



Optimising soil management and health in PNG integrated cocoa farming systems

Overview

Cocoa is Papua New Guinea's third largest agricultural export; more smallholders are producing cocoa, but yields are 2,000 kg/hectare less than they could be, due to infertile soil. The project will evaluate opportunities for green waste management of cocoa production to supply nutrients to the soil, and develop region-specific soil management strategies for smallholdings.

This project aims to improve soil management in Papua New Guinean smallholdings with crop diversification, by evaluating how nutrient management strategies affect cocoa. This project is part of the TADEP initiative and works has strong partnerships with its sibling projects HORT/2014/094 and HORT/2014/096. Working with its in-country partners this project also helps help smallholders to diversify crops; this will improve diets for farming communities. The income generated will make communities healthier, and improve the status of women, housing and education

Research

The project has three objectives:

- » Evaluate opportunities for green waste management of cocoa production to supply nutrients to the soil;
- » evaluate opportunities for managing soil condition towards future cocoa crop nutrition in cocoa farming systems; and
- » capacity building through the development of region-specific management strategies for smallholders

ACIAR project number	SMCN/2014/048
Start date and duration (years)	2017, 4 years
Location	Papua New Guinea
Budget	AUD \$1,944,432

Project leader(s) and Commissioned Organisation

Damien Field (Lead), The University of Sydney
 Kanika Singh, Research Fellow, The University of Sydney
 Todd Sanderson, Data 61, CSIRO

Partner country project leaders and their institutions

David Yinil, Cocoa Board, PNG
 Chris Fidelis, Cocoa Board, PNG

ACIAR Research Program Manager

Robert Edis



Achievements

The project commenced in February 2017 with the inception workshop held in East New Britain, PNG.

During this period the researchers consulted with project partners, and agreed on the research strategy to be implemented and selected four trial sites that represent the variety of soil types and variation in physio-climatic regions that are used for growing cocoa.

The trial sites are located at Tavilo in East New Britain, Arawa in Bougainville, Wewak in East Sepik and Kavieng in New Ireland. These are all managed by very capable and enthusiastic farmers who will play a crucial role in day-to-day management of the trial and collecting crucial data related to cocoa tree performance and yield. These farmers will also provide experiences that will be invaluable in developing the Cocoa Model Farmer Trainers (CMFT's) shared with HORT/2014/096.

Soil samples were sent to a newly established collaboration with Indian Institute of Technology Kharagpur, India where analysis using traditional and infrared technologies are being used to characterize the key soil properties. These properties are used to establish the baseline soil data for the sites and provided some insight into the current nutrient levels.

We have also identified two models that will be used to evaluate the nutrients in the coco system, being Soil Diagnostics and QUEFTS. Using these models it is expected that three levels of advice for smallholders can be provided through this work, complimenting the BMP already developed for cocoa systems. The first is 'do-nothing' and utilize the inherent soil nutrients, also known as 'forest rent', second is to apply a standard rate annual that is expected to replace the nutrients removed. The third is to use information from the models to determine that five year loss of nutrients and develop a replacement strategy, much like is done for the oil palm industry

Upstream Impact Story

Laubal plantation

*Daniel Piniau's (son, manager),
Kris Bongare (father, owner)*

Daniel was a primary school teacher and has decided to take up cocoa and palm farming, as his mother who recently moved overseas saw it as a more reliable livelihood for him and his family than teaching.

Daniel's wife, Joyce, and his two sons are happy with the responsibility bestowed on them by his parents. These are early days for Daniel and his family to work in a challenging environment, especially with the continuous investment involved in fertilizers for palm production.

Daniel is enthusiastic to grow cocoa on Labaul plantation, which was abandoned for a long time (~ 50 years), the plantation was replanted in 2010. Daniel sees an opportunity here to switch to the more sustainable options for both cocoa and palm production by incorporating composting, which the project is also working on. If he can improve soil quality and cocoa yield by composting then he can do the same on his palm plantation. We hope Daniel's wife, Joyce, can help Daniel in this production system and have a very successful cocoa farm, and provide consulting to communities in making compost with cocoa pods, leaves and shade tree litter.



Daniel Piniau, manager at Laubal plantation where trials will be run at Panamecho, Kavieng, New Ireland.