



Improvement and management of teak and sandalwood in PNG and Australia

Overview

The strong international demand for many forest products has resulted in the substantial depletion of natural sources across many areas of PNG. Many parts of lowland PNG with a high rural population have few timber resources remaining, as these areas were the first to be commercially logged due to their accessibility. Considerable interest among smallholders in these areas exists to establish a planted timber resource to meet their own needs as well as providing income.

It is clear that significant opportunity exists in PNG to develop a vibrant rural economy through the production of high-value forestry species. While smallholder farmers have a strong desire to pursue such opportunities it is often constrained by the basic requirement of access to seed/seedlings and knowledge on appropriate production regimes. This project seeks to address these fundamental constraints by establishing resources that will supply improved germplasm. The project will also evaluate and refine existing silvicultural knowledge for these species through field trials and smallholder managed plantings.

In both southern PNG and Cape York Peninsula, where sandalwood occurs naturally, there are often limited options for commercial development, but forestry provides one of the few promising opportunities. The potential to incorporate sandalwood within existing indigenous land management systems and further extend this into commercial plantings allows the opportunity to utilise an endemic tree species for economic development.

ACIAR project number	FST/2014/069
Start date and duration (years)	1 st July 2015, 4 years
Location	Papua New Guinea
Budget	1,270,775

Project leader(s) and Commissioned Organisation

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Research

The aim of the project is to advance the development of germplasm sources and smallholder-friendly silviculture systems for teak (PNG) and sandalwood (PNG and Cape York Peninsula). This will provide new opportunities for enhancing smallholder livelihoods in these regions and achieving PNG's plantation development target. The project has five objectives:

1. To advance the teak genetic improvement program in PNG through first generation selection to produce high quality germplasm.
2. To ensure maximum realisation of genetic gains made by the project through the development of robust and smallholder appropriate silviculture.
3. To develop capacity for an ongoing genetic improvement program for sandalwood in PNG.
4. To advance the sandalwood genetic improvement program in Cape York Peninsula for use by local landowners.
5. To communicate and disseminate research outputs to improve uptake and impact.

Achievements

The UNRE teak clonal trial was assessed for growth and form in 2013 and 2015, and selections were made based on performance across these measures. Further assessment of the trial was undertaken in early 2016 to ratify the superiority of selected trees and determine others that may be potential candidates. Selection of candidate plus trees from the UNRE clonal trial during 2015/16 represents a significant scientific outcome, and provides a basis for initial first generation clonal selection.

One of the earliest (2011) teak plantings in FST/2007/078 was thinned for its further development of a seedling seed orchard, and a source for clonal selection of performing individuals. Many of the thinned trees were also used for volumetric measurements, with strong positive correlation ($R^2=0.8656$) between DBHOB and under-bark biological volume.

Work with sandalwood planting has progressed with three focal communities in Central and Gulf provinces of PNG. A sandalwood woodlot was established in one of these communities, and further development of smallholder micro-nurseries has resulted in the production of seedlings in another.

In Cape York seed has been collected from sandalwood trees and representing the genotypes captured into the clonal seed orchards of the species. The seed collected will serve as the basis for developing the next generation of selection through the establishment of progeny trials of the species.

Impact story

- » Indigenous PNG sandalwood is currently listed as 'threatened and 'considered to be facing a very high risk of extinction in the wild' (IUCN 2012). It is clear that the primary constraint to the development of sandalwood agroforestry is access to sufficient quantities of quality seed as well as poor germination from wild collected seed. This is due to the fact that there are very few productive mother trees remaining in the wild as well as the likelihood of inbreeding among them.
- » The project has facilitated the identification of suitable candidate seed trees and provided input for collection and establishing productive smallholder nurseries.
- » This has culminated in the establishment of the first sandalwood planting in the community in Gulf Province and several small woodlots in another in Central Province. While the numbers of seedlings planted are modest (several hundred), they are representative of a shift in conservation prospects of this species.
- » These plantings represent the first step in rehabilitation of a decimated genetic resource, with potentially positive environmental (biodiversity), social (confidence), and economic (nursery and agroforestry production) impacts. These plantings will be a productive seed source to support further expansion of sandalwood plantings in the future.



Locals planting seedlings. Photo: ACIAR