FST/2016/025

Report for ACIAR – Workshop in the Solomon Islands

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Developing DNA-based chain of custody systems for legally-sourced teak

Workshop report: Solomon Islands

Executive summary

Research Programme Manager: Tony Bartlett, Australian Centre for International Agricultural Research (ACIAR)

Principal Investigator: Professor Andrew Lowe, University of Adelaide

Coordinated by:

- Avalyn Lim – Double Helix Tracking Technologies, Singapore ("DoubleHelix")
- Soo Lin Goh – DoubleHelix
- Dr. Richard Pauku – Maraghoto Consultancy, Solomon Islands

This report covers details of the opening workshop for ACIAR SRA project no. FST/2016/025 "Developing DNA-based chain of custody systems for legally-sourced teak" (the "Project") organised on 28 June 2017, at the Solomon Islands Development Trust in Honiara.

The purposes of this workshop included:

- Bringing together stakeholders for the Project: project partners, government (forestry) and members of the timber trade from Solomon Islands and Papua New Guinea (PNG).
- Understanding the timber supply chain issues faced there
- Knowledge sharing on timber verification and related DNA techniques
- Discuss and finalise sampling activities in both countries
- Potential next steps for this Project, further research and supply chain verification for the timber trade in these countries.

In-country coordinator

Photo (Soo Lin Goh): *Dr Richard Pakau at the workshop venue*

The in-country coordinator was Dr. Richard Pauku, who runs a consultancy focusing on agricultural research and development in Solomon Islands.

Through Dr Pauku's network, trade and government participants, as well as representatives from the Pacific Horticultural & Agricultural Market Access Programme (PHAMA) and the Solomon Islands Chamber of Commerce were engaged. Both PHAMA and the Chamber of Commerce are involved in the NEPCon Certification process for the Islands' forestry and timber trade.

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Meeting with Permanent Secretary, MoFR

Dr Pauku arranged a face-to-face meeting with Permanent Secretary Dr. Vaeno Vigulu prior to the workshop. During this meeting, a summary of the Project was shared and it transpired that PS Vigulu has a personal interest in the Project, as his doctoral studies were on teak.

The main take-away from this meeting for the Project was the understanding of improved landraces of teak in the Solomon Islands (presumed to have origins in Nigeria, but possibly also Myanmar and India); and the agreement that PS Vigulu would provide support for obtaining permits for the teak sampling and export to Adelaide to conduct the research under the Project.

***Photo (Avalyn Lim)**: (L-R) Ms Avalyn Lim, Prof. Andrew Lowe, PS Dr. Vaeno Vigulu, Dr. Richard Pakau*

Workshop attendance

There were a total of 13 participants at the workshop (including coordinators), which was within the expected turn out, given that this was an introductory and exploratory workshop in the Pacific.

Participant	Organization
Mr. Carl Menke	ACIAR
Mr. Julius Houria	Ministry of Forestry and Research
Mr. Jacob Gala	Ministry of Commerce, Industry, Labour & Immigration
Mr. Andrew Piper	Pacific Horticultural and Agricultural Market Access Program (PHAMA)
Ms. Samantha Maeke	Solomon Islands Chamber of Commerce & Industry (SICCI)/PHAMA
Dr. Martin Golman	PNG Forest Research Institute
Ms. Shabella Rathamana	Hatanga Hardwoods
Ms. Nancy Defe	Top Timber
Mr. John Paul Alasia	Solomon Islands Chamber of Commerce & Industry (SICCI)
Prof. Andrew Lowe	University of Adelaide
Ms. Avalyn Lim Ms. Soo Lin Goh	DoubleHelix
Dr. Richard Pauku	Maraghoto Consultancy

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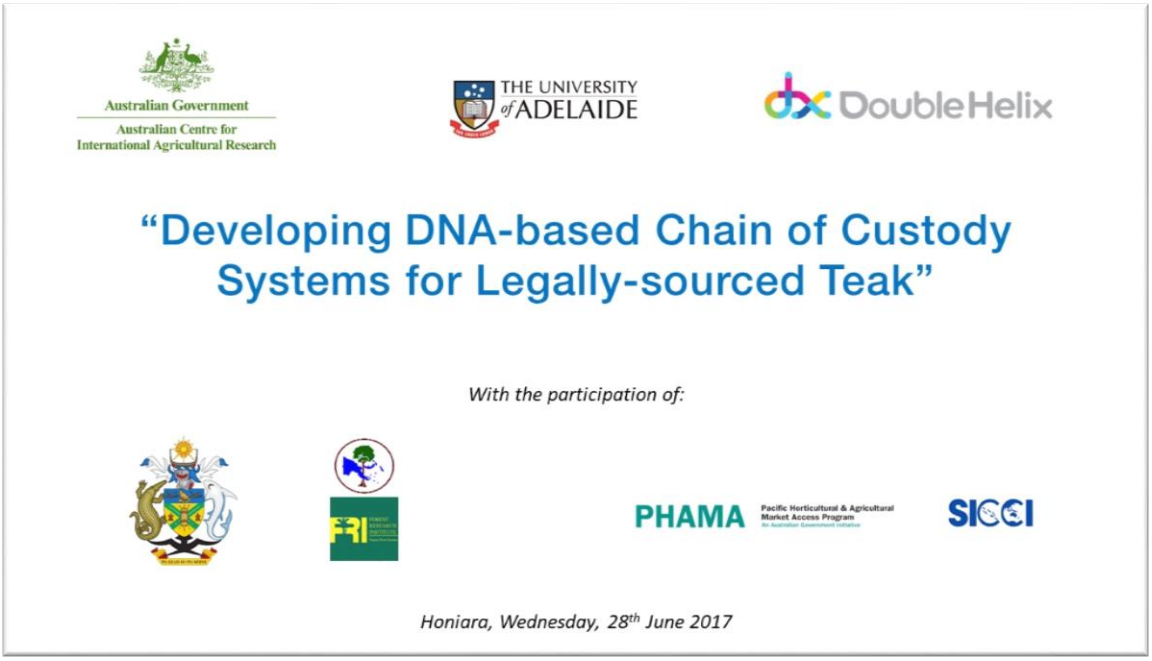

Participating organisations at the Workshop.

Photo (Prof. Andrew Lowe). *Seated (L-R): Dr. Martin Golman (PNG Forest Research Institute), Carl Menke (ACIAR), Dr. Richard Pauku (Maraghoto Consultancy), Prof Andrew Lowe (University of Adelaide), Julius Houria (Ministry of Forestry & Research, Solomon Islands), Andrew Piper (PHAMA, Solomon Islands)*

Standing (L-R): Samantha Maeke (PHAMA/Solomon Islands Chamber of Commerce & Industry – SICCI), Nancy Defe (Top Timber), Shabella Rathamana (Hatanga Hardwoods), Avalyn Lim (DoubleHelix), John Paul Alasia (SICCI), Soo Lin Goh (DoubleHelix). Not pictured: Jacob Gala (Ministry of Commerce, Industry, Labour & Immigration).

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Photo (Soo Lin Goh). *Group photo of all participants.*

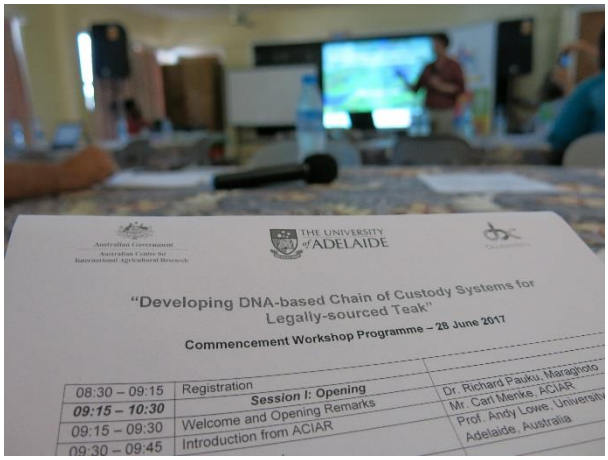

Photo (Soo Lin Goh). *Agenda for the workshop, with Prof. Andrew Lowe in background.*

Photo (Soo Lin Goh). *Discussion during a short break.*

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Presentations summary

Representatives from both the Solomon Islands and PNG were invited to speak on their respective country's forestry and timber trade, supply chain issues, and steps towards certification. There were also presentations by ACIAR, University of Adelaide and DoubleHelix.

Solomon Islands

Julius Houria
Director, Utilization
Ministry of Forestry & Research, Solomon Islands

Photo (Soo Lin Goh). *Mr. Julius Houria*

Julius Houria represented the Solomon Islands' Ministry of Forestry & Research (MoFR) and presented a short presentation on the forestry and timber trade in the Solomon Islands, in place of Permanent Secretary Dr. Vaeno Vigulu.

Julius, along with PS Vigulu and Dr Richard Pauku (the Project's in-country coordinator), are former colleagues at Kolobangara Forest Products Limited (KFPL), one of two main plantations that is involved in the timber trade 'from plantation to product'.

Solomon Islands has 14,000 hectares of plantation and of this, 75% are teak plantations. Only two companies have teak plantations, namely KFPL and Eagon Pacific Plantation Limited (EPPL), whilst the other teak plantation owners are individual families.

There are a wide range of plantations sizes, starting from as small as 0.5-1 ha. Ministry of Forestry and Research (MoFR) field officers are stationed in the provinces and advise the smallholders on management of the plantations and harvesting practices.

Photo (Soo Lin Goh). *Mr Julius Houria giving his speech on the Solomon Islands timber* trade.

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"Teak fever" hit Solomon Islands several years ago, and many smallholder farmers removed existing crops in order to cash in on the teak trend. However as teak is slow growing, and the rotation period for teak is 25 years, farmers are now trying to sell teak as young as 15 years old. With the generation of market access and demand, more people will want to plant trees. But now there is increased frustration having the (almost) mature teak trees but there is no market for it.

KFPL exports teak to India, and now also to Malaysia. The price of teak (ex-Guadalcanal) was US$150 per m^3 (diameter range 15-19 cm); and US$300 per m^3 for diameters above 30 cm.

KFPL buys teak trees from local smallholders, but farmers have to deliver the logs to their log pond. They pay around SB$900 (approx. US$116) per m^3. It is very difficult for smallholder farmers to do so as the transportation costs are prohibitively high, and need manpower to carry the logs by themselves – 3 to 5 people required to carry one log.

Andrew Piper of PHAMA provided a comprehensive list of prices that KFPL is paying to farmers depending on diameter, length and mode of payment (see tables below).

Logs 2.4 - 3.0 meters Prices are shown below for logs 2.4–3.0 m in length delivered to the Ringgi log pond:-

Average Diameter (cm)	Option 1 Cash payment to grower on log delivery maximum 4 m^3 (SB$/$m^3$)	Option 2 Bank transfer or cheque to grower on log delivery (SB$/$m^3$)	Option 3 Bank transfer or cheque to grower on payment receipt by KFPL (SB$/$m^3$)
15–19 cm	228	342	570
20–24 cm	360	540	900
25–29 cm	585	877	1462
30–34 cm	686	1029	1715
35 cm+	895	1343	2238

Logs 3.1+ meters Prices are shown below for logs >3.0 m in length delivered to the Ringgi log pond:-

Average Diameter (cm)	Option 1 Cash payment to grower on log delivery maximum 4 m^3 (SB$/$m^3$)	Option 2 Bank transfer or cheque to grower on log delivery (SB$/$m^3$)	Option 3 Bank transfer or cheque to grower on payment receipt by KFPL (SB$/$m^3$)
15–19 cm	382	573	955
20–24 cm	514	771	1285
25–29 cm	739	1108	1847
30–34 cm	840	1260	2100
35 cm+	1049	1574	2623

Other points made during Q&A session:

- Another ACIAR project in Solomon Islands is run by Dr Tim Blumfield in Munda, Western Province.
- In addition to teak, Solomon Islands also exports vitex, rosewood and kwila (merbau).

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- One of the main issues faced with supply chain verification that was raised was the ability to trace back to multiple smallholders.
- Farmers previously used chainsaws to produce sawn timber but Mr Houria advised that the recovery rate was very low (2–3 m^3 per tree). Now, more farmers have changed to using a band saw and are getting better recovery rates.
- Solomon Islands has a kiln dryer.
- Landrace: Provenance trials have taken place with breeds from all over world (KFPL). The improved landrace is thought to be from Nigeria, but new breeding is going on.
- The slow growth rate has resulted in a slowdown in the planting of teak, but they expect that the generation of a buyer market will help support new planting of teak.

Papua New Guinea

Dr. Martin Golman
Director
Forest Research Institute, Papua New Guinea

Teak was introduced to PNG between 1890 and 1900 by the Germans, from seeds of Burmese and Indian origin.

The Brown River plantation was established in the 1950s, of which 6% is plantation teak. Seed orchards for teak are found in Kerevat. The main timber species in PNG are kamarere, teak, erima and talis: all are native except teak.

Teak is sold at US$250–300 per m^3 depending on the diameter of the logs.

PNG practices customary land ownership (as well as other Melanesian countries). Land ownership lies with the people and is passed down within families and/or clans.

Photo (Avalyn Lim). *Dr. Martin Golman, Director of the Forest Research Institute, PNG.*

Smallholders own and manage about 70% of teak wood lots, while the remaining land is owned by the PNG Forest Authority (PNGFA), churches and NGOs. Hence any development that impacts community land requires community buy in. With the potential revenue coming in with forestry, landowners are more sensitive and tricky to deal with when it comes to leasing of land as they also want in on the monetary benefits.

Even for forestry concessions acquired under FMAs (Forest Management Agreement) with consultation to landowners can give rise to disputes over boundaries and benefits. Hence there is a general view that it is difficult to deal with landowners in developing community forestry in PNG.

The PNG government wants to focus on reforestation and climate change mitigation. The species that they are focusing on include teak (in the lowlands) and pine (in the highlands).

The PNGFA has the intent to plant 800,000 ha of plantation forestry by 2050 (Painim Graun Planim Diwai project). For every 100,000 ha dedicated to teak, PNGFA expects revenues of US$93,000,000 annually. Hence, if US$800,000 ha is dedicated to teak, the revenue to be generated is expected to be up to US$750,000,000 per annum.

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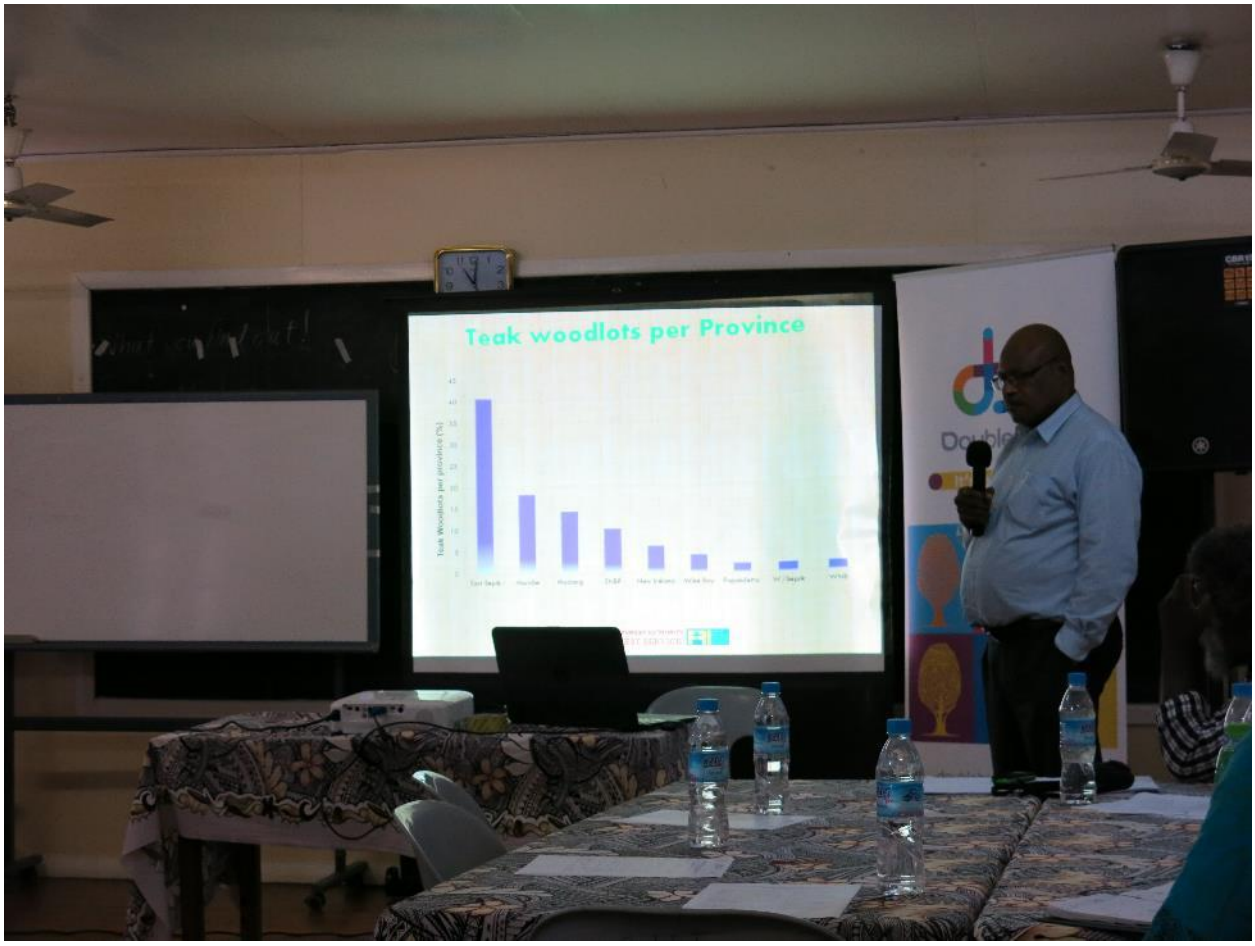

Photo (Soo Lin Goh). *Dr. Golman presenting data on teak woodlands per province in PNG*

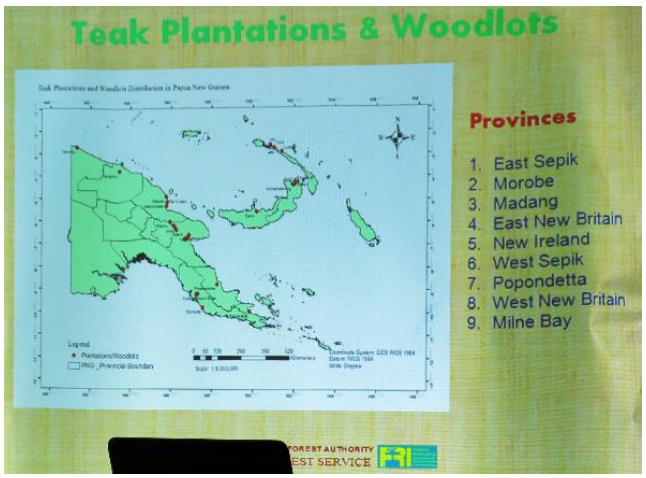

Photo (Avalyn Lim). *Slide showing provinces in PNG*

The main markets for teak from PNG include India (75%), China and Taiwan. The main usage for teak in India is flooring, furniture and coffins (the belief is that teak coffins will send the deceased straight to heaven).

Central processing units, where smallholder logs can be sent to process at one location, can act as nodes for verification of raw material.

REDD+ and the Green Climate Fund could potentially help support sustainable forestry due to the avoided emissions from deforestation. The 'climate change office' in PNG was supposed to be bringing in the funds from these sources but so far, the forest department has not received funds. There is also a potential interest in reduced impact logging (RIL) programmes.

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Developing DNA-based chain of custody systems for legally-sourced teak

Professor Andrew Lowe
Chair of Plant Conservation Biology and
Deputy Dean of Partnerships and Collaboration, Faculty of Sciences
University of Adelaide

Prof Lowe gave an overview of the current project and the application of this research into developing a DNA chain of custody for teak. He touched on the geographical focus of this project, namely the Solomon Islands, PNG, Indonesia, Myanmar, Laos and Thailand and stated that the outcome of this work is to generate a range-wide genetic resources map for natural teak; as well as identify original source of plantation teak for breeding and improvement.

Photo (Soo Lin Goh). *Prof. Andrew Lowe giving an introduction to the genetics aspect of the Project.*

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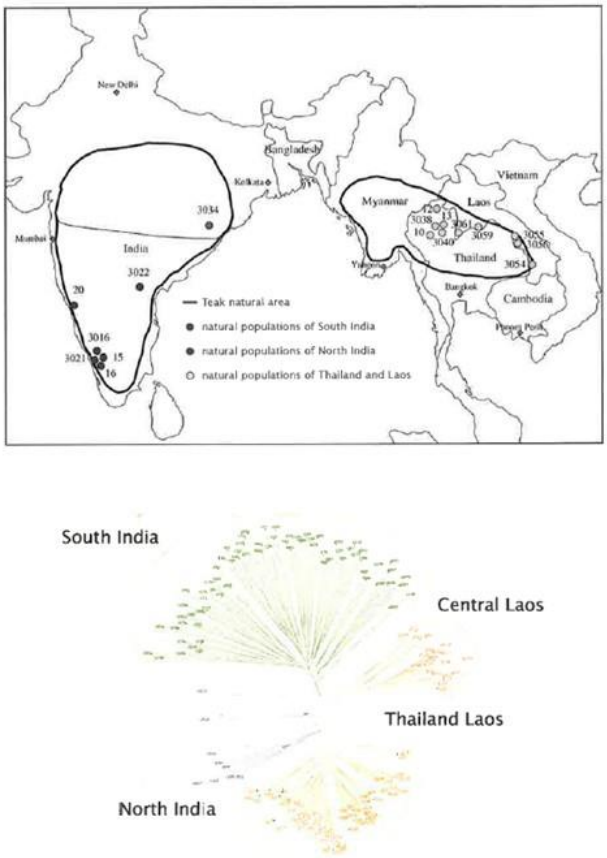

Diagram. *Excerpt from Prof. Andrew Lowe's slides, showing the distribution of teak across South and Southeast Asia; as well as genetic results from previous projects in Myanmar.*

Prof Lowe provided the audience with the background on how DNA can be used to trace timber products back to species, region and individuals, providing examples of each (see diagrams, next page).

Continued…

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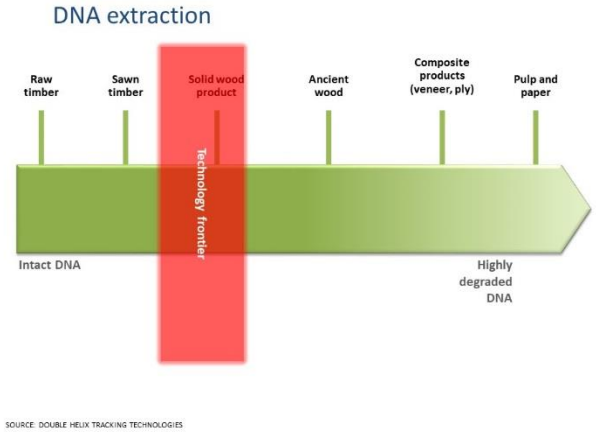

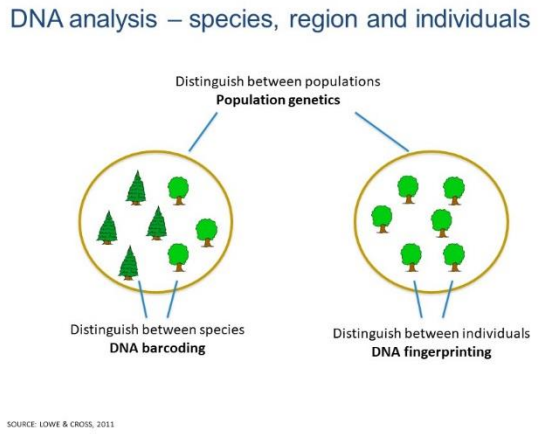

Diagrams. *Excerpts from Prof. Andrew Lowe's slides, showing: (left) the ability to extract DNA from timber products; and (right) the difference between DNA analysis in species, region and individuals.*

The talk ended with a request for Solomon Islands and PNG participants to contribute to the Project by:

- Sending samples of Solomon Island's and PNG's improved teak landraces to receive genotype information on original source region from natural range.
- Working with the Project team on verification that can incorporate scientific testing and support existing certification systems (e.g. NEPCon).

Nature's Barcode™ Verification – Trust in traceability

Avalyn Lim
Director, Strategic Partnerships
Double Helix Tracking Technologies

Overview of the DoubleHelix Nature's Barcode™ verification service that audits and verifies claims within timber supply chains for global buyers.

Topics covered included an overview of what verification means, the differences between verification and certification; and the application of scientific testing in supply chain verification.

Photo (Soo Lin Goh). *Avalyn Lim presenting on behalf of DoubleHelix.*

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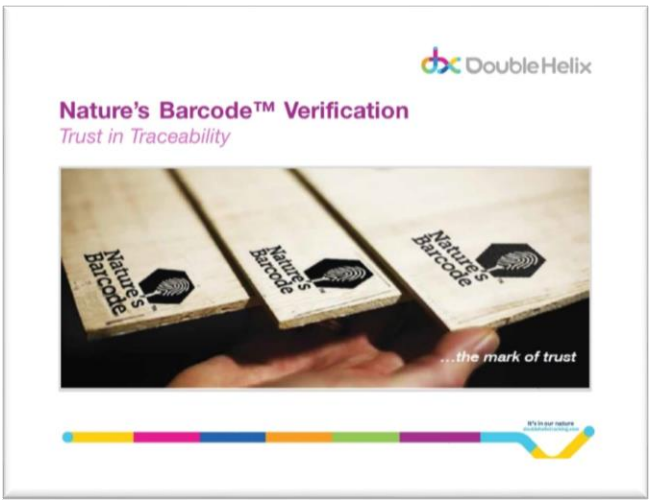

Excerpts from DoubleHelix presentation on Nature's Barcode™ verification services, scientific testing and how these could work in the Pacific timber trade.

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Roundtable discussions

Following the presentations, a roundtable discussion with all participants was set up, given that all the participants were able to contribute to developing some next steps, both for the Project and for shaping future research and development projects for the Solomon Islands and PNG.

Photo (Soo Lin Goh). *Prof. Andrew Lowe leading the roundtable discussion with workshop participants.*

Prof. Lowe chaired this discussion and the following topics were tabled:

Sampling and reference data for Project

PNG

The main objective of the Project that was discussed for PNG involved the determination of origin of the improved landrace. It was decided that the best place to sample would be in Brown River, near Port Moresby as there are up to 20 provenances there.

Transport costs from Lae (where PNGFA and PNGFRI are based) to Brown River will be needed. It was discussed that Tony Page/Tim Blumfield who are working on other ACIAR projects there could share samples as well.

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Dr. Martin Golman agreed to supervise and coordinate the sample collection in PNG.

Next steps: Avalyn has sent an MOU, budget and in-country partner contract to Martin with a proposed sampling plan.

Solomon Islands
The best place to sample was determined to be Poitete/Kolombangara Island in the Western Province where there are seed orchards. This is the same island where KFPL is situated.

The Ministry recommends the Nigerian provenance and there have been two rounds of selection trials to choose the best trees for plantation, which now constitutes the improved land race. When seeds are issued to farmers there is a record of it at the ministry's office.

EPPL and KFPL are breeding and growing teak, and so we were advised to sample from both plantations. EPPL is on New Georgia Island, while KFPL is on Kolombangara Island. Teak from these two companies is exported directly from these two islands.

Field officer Tony Rex from MoFR is based in Munda and can help coordinate sampling, with Richard Pauku as overall coordinator with University of Adelaide.

What the countries (PNG and Solomon Islands) will get out of the sampling:

- Genotype profile of their improved landrace
- Provenance source, even if it's from a hybrid source
- This would serves as reference data for future verification and can be used for plant breeders' rights.

Once the MOU and partner agreements are signed off, sampling will be achieved with sampling kits provided to the coordinators by the University of Adelaide, and shipped back to the University for DNA extraction.

Photo (Soo Lin Goh). *Roundtable session underway.*

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Verification framework

In order to provide greater clarity around how the Nature's Barcode™ verification process works, DoubleHelix will provide a verification framework with genetic test implementation, which involves a case study with community forestry/smallholders. This should also include how verification would benefit Solomon Islands forest owners and timber trade.

There was a discussion on a possible exercise in conducting a desk-based risk assessment for KFPL and EPPL (NEPCON/SITPEA will be conducting a country risk assessment on Solomon Islands natural forests to be published in September 2017, as part of the certification process).

Future prospect options

Solomon Islands

MoFR wants to be able to do species testing for vitex, rosewood, kwila (merbau), and taun. There is a perceived higher quality of Solomon Island vitex as compared to vitex from other countries.

Rosewood trade is not restricted (species uncertain). Kwila should be a good case study with existing genetic info.

PNG

PNGFRI is keen to investigate supply chain verification support for international market access for smallholders. They are also keen to consider setting up a CPU (central processing unit). There is also interest in verification for non-timber forest products (e.g. sandalwood and agarwood)

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"Developing DNA-based Chain of Custody Systems for Legally-sourced Teak"

Commencement Workshop Programme – 28 June 2017

08:30 – 09:15	Registration	
09:15 – 10:30	***Session I: Opening***	
09:15 – 09:30	Welcome and Opening Remarks	Dr. Richard Pauku, Maraghoto
09:30 – 09:45	Introduction from ACIAR	Mr. Carl Menke, ACIAR
09:45 – 09:55	Keynote Speech	Prof. Andrew Lowe, University of Adelaide, Australia
09:55 – 10:30	Group photo and refreshment	
10:30 – 15:50	***Session II: Presentations & Panel***	
10:30 – 11:00	Welcome from Ministry of Forestry & Research & Overview of teak trade / forest governance issues in the Solomon Islands	Mr. Julius Houria, Utilization Division Director, Ministry of Forestry and Research (MoFR)
11:00 – 11:20	Question & Answer	
11:20 – 11:50	Overview of teak trade / community forestry issues in PNG	Dr. Martin Golman, Forest Research Institute, Papua New Guinea
11:50 – 12:10	Question & Answer	
12:10 – 13:30	Networking lunch	
13:30 – 14:00	Teak genetics for supply chain verification in the Pacific	Prof. Andrew Lowe, University of Adelaide, Australia
14:00 – 14:20	Question & Answer	
14:20 – 14:40	Nature's Barcode: Trust in Traceability	Ms. Avalyn Lim, Partnerships, Double Helix Tracking Technologies
14:40 – 15:00	Question & Answer	
15:00 – 15:40	Refreshment	
15:40 – 16:10	Panel: Securing timber supply chains in the Pacific	Prof. Andrew Lowe (Moderator) Panelists: Mr. Julius Houria (MoFR), Mr. Carl Menke (ACIAR), Mr. Andrew Piper (PHAMA), (Ms. Soo Goh (DoubleHelix)
16:10 – 16:30	Question & Answer	
16:30 - 17:00	***Session III: Closing***	
16:30 - 16:45	Wrap-up Remarks	Prof. Andrew Lowe, University of Adelaide, Australia
16:45 - 17:00	Closing Remarks	Dr. Richard Pauku, Maraghoto

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