Soil and Land Management

Sustainable soil management of sweetpotato cropping systems

Papua New Guinea

Overview

Papua New Guinea's (PNG) population has more than doubled in the last 30 years, with the highest growth rates in the Highland provinces. Chronic malnutrition is rife.

The country has limited land available to expand agricultural production, which means that existing food production systems will need to intensify to feed the rapidly growing population.

Sweetpotato is both a staple food and a cash crop in the PNG Highlands, with most producers engaged in subsistence farming. Studies show that farmers in the region are growing sweetpotato with a shorter fallow period and more rotations with legume crops, and using shorter cropping periods compared with 10 years ago. The sustainable intensification of the sweetpotato cropping system will be essential in increasing food security and improving the livelihoods and incomes of all rural highland communities.

Farmers involved in this project are emerging as semi-commercial producers. Their production expectations will speed soil degradation, with market engagement providing them with the financial resources to enable adoption of innovations in nutrient management.

KEY FACTS

ACIAR Project No. SMCN/2012/105
Duration: February 2016 to December 2019 (4 years)
Target areas: Papua New Guinea
Budget: A$1,499,971

Project Leader
Professor Neal Menzies, The University of Queensland

Key partners
• National Agricultural Research Institute (NARI)

ACIAR Research Program Manager
Dr James Quilty

Objective

The project's overall aim is to provide farmers with a range of nutrient supply options to underpin the sustainable intensification of the PNG Highland sweetpotato cropping system.

The project's specific objectives are to:

- Elaborate nutrient budgets for typical sweetpotato production systems and determine the response of the system to the addition of macronutrients.

- Develop a range of nutrient management strategies to sustain and intensify semi-commercial sweetpotato cropping systems.

- Estimate the costs and benefits of crop management strategies such as crop rotations, hedgerow biomass incorporations, and introduced fertilisers, including 'waste' materials.

- Enhance field and laboratory research capacity in the PNG Highland region by providing quality training for junior scientists and technicians, and pairing of University of Queensland and Kila Kila laboratories for improved quality control and operation efficiency.

Expected scientific results

- Novel, scientifically validated insight regarding sweetpotato nutrient dynamics and options to maximize storage-root thickening in existing cultivars and new PT planting materials.

- Essential information on nutrient balances in the whole sweetpotato production cycle under subsistence and semi-commercial soil management practices.

- Information regarding the identification of cultivated or voluntary fallow species and their nutrient accumulation traits.

- Information about fertilisation strategies, including the use of high nutrient content organic wastes and inorganic fertilisers to offer farmers a range of options for further production development relevant to semi-subsistence through to high input commercial production systems.

Expected outcomes

- Improved food security and sovereignty as well as higher household incomes of rural communities in the PNG Highlands thanks to increased and sustained production of sweetpotato.

- Greater dietary diversity and improved nutrition, especially among women and children, due to increased use of legume rotation crops.

- Increased nutrient inputs through crop rotations, hedgerow management, and the use of commercial fertilisers for the projected adoption of high yielding PT varieties by semi-commercial farmers.

- Improved quality and reliability of the PNG national plant and soil analytical service, and greater capacity of junior scientist/technician to manage the improved service after the project is completed.

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