no specific purpose other than investment in forestry



Pulp companies with an interest in plantations are summarised in Table 1.

**Table 1:** Pulp companies with plantation interests in China

Company	Plantation area / Status
Stora Enso	< 10,000 ha, expanding to 150,000 ha
Asia Pulp and Paper	200,000 ha
Sino Forests Corporation	150,000 ha (estimated)
UPM Kymmene	To start
Oji	Very small

In recent years, there has been a growing interest in plantation investment by private individuals, particularly in the north of Guangdong where land values are cheaper. However, eucalypt plantation development in the north of the Province is limited by cold climatic conditions.

Despite growing interest in eucalypt plantations, there are ecological concerns among the community. These include:

- Concern over degradation of soil fertility;
- Decreased water yield, especially resulting from plantations in mountainous catchment areas.

The Provincial Forestry Bureau is encouraging more research to address these concerns, and is also encouraging practices such as intercropping with agricultural plants to reduce the concern over eucalypts.

Guangdong Forestry Department utilises eucalypt clones that have been developed by RITF. RITF provides its material to the Forestry Department free of charge. This arrangement devalues third party breeding efforts and makes protection of IP difficult.

Currently the main clone planted near the coast is clone "U6", while in the central area of the province, *E. urophylla* x *E. grandis* hybrid is the main species. U6 contains some *E. tereticornis* background, giving it a relatively thin crown and greater typhoon resistance than *E. urophylla* x *E. grandis* hybrid, which typically has a heavy crown.

The meeting with Guangdong Provincial Forestry Department identified that: (i) they considered themselves self sufficient with respect to clonal breeding; and (ii) that there was little incentive for them to look at introducing commercial clones given they benefit from the breeding efforts of the RITF at no expense. However, the meeting also identified a number of opportunities outside the Department:

- breeding for typhoon resistance (wind-firmness) is an important trait for plantations in coastal regions;

- breeding for tolerance to rapid drops in temperature typical in the northern part of the southern Provinces is a very important focus to open up access to relatively cheap land and significantly expand the range of eucalypts;
- There is significant investment by companies intending to build pulp mills, with very large plantation investments by Stora Enso, UPM Kymmene and Oji just commencing;
- Sino Forests has an interest in operating more in the northern areas of the southern provinces and is interested in cold tolerance;
- With the growing wealth of the country, there is growing interest in forestry investment by private individuals. This is supported by short rotations, high yields and high returns achievable from forestry investment. As such there is a growing opportunity to provide managed plantation investment projects. Given the greater availability of land in the northern parts of the province, the capacity to provide a managed plantation investment service would be enhanced by availability of germplasm tolerant to the type of cold winter conditions experienced.

#### **4.1.3 Sino Forests Corporation Limited.**

A brief meeting was held with Dr Wei Runpeng following the presentation given to the Research Institute which Dr Wei attended. Dr Wei indicated his interest in the work being carried out by Saltgrow, Sino's interests in plantations in the northern parts of the southern provinces, and an interest to continue discussions toward the aim of jointly trialling Saltgrow hybrids in China. The issue of protecting Saltgrow's IP was raised but not resolved. Further discussions will be held with Dr Wei re establishing trials of Saltgrow hybrids in China.

#### **4.1.4 Asia Pulp and Paper Company Limited.**

A brief meeting was held with Dr Chung Hsu-Ho following the presentation given to the Research Institute, where Dr Chung indicated his interest on trialling Saltgrow's hybrids in China. Again, the issue of protecting Saltgrow's IP was raised but not resolved. During the course of this discussion, Dr Chung indicated that APP's growing costs for pulp plantations was in the order of US \$700 to \$800 per ha. Further discussions will be held with Dr Chung Hsu-Ho re establishing trials of Saltgrow hybrids in China.

#### **4.1.5 Stora Enso Forestry Co Ltd and Gao Feng Forestry Company Ltd.**

A detailed presentation was given to Mr Kari Tuomela, Vice President Stora Enso, Mr Risto Vuokko, R&D Director Stora Enso, and Mr Zheng Bai, Deputy General Manager, Guangxi Gao Feng Forest & Pulp-Paper Group Ltd. Stora Enso and its Chinese partner, Gao Feng Forest & Pulp-Paper Group, commenced plantation establishment in China relatively recently, and has plans to establish sufficient resource (approximately 150,000 ha) to support a pulp mill. The current focus is on lands in the south-east corner of Guangxi and the adjoining south-west corner of Guangdong. The main issues in this area are windfirmness due to the proximity to the coast and risk from typhoons, bacterial wilt, and

poor productivity on some soil types. Stora Enso is actively seeking a suite of germplasm that is best matched to the range of site conditions across its estate, and will optimise overall productivity. At present, little attention is given to pulp yield from the material being planted. Stora indicated at the meeting that they would be interested in entering into an arrangement to trial Saltgrow material in China. The issue of protecting Saltgrow's IP was raised with Stora, and is appreciated by Stora staff.

Stora currently has trialling arrangements with other germplasm suppliers, both from within China and overseas. For overseas suppliers, this is along the lines of a fee of US\$1000/clone for initial testing up to 50,000 plants, and payment of \$40 to \$50,000/clone for unrestricted commercial use. For Chinese suppliers, this is along the lines of \$500/clone for testing in line plots, \$1000/clone for more extensive testing, and \$9000/clone for commercial use. Both these arrangements significantly undervalues Saltgrow hybrids, especially given the risk of managing IP. Notwithstanding, Stora represents a sound opportunity for initial introduction and trialling of Saltgrow hybrids in China, and further discussions will be held with in this direction.

#### **4.1.6 Sub-tropical Horticultural Botany Research Centre, Fujian.**

A dinner meeting was held with Prof Wang Shao Feng, Director, Fujian Subtropical Horticultural Botany Research Centre, Mr Chen Yan Hua, Rusun and China Young Entrepreneurs Association, Mr Guan Qiyang, Vice Director, Fujian Science and Technology Department, Fujian Subtropical Horticultural Botany Research Centre and Mr Wu Yi, Director, Science and Technology, Fujian Forest Bureau. While Prof Wang Shao Feng was very interested in the product, no direct opportunities for Saltgrow were identified. Mr Wu Yi subsequently accompanied the mission to field visits in Fujian, and to Fuzhou for meetings with the Provincial Forestry Department.

#### **4.1.7 Fujian Provincial Forestry Department.**

A presentation was given to Mr Huang Jianxing, Director General Fujian Provincial Forestry Department, Mr Yuan He Sheng, Chief of Foreign Co-operation Fujian Provincial Forestry Department, Mr Hersheng Lan, Fujian Provincial Seed and Seedling Station, Mr Wu Yi, Director Science and Technology Fujian Forest Bureau and Dr Yang Zongwu, Deputy Director Fujian Research Institute of Forestry. This presentation was followed by a discussion on the opportunities for introduction of Saltgrow hybrids into Fujian Province.

Fujian Province is the most forested province in China with 7.33 million ha of forested land covering 60.5% of the province. While much of this area is native forest designated for environmental purposes only, annual commercial timber production is 5 million m<sup>3</sup>, with a total output value of \$ 40 billion RMB (approx. AUD\$6.7 billion). In 2003, Fujian Province received 166 proposals for foreign investment projects in forestry and wood processing with contracted investment of US\$210 million and actual investment of US\$110 million. The Province imported .5 million m<sup>3</sup> of forest products logs, sawn timber, mid and high quality decorative wood, and 300,000 tons of pulp and paper. In the same period, Fujian exported \$650 million of processed timber products including bamboo, rattan and grass work. In recent years, spindles lathes have been introduced into China allowing the peeling of veneer from small diameter eucalypts down to a core of 2 to 2.5cm. In the last two years, over 600 veneer mills have set up in Fujian. Many of these mills are currently supplied with log imports from

Guangxi. Major international companies such as Weyerhaeuser have shown an interest in forestry investment in Fujian, and furniture manufacturers such as Ikea are interested in establishing solidwood plantations. Establishment of solidwood plantations is now policy from the State Forestry Administration (central authority based in Beijing). Chinese companies attending the Trade Fair include:

- Fujian Yongan Forestry Group Co.Ltd., a state-own enterprise in Northwest of Fujian Province who owns plantations(they are now large area of Eucalyptus plantations) and wood processing industry ( Plywood, MDF, Particle etc.)
- Furen Wood Industry Co. Ltd, a state-own enterprise in Fuzhou (MDF plant and Eucalyptus Plantation)
- Fujian Provincial Forestry Investment Company (state-owned enterprise with forest investment : plantation,wood products)
- Fujian Provincial Timber Company (State-owned enterprises ,timber import and export)
- Xiamen Timber Company (State-owned Enterprise, timber import and export)
- Xiamen Forestry Import & Export Company (state-owned enterprise, forest products import and export)
- Great World Group (Private enterprise, forest trade and wood processing, who owns Fuzhou Forest Products Market)
- Fujian Timber Net
- Xiamen Jiazhou Forestry Company (private enterprise, forest plantation)
- Xiamen Zongkun Chemicals Company ( private enterprise, forest chemicals)
- Yongqun Forestry Group ( Private enterprise, nursery, plantation, wood products processing, forest chemicals)
- Bel Trade Wood Ind'L Co., Ltd (Private enterprise, wood products processing)
- Xiamen Xiyingmen Furniture Products Company ( private enterprise, furniture producing plant)
- Sanming Municipal Forestry Bureau (Government Agency, Sanming is key forest region in northwest Fujian, Eucalyptus of cold resistance )
- Nanping Municipal Forestry Bureau (Government Agency, Nanping is key forest region in northern Fujian, Eucalyptus of cold resistance)
- Longyan Municipal Forestry Bureau (Government Agency, Longyan is key forest region in northwest of Fujian, Eucalyptus of cold resistance )
- Zhangzhou, Quanzhou, Putian Municipal Forestry Bureau( Government Agency, Eucalyptus plantation area in Southern Fujian)

and some other 20 wood processing enterprises

Fujian has significant potential for salt tolerant eucalypts in coastal regions, and 10 million mu or approximately 670,000 ha potentially suitable for cold tolerant eucalypts. As a government enterprise, the Provincial Forestry Department is keen to introduce scientific enterprises that will lead to productive co-operation within the Province. The potential terms on which Saltgrow hybrids might be introduced into Fujian were discussed in some detail. The problem of maintaining control of the intellectual property was highlighted, and accepted. To overcome this, it was put to the meeting that Saltgrow would consider a proposal along the lines of a security deposit on a licence fee being paid to an independent party, with a proportion of this licence fee being released to Saltgrow in return for provision of plants for initial trialling. If trials were successful to an agreed standard, then broader testing would be carried out, with a further release being made to Saltgrow. If the second stage trialling was again successful to an agreed standard, the full licence fee would be released to Saltgrow in return for full commercial use of successful clones. In this way, the interests of both parties are protected. If trials are unsuccessful, then issues of IP protection in China are irrelevant, but Saltgrow is re-imbursed for the costs associated with initial trials. If the trials are successful, then Saltgrow is guaranteed payment of a licence fee, and Fujian Province has established the confidence necessary to allow it to commercially exploit Saltgrow germplasm. The key to this arrangement is a reliable intermediary, which could potentially be arranged through an Australian Government organization such as AusTrade. Interest in this approach to germplasm licensing was shown by the Fujian Forestry Department, but specific amounts were not discussed. This proposal needs to be developed more fully, and put to the Department in writing.

In addition to direct commercialisation of Saltgrow germplasm, the Province has identified a significant potential for breeding of cold tolerant eucalypts. Existing Saltgrow trials in Australia have shown potential for cold tolerance under the type of conditions experienced in Fujian where conventional cold tolerant eucalypts fail. This is a potentially fertile area for co-operation and new research. An initial opportunity in this direction is being pursued (see discussion under Technical Presentations, Fujian Research Institute of Forestry), but a more substantial joint research and development program is warranted given the scale of the opportunity.

Other opportunities to continue engagement with Fujian include a visit to Australia later this year by 16 technicians, and the China International Fair for Investment and Trade (CIFIT) being held in Xiamen during 8-11 September. The visit to Australia by Fujian Technicians will be used as an opportunity to progress the Province's interest in Saltgrow by incorporating a visit to Saltgrow trials.

The CIFIT is held annually, and is the sole, nation wide international investment event focussing on Foreign Direct Investment. During this Fair, the Fujian Provincial Forestry Department will organise a matchmaking meeting between 40 of Fujian's major forest, forest products processing, and forest trade enterprises, with foreign enterprises with an interest in investment in China. The "Modern Agriculture and Forestry" meeting will be one of nine industrial sector meetings, also including "Environmental Protection". The Forestry meeting will also provide the opportunity for companies to hold special presentations on their forest products and investments. While it is currently unlikely that Saltgrow will be able to attend the 2004 meeting, arrangements have been made with the delegation being sent by NAFI (National Association of Forest Industries) to distribute Saltgrow promotional



materials, and to identify possible opportunities for further investigation by Saltgrow subsequent to the meeting.

#### **4.1.8 DiaMed China and Zhuhai Biomed Co Ltd.**

A dinner meeting was held with Mr Neil Sutherland, Managing Director DiaMed China Ltd and Mr Li Ye, General Manager Zhuhai Biomed Co Ltd. Neil was previously known to some members of the delegation though his prior involvement in ForBio China, a company involved in the application of biotechnology to improvement of forestry germplasm. From information gathered during the mission prior to the meeting with Neil, it had become apparent that investment in general industrial plantation forestry in China offered attractive returns, with lower plantation establishment and management costs than Australia, higher stumpage values, and generally higher productivity (attributed to both the significantly higher rainfall throughout most areas suitable to eucalypts (generally around 2000mm/yr) and achievements with genetic improvement of the tropical hybrid *E. urophylla* x *E. grandis*). In addition, the rapid expansion, growing affluence and large population of China ensure a substantial and growing market for forest products.

In discussion of these attributes of Chinese forestry with Neil, it became apparent that the rapidly growing affluence of the nation also provides a very large pool of private investment funds looking for opportunities for solid investment returns. The potential returns from eucalypt forestry in China and the short rotation times (generally 6 to 7 years), provide the opportunity to raise significant investment capital within China for managed plantation investment projects. This opportunity was also indicated from the meeting with the Guangdong Provincial Forestry Department. As indicated by the Guangdong Forestry Department, private forestry investment has begun to occur in the northern areas of this Province, and substantial expansion will require development of more cold tolerant germplasm. However, private Joint Venture plantations were also seen in southern Fujian in areas suitable for *E. camaldulensis* x *E. grandis* hybrid. As such, there is potential to develop managed forestry plantation investment projects that may utilise a combination of Saltgrow hybrids existing Chinese germplasm, and new cold tolerant material. Further pursuit of this opportunity will require preparation of a business plan, presentation to potential investors and identification of appropriate Chinese partners. Neil has indicated that he can secure substantial private Chinese investment funds to fulfil a business plan delivering solid investment returns. Agrifood Asia has the skills and track record to facilitate appropriate Chinese partners and secure the required regulatory approvals for any venture along these lines.

#### **4.1.9 PSY Pty Ltd, Da Bei S&T Development Co Ltd and Henan Province Bureau of Agriculture.**

A meeting was held with Prof Chen Shenyi, Vice Chairman PSY Pty Ltd, Mr Wei, Bureau of Agriculture Henan Province and Mr Gao Xiao Yang. The group claims to have been working on introducing eucalypts to areas in China north of the Yangtze River for a number of years. This is in contrast to most experience with eucalypts in China which indicates that eucalypts are largely restricted to areas south of the Yangtze due to extremely low winter temperatures. The group claim to have successful trials in Sichuan, Hunan, Hubei, Henan, Anhui, Shanghai, Jiansu, Shanxi and Hebei, and are now trialling eucalypts in Beijing in areas subject to -16oC. The group claim to have access

to a large tracts of land totalling 2.5 million mu (approximately 167,000 ha) in Zhejiang, and interest from two pulp companies wishing to grow eucalypts in Henan. The group espoused the need to protect IP and find a “loyal partner” in China, and was excessively keen to wrap up an agreement to market Saltgrow in China. It was felt among the members of the delegation that this group were overselling the potential of eucalypts in China, well beyond the reasonable expectations of even the most cold tolerant eucalypts, and were likely to be an unreliable partner. The meeting was cordially wrapped up.

#### **4.1.10 Ministry of Agriculture.**

A meeting was held with Assoc. Prof Zhen Yichun, Director President, and Mr Zhu Wenjunm Director, Senior Agronomist, Mr Wu Guoqiang, Director, Audio Visual Publishing House National Farmer’s Science and Technology Training Centre, Ministry of Agriculture. The opportunities for Saltgrow hybrids to integrate with farming practices to manage environmental sustainability and generate a commercial return were presented. While the Ministry of Agriculture was very interested in Saltgrow, they had no direct assessment of opportunities for Saltgrow, but offered any assistance in progressing opportunities for the product.

#### **4.1.11 Dalian Forest Administration Bureau.**

A lunch meeting was held with Mr Wang Xiuyun and Ms Wang Changxun, Dalian Forest Administration Bureau. The Dalian Forestry Bureau was interested in Australian species with potential for commercial and ornamental application in Dalian. Although Dalian is located in the far north-east of China, it is coastal and, potentially, the maritime influence may moderate the extreme cold conditions experienced in inland areas. At the invitation of the Dalian Forestry Bureau, Chris Yuan returned to Dalian at the end of the mission and remained on to make further presentations on Saltgrow and further pursue commercial opportunities. From this, the Dalian Forestry Bureau expressed strong interest in Saltgrow hybrids and Saltgrow’s stress gene technology. A Dalian delegation to Australia in July visited a low rainfall Saltgrow trial on a seasonally waterlogged, saline discharge site near Cowra in NSW. This site demonstrates extreme conditions tolerated by Saltgrow hybrids, where rainfall in the three years since planting has been less than an average year in many areas of China.

To progress potential interest from Dalian, detailed weather information for the province is required. This information has been received and is currently being translated. Once available in English, the weather data for Dalian will be analysed to identify regions with potential for Saltgrow, and to identify other Australian species with potential for ornamental and commercial use in Dalian and the NE of China. This information will be used to pursue licensing opportunities for Saltgrow hybrids, and opportunities to commercialise other Australian species. Discussions on the potential to utilise Saltgrow’s gene technology to introduce salt and stress tolerance into native cold adapted Chinese species will also continue to be pursued.

#### **4.1.12 China Cotton Industries Group.**

The final business meeting of the mission was held with Mr Qi Husheng, Chairman President, China Cotton Industries Group and Mr Nan Quan, Vice President and Manager of International Marketing Division, China Cotton Industries Ltd. China Cotton Industries is responsible for all cotton processing in China, while China Cotton is responsible for all marketing. It has an international sales network in all continents and 41 countries.

Principle cotton growing areas in China are the central eastern provinces of Hebei, Shandong, Henan, Anhui, Jiangsu, Hubei, Hunan, Jiangxi and Zhejiang; small areas in the central Chinese provinces of Sichuan, Shanxi and Shaanxi, and extensive areas in the far western province of Xinjiang. Although China Cotton Industries Group and China Cotton have are not directly involved in cotton production, they are interested in the environmental sustainability of the industry, and were interested in the potential of Saltgrow to manage environmental problems in cotton growing areas. In this context, Mr Qi suggested two areas where Saltgrow could have potential:

- (i) a large coastal area of Jiangsu province immediately north of Shanghai affected by salinity where prior attempts at tree establishment have generally failed. The city government in this province is interested in trees for commercial forestry and greening, and Mr Qi offered assistance in making appropriate introductions to pursue this opportunity. Although well north of the generally accepted limit to eucalypts, the area in question is coastal, and is believed to experience winter minimums of  $-6$  to  $-7^{\circ}\text{C}$  which is well within the limit of Saltgrow hybrids.
- (ii) extensive areas in Xinjiang Province in the north-west of China. Again, although well north and west in China, it was indicated at the meeting that this area experiences winter minimums of only  $-4$  to  $-5^{\circ}\text{C}$ . This being the case, a greater problem in this region may be extremely low rainfall.

For both Jiangsu and Xinjiang, more detailed climate data is required to assess the opportunities, however, superficially, both appear to present a combination of site and weather conditions suited to Saltgrow hybrids. Given both locations offer a substantial land base in need of reforestation for environmental outcomes, there may exist opportunities to link in with large government funding programs. There may also be potential to integrate managed investment projects along the lines discussed in 4.1.8 above.

From the meeting it was agreed:

- China Cotton would assist in providing more detailed climate data for analysis by Saltgrow
- If the identified regions are climatically suitable, Saltgrow would provide China Cotton with more detailed information on its hybrids, their economic potential, and what reforestation could do for these areas in terms of greening and soil improvement.
- With additional information from Saltgrow in hand, Mr Qi would travel to Jiangsu to talk to the government about possible projects.

In addition to the above, Mr Qi mentioned that a government Minister from Jiangsu will visit Australia later in 2004, providing an opportunity to visit Saltgrow trials and progress potential project opportunities.

## 4.2 Technical Presentations

A detailed technical and scientific presentation was given at the following research institutes:

1. Research Institute of Tropical Forestry, Guangzhou
2. Guangxi Forest Research Institute, Nanning
3. China Eucalypt Research Centre, Chinese Academy of Forestry Nursery, Zhanjiang Forest Research Institute and Leizhou Forestry Bureau, Zhanjiang
4. Fujian Research Institute of Forestry, Chinese Academy of Forestry, Fuzhou
5. Chinese Academy of Forestry, and Beijing Forestry University, Beijing

Each presentation was attended by 20 to 30 staff and students of the respective institutions. The presentation emphasised the opportunities for commercial eucalypt forestry to contribute to environmental problems in China, particularly reforestation of land subject to degradation from erosion, as well as salinity.

The presentation was well received at all Institutes. Particular interest was shown by the China Eucalypt Research Centre to collaborate on projects characterising the performance of Saltgrow hybrids in China. This interest may have been aided by a visit to Saltgrow's trial site at Mt Scobie in Victoria by Mr Yang Minsheng and Chen Shaoxiong in April prior to the mission's visit to China.

Wang Houran from the Chinese Academy of Forestry, Beijing, has offered to write a proposal for funding by the Chinese Government to test Saltgrow hybrids in China, and to be involved directly with any companies that may be interested in adopting the technology. He expressed particular interest in the coastal region of Taizhou in the province of Zhejiang, where early trials with eucalypts have shown promise as one of the only genera with potential to survive emissions from large pharmaceutical manufacturing plants.

Strong interest was also shown by the Fujian Research Institute of Forestry. In particular, Mr Chen Bihua, PhD student expressed particular interest. He has subsequently obtained funding to work in Australia as a visiting scholar to undertake research into the molecular genetics of cold tolerance in Eucalypts. Assistance has been given in identifying Institutions in Australia capable of supporting Chen Bihua's area of interest, and in helping him to secure a position at Southern Cross University with Professor Robert Henry.

The scientific presentations to the above institutes identified many useful forestry research contacts in China, and promoted a considerable degree of scientific exchange. Importantly, it has helped develop

a valuable network that can be called upon to develop specific projects to support commercialisation of Saltgrow hybrids in China.

In addition to research opportunities for direct support of Saltgrow hybrids, potential partners for joint research investment into breeding and development of cold tolerant eucalypts, particularly for Fujian Province, and potential for projects seeking to utilise Saltgrow's patented stress gene technology for introduction to native Chinese species.

Opportunities for research collaboration in China will be pursued to support any successful commercial opportunities.

## 4.3 Field inspections

### 4.3.1 South China Botanical Gardens

Following the meeting with Prof Zhou Guoyi and Dr Hongxian Qu of the South China Institute of Botany the group was hosted to an inspection of the South China Botanic Gardens, which provided a useful introduction to many Chinese native plant species, and Chinese relatives of Australian plant species and genera.

### 4.3.2 Dongmen forest Farm, nursery and veneer processing facility, Dongmen, Guangxi

A visit was paid to Dongmen Forest farm en route from Nanning to Zhanjiang. Dongmen was the location for an AusAid funded project run by Queensland Forestry from the late 1970's to the early 1990's. The project introduced a genetic improvement and clonal breeding program that achieved substantial gains in productivity, particularly from *E. urophylla* x *E. grandis* hybrids. Dongmen hybrids are now widely grown across industrial plantation areas of southern China. While this hybrid has been very successful, it has limitations in coastal areas due to its heavy crown and susceptibility to wind-throw, and in the northern part of the southern provinces where cold tolerance is required. It is also unlikely that *E. urophylla* x *E. grandis* displays any tolerance to salt.



**Figure 1:** Dongmen nursery showing plants grown in “plastic bag” pots in the foreground, simple shade structures over freshly set cuttings in the centre, and modern polyhouses in the rear. Dongmen nursery production costs are: Seedlings: F15-18 (AUD2.5-3c); Cuttings: F25 (AUD 8c); Tissue Culture: F50 (AUD 16c). This compares to the costs of cuttings production by Stora Enso: F12-15 (AUD2-2.5c) and by small independent nurseries: F20 (AUD3.3c).



A number of Dongmen trials were visited, however, of particular interest was a private veneer mill recently established to peel small diameter eucalypt logs from Dongmen plantations. The mill represents a new product from Dongmen forests, which are principally harvested to produce woodchip for paper production.



**Figure 2:** Second rotation plantation of *E. urophylla* x *E. grandis* hybrid at Dongmen. Plantation regenerated from stump coppice (note the high frequency of double stems). Plantation age approx 7 years.

The Dongmen veneer mill operates a spindles lathe that can peel down to a core of 25mm. More recent lathes can apparently peel down to a core of 20mm. The Dongmen lathe is similar to the hundreds of veneer lathes that have recently sprung up across Fujian Province (refer 4.1.7). The lathe peels billets of 1.2m in length, with top end diameters generally ranging between 8 and 30cm, with most logs being in the order of 14 cm SED. These logs are the product of 6 year old plantations. Logs are unpruned, but pruning to small diameter would substantially improve product value. Price of logs are purchased by the Dongmen mill are set out in Table 2.

**Table 2:** Price structure for veneer logs at Dongmen for a range of small end diameter (SED) classes.

SED	Mill Door Price	Harvesting and transport cost	Stumpage
8-13 cm	Y340 (AUD\$57)	Y90 (AUD\$15)	Y250 (AUD\$42)
14-18cm	Y390 (AUD\$65)	Y90 (AUD\$15)	Y300 (AUD\$50)
20-30cm	Y440 (\$AUD73)	Y90 (AUD\$15)	Y350 (AUD\$58)

As such, growers in China realise relatively attractive returns from peeler logs relative to log stumpage prices in Australia, which are in the order of AUD\$50 to \$75 for large diameter, pruned sawlogs. The returns to Chinese relative to Australian growers are even higher when the sort rotation time of 6 years, high productivity (generally in the order of 30m<sup>3</sup>/ha/yr) and relatively low establishment costs (around \$US 700 to \$800 (\$AUD 1000 to \$1142) are taken into account. The mill door price obtained for veneer sheets is in the order of Y1200/m<sup>3</sup> (AUD\$200) of processed product. Given recovery is in

the order of 70%, this equates to around Y840/m<sup>3</sup> of round log (AUD\$140/m<sup>3</sup>), representing a gross profit on raw material cost of around Y760 to Y860/m<sup>3</sup> (AUD\$126 to \$143/m<sup>3</sup>).



**Figure 3:** Dongmen veneer mil. (a) Spindle-less veneer lathe showing one log in the lathe, one log in preparation for loading, and veneer sheet coming off the lathe. (b) Guillotining veneer sheets to size. (c) Trimmed veneer sheet in front of veneer stack. (d) Veneer logs around 14cm diameter. (e) Drying veneer sheets. (f) Veneer cores. Note size relative to film canister.

The Dongmen mill and other similar veneer mills throughout China is interesting as they challenge the Australian concept of both useable log size and commercial rotation age, and demonstrate the potential for attractive financial returns from small diameter logs. Importantly, the utilisation of small diameter logs in the Australian context provides an opportunity for high value utilisation of small diameter



thinnings, and in low productivity areas, provides an opportunity to reduce both the rotation age and growing risk.

A group of five staff from Dongmen Forest Farm will visit Australia in October, and among other things, will visit Saltgrow trials in south-east Queensland.



**Figure 4:** Other forest products from Dongmen plantations.

#### **4.3.3 Guangxi Forest Research Institute nursery, Nanning, Guangxi**

Following the presentation to the Guangxi Forest Research Institute, the group was hosted to a tour of the Research Institute Nursery. This nursery specialises in propagation by tissue culture to provide motherstock and general planting stock to forest farms around southern China. Nursery production is in the order of 2 million plants/year. The nursery had recently been successful in propagation of *E. dunnii*, a species of interest for cold tolerance, but typically very difficult to propagate. The propagation system ex lab used in the nursery is typical of many forest nurseries in China, utilising thin walled “plastic bag” pots filled with clay sub-soil.

#### **4.3.4 Stora Enso plantations and nursery, Shankou, Guangdong/Guangxi border region**

Following the meeting with Stora Enso staff in Nanning, the mission was invited to inspect Stora Enso Plantations in the Shankou area on the southern border between Guangxi and Guangdong. The six month old plantation inspected was demonstrating good early height growth with trees at around 1 to 2m, but there are some concerns about bacterial wilt and evidence from older adjacent plantations of growth rate dropping off in year two, possibly due to limiting site factors. Stora indicated that they would have some interest in trialling Saltgrow hybrids on soils similar to the plantation inspected because of the potential site limitations to *E. urophylla* x *E. grandis*.



**Figure 5:** Stora Nursery operations. (a) Preparation of cuttings. (b) Setting cuttings into trays in the shade house. (c) Nursery showing plants ready for dispatch to the field in the foreground, and shade house structures in the rear. (d) Motherstock beds.

The field inspection was followed by a nursery inspection where Stora has recently begun gearing up for production of up to 1 million plants/year. The nursery utilises motherstock beds grown in the ground. After setting, cuttings are placed into shade houses without any form of humidity control or bottom heating, indicating the relatively easy propagability of *E. urophylla* x *E. grandis* hybrids. Unlike most Chinese nurseries, Stora has introduced non-soil potting media, a standard in western nurseries. This may potentially eliminate the source of bacterial wilt disease.

#### 4.3.5 Chinese Academy of Forestry nursery, Zhanjiang, Guangdong

Prior to the presentation to staff from the China Eucalypt Research Centre, the group was hosted to a tour of the Zhanjiang Chinese Academy of Forestry Nursery. This nursery was established as a showpiece of nursery technology and is set in picturesque landscaped grounds, but appears hardly utilised. Growing house environmental conditions are monitored by sensors, and activity is captured by a scanning video camera, and this information is relayed to computer screens in a central nursery control centre.





**Figure 6:** Cuttings preparation area of CAF Nursery. Cuttings are delivered by a moving belt to seated workstations.

#### 4.3.6 Leizhou Forestry Bureau plantations and nursery, Leizhou, Guangdong

An inspection of Leizhou Forestry Bureau plantations contrasted blocks of clones from extremely poor performance of the original clone, with the high productivity of the latest breeding developments.. These were:

- W5 the first clone released in China, selected from a 50g seedlot collected from clone ABL12, a clone of *E. tereticornis*. The seed of clone ABL12 was introduced from South Africa;
- Zhanjiang U6, a natural hybrid of *E. urophylla* x *E. tereticornis* widely planted in south China; and
- DH33-27, an *E. urophylla* x *E. grandis* hybrid from Dongmen with parentage U16 x G33.

The nursery was again typical of many Chinese nurseries, using clay sub-soil as the potting medium, with plants grown in Brazilian “bullet cells”, with motherstock beds grown in the ground. The use of soil derived potting media is a potential source of bacterial wilt disease.



**Figure 7:** Leizhou Forestry Plantation illustrating the progression of clonal development in southern China. Left. Clone W5, the first clone released in China. Centre. Clone U6, one of the most widely planted clones in southern China. Right. Clone DH33-27 from Dongmen breeding program.



#### 4.3.7 Zhengzhou joint venture forest plantations, Zhengzhou, Fujian

A public-private joint venture plantation located in Changtai County near Zhengzhou was inspected with Mr Wan Jin Sui, Vice Director of Changtai County, Fujian Forestry Department and Wu Yi, Director, Science and Technology, Fujian Forest Bureau. Investment in the plantation is split 32% State, 6% Forest Farm and 62% private investment. The plantation covers an area of approximately 70,000ha. It is located on deep granitic soils on steep hillsides that had previously supported low productivity Chinese Fir. Annual average rainfall is in the order of 2200mm. The plantation utilised Dongmen *E. urophylla* x *E. grandis* hybrid clones DH32-29, DH32-13 and DH32-27. Trees were fertilised at planting with 500g/tree of P<sub>2</sub>O<sub>5</sub> (18%). At one year, tree height was in the order of 5-8m, with diameters of 5-7cm. At two years, were up to 12m tall with DBH of up to 12cm. The trees exhibited excellent form and light branching.

The excellent growth of this plantation is a combination of improved genetics, deep, well drained soils and high annual rainfall. The potential for solid investment returns is indicated by the substantial proportion of private investment, and is evidence of the growing potential of this sector.



**Figure 8:** Zhengzhou Joint Venture plantation showing two year old trees of Dongmen hybrid DH33-29. Note the steep terrain.

#### 4.4 Sightseeing

On the final day in China, a brief visit was arranged to:

- Great Wall, Beijing;
- Summer Palace, Beijing.

The driver and guide for these visits was kindly provided by the Ministry of Agriculture.

## 5. Administrative arrangements

### 5.1 Problems encountered

Once the delegation arrived in China, all arrangements ran very smoothly and to plan, and no problems were encountered. Important factors in the successful execution of the trip were:

- Detailed advance planning and preparation of a clear, well defined and achievable itinerary;
- Extensive prior correspondence with all people visited in China, and establishment of a relationship by correspondence;
- The inclusion of consultants as part of the delegation with a sound knowledge of travelling, business and forestry in China and an extensive network of contacts.

In addition, the successful execution of the trip was due, in no small part, to the excellent assistance provided by our host and companion for the trip, Prof Xu Daping, Director of the Research Institute of Tropical Forestry (RITF). While Daping was officially engaged as interpreter for the trip, as a senior level professional forest researcher actively involved with many of the organizations on the itinerary, he provided a dimension to the mission that could not have been provided by an interpreter alone. Daping's professional involvement with many of the organizations visited provided a conduit that assisted in achieving much greater depth in meetings than might have been expected from introductory meetings conducted through a translator. In addition to his professional contribution to meetings, Daping also very competently handled all internal travel and accommodation arrangements in China with flowed seamlessly throughout the entire trip.

The only serious problem encountered with the program was the finalisation of the invitation for travel to China. In this regard, an itinerary and travel dates were put forward on April for travel departing 16 May, returning 29/30 May. From correspondence passed on by Brian Mills, there appears to have been some confusion between the State Forestry Administration and the Research Institute of Tropical Forestry regarding who was hosting the delegation. Once this came to light, a member of our delegation with fluent Chinese rang the State Forestry Administration directly, and the Invitation was delivered within 24 hours. However, this issue was resolved only a few days before the original scheduled departure date, resulting in departure of the mission being delayed by a week. This created a conflict with Ken Richards' schedule that prevented him from joining the mission.

Another problem that did not directly affect our delegation, but was more a problem for the Chinese administration of the program, was that there appeared to be confused communication between the State Forestry Administration and our hosts for the trip, RITF. RITF staff were unaware that they were hosting the delegation and bearing all costs until shortly before our arrival. While in this instance, RITF was able to absorb the time commitment and costs at short notice, a repeat of this problem could lead to disruptions to future delegations.

## 5.2 Recommended improvements

In preparing the itinerary for the visit, it was unclear how much detail we needed to arrange directly, and how much was to be arranged by our Chinese hosts. The ACACA documentation states:

“The key value to Australia of the ACACA is its ability to facilitate the development of commercial linkages between Australian and Chinese agriculture and associated agribusiness enterprises. The main benefit is that through the co-operative relationship established between AFFA and the Chinese Ministry of Agriculture, (MoA), projects often include visits to locations within China and contacts that would otherwise not be possible.”

In our instance, no assistance was provided by either the Chinese or Australian Governments in arranging the itinerary prior to the trip until a few days prior to departure, despite the fact that a draft itinerary was originally provided with the initial application. The structure of the itinerary and virtually all meetings and presentations were put together by the delegation members on the basis of prior contacts, or research into appropriate organizations to include on the visit followed by a direct approach to these organisations. Shortly prior to our departure, a request was made to the State Forestry Administration to arrange a meeting with the Vice Minister in charge of Afforestation and Desertification Control given that this role was very pertinent to the aims of our mission, but unfortunately, this meeting was not able to be arranged in the time available.

To better achieve the aims of ACACA and deliver maximum value to future missions, the following recommendations are made:

- The interpreter should be someone who is both able to act as interpreter, but much more, should be someone who is actively involved at a reasonably senior level within the field of interest, such that the person provided by the Chinese Government to accompany delegations has more a role of liaison/host/facilitator than simply interpreter.
- This liaison /host/facilitator should be nominated at the time that delegations are approved, so that the missions have a point-of-contact in China with who they can work to develop the final itinerary details, and facilitate inclusion of meetings that would otherwise be difficult for companies from Australia with limited knowledge of China to arrange.

In our instance, once it had been clarified less than a week before our departure that RITF was our host organisation and that Xu Daping our point of contact, Daping was able to review our itinerary, arrange the inclusion of a few additional meetings, and make the internal travel arrangements. Had this been done, it would also have allowed finalisation of the invitation much earlier. In fact, it was not clear until our arrival in China that Daping would be our host/interpreter for the trip. We were very fortunate in the end to have Daping, but it is easy to see the potential for other missions to with less background experience in China to be less fortunate, potentially resulting in missions failing to achieve their full potential.

## 6. Mission follow up

### Major pulp and paper companies

- Follow up discussions with Sino Forests re Saltgrow trials in China
- Follow up discussions with Asia Pulp and Paper re Saltgrow trials in China
- Follow up discussions with Stora Enso re Saltgrow trials in China
- Continue discussions with UPM Kymmene commenced during preparation of the visit itinerary, but unavailable for meetings due to overseas commitments at the time of the mission.

### Fujian Province

- Preparation of a licensing proposal for further discussion and negotiation with the Fujian Provincial Forestry Department.
- Investigation of opportunities for joint research investment into breeding and development of cold tolerant eucalypts, particularly for Fujian Province.
- Pursue opportunities for Mr Chen Bihua, PhD student from the Fujian Academy of Forestry Sciences, to undertake visiting scholar research in Australia on molecular genetics of cold tolerance in Eucalypts.
- Follow up on intended delegation to Australia in late 2004 by staff from the Fujian Provincial Forestry Department.
- Preparation of marketing material for distribution by NAFI representatives at the “Modern Agriculture and Forestry” and “Environmental Protection” meeting sectors of the China International Fair for Investment and Trade to be held in Xiamen, Fujian Province from 8-11 September.

### Managed plantation investment projects

- Further discussion with Neil Sutherland (DiaMed) and Agrifood Asia toward developing a business plan for managed plantation investment projects that may utilise a combination of Saltgrow hybrids and existing Chinese germplasm.

### Dalian Province

- Analyse climatic data and identify regions (if any) with potential for Saltgrow hybrids and other Australian species with potential for ornamental and commercial application in Dalian and north-east China
- Host delegation from the Dalian Forestry Bureau to Australia and visit Saltgrow trial (completed).



- Continue discussions re potential to utilise Saltgrow's gene technology to introduce salt and stress tolerance into native cold adapted Chinese species

#### **Commercial - Environmental Project Opportunities in Cotton Growing areas.**

- Analyse climatic data for Jiangsu and Xinjiang Provinces for suitability for Saltgrow, and if positive, prepare detailed package on production, economic and environmental features of Saltgrow to support visit to Jiansu government by Mr Qi of China Cotton.
- Follow up dates for visit to Australia by Jiangsu Minister, and arrange visits to appropriate Saltgrow trial sites.
- Continue discussions with China Cotton, and open discussions with Jiangsu Government, re establishment of a large-scale commercial-environmental project on saline affected land.

## **7. Anticipated commercial outcomes**

1. Licensing of Saltgrow propagation rights to at least one major pulp plantation company.
2. Licensing of Saltgrow propagation rights to at least one Provincial Forestry Department.
3. Secure a contract to establish plantations using Saltgrow hybrids that provide joint environmental and commercial outcomes.
4. Packaging of a plantation investment project that may utilise a combination of Saltgrow hybrids and existing Chinese germplasm.
5. Joint research investment into breeding and development of cold tolerant eucalypts capable of extending the current northern limits to viable commercial cultivation.
6. Licensing of rights to utilise Saltgrow's patented stress gene technology for use in application in other species.



**Figure 9:** Delegation members prior to departure from Beijing. From left, Richard Pegg, Chris Yuen, Glenn Dale and Xu Daping.



## APPENDIX 1 – DETAILED ITINERARY

Location	Date	Day	Time	Agenda	Details
Guangzhou	23	Sun	Evening	Arrive Guangzhou/Baiyun 21:15, Dragonair KA1306/China Southern CZ306	<ul style="list-style-type: none"> <li>Travel</li> </ul>
	24	Mon	am	Meeting with members of the South China Institute of Botany Academy of Science and Inspection of Guangzhou Botanic Gardens.	<ul style="list-style-type: none"> <li>Prof Zhou Guoyi, Deputy Director</li> <li>Dr Hongxian Qu, Researcher Associate</li> </ul>
			Lunch	Lunch with representatives of the South China Institute of Botany at the Botanic Gardens	<ul style="list-style-type: none"> <li>Prof Zhou Guoyi, Deputy Director</li> <li>Dr Hongxia, Researcher Associate</li> <li>Alan Guo – President Capab China</li> </ul>
			pm	PM. Meeting with Managing Director, Conghua Agricultural investment project, and farm inspection.	<ul style="list-style-type: none"> <li>Mr Leong Bao Zhoyn, Managing Director</li> <li>Mr Zou Shaoning, Director, Committee of Liangkou Township, Conghua CCP</li> <li>Li Jun, Conghua Flower Association</li> </ul>
			Dinner	Dinner with representatives of the Conghua Agricultural investment project and Conghua Municipal Peoples Government	<ul style="list-style-type: none"> <li>Mr Leong Bao Zhoyn</li> <li>Mr Liang Jia Chi, Secretary, Conghua Municipal Committee of the CPC</li> <li>Ms Liu Zong Jing, Vice Mayor, Conghua Municipal Peoples Government</li> <li>Mr He, Security Bureau Chief, Conghua Municipal Peoples Government</li> <li>Ms Jianying Zhen, Vice-Secretary General Conghua Travel Bureau, Conghua Municipal Peoples Government</li> <li>Alan Guo, President Capab China</li> </ul>

C O M M E R C I A L I N C O N F I D E N C E

Location	Date	Day	Time	Agenda	Details
Guangzhou	25	Tues	am	Meeting with Director of Science and Technology Division, the Provincial Forestry Department of Guangdong.	<ul style="list-style-type: none"> <li>Mr Chen Youhuai, Deputy Director General, Sci-Tech &amp; Foreign Co-operation Division, Forestry Department of Guangdong Province.</li> <li>Mr Zhang Xinjie, Forestry Department of Guangdong Province</li> </ul>
			lunch	Lunch with representatives of the Forestry Department of Guangdong Province	<ul style="list-style-type: none"> <li>Mr Chen Youhuai, Deputy Director General, Sci-Tech &amp; Foreign Co-operation Division, Forestry Department of Guangdong Province.</li> <li>Mr Zhang Xinjie, Forestry Department of Guangdong Province</li> </ul>
			pm	Presentation to members of the Research Institute of Tropical Forestry, and representatives of Sino Forests Corporation and Asia Pulp and Paper.	<ul style="list-style-type: none"> <li>Prof Xu Daping, Director, Research Institute of Tropical Forestry</li> <li>Prof Xu Jianmin, Tree Breeder, Research Institute of Tropical Forestry</li> <li>Prof Bai Jiayu, Chief Scientist, Research Institute of Tropical Forestry</li> <li>Dr Siming Gan, Research Institute of Tropical Forestry</li> <li>Dr Zhou Zai Zhi, Research Institute of Tropical Forestry</li> <li>Numerous other scientists and students from the Research Institute of Tropical Forestry</li> <li>Dr Run-Peng Wei, Director, R&amp;D and Environmental Departments, Sino-Forest Corporation</li> <li>Dr Chung Hsu-Ho, Director, Asia Pulp and Paper</li> </ul>
			Dinner	Dinner with members of the Research Institute of Tropical Forestry and representatives of Sino Forests Corporation	<ul style="list-style-type: none"> <li>Prof Xu Daping, Director, Research Institute of Tropical Forestry</li> <li>Prof Xu Jianmin, Tree Breeder, Research Institute of Tropical Forestry</li> <li>Prof Bai Jiayu, Chief Scientist, Research Institute of Tropical Forestry</li> <li>Dr Siming Gan, Research Institute of Tropical Forestry</li> <li>Dr Zhou Zai Zhi, Research Institute of Tropical Forestry</li> <li>Dr Run-Peng Wei, Director, R&amp;D and Environmental Departments, Sino-Forest Corporation</li> </ul>
			Evening	Fly Guangzhou to Nanning (Dept 21:10, China Southern flight CZ8908 )	<ul style="list-style-type: none"> <li>Travel</li> </ul>

C O M M E R C I A L I N C O N F I D E N C E

Location	Date	Day	Time	Agenda	Details
Nanning	26	Wed	am	Joint meeting with Stora-Enso Forestry Co Ltd and their Chinese partner, Gao Feng Forest Company.	<ul style="list-style-type: none"> <li>• Mr Kari Tuomela, Vice President Forestry, Guangxi StoraEnso Forestry Co. Ltd</li> <li>• Mr Risto Vuokko, Director, R&amp;D, Guangxi StoraEnso Forestry Co. Ltd</li> <li>• Mr Zheng Bai, Deputy General Manager, Gao Feng Forest &amp; Pulp-Paper (Group) Ltd</li> </ul>
			Lunch	Lunch with representatives of Stora Enso Forestry Co Ltd and Gao Feng Forest Company.	<ul style="list-style-type: none"> <li>• Mr Kari Tuomela, Vice President Forestry, Guangxi StoraEnso Forestry Co. Ltd</li> <li>• Mr Risto Vuokko, Director, R&amp;D, Guangxi StoraEnso Forestry Co. Ltd</li> <li>• Mr Zheng Bai, Deputy General Manager, Gao Feng Forest &amp; Pulp-Paper (Group) Ltd</li> </ul>
			pm	Presentation to scientists from the, Guangxi Forest Research Institute, and. Meeting with Pang Zhenghong Science, technology and international co-operation	<ul style="list-style-type: none"> <li>• Dr Xiang Dongyun, Deputy Director, Guangxi Forest Research Institute</li> <li>• Peng Zhenghong, Division Director, Guangxi Forestry Department Division of Science-technology and International Cooperation</li> <li>• Numerous other scientists and students from the Guangxi Forest Research Institute</li> </ul>
			dinner	Dinner with representatives of the Guangxi Forest Research Institute and Guangxi Forestry Department	<ul style="list-style-type: none"> <li>• Dr Xiang Dongyun, Deputy Director, Guangxi Forest Research Institute</li> <li>• Peng Zhenghong, Division Director, Guangxi Forestry Department Division of Science-technology and International Cooperation</li> </ul>

Location	Date	Day	Time	Agenda	Details
	27	Thur	am 1	Travel Nanning to Dongmen by Car	<ul style="list-style-type: none"> <li>Travel</li> </ul>
			am 2	Inspection of Dongmen plantation trials, nursery, tissue culture lab, and veneer processing facilities	<ul style="list-style-type: none"> <li>Mr Huang Xize, Deputy Manager, Dongmen Forest Farm</li> <li>Mr Shen Wen Hui, Deputy Manager Research, Dongmen Forest Farm</li> </ul>
			Lunch	Lunch with representatives of Dongmen Forest Farm	<ul style="list-style-type: none"> <li>Mr Huang Xize, Deputy Manager, Dongmen Forest Farm</li> <li>Mr Shen Wen Hui, Deputy Manager Research, Dongmen Forest Farm</li> </ul>
			pm	Travel Dongmen to Beihai by car	<ul style="list-style-type: none"> <li>Travel</li> </ul>
			Dinner	Dinner in Beihai	<ul style="list-style-type: none"> <li>Free dinner</li> </ul>

Location	Date	Day	Time	Agenda	Details
Beihai	28	Fri	am 1	Travel Beihai to Shankou by car	<ul style="list-style-type: none"> <li>Travel</li> </ul>
Shankou			am 2	Inspect Stora Enso plantations and nursery	<ul style="list-style-type: none"> <li>Mr Urmas Kyro, Senior Manager Field operations, StoraEnso</li> <li>Mr Markku Temmes, Senior Manager Nursery, StoraEnso</li> </ul>
			lunch	Lunch with representatives of Stora Enso	<ul style="list-style-type: none"> <li>Mr Urmas Kyro, Senior Manager Field operations, StoraEnso</li> <li>Mr Markku Temmes, Senior Manager Nursery, StoraEnso</li> </ul>
			pm 1	Travel Shankou to Zhanjiang by car	<ul style="list-style-type: none"> <li>Travel</li> </ul>
Zhanjiang	28		am	<p>Inspection of Chinese Academy of Forestry nursery</p> <p>Presentation to scientists from the China Eucalypt Research Centre, CAF Nursery and Zhanjiang Forest Research Institute and managers from the Leizhou Forestry Bureau</p>	<ul style="list-style-type: none"> <li>Prof Yang Minsheng, Director, China Eucalypt Research Centre.</li> <li>Prof Xie Yaojian, Deputy Director, China Eucalypt Research Centre.</li> <li>Prof Chen Shaoxiong, China Eucalypt Research Centre.</li> <li>Mr Peng Yan, China Eucalypt Research Centre.</li> <li>Dr Luo Jian Zhong, Tree Breeder, China Eucalypt Research Centre</li> <li>Mr Xu Fang Hong, Director, Zhanjiang Forest Research Institute.</li> <li>Mr Fang Liang, Deputy Director, Zhanjiang Forest Research Institute.</li> <li>Prof Mo Xiaoyong, Chief Engineer Leizhou Forestry Bureau.</li> <li>Mr Martin Van Bueren, Research Economist CIR</li> <li>Numerous scientists and students from the China Eucalypt Research Centre</li> </ul>
			dinner	<p>Dinner with representatives of the China Eucalypt Research Centre, CAF Nursery and Zhanjiang Forest Research Institute</p>	<ul style="list-style-type: none"> <li>Prof Yang Minsheng, Director, China Eucalypt Research Centre.</li> <li>Prof Xie Yaojian, Deputy Director, China Eucalypt Research Centre.</li> <li>Prof Chen Shaoxiong, China Eucalypt Research Centre.</li> <li>Mr Peng Yan, China Eucalypt Research Centre.</li> <li>Dr Luo Jian Zhong, Tree Breeder, China Eucalypt Research Centre</li> <li>Mr Xu Fang Hong, Director, Zhanjiang Forest Research Institute.</li> <li>Mr Fang Liang, Deputy Director, Zhanjiang Forest Research Institute.</li> <li>Prof Mo Xiaoyong, Chief Engineer Leizhou Forestry Bureau.</li> <li>Mr Martin Van Bueren, Research Economist CIR</li> </ul>



Location	Date	Day	Time	Agenda	Details
Zhanjiang		Sat	am	Inspection of Leizhou Forestry Bureau plantations and nursery	<ul style="list-style-type: none"> <li>• Prof Mo Xiaoyong, Chief Engineer Leizhou Forestry Bureau.</li> <li>• Dr Peng Shi Yao, Leizhou Forestry Bureau</li> <li>• Dr Yang Guo Quing, Leizhou Forestry Bureau</li> </ul>
			Lunch	Lunch with representatives of the Leizhou Forestry Bureau and Zhanjiang South Forestry Project Quality Supervision Co Ltd	<ul style="list-style-type: none"> <li>• Prof Mo Xiaoyong, Chief Engineer Leizhou Forestry Bureau.</li> <li>• Mr Qi Shu Xiong, Chairman, and Zhanjiang South Forestry Project Quality Supervision Co Ltd</li> </ul>
Guanzhou			pm	Drive Leizhou to Guanzhou	<ul style="list-style-type: none"> <li>• Travel</li> </ul>
			Dinner	Dinner in Guanzhou	<ul style="list-style-type: none"> <li>• Free dinner</li> </ul>

Location	Date	Day	Time	Agenda	Details
Guanzhou	30	Sun	am	Free	<ul style="list-style-type: none"> <li>• Free</li> </ul>
			Lunch	Lunch en route to airport with scientists from Centre for International Forestry Research (CIFOR) and RITF	<ul style="list-style-type: none"> <li>• Dr Unna Chokkalingam, CIFOR</li> <li>• Dr Zhou Zai Zhi, Research Institute of Tropical Forestry</li> </ul>
Zhengzhou			pm	Fly Guanzhou to Xianzhou Drive to Zhengzhou	<ul style="list-style-type: none"> <li>• Travel</li> </ul>
			Dinner	Dinner with representatives of various Fujian Agricultural, Forestry and commercial organisations	<ul style="list-style-type: none"> <li>• Prof Wang Shao Feng, Director, Fujian Subtropical Horticultural Botany Research Centre</li> <li>• Mr Chen Yan Hua, Rusun and China Young Entrepreneurs Association</li> <li>• Mr Guan Qiyang, Vice Director, Fujian Science and Technology Department, Fujian Subtropical Horticultural Botany Research Centre</li> <li>• Wu Yi, Director, Science and Technology, Fujian Forest Bureau</li> </ul>

**C O M M E R C I A L I N C O N F I D E N C E**

Location	Date	Day	Time	Agenda	Details
Zhengzhou		Mon	am	Inspection of Zhengzhou forest plantations	<ul style="list-style-type: none"> <li>• Wan Jin Sui, Vice Director of Changtai County, Fujian Forestry Department</li> <li>• Wu Yi, Director, Science and Technology, Fujian Forest Bureau</li> </ul>
			Lunch	Lunch with representatives of the Zhengzhou Municipal Government and Zhengzhou Forestry Bureau	<ul style="list-style-type: none"> <li>• Ms Yu Ai Lian, Executive Vice Governor, Changtai County</li> <li>• Wan Jin Sui, Vice Director of Changtai County, Fujian Forestry Department</li> <li>• Wu Yi, Director, Science and Technology, Fujian Forest Bureau</li> </ul>
			pm	Drive Zhengzhou to Fuzhou	<ul style="list-style-type: none"> <li>• Travel</li> </ul>
Fuzhou			Dinner	Dinner with representatives of the Fujian Provincial Forestry Department	<ul style="list-style-type: none"> <li>• Mr Guosheng Yuan, Vice Director, Fujian Provincial Forestry Department</li> <li>• Ms Cheng Wenzhou (Wendy) Section Chief Interpreter, Fujian Forestry Department Foreign Affairs and Economy Office</li> <li>• Wu Yi, Director, Science and Technology, Fujian Forest Bureau</li> <li>• Mr Yuan He Sheng, Chief of Foreign Co-operation, Fujian provincial Forestry Department.</li> </ul>

Location	Date	Day	Time	Agenda	Details
	31	Tue	am	Meeting with representatives of the Provincial Forestry Department and Fujian Research Institute of Forestry	<ul style="list-style-type: none"> <li>• Mr Huang Jianxing, Director General, Fujian Provincial Forestry Department</li> <li>• Mr Yuan He Sheng, Chief of Foreign Co-operation, Fujian Provincial Forestry Department</li> <li>• Mr Hersheng Lan, Fujian Provincial Seed and Seedling Station</li> <li>• Wu Yi, Director, Science and Technology, Fujian Forest Bureau</li> <li>• Dr Yang Zongwu, Deputy Director, Fujian Research Institute of Forestry</li> </ul>
			lunch	Lunch with representatives of the Provincial Forestry Department and Fujian Research Institute of Forestry	<ul style="list-style-type: none"> <li>• Mr Huang Jianxing, Director General, Fujian Provincial Forestry Department (briefly)</li> <li>• Mr Yuan He Sheng, Chief of Foreign Co-operation, Fujian Provincial Forestry Department</li> <li>• Mr Hersheng Lan, Fujian Provincial Seed and Seedling Station</li> <li>• Wu Yi, Director, Science and Technology, Fujian Forest Bureau</li> <li>• Dr Yang Zongwu, Deputy Director, Fujian Research Institute of Forestry, CAF</li> </ul>
			pm	Presentation to scientists from the Fujian Research Institute of Forestry, Chinese Academy of Forestry	<ul style="list-style-type: none"> <li>• Dr Yang Zongwu, Deputy Director, Fujian Research Institute of Forestry</li> <li>• Mr Chen Bihua, PhD Student</li> <li>• Numerous other scientists and students from the Fujian Research Institute of Forestry</li> </ul>
			Dinner	Dinner with representatives of the Fujian Research Institute of Forestry and Fujian provincial Forestry Department.	<ul style="list-style-type: none"> <li>• Dr Yang Zongwu, Deputy Director, Fujian Research Institute of Forestry</li> <li>• Wu Yi, Director, Science and Technology, Fujian Forest Bureau</li> <li>• Mr Yuan He Sheng, Chief of Foreign Co-operation, Fujian provincial Forestry Department.</li> </ul>

Location	Date	Day	Time	Agenda	Details
	2	Wed	am	Travel to Fuzhou airport by car	• Travel
			pm	Fly Fuzhou to Beijing	• Travel
			Dinner	Dinner with representatives of DiaMed China Ltd and Zhuhai Biomed Co Ltd	<ul style="list-style-type: none"> <li>• Mr Neil Sutherland, Managing Director, DiaMed China Ltd</li> <li>• Mr Li Ye, General Manager, Zhuhai Biomed Co Ltd</li> </ul>

Location	Date	Day	Time	Agenda	Details
Beijing	3	Thurs	am	Meeting with representatives of PSY Pty Ltd and Henan Province Bureau of Agriculture	<ul style="list-style-type: none"> <li>• Dr Peter Yau, Managing Director, PSY Pty Ltd</li> <li>• Prof Chen Shenyi, Chief Scientist, Peking University and Da Bei S&amp;T Development Co.</li> <li>• Mr Wei, Bureau of Agriculture, Henan Province</li> <li>• Mr Gao Xiao Yang</li> </ul>
			Lunch	Lunch in Beijing	• Free lunch
			pm 1	Meeting with representatives of the Ministry of Agriculture	<ul style="list-style-type: none"> <li>• Assoc. Prof Zhen Yichun, Director President, National Farmer's Science and Technology Training Centre, Ministry of Agriculture.</li> <li>• Mr Zhu Wenjunm Director, Senior Agronomist, National Farmer's Science and Technology Training Centre, Ministry of Agriculture.</li> <li>• Mr Wu Guoqiang, Director, Audio Visual Publishing House, National Farmer's Science and Technology Training Centre, Ministry of Agriculture.</li> </ul>
			Dinner	Dinner in Beijing	• Free dinner

**C O M M E R C I A L   I N   C O N F I D E N C E**

Location	Date	Day	Time	Agenda	Details
Beijing	4	Fri	am	Presentation to scientists from Chinese Academy of Forestry, and Beijing Forestry University.	<ul style="list-style-type: none"> <li>• Prof Wang Houran, Research Institute of Forestry, Chinese Academy of Forestry.</li> <li>• Prof Meng-Zhu Lu, Vice Director, Research Institute of Forestry, Chinese Academy of Forestry.</li> <li>• Numerous other scientists and students from the Research Institute of Forestry, Chinese Academy of Forestry and Beijing Forestry University.</li> </ul>
			Lunch	Lunch meeting with representatives of the Dalian Forest Administration Bureau	<ul style="list-style-type: none"> <li>• Mr Wang Xiuyun, Dalian Forest Administration Bureau</li> <li>• Ms Wang Changxun, Dalian Forest Administration Bureau</li> </ul>
			pm	Meeting with representatives of China Cotton Industries Ltd	<ul style="list-style-type: none"> <li>• Mr Qi Husheng, Chairman President, China Cotton Industries Group.</li> <li>• Mr Nan Quan, Vice President and Manager of International Marketing Division, China Cotton Industries Ltd.</li> </ul>
			Dinner	Dinner with representatives of the Research Institute of Forestry and Chinese Society of Forestry.	<ul style="list-style-type: none"> <li>• Prof Wang Houran, Research Institute of Forestry, Chinese Academy of Forestry.</li> <li>• Mr Zheng Xiangwei, Deputy Director, International Department, Chinese Society of Forestry.</li> </ul>



Location	Date	Day	Time	Agenda	Details
	5	Sat	am/pm	Visit Great Wall Visit Summer Palace	<ul style="list-style-type: none"> <li>Mr Wang, Ministry of Agriculture</li> </ul>
			Dinner	Dinner with scientists from Centre for International Forestry Research (CIFOR)	<ul style="list-style-type: none"> <li>Christian Cossalter, Senior Forestry Specialist, Centre for International Forestry Research (CIFOR)</li> <li>Keith Barney, Senior Forestry Specialist, Centre for International Forestry Research (CIFOR)</li> <li>Christopher Barr, CIFOR</li> </ul>
	6	Sun	am	Drive to Beijing airport	<ul style="list-style-type: none"> <li>Travel</li> </ul>
			pm	Depart Beijing/Capital Airport 15:50, Dragonair KA909	<ul style="list-style-type: none"> <li>Travel</li> </ul>
	7	Mon	am	Arrive Brisbane	<ul style="list-style-type: none"> <li>Travel</li> </ul>

## APPENDIX 2: SCIENTIFIC TECHNICAL PRESENTATION