Australian Government
Australian Centre for International Agricultural Research

Soil and land management

Optimising soil management and health in Papua New Guinea's integrated cocoa farming systems

Overview

Cocoa is the third largest agricultural export for Papua New Guinea (PNG), and a major contributor to the rural economy in the lowlands. Global demand for high quality cocoa remains strong, providing opportunities for the intensification and growth of the PNG cocoa industry.

Smallholder contributions to total cocoa production have increased in PNG in recent years, coinciding with the decline of the plantation sector, but annual yields produced by these smallholders remain low at 200-400 kilograms of dry beans per hectare. This is in spite of the use of new planting materials with potential yields of 2500kg/ha/pa.

Soil fertility in cocoa production is declining. Limited availability and high costs of fertilisers, as well as the remote location of many smallholder coca producers, are all barriers to the adoption of fertilisers. Smallholder cocoa farms are generally low input and low intensity systems. Intensification of cocoa farming systems through the inclusion of intercropped vegetables and cash crops can help smallholders diversify income streams and improve food security. However, without appropriate soil fertility management intensification and attempts to meet the demand for cocoa production will further increase pressure on soil fertility and soil health.

It is necessary to understand nutrient limitations to production, and the benefits of soil fertility management, if potential cocoa yield declines are to be reversed over the next decade. With consideration of the resource base of smallholder cocoa producers, and their social, cultural and economic context, this project will develop and disseminate improved soil management strategies focussed on soil fertility and health supporting cocoa production and crop diversification.

KEY FACTS

ACIAR Project No. SMCN/2014/048
Duration: October 2016 to April 2026 (9 years and 10 months)
Target areas: Papua New Guinea
Budget: A$1,944,432

Project Leader
Dr Damien Field, The University of Sydney

Key partners
- Cocoa Coconut Institute of Papua New Guinea

ACIAR Research Program Manager
Dr James Quilty

Objective

The project aims to improve soil management in smallholdings with crop diversification by evaluating nutrient management strategies and their effects on cocoa.

The objectives are to:

- Evaluate opportunities and the social, environmental and economic impacts in smallholder cocoa production of improving green waste management as a source of soil nutrients.
- Evaluate opportunities and the social, environmental and economic impacts of managing soil condition towards future cocoa crop nutrition in diversified cocoa farming systems.
- Build capacity through research, training and extension in the development and dissemination of region-specific soil management strategies for smallholder cocoa production systems.
- Through the Family Farms Team approach disseminate knowledge on soil management strategies and support the equitable distribution of benefits from cocoa production systems.

Expected scientific results

- Better understand of nutrient flows in diversified cocoa-based farming systems.
- Develop methods for measurement and monitoring of soil nutrient capability and condition.
- Develop methods for soil biological assessment.
- Develop models for decomposition and nutrient release of compost components.
- Knowledge of the gendered roles in cocoa production and soil management in smallholder cocoa production.
- Increased understanding of the resource base of smallholder cocoa producers in PNG, and the potential to improve the sustainability of their production systems
- Increase soil health research conducted in PNG institutions, and improve methods of extension and research outcome delivery.

Expected impact/outcomes

- Improved soil health and sustainable management of soils and farming systems supporting resilient and profitable cocoa production.
- Increased incomes for smallholder farmers through increased cocoa yields.
- Diversification of cocoa farming systems will improve cocoa farming household access to a diverse range of food crops.
- Broader increase in profitable enterprises through enhanced production of cocoa and other food crops.
- Efficient uses of nutrient and water resources through diversification of cocoa farming systems.
- Reduced requirement for mineral fertiliser inputs and more efficient and sustainable use of natural resources.

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