



AusAID Public Sector Linkages Project

Strengthening Capacities in Tree Seed Technologies in Pacific Island Countries

Project Inception Meeting

Held at Tanoa International Hotel, Nadi, Fiji Islands, 19-20 September 2011



Contents

Introduction	1
Agenda and Attendance at the Inception Meeting	2
Key Factors Pertaining to the Pacific Islands Tree Seed Centre Discussed at the Inception Meeting and the Recommendations Made	2
1 Country Needs and Species Priorities.....	2
2 Pacific Islands Tree Seed Centre - Strategy & Action Plan	4
3 Material Transfer Agreement for Forest Genetic Resources	5
4 Seed Technology Training Course Content	5
5 Train PITSC staff at Australian Tree Seed Centre in Canberra	5
ANNEX 1	7
Inception Meeting Agenda.....	7
ANNEX 2	8
List of Participants	8
ANNEX 3	12
Summary of Country Reports	12
1 What tree seed (species and quantities) does your agency collect and/or import annually?	12
2 Does your agency currently share/exchange/market tree germplasm and, if so, what material is traded?	12
3 What, if any, constraints to this trade are caused by Biosecurity issues?.....	12
4 What facilities are used by your agency for seed collection/processing, phytosanitary treatments, seed storage and germination testing?.....	13
5 Highlight any constraints (problems) in your agency in undertaking item 4 (above) including a 'wish list' of facilities/equipment that would make this task more efficient ...	14
6 What system, if any, does your agency employ to keep track of the seedlots collected and their distribution?.....	14
7 Recommend a short list (say up to 5 species) of priority tree species (native and exotic) where there are seed supply problems in your country and you feel that regional help through the SPC Pacific Islands Tree Seed Centre might assist?.....	15
8 PITSC in Solomon Islands	15
ANNEX 4	16
Priority species for the early attention of the Pacific Islands Tree Seed Centre.....	16
ANNEX 5	19
Pacific Islands Tree Seed Centre - Strategy & Action Plan	19

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Prepared by Project Team, CSIRO Australian Tree Seed Centre and Land and Resources Division of the Secretariat of the Pacific Community

26 September 2011

Introduction

AusAID supported Public Sector Linkages Project “Strengthening Capacities in Tree Seed Technologies in Pacific Island Countries”, 1st July 2011 – 30th June 2014, has as its main implementation partners CSIRO Plant Industry and the Secretariat of the Pacific Community (SPC), Land Resources Division, Forest & Trees Program. Other project collaborators are SPCs Centre for Pacific Crops and Trees where the Pacific Islands Tree Seed Centre (PITSC) is based, EU funded Facilitating Agricultural Commodity Trade in Pacific (FACT) project that is supporting two staff positions at PITSC, JICA Regional Forestry Program that is supporting equipment purchase and some buildings for PITSC and ACIAR that is co-sponsoring training in Australia for one PITSC staff. Participating partners are the six focus Pacific Countries of Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu.

Project focus is on strengthening both the Pacific Islands Tree Seed Centre and the national staff responsible for tree germplasm in their respective countries. The aim is to assist PITSC to: (1) establish a well documented collection of high quality seed of PIC’s woody species of high regional importance; (2) facilitate the safe and effective exchange of this tree germplasm within the region; (3) provide information on these species from current knowledge and research undertaken on collection, storage, germination and planting; and (4) assist the individual Pacific Island Countries to implement appropriate seed collection, handling and storage techniques; and to contribute to the safe and effective regional exchange of tree germplasm

These aims and objectives will be addressed through the following series of activities:

Year 1 (2011/2012) (1a) hold a Project Inception Meeting to inform and seek inputs to the project from all collaborators and participating country agencies; (1b) train one PITSC staff at Australian Tree Seed Centre in Canberra in Seed Centre operations and management; (1c) develop a comprehensive ‘Tree Seed Technology’ training course and present the course in one of the focus countries; and (1d) develop a research program to address seed technology issues (germination, storage etc) at PITSC.

Year 2 (2012/2013) (2a) refine comprehensive ‘Tree Seed Technology’ training course based on the experience from the initial delivery of this course in one project country and deliver training course to three project countries; (2b) continue to carry out priority seeds research; (2c) complete and publish a PITSC Manual of Operations commenced during staff training at ATSC in Year 1; and (2d) prepare information on seed-related topics pertaining to priority species for publication on the web and/ or as leaflets as part of the aim of PITSC being an Information Hub for the national centres.

Year 3 (2013/2014) (3a) delivery of the training course to two project countries; (3b) continue to carry out priority seeds research; and (3c) continue collation and publication of seeds-related research on priority tree species as part of the Information Hub activity at PITSC.

The purpose of this report is to serve as a record of the activities undertaken and decisions taken at the Project Inception Meeting in Nadi, Fiji, 19-20 September 2011 (Activity 1a above).

Agenda and Attendance at the Inception Meeting

The Agenda for the Inception Meeting and a list of those attending are given in Annexes 1 and 2.

Presentations to the meeting were to a high standard facilitating focussed discussions and allowing the Agenda to be completed effectively and efficiently in the time available.

Key Factors Pertaining to the Pacific Islands Tree Seed Centre Discussed at the Inception Meeting and the Recommendations Made

1 Country Needs and Species Priorities

Reports from representatives of forestry departments in the six focus countries are summarised in Annex 3. Issues faced by the national tree seed centres and opportunities for the PITSC to assist were identified:

Trade in and sharing of tree germplasm

National tree seed centres were focussed on collecting seed for local tree planting activities. Although there appeared to be ample opportunity for income generation from collecting seed for sale internationally little was happening because of the common, substantial constraints faced by each centre. These constraints were identified as lack of Pest Risk Assessments for forest trees causing bottlenecks with Biosecurity agencies, lack of a Material Transfer Agreement to protect intellectual property rights and lack of funding.

Equipment needs

All countries had rudimentary equipment for seed collection, seed storage and germination testing. Four (Fiji, Solomon Islands, Papua New Guinea and Vanuatu) of the focus countries had walk-in cool rooms, although the cool room in Vanuatu was new and not yet operating. Much of the equipment, however, was old and in urgent need of replacement (e.g. climbing gear) and there was a general lack of funds to do so. Training climbers and personnel in tree seed technology was seen as an urgent universal need. Adoption of a standard computerised seed store management system with paper backup was also seen as a desirable common objective.

Priority tree species

Annex 4 gives a list of PICs priority tree species as developed during earlier meetings discussing species priorities for PITSC attention. Representatives of the focus countries at the Inception Meeting were asked to nominate a short list (5) of their top priority species (see summary in Table 1). This was to identify species that are of interest across multiple countries and these will be the focus of PITSC

Table 1 - Species priorities by country as nominated by participants at Inception Meeting

Species	Fiji	PNG	Samoa	Solomons	Tonga	Vanuatu	Total
Acacia cincinnata		1					1
Acacia mangium		1					1
Acacia simsii		1					1
Agathis macrophylla	1						1
Artocarpus altilis					1		1
Canarium indicum					1	1	3
Cocos nucifera					1		1
Endospermum medullosum	1					1	2
Eucalyptus deglupta				1			1
Eucalyptus pellita			1				1
Flueggea flexuosa	1		1	1			3
Garcinia sessilis					1		1
Intsia bijuga			1				1
Mango					1		1
Manilkara samoensis			1				1
Morinda citrifolia			1				1
Ochroma pyramidale		1					1
Orange					1		1
Pinus caribaea		1					1
Pometia pinnata			1	1			2
Pterocarpus macrocarpus				1			1
Santalum spp.	1	1	1	1	1	1	6
Swietenia macrophylla			1	1		1	3
Syzigium spp.			1				1
Tectona grandis	1	1	1	1		1	5
Terminalia catappa				1		1	2
Terminalia richii			1				1
Vi-apple					1		1
Vitex coffusus				1			1
Xanthostemon melanoxyton				1			1
Grand Total	5	7	11	11	8	6	48

activities in the early years of its operation. The genera/species that were the most nominated were *Santalum* spp (sandalwood) and *Tectona grandis* (teak) followed by *Swietenia macrophylla* (mahogany), *Flueggea flexuosa* [mamafua (Solomon Islands); namamau (Vanuatu); pou (Fiji); poumuli (Samoa, Tonga); poutea (Futuna)] and *Canarium indicum* [galip nut (Papua New Guinea), nangai nut (Vanuatu), ngali nut (Solomon Islands)].

A number of desirable seed exchanges were proposed by participants at the Meeting. They were:
 Mahogany exchange between Solomon Islands and Fiji
 Teak exchange between Papua New Guinea and Solomon Islands
 Vanuatu sandalwood (*S. austrocaledonicum*) for Solomon Islands teak
 Fiji willing to help Tonga with ex-situ conservation of Tongan sandalwood (*S. yasi*)
 Fiji would like to trial Vanuatu whitewood

Samoa would like to trial Solomon Islands *Flueggea flexuosa*.

An opportunity for PITSC and its partner national tree seed centres to join a collaborative research project on *Calophyllum inophyllum* with Forest Tree Breeding Centre, Japan was outlined by Mr Kazutaka Kato from FTBC. He described a breeding and gene pool research project on *C. inophyllum* being undertaken at his Centre in collaboration with Taiwan. FTBC would now like to expand the research of *C. inophyllum* to SPC countries. Objectives of the *C. inophyllum* study at FTBC are, firstly, to investigate and select individuals or families with superior growth, straightness, tolerance to typhoon and good wood quality. Secondly, to unveil gene pools (genetic diversity or differentiation) in circum-pacific area to inform genetic conservation and management in the region.

Mr Kato's request to SPC and its partners was, firstly, exchange of seeds for comparison of growth performance. For the comparison, FTBC would like to collect seeds (20-30 seeds from each 10 mother trees in each country) for selective breeding. Secondly, collect leaf samples to analyze genetic diversity by DNA analysis. For this purpose, FTBC would like to collect leaf samples from 30 natural trees from 10-15 islands. Collaborators will receive improved seed, research results and training from FTBC.

Recommendation

That SPC and PITSC support the national tree seed centres through:

- capacity building/institutional strengthening/knowledge transfer in collection, storage, germination testing and propagation of woody species of national importance,
 - assist in development of proposals for funding for national tree seed centres,
 - facilitate supply and exchange of important woody-plant germplasm including establishing a regionally approved MTA and providing assistance with PRAs and other activities to ensure fair, equitable and safe movement of germplasm between countries.
-

2 Pacific Islands Tree Seed Centre - Strategy & Action Plan

A revised strategy and action plan for the conservation and sustainable use of forest genetic resources in PICTs was developed in 2007. There was consensus amongst Pacific Island delegates who formed the plan that regional cooperation was essential to facilitate the exchange of information and genetic resources within the Pacific Region. Establishment of a regional tree seed centre and relevant programmes under the centre were deemed by delegates to be priority actions agreed in the strategic action plan. The centre was: (a) to assist PICTs to collect and share germplasm of timber, fruit/nut tree and woody-plant species of high regional importance including species of particular importance for their resistance to cyclones, coastal protection and atolls; and (b) to act as a centre-of-excellence providing technical support, training, information and advice to member PICTs in seed technology, propagation techniques and establishment of seed production areas for priority species that are hard to collect from the wild. The Centre now called the Pacific Islands Tree Seed Centre was established by SPC at its Centre for Pacific Crops and Trees (CePaCT), Narere, Fiji in 2010. It is being staffed with the help of EU-FACT and equipped with the assistance of JICA during 2011.

It was a milestone for this meeting to agree on a vision statement, objectives and activities for the new Pacific Islands Tree Seed Centre. These were developed at the Meeting and are presented in Annex 5.

Recommendation

That SPC seek Heads of Forestry (HoAFs) approval for the PITSC Strategy and Action Plan as presented in Annex 5 to this report.

3 Material Transfer Agreement for Forest Genetic Resources

An MTA agreed on by PICTs and supporting fair and equitable exchange of tree germplasm is an essential document as without it there is no legal framework for germplasm exchange throughout the region. Sairusi Bulai of SPC made a point of this in his opening speech to the Meeting and noted that progress in establishing an agreed MTA had been disappointing. It was a milestone of this Meeting to advance the MTA and Cenon Padolina of SPC presented the latest version for the scrutiny of participants. Several useful comments were received and Cenon will now take the document back to the SPC lawyers for amendment.

Recommendation

That once the MTA is amended that SPC seek Heads of Forestry (HoAFs) assistance in gaining Ministerial approval for the MTA within their respective countries.

4 Seed Technology Training Course Content

Paul Macdonell of CSIRO presented an outline of the seed technology training course developed by CSIRO for Greening Australia and presented at a dozen different locations throughout Australia. This course will be the basis for the course given by Paul and Basil Gua of SPC in the six Pacific focus countries but it will need to be amended to suit. There was consensus at the meeting that: (a) Pacific Island tree species should be used as examples to illustrate points in the course wherever possible; (b) it will be necessary to adjust the course for each country to cater for varying levels of experience and education amongst the trainees; (c) the theory component of the course should be reduced and simplified in favour of expanded practical field exercises; and (d) a four- to five- day course duration would be appropriate to allow time for hands-on training with due consideration of weather patterns and fruiting phenology of species required for practical demonstrations of techniques. Country representatives at the Inception Meeting agreed to be the first point of contact for Paul and Basil in planning (content, location, logistics) the training in each country and assessing the effectiveness of the training.

Recommendation

That CSIRO and SPC work with country representatives to amend the course to suit local conditions and decide on location for the training and logistics. Wherever possible knowledge on local tree species should be used to illustrate points in the course to increase relevance.

5 Train PITSC staff at Australian Tree Seed Centre in Canberra

Cenon Padolina reported that a new staff member, the seed technician at PITSC Narere, could be appointed as early as October 2011. This technician is to receive one-month of seed technology training at ATSC, Canberra under funding from this project, while PITSC OIC, Basil Gua, will be

funded to ATSC under arrangements between ACIAR and EU-FACT. Bronwyn Clarke advised that February 2011 would be an appropriate time for the training to take place at ATSC.

Recommendation

That PITSC staff (2) be invited to commence their one-month traineeship in tree seed technology at CSIRO ATSC Canberra in February 2011.



Australian Government
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ANNEX 1
AusAID PSLP Project
Strengthening Capacities in Tree Seed Technologies in
Pacific Island Countries

Inception Meeting – 19-20 September 2011, Nadi, Fiji Islands Agenda

Monday, 19 September 2011:

8:30 – 9:00am	Devotion (TK) Welcome Remarks (SB) Any housekeeping matters (CP)
9:00 – 10:00am	Introduction to project and what is to be achieved by this meeting (BC)
10:00 – 10:30am	Morning tea and group photo
10:30 – 12:00am	Brief country reports (15 min plus 5 min for questions x 6 countries)
12:00 – 12:30pm	Basil Gua – Pacific Islands Tree Seed Centre current activities
12:30 – 1:30pm	Lunch
1:30 – 2:00pm	Mr Kato – Japanese Project on <i>Calophyllum inophyllum</i>
2:00 – 3:00pm	Group (2) discussions on the vision, objectives and activities of Pacific Islands Tree Seed Centre including priority species for initial work (JD)
3:00 – 3:30pm	Afternoon tea
3:30 – 5:00pm	Groups report on Strategy and Action Plan for Pacific Islands Tree Seed Centre

Tuesday, 20 September 2011:

8:30 – 9:00am	Continuation of previous days discussions and completion of priority species list and Strategy and Action Plan for Pacific Islands Tree Seed Centre (BC)
9:00 – 9:30pm	Background to setting up of Pacific Islands Tree Seed Centre and presentation of Materials Transfer Agreement under which the Pacific Islands Tree Seed Centre will operate for comments (CP)
9:30 – 10:30am	Description of proposed Seed Technology Training Course based on Australian model (PM)
10:30 – 11:00am	Morning tea
11:00 – 12:30pm	General discussion on modifications to training course to make it relevant to Pacific Island countries and experiences (e.g. approvals to collect, highlight examples from Pacific trees where possible and who can provide this data)
12:30 – 1:30pm	Lunch
1:30 – 2:00pm	Country Report from Samoa (MP)
2:00 – 3:30pm	Course organisation and logistics in each country including staff of other agencies who might attend (BC/PM)
3:30 – 4:00pm	Afternoon tea
4:00 – 5:00pm	Finalise recommendations to Technical Meeting and wrap up any outstanding business (BC)

ANNEX 2

Inception Meeting on “Strengthening Capacities in Tree Seed Technologies in Pacific Island Countries”

19-22 September 2011, Tanoa International Hotel, Nadi, Fiji

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ANNEX 3

Summary of Country Reports

1 What tree seed (species and quantities) does your agency collect and/or import annually?

Fiji - 2,102 kg seed collected in the last five years (av. 420 kg/yr), mostly mahogany (1,639 kg)

PNG – seed of 33 species of 14 genera regularly collected by National Tree Seed Centre, Bulolo in quantities from 1 kg to 1,000 kg (*Araucaria* spp.)

Samoa - The Forestry Division-Samoa is continuing collecting seeds of native trees for local nurseries. Mahogany is the only exotic species the Samoa Forestry is collecting locally from stands that have been established within the last twenty years either as community woodlots or as a forest plantation. Samoa Forestry is not importing any seedlot from overseas for large scale production or for commercial use.

Solomon Islands – Annual collection 1,500 kg of *Tectona grandis*, 200 kg – 300 kg of *Swietenia macrophylla*, 2 kg of *Eucalyptus deglupta*. Small quantities of *Gmelina arborea*, *Gmelina mollucana*, *Terminalia brasii*, *Calophyllum perkellii*, *Flueggea flexuosa*, *Cordia subcordata*, *Cedrella odorata* collected on request. *Paraserianthes falcataria* - only small amounts collected annually depending on request, collection of the species depends on manpower availability and seed sources. Demand for local provenance is very high, however collection & processing in large quantity needs manpower.

Tonga – Imported tree seeds include Pine seeds - 2kg/year; Fruit Trees (2008 – 2010), local :40, imported :25, 500 planting materials per year. Imported fruit trees include pomegranate, ice-cream bean, yellow rambutan, red rambutan, yellow pitaya, red pitaya, grumichama, beach cherry, granadilla, sweet kumquat, abiu, miracle fruit, lychee varieties (3), mulberry, tangelo, pomelo, purple and yellow mangosteen, South American sapote, canarium nut. Local indigenous collections include breadfruit varieties (6), mangoes (2), orange, avocado (2), soursop, vi-apple, mandarin, custard apple, Pacific lychee (2), bush lemon and malay apple. Of these planting materials 70% - seeds, 15% - marcotted (air layering), 10% - cuttings / root suckers and 5% - grafted

Vanuatu – A total 495 kg of tree seed were collected in 2010 comprising sandalwood 98 kg, whitewood 82 kg, *Canarium indicum* 126 kg, *Terminalia catappa* 5 kg, mahogany 181 kg.

2 Does your agency currently share/exchange/market tree germplasm and, if so, what material is traded?

Fiji - 66 kg of seed traded in last five years including 36 kg of mahogany seed to Australia, Samoa and Vanuatu

PNG - seeds of different tree species have been exchanged, shared and marketed to both overseas and national researchers, seed buyers and for plantations.

Samoa - Samoa Forestry does not engage in any germplasm exchange at the moment.

Solomon Islands – Past exchange of the following has taken place - *Terminalia brasii*, *Tectona grandis*, *Swietenia macrophylla*, *Flueggea flexuosa*, *Canarium indicum*, *Paraserianthes falcataria* and *Terminalia catappa*. At the moment, we do not import any seeds from outside but we would like to if possible get some sandalwood for trial purposes.

Tonga - No trade, relied on import of grafted materials to meet project objectives but very expensive, therefore relied on imported seeds instead.

Vanuatu - No formal share/trade/exchange of germplasm since SPRIG Project, although VDoF is aware of exchange of local *Santalum austrocaledonicum* seeds for Tamarind seeds from Fiji.

3 What, if any, constraints to this trade are caused by Biosecurity issues?

Fiji - PRA evaluation required by a qualified agency (Fiji lacks expertise & capacity in this area); “Phytosanitary certificate “ must accompany seed; tree species listed in the Endangered and Protected Species Act 2002 and in the CITES list cannot be traded unless prior approval is sorted from DoE and

material must be strictly used for research purposes only; management of quality during the transferring process; method of packaging; and correct treatments as required by other countries with specified chemicals.

PNG - None at present, but this will become more apparent in future and therefore regional and national policy and management strategies need to be developed to address the biosecurity issues as they may become a serious constraint to future germplasm trade.

Samoa - Since Samoa Forestry does not engage in seed exchange/trade at the moment, thus we are not experiencing any constraint at this issue. However, the only constraint that we have heard from the private sector (WIBI) was trying to import seed of *Canarium* from Vanuatu requiring an Impact Assessment (IA) which took many months to completed.

Solomon Islands - Seed trade could be hampered by Bio-security issues.

Tonga - Legal procedures in applying for Import Permit carefully adhered to when importing fruit tree planting materials; Facts sheets / brief information on species planting material attached to application.

Vanuatu - Biosecurity issues still remain a constraint to movement of germplasm; Seeds are probably easier to move than cuttings and seedlings eg eaglewood cuttings; the main issue is the process.

4 What facilities are used by your agency for seed collection/processing, phytosanitary treatments, seed storage and germination testing?

Fiji - use tree climbing gear for seed collection; have seed lab for seed processing and seed germination testing

PNG - Seed Collection use ladder and pole hook, tree climbing set, sling shot, gloves and bags; Seed Processing use wire sieves manual depulper, electric fans, seed extraction machine, cement mixer, seed X-ray machine dehydrating oven; Phytosanitary Treatments use naphthalene balls of powder (1-2 balls per kg of seeds), copper powder used for overseas despatches; Seed Storage in air tight plastic containers, jars and bags in storage environments of +25°C aircon shelved room, container fridges (+3.5°C) and deep freezer (-12°C); Germination Tests by direct sowing, in petri dish with moist tissue paper using distilled water, seed X-ray machine

Samoa - Samoa Forestry is collecting seeds from trees using climbing aids followed by simple manual seed cleaning, drying and then storing in the refrigerator. There is no facilities to carry out phytosanitary treatments except the Quarantine Service that has the facility. Seed testing is done by using peatmoss.

Solomon Islands - Qualified tree climbers; Seed processing currently done manually for major plantation species; Phytosanitary treatments- currently use Captain A; Apply normal quarantine check prior to seed dispatch to overseas (sometimes depend on importing countries for quarantine requirements) so far no problems encountered; Seed cold storage facility in Munda & Honiara for preserving seed viability; Germination testing can be done by use of Agar Test for delicate & small seeds; Most practical method is by using sterile river sand as our germination media; Besides, Coir Fibre and loam top soil are equally available as our germination medium.

Tonga - Seeds locally collected left for 2 days, washed and dried in cool shady area for one night, packed in tight sealed bag, stored in refrigerator ready for sowing or sending to outer islands. Imported seeds applied with phytosanitary treatments from sender, Tonga Quarantine would not accept any imported seeds without their phytosanitary requirements. Imported seed stored in tight sealed plastic bags with non-living germinating media, Seeds that germinate quickly such as lime are planted immediately; Mangoes can be stored in refrigerator for later planting.

Vanuatu - VDoF does not use any phytosanitary treatments in treating seeds; Recently completed a seed storage facility (walk in cold room), but other components still outstanding; No specific germination treatments, except tests on sandalwood seeds with GA and prickling and cracking of canarium nuts.

5 Highlight any constraints (problems) in your agency in undertaking item 4 (above) including a ‘wish list’ of facilities/equipment that would make this task more efficient

Fiji - Lack capacity in PRA; shortage of certified tree climbers for seed collection; need to upgrade facilities for viability testing and seed storage; periodic fruiting upsets seed collection program; and database management.

“Wish List” Database to be developed for documentation of all seed data (seed collection, seed processing, seed-lot serial numbering, seed storage, seed testing [moisture & viability], distribution, export & sales; computer for data storage; certified tree climbers; seed germination testing facility; seed drying facility; seed laboratory facility to be improved; and seed treatment facility (use of CO₂).

PNG - Lack of adequate funding; new climbing gear sets; seed thresher machine; transport; a new - 12°C large container fridge; new Germination shed (greenhouse);nursery with several stand-out seed beds; chemicals for testing seed viabilities

Samoa - Forestry Samoa requires a small seed lab with all equipment that is required to undertake all seed handling, processing, testing, storage and phytosanitary treatments. In addition, training on seed technology and handling is very much needed for forestry (Research) staff in order to perform the task more efficiently.

Solomon Islands –All climbing equipment required as well as training of climbers, need for laboratory equipment, stand-by generator, oven drier (moisture content test) and metric balance for weighing small amounts of seeds e.g. *Eucalyptus deglupta* seeds.

Tonga – Wish List includes GPS, watering tools for germinating seeds in nursery beds, seed collection and grafting tools.

Vanuatu - Seed storage facility not completely ready; Needs equipment required for germination tests; Need good seed season to operate the facility; Need information on germination techniques and germination test from others; Seed germination treatments seemed no different from normal sowing – just need right environmental conditions (& mature) to germinate.

6 What system, if any, does your agency employ to keep track of the seedlots collected and their distribution?

Fiji - Seed register - 01/11/F; Serial number; Species; Date received; Country of origin; Location; and Total weight (dry/processed weight). Seed storage labeling – S/N 01(11)F(C) date, species, MC av %, germination % & total weight.

Distribution – Tally card to keep track of seed stock available

PNG - Seed data base with computer – newly established for data entry; also manual - cards. Under these two systems, records of tree species, quantity, collection dates, seed lots, distribution and viability/germination tests are recorded.

Samoa - This is one of the areas in Samoa Forestry that needs to be improved. There is no proper system in place to keep track of seedlots collected and their distributions. Capacity building for research staff is very much needed in this area of the Forestry Samoa which needs to have one staff trained purposely for seed technology and book keeping (record keeping).

Solomon Islands – Comprehensive details are recorded on each collection.

Tonga - EXCEL spreadsheet database is used to keep track of all seeds collected and distributed.

Vanuatu - No good system in place to track origin of seeds and its distribution; VDoF collects and distribute seeds and seedlings; Resource owners collect and distribute the same; This puts the quality of materials distributed being unknown.

7 Recommend a short list (say up to 5 species) of priority tree species (native and exotic) where there are seed supply problems in your country and you feel that regional help through the SPC Pacific Islands Tree Seed Centre might assist?

Fiji - Poumoli *Flueggea flexuosa*; Pacific Kauri *Agathis macrophylla*; Yasi *Santalum yasi*; Teak *Tectona grandis*; Whitewood *Endospermum medulosum*

PNG – *Acacia* spp. as provenances remote and expensive to sample in PNG and expensive to purchase from Australia (e.g. *A. cincinnata*, *A. simsii*) also *Pinus caribaea* as in great demand and seed orchards at low altitude are not producing. Financial assistance required to establish seed orchards and acquire seed.

Samoa - *Terminalia richii*; *Manilkara hoshinoi (samoensis)*; *Flueggea flexuosa*; *Swietenia macrophylla*; *Tectona grandis*

Solomon Islands - *Tectona grandis* - satisfactory local seed sources - to achieve targets depend on fruiting season. *Swietenia macrophylla* - sources available however need to make some improvements, problem with shoot borers in some places. *Eucalyptus deglupta* - currently being tested on progeny trials and hopefully in the future we will have improved quality seeds. The next step forward is to go into tissue culture which certainly would need some help. Some work on vegetative propagation been carried out on teak and *Eucalyptus deglupta* but could only be practical where power supply is available.

Paraserianthes falcataria is in high demand especially from Asian countries because of its growth performance. Request for large quantities of seeds received but unable to meet demand due to manpower shortage as well as seed sources become scarce. The processing of this species is time consuming as seed is extracted manually. This species has the potential for overseas market hence seed sources need to be established now for future improved seed source.

Tonga - Food Security – breadfruit, orange, mangoes, vi-apple; Export potential – breadfruit, orange, coconut; Regeneration management – orange, coconut

Vanuatu – The PITSC could help VdoF by assisting in completing the seed facility, by providing storage and germination test equipment; training in seed handling and storage; provide updated information on seed storage.

8 PITSC in Solomon Islands

Basil Gua, OIC PITSC, who was based initially in Solomon Islands for SPC before transfer to Fiji early next year, reported on species he was concentrating on collecting in Solomon Islands for conservation and sharing with local collaborators. They were *Canarium indicum*, *Xanthostemon melanoxyton*, *Terminalia catappa*, *Pterocarpus macrocarpus*, *Tectona grandis*, *Eucalyptus deglupta*, *Swietenia macrophylla* and *Vitex coccifera*. These were added to the priority list (Table 1). Already 46 trees on Guadalcanal, 24 trees on Kia Isabel Province and 56 trees from Choiseul have been collected. Plans for the *Xanthostemon melanoxyton* and *Terminalia catappa* are well underway.

The seeds collected will be used for genetic conservation plot establishment, to supply seed/ seedlings to EU FACT partner enterprises, for exchange with other Pacific countries e.g. *Canarium* to the Samoan women's group and Vanuatu forestry department, and to local tree growers for private plantation establishment especially members of the Nut Growers Association of Solomon Islands (NGASI).

ANNEX 4

Priority species for the early attention of the Pacific Islands Tree Seed Centre

- as discussed at earlier planning meeting. Species are group by seed type i.e. orthodox, intermediate and recalcitrant

Species	Occurrence	Primary Uses	Seed Type	Propagation	Notes	Priority
<i>Alphitonia zizyphoides</i> (toi)	Widely dist. In South Pacific islands	Multipurpose, windbreak, timber, fuelwood, traditional medicine	orthodox	Seed germinate readily and seed stores well		
<i>Casuarina equisetifolia</i> (beach she-oak)	Widely dist. in Pacific, also elsewhere	Multi-purpose, coastal stabilisation	orthodox	Fresh seed germinate readily	Candidate for vegetative propagation	
<i>Cordia subcordata</i> (island walnut)	Widely dist. in Pacific, also elsewhere	wood for crafts, coastal stabilisation etc.	orthodox	Propagated from seed		
<i>Endospermum</i> spp. esp. <i>E. medullosum</i> (whitewood)	Widely dist. in Pacific, also elsewhere	timber, multi-purpose	variable depending on species but seed often has short storage life	Fresh seed germinate readily	Candidate for vegetative propagation	3
<i>Eucalyptus</i> species especially <i>E. deglupta</i> (kamarere)	Papua New Guinea, Philippines, Indonesia, Irian Jaya	timber	orthodox (short lived at room temp)	Fresh seed germinate readily	Improved material available from Papua New Guinea	
<i>Flueggea flexuosa</i> (poumuli)	Philippines to Vanuatu, exotic in Samoa and elsewhere	timber, multi-purpose	orthodox	Propagated from seed	Superior provenance sources from Solomon Islands	2
<i>Hibiscus tiliaceus</i> (beach hibiscus)	Pantropical	Craft wood, fuelwood, fibre, medicinal	orthodox	Fresh seed germinate readily, however, the most common method of propagation is branch cuttings for living fences	Known varieties are available in horticulture	
<i>Intsia bijuga</i> (kwila)	Widely dist. in Pacific, also elsewhere	timber, multi-purpose	orthodox	Propagated using scarified seed		
<i>Paraserianthes falcataria</i> (syn. <i>Albizia falcataria</i>)	Philippines to Solomon Islands	Timber, soil improvement	orthodox	Seed germinate readily after scarification	Candidate for vegetative propagation. Superior provenance sources from Solomon Islands.	

Species	Occurrence	Primary Uses	Seed Type	Propagation	Notes	Priority
<i>Pterocarpus indicus</i> (rosewood)	SE Asia, Papua New Guinea, Solomon Islands, Vanuatu	timber, multi-purpose	orthodox	Fresh seed germinate readily	Candidate for vegetative propagation	
<i>Santalum</i> spp. (sandalwood)	Fiji, Tonga, Vanuatu, New Caledonia, also elsewhere	essential oil	orthodox	Readily propagated from depulped seed	Candidate for vegetative propagation	1
<i>Swietenia macrophylla</i> (South American mahogany)	Introduced in many Pacific countries	timber	short-lived orthodox	Fresh seed germinate readily		2
<i>Tectona grandis</i> (teak)	India, Myanmar and Thailand	timber	orthodox	Fresh seed germinate readily after pretreatment	Improved material available from Solomon Islands	1
<i>Terminalia</i> spp. especially <i>T. catappa</i> (tropical almond) and <i>T. richii</i> (malili)	Widely distributed in tropics and subtropics	timber, edible nuts, multiple uses, cyclone resistance	variable, species of interest most likely orthodox	Fresh seed germinate readily	Candidate for vegetative propagation	3
<i>Agathis</i> species, especially <i>A. robusta</i> (kauri pine)	Papua New Guinea, Solomon Islands, Vanuatu, Fiji?	Wind-firm /cyclone resistance, timber,	intermediate?	Fresh seed germinate readily	Candidate for vegetative propagation	
<i>Azadirachta indica</i> (neem)	Native to dry forests of southern and south east Asia but widely cultivated	Multipurpose including medicinal, insect repellent, fuelwood	Intermediate?	Depulped seed germinate readily		
<i>Calophyllum</i> species especially <i>C. inophyllum</i> (kamani)	Widely dist. in Pacific, also elsewhere	coastal protection, shade, amenity, timber, nuts - oil	short-lived (a few months only) intermediate?	Moderately easy to propagate from seed	<i>C. inophyllum</i> Japan/Taiwan project to identify wind-firm trees for planting	
<i>Canarium</i> species especially <i>C. indicum</i> (nagai nut)	Widely dist. in Pacific, also elsewhere	edible nut, veg. oil, timber, firewood	Intermediate, seed will store in a cool room for up to 6 months	Propagated by seed little success using stem cuttings	<i>C. indicum</i> targeted for commercial development in Papua New Guinea, Solomon Islands and Vanuatu	2

Species	Occurrence	Primary Uses	Seed Type	Propagation	Notes	Priority
<i>Artocarpus altilis</i> (breadfruit)	Pantropical including Indonesia, Papua New Guinea, W Melanesia, Micronesia	Fruit, multi-purpose	recalcitrant	Fresh seed germinate readily, however, breadfruit is traditionally vegetatively propagated from root segments/suckers, air-layering branches or grafts		
Bamboo species (bamboo spp.)	Widely dist. in Pacific, also elsewhere	Furniture, flooring	recalcitrant	Seed rarely, veg. prop method used widely	Vegetative propagation protocols in place	
<i>Barringtonia</i> species especially <i>B. procera</i> (cut nut)	Widely dist. in Pacific, also elsewhere. <i>B. procera</i> indigenous to Solomon Islands, Vanuatu and PNG	species specific – nut, multi-purpose, coastal stabilisation	recalcitrant	Commonly propagated by sowing the whole fruit	Candidate for vegetative propagation	
<i>Cocos nucifera</i> (coconut)	Widely dist. in Pacific, also elsewhere	food, coastal stabilisation, wood etc.	recalcitrant	Propagated from seed	Tissue culture is being researched	
<i>Inocarpus fagifer</i> (Tahitian chestnut)	Widely dist. in Pacific, also elsewhere	edible nut, wood, coastal stabilisation etc.	recalcitrant	Fresh seed germinate readily	Candidate for vegetative propagation	
Mangroves (mangrove spp.)	Widely dist. in Pacific, also elsewhere	coastal protection	recalcitrant	Protocols for vegetative propagation developed	Not included for seed. Included so centre can be source of information on propagation techniques	
<i>Pandanus tectorius</i> (pandanus)	Widely dist. in Pacific, also elsewhere	food, multi-purpose	recalcitrant	Selected clones propagated by branch cuttings	Numerous cultivated traditional varieties exist	
<i>Pometia pinnata</i> (tuan)	Widely dist. in Pacific, also elsewhere	timber	recalcitrant	Fresh seed germinate readily	Candidate for vegetative propagation	3
<i>Spondias dulcis</i> (Wi)	Widely distributed in Pacific Islands, often an ancient introduction	Fruit, bark medicinal	recalcitrant		Candidate for vegetative propagation	

ANNEX 5

Pacific Islands Tree Seed Centre - Strategy & Action Plan

Tagline: A memorable phrase that sums up the tone and premise of a brand or product e.g.

Quality Tree Seed for Healthy and Prosperous Communities

Vision statement: *An aspirational description of what an organisation would like to achieve in the mid to long term. Serves as a clear guide for choosing current and future courses of action.*

Supporting Pacific Island Countries with:

- 1. fair and equitable access to priority tree germplasm for sustainable development, improved livelihoods and conservation in a changing climate; and**
- 2. seed technology research, capacity building and information exchange.**

Draft Objectives	Draft Activities (in general)
1. Collect, acquire, process, treat, store and exchange high quality seed of priority Pacific Islands tree species	<ul style="list-style-type: none"> ➤ Finalise Material Transfer Agreement (MTA) ➤ Prepare a list of priority species for the attention of the regional and national centres including those species where seed is in demand from domestic/export markets (income generation) ➤ Prepare and execute a detailed Work Plan to include all aspects of the work at the Centre – <ul style="list-style-type: none"> • seed acquisition, safe storage and distribution strategy • research and database development plan • contributions to Pest Risk Analysis (PRA) preparation to facilitate tree seed exchange in PICs • plan network of seed orchards in PICs to provide improved seed for future plantation development and foster conservation of natural stands • review plan after three years ➤ Prepare a Centre ‘Manual of Operations’

<p>2. Facilitate the development of national tree seed centres in Pacific Island Nations</p>	<ul style="list-style-type: none"> ➤ Capacity building/institutional strengthening/knowledge transfer in collection, storage, germination testing and propagation of woody species of national importance ➤ Assist in development of proposals for funding for national tree seed centres
<p>3. Research to enable safe and effective exchange and utilisation of priority tree species</p>	<p>For priority tree species -</p> <ul style="list-style-type: none"> ➤ Determine optimum requirements for collection, processing including phytosanitary treatments and storage ➤ Determine dormancy-breaking treatments and germination prescriptions ➤ Develop vegetative propagation protocols (only where appropriate/necessary) ➤ Advise on simple tree breeding methods (provenance/family trials, seed production areas, seedling seed orchards etc) ➤ Facilitate research into reproductive biology in collaboration with national agencies & research institutions (where unknown and necessary for further improvement) ➤ Collaborate on studies of genetic erosion of priority species
<p>4. Centre serves as a one-stop-shop for information on seed collection, storage, germination testing, propagation, genetic variation, silviculture and utilization of priority tree species</p>	<ul style="list-style-type: none"> ➤ Monitor the exchange of tree seeds within and outside of Pacific Island Countries and provide necessary advice and support ➤ Database developed (possibly based on SPRIG/USP database with links to PAR, Hawaii) to give ready access to the best available information on collection, storage, germination testing, propagation, genetic variation and silviculture of priority tree species ➤ Publish relevant research results from 3 above