



Soil management in Pacific Islands: investigating nutrient cycling and development of the soils portal

Overview

Sustainable agriculture is fundamental to the future prosperity of the Pacific Island Countries Territories (PICTs). Commercial farming is an important source of employment and export revenue, while subsistence farming underpins food security for most rural areas.

Diverse farming systems operate across the region, from traditional gardening systems to commercial mechanised farming.

The intensification of traditional gardening systems in the PICTs has depleted the soil nutrient capital. Comprehensive nutrient budgeting is essential for improving farm productivity and agricultural resilience on volcanic islands and sand atolls.

Extension officers are currently unable to reliably determine which nutrients (or other factors such as diseases) are limiting production let alone recommend optimal nutrient inputs. The lack of access to information on soil types and their distribution further limits the ability to extend the results from previous research studies or well-understood farming systems to other locations across the PICTs.



KEY FACTS

ACIAR Project No. SMCN/2016/111
Duration: October 2017 to September 2021
Target areas: Pacific Islands
Budget: A\$2,020,000

Project Leader

Ben Macdonald, Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Key partners

- Secretariat Pacific Community
- Landcare Research New Zealand
- Ministry of Natural Resources and Development, Tuvalu
- Ministry of Agriculture and Fisheries, Samoa
- Ministry of Agriculture, Food, Forestry and Fisheries, Tonga
- Ministry of Environment, Lands and Agriculture Development, Kiribati
- Ministry of Agriculture, Fiji

ACIAR Research Program Manager

Dr James Quilty

Objective

The project's aim is to ensure that soil knowledge is enhanced and provides a reliable foundation for sustainable intensification of agricultural systems.

The project's specific objectives are to:

- Identify the barriers preventing sustainable soil management.
- Quantify nutrient cycling in island agricultural and taro production systems and undertake field trials to highlight the importance of budgeting for soil fertility management and increasing yield.
- Identify problems with, and subsequently improve, current soil sampling, testing and interpretation protocols and develop soil type specific protocols.
- Develop the Pacific Soil Portal to enable sustainable soil management in the farming systems of the region.

Expected scientific results

- A strong systems-view of the soil nutrient system enabling the most effective interventions to be identified along with their likely cascade of effects.
- The framing of soil nutrient research within a pedological and landscape context that allows more effective generalisation of research results.
- Use of the Pacific Soil Portal as a basis for undertaking more interdisciplinary studies, particularly through the provision of web services that can be readily used by other scientific communities (e.g. simulation modelling, spatial analysis, environmental monitoring).
- Identification of the barriers that have prevented soil nutrient management.

Expected outcomes

- Enhanced soil knowledge and a reliable foundation for sustainable intensification of agricultural systems by growers, extension officers and policy-makers.
- The Pacific Soil Portal, the first and most trusted point-of-reference for any queries on the soils of the Pacific, forming an integral part of the emerging global soil information system and becoming an internationally recognised showcase for regional cooperation and excellence in sustainable soil management.
- Increased profitability resulting from improved farming practices and the resulting multiplier effect throughout the economy.
- Increased capacity of all stakeholders participating in their associated value chains (e.g. from farm to market) to overcome the major threat of long-term soil fertility loss.
- Introduction of advanced rapid methods for determining nutrient budgets, resulting in a major increase in the capacity of scientists and technicians working in the Pacific.
- Next-users and end-users involved in the development of the Pacific Soil Portal acquiring skills and capacity that will support innovation in agriculture and related fields.
- Policy-makers provided with the evidence to design policy that can respond at regional, national and local levels, such as through fertiliser subsidies or recycling of effluent and other wastes for farm production or business development.
- Governments able to meet existing policy and reporting commitments to sustainable agriculture, sustainable development goals and voluntary international agreements.

