



Australian Government

Australian Centre for  
International Agricultural Research

Soil and land management

# Land management of diverse rubber-based systems in southern Philippines

## Overview

Agusan del Sur in the southern Philippines is one of the country's poorest provinces, with approximately 45% of households living below the poverty line. The majority of these households are smallholder farmers with poor access to technology and a high dependence on subsistence farming.

Rubber is Agusan del Sur's fourth largest crop but only 50% of the total planted area is productive or tappable, and the average cuplump yield of 0.9 tonnes per hectare per year is much lower than the national average of 1.28t/ha/yr.

Major constraints on the province's rubber production include lack of land suitability information, lack of cost-effective rubber-based cropping systems, inadequate soil and nutrient management, lack of high yielding rubber clones, poor harvesting techniques and lack of technical training and support.

Nutrient management is a particular problem for rubber plantations throughout the Philippines and ineffective nutrient management currently affects over 12,000 ha of rubber plantations and 6,400 households. This project will contribute to poverty reduction in marginalised upland communities through the development of sustainable and productive rubber-based cropping systems that employ crop diversification and improved nutrient management to improve smallholder farmers' livelihoods.



## KEY FACTS

**ACIAR Project No.** SLAM/2017/040

**Duration:** January 2019 to December 2023 (5 years)

**Target areas:** Philippines

**Budget:** A\$2,000,002

### Project Leader

Professor Chengrong Chen, Griffith University

### Key partners

- University of Southern Mindanao
- Provincial Government of Agusan del Sur
- Caraga State University
- Department of Agriculture

### ACIAR Research Program Manager

Dr James Quilty

## Objective

**The project aims to boost household incomes of indigenous smallholder farmers in the uplands of southern Philippines through the introduction of profitable rubber intercropping systems, sustainable management regimes and capacity building.**

The objectives are to:

- ◆ Develop an effective market-oriented rubber-based cropping system for the uplands of Agusan del Sur.
- ◆ Characterise the key soil constraints and identify the most suitable lands for rubber-based cropping systems in Agusan del Sur.
- ◆ Develop nutrient diagnostic tools and fertiliser regimes for rubber and companion crops.

## Expected scientific results

- ◆ Testing of market-oriented rubber-based cropping system models to increase understanding of how natural environmental conditions, plant species interactions, nutrients and water, can integrate with social, cultural and economic status to maximise productivity, economic and environmental benefits.
- ◆ Evaluate land suitability for rubber to improve investigations of site-, landscape- or region-specific rubber-based cropping systems for long-term sustainable use of land and soil resources.
- ◆ Develop rapid and robust soil nutrient deficiency diagnostic tools and the concept of soil as a living system for measuring soil health indicators leading to greatly advanced understanding of robust relationships between rubber and intercrops growth and available soil nutrient pools.
- ◆ Increase adoption of sustainable management practices, to increase productivity and protection of land and water resources.
- ◆ Analyse the economy and market of rubber-based cropping systems and management practices, to provide local researchers with a scientific basis to improve crop yield and economic outcomes and be more responsive to changes in markets for rubber and agricultural produce.

## Expected impact/outcomes

- ◆ Develop local capacity and expertise to design and implement rubber-based cropping systems research; conduct farm-level budget analysis, market access, value-chain and risk analyses; and conduct land suitability analysis to support the sustainable expansion of rubber production in Agusan del Sur and elsewhere.
- ◆ Develop local capacity to use robust nutrient diagnostic tools and assess soil health for improved nutrient management and sustainable use of soils.
- ◆ Increase understanding among smallholder farmers of the rubber-based cropping systems most suited to their lands and resources to achieve the best incomes for their family.
- ◆ Develop local capacity to interpret the results from land suitability analysis, soil nutrient deficiency tests and farm-level budget predictions to enable the identification of suitable land, appropriate intercropping patterns and best management for rubber production.
- ◆ Collect evidence to influence policies supporting the sustainability of improved rubber-based cropping systems and communicate information to local government and other stakeholders.
- ◆ Increase economic returns on farming activities by smallholder farmers, contributing to poverty alleviation.

