ITTO PD 386/05 Rev.1 (F)

TECHNOLOGICAL DEVELOPMENT FOR THE PRODUCTION OF PLANTING MATERIALS TO SUPPORT SUSTAINABLE PLANTATION OF BALI INDIGENOUS SPECIES THROUGH COMMUNITY PARTICIPATION

REPORTING ACTIVITY 1.3 COMPARATIVE STUDY ON PROPAGATION TECHNIQUES TO QUEENSLAND, AUSTRALIA

PREPARED BY:
PROJECT EXECUTING TEAM

BALI PROVINCIAL FORESTRY SERVICE
REGIONAL TREE SEED CENTER FOR BALI AND NUSA TENGGARA
INTERNATIONAL TROPICAL TIMBER ORGANIZATION

2009

Reporting
Activity 1.3. Comparative study on propagation techniques to Queensland, Australia

Project Executing Team ITTO PD 386/05 Rev.1(F)

Bali Provincial Forestry Service and
Regional Tree Seed Center for Bali and Nusa Tenggara and
International Tropical Timber Organization
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SUMMARY

The comparative study on propagation techniques to Queensland, Australia started on Tuesday, 7 August, 2007. The nine-day tour was organized by ITTO Project PD 386 and facilitated by ENSIS, joint forces of CSIRO and SCION.

The main objective of the tour is to see and learn propagation techniques of forestry species, tree improvement experiments of softwood and hardwood species, silviculture practices, and nursery operation in Queensland.

Visit to high quality plantation grown from genetically improved planting materials, well-managed propagation and nursery, well-planned silviculture practices learned during the study tour could be very educational and informative to participants. What we learnt is highly valuable to improve planning and implementing activities of ITTO PD 386. We wish to express my sincerely thanks and appreciation to those who made the study tour success.

1. INTRODUCTION

As a part of activity 1.3 the comparative study on propagation techniques to Queensland, Australia started on Tuesday, 7 August, 2007. The nine-days tour was organized by ITTO Project PD 386 and facilitated by ENSIS, joint forces of CSIRO and SCION.

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2. MAIN TEXT

2.1. Participants and Facilitators

Four participants of the study tour are as the following:

1. A.A. Ngurah Buana, Deputy Director for Land and Forest Rehabilitation of Bali Provincial Forestry,
2. I Made Gunaja, Deputy Director for Forestry Development of Bali Provincial Forestry,
3. Magdalena Hehakaya, Project Manager ITTO PD 386/05 Rev.1(F)
4. Djoko Iriantono, Field Coordinator for Planting Materials and Seed Orchard of ITTO PD 386/05 Rev.1(F), Regional Tree Seed Center for Bali and Nusa Tenggara.

The main facilitator of the study tour is Mr. Paul Warburton. He made excellent preparation and arrangement for visit to propagation facilities, many valuable trials, convenience accommodation and transportation. The valuable information was given by Jeremy Brawner, ENSIS; Cameron Smeal, Gelita Australia; Murry Keys, Former Forester of a Queensland Forestry Office; Garry Clark, Land Care.

2.2. Visiting

2.2.1. Planting trials of Ebenezer Mining Company (EMC)

A taxa trial consisting of twenty one species which was randomly planted in 4 replications was established as experiment 391/2a Hwd. The objective of the trial was to find the most suitable and productive species in the marginally mined areas owned by EMC. We learned the different rate of survival and growth and the resistance ability to pest and disease among the species.

(a) (b) (c)

Figure 1. Mined coal reclamation of EMC (a), experiment 391/2a Hwd (b), plantation on mined coal area of EMC.

2.2.2. Planting trials of Gelita Australia Pty Ltd

As part of improving environment quality and timber production, the company and Ensis established a hybrid and taxa trial at its factory land. The company produces gelatine from processing cattle skin at its plant. The treated wastewater produced by its gelatine plant was mainly reused to irrigate grasses and trees grown surrounding the factory. We find out that there is a significant variation among hybrids in term of growth and performances, such as stem and branch form, in both irrigated and non-irrigated trial. We also find out that the variation occurs among species in the taxa trials. We understand that the trials are crucial to select the most suitable species and hybrids for having high productivity planted trees at affluent irrigated-area.

(a)

(b)

Figure 2. Irrigated grass land with treated wastewater at Gelita Company (a), variation within hybrid at a Gelita site(b)

2.2.3. Propagation Facilities and Clonal Arboretum at Nambour

We made a quick visit to propagation house at Maroochy Station and clonal arboretum at Nambour during travel from Brisbane to Gympie. In the propagation house, Ensis developed a propagation technique for cutting. The one part of the house was assigned as multiplication of cutting material, another part was used for production of rooted cutting. In the clonal arboretum, Ensis developed techniques for control pollination of some Eucalypts. The small scale facilities for rooted cutting and control pollination inspire us to make planning for renovation of cutting facilities in Bali.

(a) (b) (c)

Figure 3. Multiplication of cutting materials (a), facilities of rooted cutting (b), clonal arboretum (c)

2.2.4. Hardwood domestication and tree improvement

Hardwood domestication and tree improvement trials in Queensland are mainly aimed to provide a supply of high quality seed (especially for agroforestry and woodlot plantings) and lay the foundation of genetic improvement of the selected hardwood species. We visit quite many trials as the followings:

1. Seedling Seed Orchard (SSO) trial of *Grevillea robusta*, Toolara
2. Provenance Seedling Seed Orchard (PSSO) of *Corymbia variegata*, Tuan State Forest, Maryborough
3. SSO of *Corymbia henryi*, Tuan State Forest, Maryborough
4. PSSO of *Eucalyptus pilularis*, Tuan State Forest, Maryborough
5. PSSO of *Corymbia citriodora* subsp. *variegata*, Baker Logging Area
6. PSSO of *C. citriodora* subsp. *variegata*, Tiaro Forestry Camp
7. PSSO of *C. citiodora* subsp.*variegata*, St Mary State Forest
8. PSSO of *Eucalyptus cloeziana*, St Mary State Forest.

Figure 4. Comparison between good and worse provenance of *Corymbia Variegata* at Tuan State Forest (a); roughing of *C. citriodora* subsp. *variegata* provenance trial to be a SSO at Tiaro Forestry Camp (b)

2.2.5. Softwood domestication and tree improvement

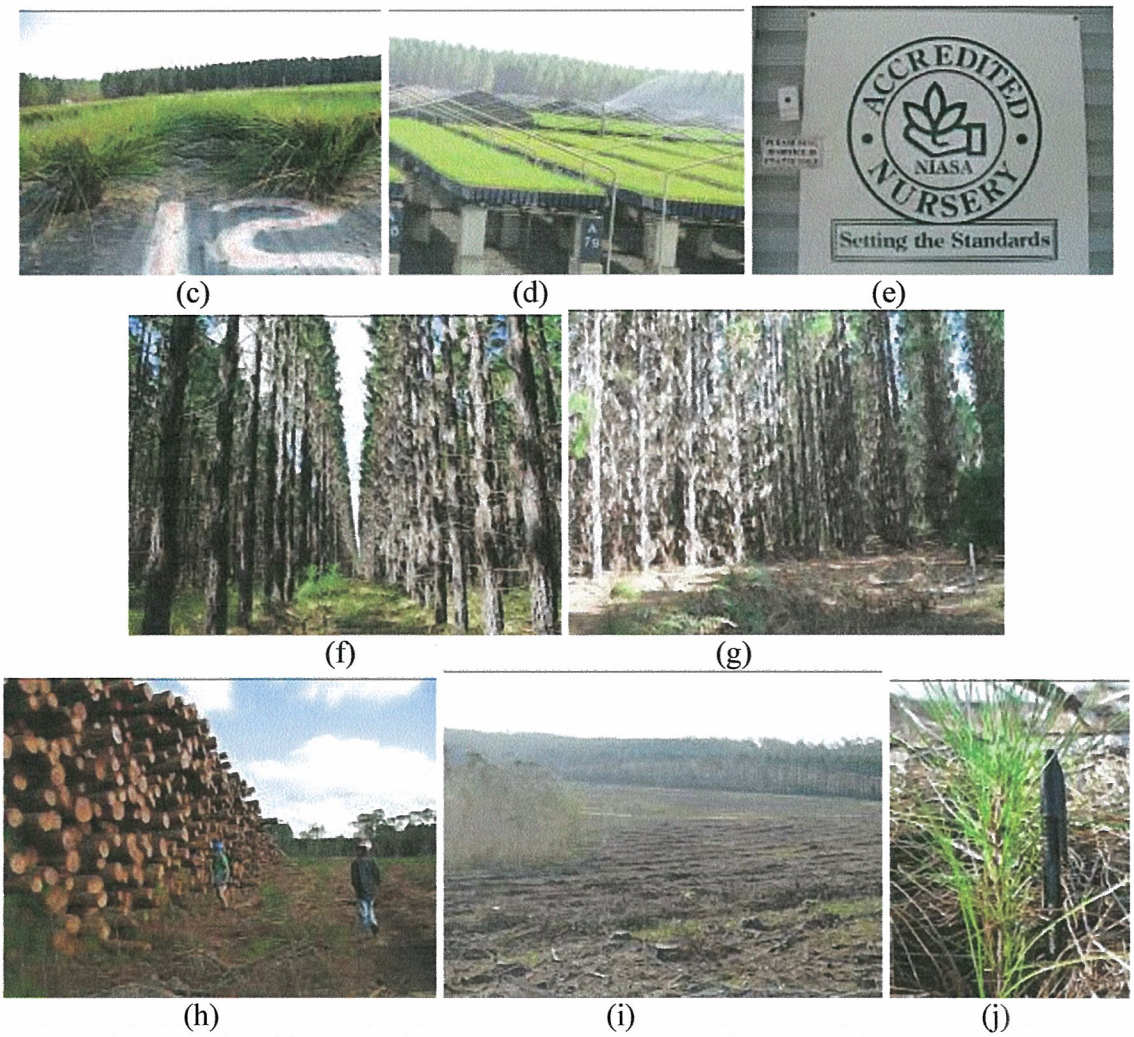
Forestry Plantation Queensland commercially grows softwood species to supply timber in Queensland and other states of Australia. Quite many advanced trials have been established as a part of improving timber productivity of the plantation. We managed to visit as following trials and areas:

1. Unimproved and improved *Pinus caribaea* var. *honduris*, Compartments 89 and 101 North Dempster, SF 1004 Toolara
2. Nursery of Toolara
3. Clonal forest nearby the nursery
4. Experiment 288 GYM Nelder Wheel
5. Experiment 288 Family x Clone Trial
6. Logging area
7. Site preparation for planting.

The trials demonstrates that timber productivity can be significantly increased by growing the best available planting materials (seeds, seedlings or clones), incorporating trial results into silviculture practice, optimizing site preparation, providing good access to forest compartments, and minimized impact logging. Compartments 89 and 1001 indicate that the improved material of *P. caribaea* is almost twice as productive and valuable as the unimproved seed source. The productivity is continuously improved by growing clonally planting materials. We visited the Accreditated Nursery of Toolara supplying the planting materials grown in nearby forest compartments. The 288 experiments are tested on effect of clones, planting distance, and planting material (i.e. seedling and cutting) on survival, growth, stem and branch forms. Visiting those softwood trials, we learn that growing the best available genetic quality significantly improve productivity of forest plantation.

(a)

(b)



(c) (d) (e)

(f) (g)

(h) (i) (j)

Figure 5. Unimproved and improved *Pinus caribaea* var. *honduris* (a and b), clonal planting material (c: hedge orchard, d: cutting propagation, e: accredited nursery), clonal trees (f), Experiment 288 GYM Nelder Wheel (g) logging of planted trees (h), site preparation (i), standard size of seedling (j).

2.2.6. Farm forestry

Land Care is an NGO facilitating communities to grow trees in Noosa. The organization deals with programs relating to farm forestry nursery (propagation services, seed collection, community contribution: staff, volunteers, traineeships), forestry monitoring (landholder feedback, research, education, evaluation), education and training (partnership, workshop), free tree incentive program (site visit, property planning, supply plants), and contracting service (plantation establishment, weed management, erosion mitigation). We visit nursery, wood-lot garden, and commercial tree plantation planed and managed by Land Care.

(a) (b) (c)

Figure 6. Farm forestry program and services provided by Landcare (a: nursery, b: wood-lot garden, c: private plantation)

3. CLOSING

The comparative study tour was very interesting. The nine-day tour to see and learn plantation grown from improved genetic planting materials, well-managed propagation and nursery, well-planned silviculture practices could be very educational and informative to participants. What we learnt is highly valuable to improve planning and implementing activities of ITTO PD 386. We wish to express my sincerely thanks and appreciation to those who made the study tour success