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Front cover: Mani Mua (left) was one of 4 recipients of John Allwright Fellowships in the Pacific region in 2020. Photo: Simione Tukidia, SPC.

Back cover: Jone Kunatui prunes his tomato crop. Photo: ACIAR.

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Foreword

Welcome to this special edition of the ACIAR Pacific Newsletter, dedicated to bringing you updates and insights from ACIAR projects across the Pacific region. The agriculture, fisheries and forestry sectors are more than just an economic activity here. They are the backbone of our communities, providing sustenance, employment and a shared connection to our land.

The Pacific Week of Agriculture and Forestry in Tonga on 26–30 May brings together leaders, experts and stakeholders in the agriculture and forestry sectors from across the Pacific region to discuss key challenges and opportunities.

The event shapes strategic directions and actions aimed at achieving food security and reducing poverty across the Pacific. Furthermore, it will empower Pacific member countries to influence key discussions and help guide ACIAR's regional priorities for the following 2 years.

In this issue, we focus on stories of impact from ACIAR projects in the Pacific region. These include the successful projects focusing on citrus production and market development in Tonga and Samoa, which are creating commercial opportunities for smallholder farmers and boosting local supplies of fresh, high-quality fruits.

We invite you to explore the stories and updates within this newsletter and take part in the ongoing dialogue about how we can collectively contribute to the growth and resilience of our agriculture sector. Your insights and experiences are invaluable as we build a vibrant community of learning and progress.

Thank you!

ACIAR Pacific team

ACIAR Pacific Program 2024–25 overview

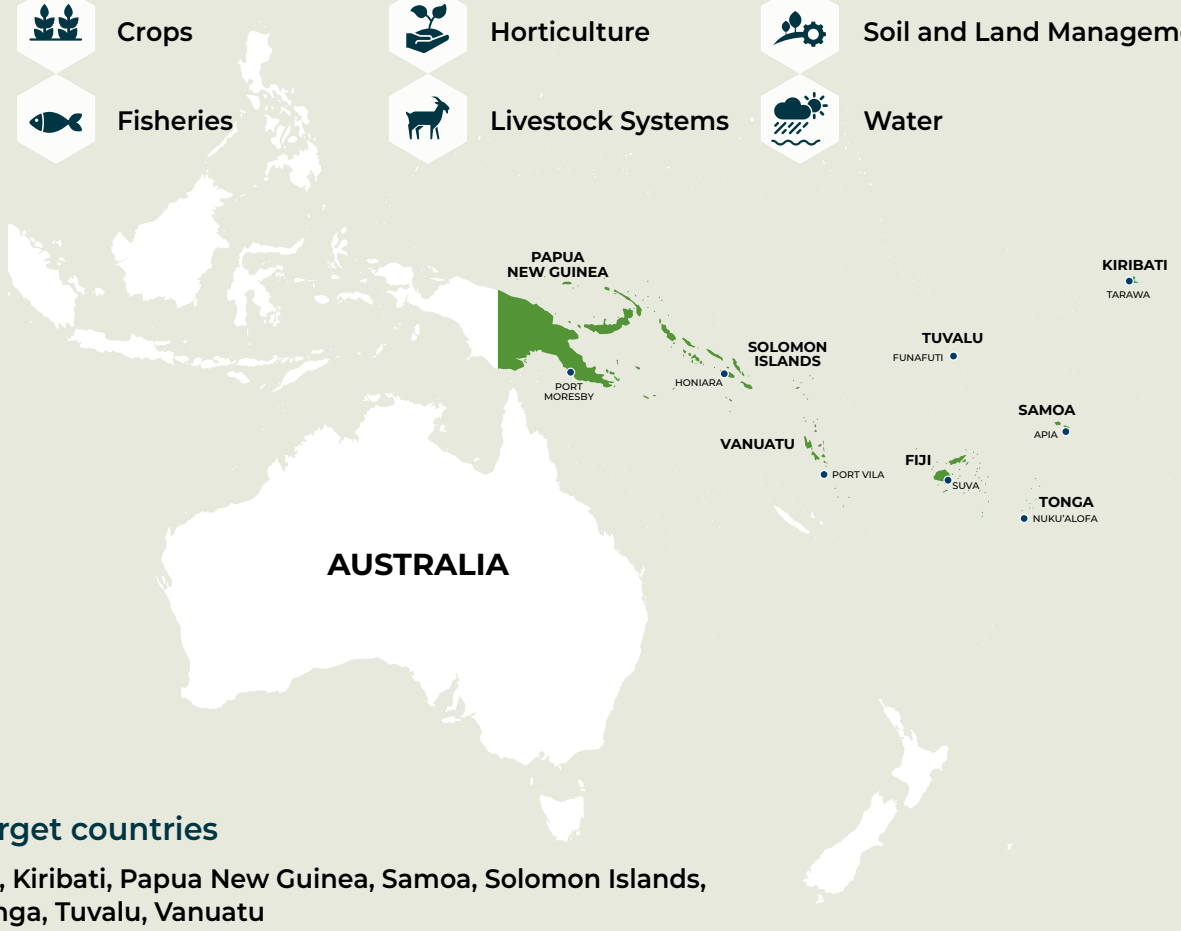
A$18.16m
Total investment

54
Projects funded

8
Pacific partner countries

Research programs

- Agribusiness
- Forestry
- Social Systems
- Crops
- Horticulture
- Soil and Land Management
- Fisheries
- Livestock Systems
- Water



Target countries

Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu

While acknowledging the individual needs and unique research and development priorities of each partner country in the Pacific region, the scattered nature of the island nations and their small populations mean that many countries cannot address all their challenges and opportunities in agriculture on their own.

Drivers of regional collaboration

Since 1982, ACIAR has been at the forefront of transforming the agricultural landscape in the Pacific region by fostering collaboration between Australian and Pacific institutions to bridge gaps in knowledge, technology and resources.

In 2024–25, ACIAR will invest a little more than A$18 million in agricultural research for development across 7 Pacific island countries and Papua New Guinea. A central focus of current ACIAR efforts in the Pacific region will be fostering regional cooperation in research and capacity development to address shared challenges and opportunities. This collaborative approach encompasses projects on climate-resilient livelihoods, biosecurity, agribusiness development, community-based fisheries management, and integrated food systems and nutrition.

ACIAR supports the development of sustainable agricultural practices that are tailored to the region's unique environmental and socio-economic conditions by funding and facilitating research collaborations between Australian and Pacific institutions.

A valuable platform for driving regional collaboration is the biannual forum of the Heads of Pacific Agriculture and Forestry Services and the Pacific Week of Agriculture and Forestry, which ACIAR draws upon for developing research priorities and partnerships.

The 2025 Pacific Week of Agriculture and Forestry in Tonga provides a forum for Pacific member countries to lead discussions and inform ACIAR's regional priorities for the next 2 years.

ACIAR in Tonga: Research partnerships for sustainable agriculture and forestry

The Australian Centre for International Agricultural Research (ACIAR) has been a close partner in research and development in Tonga since 1984. ACIAR collaborates with research and government organisations to enhance farmers' livelihoods and foster economic growth.

ACIAR is recognised across the Indo-Pacific region as a facilitator of research-for-development partnerships that generate, apply and share innovative knowledge to address the agricultural challenges faced by developing nations.

ACIAR and Tonga

Tonga is one of the 36 countries in the Indo-Pacific region where ACIAR research partnerships are contributing to reducing poverty and improving food security through agricultural research for development. ACIAR achieves this by brokering and funding research partnerships consistent with jointly agreed priorities.

Since 1984, ACIAR has commissioned research projects in Tonga as a focus country or regional implementing partner, across various themes including pest and disease management, livestock production systems, aquaculture development, marine resource management, soil health and land management, agribusiness development, facilitated agriculture extension, and climate-resilient livelihoods.

ACIAR supported research

These collaborative projects are implemented in close collaboration with the Tonga Government, Ministry of Agriculture Food and Forest – Tonga, Mainstreaming of Rural Development Initiative, Tonga Trust; regional and international organisations such as the Pacific Community (SPC), Fiji National University, University of the South Pacific; and civil society organisations, such as the Pacific Islands Farmers Organisations and Pacific Grow.

Building research capacity is a shared agenda

Strengthening agricultural research and development capacity is also a shared goal of ACIAR and its partners, particularly in building individual and organisational capacities for research. ACIAR provides opportunities for researchers and research managers in the Pacific region, including Tonga, to boost their technical, policy and management skills in agricultural research for development.

To achieve this, ACIAR delivers a capacity development program that provides scholarships for postgraduate degrees (Master and PhD), specialised technical training, research leadership and management, partnership brokering, and support for women leaders in science. Alumni of ACIAR capacity development programs are active researchers, scientists and research managers who are contributing to the development of agriculture, fisheries and livestock in the region. Eighteen Tongans have received ACIAR capacity development scholarships for Master and PhD programs.

ACIAR is proud that many alumni are now senior officials and leaders in their respective organisations.

ACIAR projects Tonga

- Sustainable agricultural intensification systems for climate resilient development in Pacific island countries, **CLIM/2020/186**
- Adopting a gender-inclusive participatory approach to reducing horticultural food loss in the Pacific region, **CS/2020/191**
- Half-pearl industry development in Tonga and Vietnam, **FIS/2016/126**
- Towards more profitable and sustainable mabé pearl and shell-based livelihoods in the western Pacific, **FIS/2019/122**
- Responding to emerging pest and disease threats to horticulture in the Pacific islands, **HORT/2016/185**
- Improving root crop resilience and biosecurity in Pacific island countries and Australia, **HORT/2018/195**
- Enhanced fruit systems for Tonga and Samoa (Phase 2): Community-based citrus production, **HORT/2019/165**
- PIC More Veg: Driving vegetable food environments to promote healthy diets in Pacific island countries, **HORT/2021/141**
- Building mechanisms to respond to and manage emerging pests and diseases of horticultural crops in Pacific islands, **HORT/2025/100**
- Soil management in Pacific islands: investigating nutrient dynamics and the utility of soil information for better soil and farming system management, **SLAM/2020/139**
- A review of the soil and agronomic constraints and opportunities in Pacific food garden systems, **SLAM/2022/180**
- Assessment of the capacity and sustainability of Pacific Agricultural Chemistry Laboratories, **SLAM/2022/181**
- Identifying Pacific Soils Analysis and Advice Network capacity-building needs, **SLAM/2024/142**

ABOVE Tongan vendors at the 2024 Royal Tonga Agriculture Show.

Citrus developments bearing fruit in Tonga and Samoa

Citrus production and market development in Tonga and Samoa are boosting local supplies of fresh high-quality fruit and creating commercial opportunities for smallholder farmers.

ABOVE The ACIAR-supported project aims to increase domestic citrus production in Tonga and Samoa.

Harvests from newly developed orchards in Tonga are raising hopes for increased access to locally grown citrus fruit. Lemons, limes, sweet oranges and mandarins are all well-known on the islands, but imported fruit has grown to dominate local markets in recent decades.

However, harvests from new orchards established 5 years ago under an ACIAR-supported project mark an anticipated revival of local fresh fruit production. Mandarins have sold quickly, fetching good prices this year.

An initial ACIAR-supported project investigated tropical fruit crops in Fiji, Tonga and Samoa. Although that project ended in 2020, it identified citrus as an important fruit crop for development in Tonga and Samoa. Horticultural expert Professor Steven Underhill at the University of the Sunshine Coast led this work and now leads Phase 2, which will run until 2025, and is focused solely on citrus.

Professor Underhill said citrus has a comparatively long shelf life and a winter harvest provides an off-season fruit supply. They are also a diabetic-friendly fruit, which is important as almost one in 3 adults in Tonga and Samoa is estimated to suffer from diabetes. This fits with one of the project's objectives: to get people to eat more fresh fruit.

Health and business goals

Former ACIAR Research Program Manager, Horticulture, Irene Kernot said increasing the availability of affordable fresh fruit could help to increase consumption and improve diets.

From an agribusiness perspective, Ms Kernot said investing in improved tree genetics, along with propagation and crop management skills will also support new business opportunities for smallholders in Tonga. As part of the original ACIAR project, more than 1,000 citrus trees were planted in 5 orchards. Varieties trialled include Washington and Valencia oranges; Emperor, Imperial, Afourer and Ellendale mandarins; Meyer lemon and Tahitian lime. Elite Australian rootstock with advanced disease resistance and vigour, plus early and late season varieties, have the potential to extend local production from 4–6 weeks to 6 months.

In Tonga, 3 orchards are based on the outer island of Eua. One is a private orchard and 2 are community-run. There are also a further 2 commercial orchards on the main island of Tongatapu. One is owned by the NGO Mainstreaming of Rural Development Innovation (MORDI) Tonga Trust and the other by fruit export enterprise Nishi Trading.

Nishi Trading Managing Director Mr Minoru Nishi said the ACIAR-supported research has helped to find species well suited to the climate in Tonga. His company was the first to harvest and sell crops from trees established as part of this work. He supports the production of more fresh, high-quality fruit for local consumers to replace imports.

'It will help increase incomes for people involved in fruit tree production and fruit retailing. By building local skills and capacity, it is also helping to improve employment opportunities,' said Mr Nishi.

Skills development

The project is also building local capacity and skills in tree propagation and grafting, pruning and orchard management, including the staff at MORDI.

'They are now running a highly successful plant nursery,' said Professor Underhill.

'The relationship with MORDI has also been essential in developing the community orchards on Eua, and also in providing training to local farmers in propagation and orchard management.'

Key points

1. The ACIAR project on enhanced fruit systems for Tonga and Samoa is building local capacity and skills in tree propagation, grafting, pruning and orchard management.
2. To enhance horticultural expertise in Tonga and Samoa, ACIAR have supported three Pacific islanders to undertake postgraduate studies aligned to the project.
3. Significant progress has been made towards developing a new women-led citrus value-adding enterprise in Samoa.

Demand for the fruit produced to date has been strong and Professor Underhill said surveys will be conducted to determine consumer preferences for different varieties, particularly of oranges and mandarins, as well as barriers to increased fruit consumption.

Samoan trials

In Samoa, there is an existing small-scale citrus industry on the island of Savai'i with native citrus trees that are well adapted to local conditions. A trial is underway to compare local seed-produced trees with imported elite grafted material.

An important core focus of the project's work in Samoa is enabling citrus value-adding opportunities. The local citrus harvest includes limes, oranges and grapefruit but it is a short season, which causes a supply glut and low prices. According to the Samoan project coordinator Dr Seeseei Molimau-Samasoni at the Scientific Research Organisation of Samoa (SROS), preliminary discussions between SROS and citrus farmers revealed a keen interest in value-adding, with farmers eager to make full use of the local citrus supply, particularly during peak season.

Fiji-based food scientist Dr Richard Beyer has been leading this work as part of the project. At a product development workshop on Savai'i in April 2023, he introduced community members to food safety and handling procedures, and to a range of products and preserving processes that they might try.

'There was "explosive enthusiasm" from the women attending,' said Dr Beyer.

Workshop experiments created 8 new products using citrus ingredients, and 4 other products to supplement production during the citrus off-season, with half showing promise for further development.

With the right products and packaging, Dr Beyer said these products have the potential to generate new business opportunities, tapping into tourist markets as well as local demand.

> **ACIAR PROJECT:** 'Enhanced fruit systems for Tonga and Samoa (Phase 2): Community based citrus production' (HORT/2019/165)

ABOVE The project is building local capacity and skills in tree propagation, grafting, pruning and orchard management, including the staff at MORDI.

Building a collaborative research future in the Pacific

An exciting initiative is shaping the future of agricultural and forestry research – the Regional Research Agenda. The vision of the agenda is to identify common agriculture and forestry development challenges in the Pacific region, establish Pacific research partnerships and define research strategies to overcome these challenges.

The concept of forming the Regional Research Agenda project began during the Heads of Agriculture and Forestry meeting in 2021, where it was emphasised that enhancing research coordination and resource sharing is critical to addressing development challenges in Pacific island countries and territories.

Supported by ACIAR in collaboration with the Pacific Community (SPC), the project aimed to develop a framework for a regional research agenda in agriculture and forestry for the Pacific region. The main goals were to define a shared vision, concepts, expectations, process and framework for the regional research agenda, which would deliver expected outputs in the medium term (10–15 years) and to develop the framework and processes needed to deliver those expected outputs.

SPC Research for Development Advisor, Ramona O'Connor, said that the framework contained 3 main components:

a) **Hearing Pacific voices** – gathering research priorities from member countries through an ongoing process using SPC networks, national Agriculture and Forestry plans, farmers, industry, civil society organisations and research institutions. Research priorities will also be discussed biennially during panel discussions at the Pacific Week of Agriculture and Forestry.

b) **Peer review** – top researchers and experts nominated by the Heads of Agriculture and Forestry, collaborating with the secretariat to identify the most urgent research priorities with regional impact potential.

c) **Partners in Research** – focusing on forming alliances among countries interested in researching prioritised issues. These countries nominate a Regional Research Team to conduct the research. Initially, the team and the secretariat assess ongoing regional research and available resources, including infrastructure and expertise. Once gaps are identified, they define a research approach and proceed with the research.

Key points

1. The Regional Research Agenda aims to identify common agriculture and forestry development challenges, establish Pacific research partnerships and define research strategies.
2. Changes and adaptations will be made to the agenda to ensure that the model fits its purpose – to benefit Pacific island countries and territories.
3. The first Regional Research Agenda Symposium will be held in Tonga on 22–23 May to promote Pacific-focused research and engage with policymakers, researchers and practitioners.

SPC began consultations to craft the Regional Research Agenda for initial assessment where 4 main researchable priorities were identified:

- support and make available healthy and nutrient-rich crops for local consumption
- improve the genetic base through seed production
- implement solutions to support sustainable forest and landscape management
- promote crops that are climate resilient.

TOP Pacific researchers took part in the first Regional Research Agenda writing workshop, held in Fiji in 2024. **ABOVE** Pacific researchers at work on the Regional Research Agenda Framework.

Currently, the Regional Research Agenda is being evaluated and adjustments are being made to ensure it meets its intended purpose for the benefit of Pacific island countries and territories.

With support from ACIAR, the findings will be showcased leading up to the Pacific Week of Agriculture and Forestry in Tonga, at the first ever Regional Research Agenda Symposium on 22–23 May. The symposium offers a strong opportunity to strengthen partnerships, promote our Pacific-focused research and engage with a diverse audience including policymakers, researchers, and practitioners.

In collaboration with the Ministry of Agriculture, Food and Forestry and SPC, ACIAR is also supporting and co-hosting the Symposium Dinner. With a significant number of ACIAR alumni, scholars and project team members expected to participate in the symposium, the dinner presents a unique opportunity to celebrate and reconnect with ACIAR Alumni across the Pacific region, strengthen ties between key partners and recognise the contributions of ACIAR-supported projects to agricultural development in the region.

The final adapted Regional Research Agenda framework will then be presented to the Heads of Agriculture and Forestry meeting, 26–30 May in Nukualofa, Tonga, for endorsement.

ACIAR PROJECT: 'Testing and adapting the Pacific Regional Research Collaborative Framework' (GMCP/2023/178)

Fostering the next generation of agricultural research leaders

Spotlight on ACIAR Pass Scholar – Luisa Wara

Luisa Wara is a research intern with the Pacific Community's Land Resources Division, supporting work on Regional Research Agenda.

A current ACIAR Pacific Agriculture Scholarships and Support (PASS) PhD scholar at the University of the South Pacific, Luisa is part of a growing cohort of young Pacific researchers whose academic and professional journeys are being supported through the SPC internship program and ACIAR's scholarship initiative. These programs are helping to build the next generation of agricultural research leaders in the Pacific.

Can you briefly describe your academic background and how it has led you to pursue this internship opportunity?

I am a research student currently affiliated with the University of the South Pacific, with a decade of experience in agriculture, particularly focusing on agribusiness and agri-economics. My studies integrate various disciplines such as social science, marketing, management, farming and economics, making it truly multidisciplinary. My interest has always been in rural development and agriculture's pivotal role in it, especially considering the dependence of rural communities in Fiji and nearby regions on agriculture. I advocate for the integration of cultural elements into agricultural innovation.

The internship with the Regional Research Agenda Framework at the Land Resources Division aligns perfectly with this vision by developing research and initiatives that advance the agriculture sector and enhance rural livelihoods, all while prioritising the farmers' way of life.

Can you tell me about your internship work/project and what inspired you to pursue it?

In our Pacific culture, community is central, and individuals live not just for themselves, but for others. Over time, I have realised that my career choice may be less about personal benefits and more about contributing to my community and region. Being a Regional Research Agenda intern is a privilege, offering me the chance to serve. It is a mutually beneficial scenario where I can apply my academic knowledge to give back to the community while also gaining valuable experience with the region's leading scientific and technical organisation. As a win–win situation, I can give back to my community by putting into practice what I have learnt throughout my academic journey. Also, I get to build on my work experience with the region's principal scientific and technical organisation.

LEFT Luisa Wara (left) with the ACIAR PNG Country Manager, Dr Nora Omot.

How do you think your involvement at SPC will help prepare you for your career?

"If I have seen further, it is by standing on the shoulders of giants." — Isaac Newton

I joined the team as a student, a mentee – little experience but ready to learn. I am fortunate that in this role, I am given the chance to make mistakes (and improve from it). I can work independently while still be a team player (we live by the motto: teamwork makes the dream work). I also get to make good friends and expand my network. No words can fully describe how much I appreciate being a part of the Land Resources Division and SPC. I have learnt and am still learning a lot!

Are there any specific skills or knowledge areas that you have gained or improved?

I have been able to build my interpersonal skills, teamwork, survey tools and techniques, organisational skills, baseline studies/desktop research, business analytics software and so much more. I work under the supervision of the Advisor for Research for Development in the Land Resources Division. Although the primary goal of my role is to support the Regional Research Agenda Framework, I still have links with the other pillars within the Division. To provide examples, I have broadened my knowledge on organic agriculture – both the sciences and socioeconomic impacts through the POLFN programme. I am made aware of the current (most updated) status of the coconut industry in the region through the Pasifika NiuNet network and the Coconut Integrated Programme. I have learnt about the basics of poultry feed formulation from the livestock experts.

Any advice you would give young aspiring interns who want to be regional researchers?

Always have a heart to serve.

Growing up in the Pacific, each one of us is considered a custodian of our Vanua (land and people) and every element tied to it regardless of which career path we choose. To serve is to be humble enough to listen and learn; to place people at the heart of all that you do; and when things get extra tough... just remember why you started in the first place.

Good things do not come easy. Patience, perseverance and positive thinking can really take us far in life. Trust the process and enjoy every season that life takes you through. Also, remember that no human is an island and having a dedicated support system consisting of faith, family and friends is especially important.

LEFT Luisa (far right) with fellow PASS scholars (L-R) Christian-Yves Amato-Ali, Aleksio Rabaka and Salote Nasalo.

Bridging the soil knowledge gap in the Pacific

A recent survey of agricultural professionals in Pacific island countries and territories (including agricultural extension officers, agronomists and soil laboratory technicians) showed 30–40% as having little understanding of basic soil topics. Gigi Woods from Soil Science Australia explains how we can bridge that knowledge gap.

Understanding the fundamentals of soil is an essential skill as it serves as the very foundation for successful crop cultivation and land management. Soil is a dynamic, living system teeming with diverse microorganisms, nutrients and physical properties that directly influence plant growth and overall agricultural productivity.

Knowledge of soil types, composition, structure and fertility empowers informed guidance to farmers, aiding in optimal crop selection, irrigation practices, fertiliser management and pest control strategies tailored to specific soil conditions. This understanding is particularly crucial in the Pacific region, where diverse environments present unique agricultural challenges.

In support of this, an ACIAR-supported project aims to assess the capacity and challenges associated with delivering analytical services across agricultural chemistry (Ag-Chem) laboratories in the Pacific, including in Fiji, Samoa, Tonga, Vanuatu and Solomon Islands. Enhancing these services will help ensure that soil testing and analysis can guide more effective and sustainable agricultural practices.

Across the Pacific island countries and territories there is a passion and willingness to protect and invest in soil, but the knowledge on how to do so is often lacking. If we want to build capacity for the region, the focus should begin with increasing soil skills. This empowers professionals to use all the equipment available. This may not be only physical equipment but their eyes and hands as well – as these can often be the most useful and powerful tool in understanding soil limitations for crop growth.

Key points

1. A recent survey showed 30–40% of agricultural professionals in the Pacific region identified as having little understanding of basic soil topics.
2. A recent ACIAR project aimed to assess the capacity and issues related to delivery of analytical services across the agricultural chemistry laboratories in Fiji, Samoa, Tonga, Vanuatu and Solomon Islands.
3. Soil Science Australia undertook a regional pilot training program in the fundamentals of soil.

ABOVE A soil health training workshop for agricultural officers across the Pacific region was held in Fiji in 2024, organised by Soil Science Australia and the University of New England.

For many agricultural professionals working in the Pacific region, their knowledge on the fundamental properties and functions of soil comes from on-the-job instruction. In a recent survey 30–40% of professionals in the region identified as having little understanding of basic soil topics. As one of the respondents of the survey noted:

'There is a big gap that requires understanding the fundamentals of soil itself. Understanding the fundamentals of soil science will upgrade me in testing and results interpretation.'

The skills gap is not restricted to one element of soil science, but a lack of knowledge across all the behaviours and properties of soil. This means professionals would benefit from an introductory course on soil science. There are formal training pathways in the region to gain such knowledge, such as through tertiary institutions including the University of the South Pacific (Samoa campus) and Fiji National University. However, the time and enrolment requirements of degrees such as a Diploma or Bachelor of Agriculture may act as a roadblock. Geographical distance and isolation for many countries in the region can also deter agricultural professionals undertaking further education outside their home country. A simpler, targeted training is necessary for professionals to enable them to gain fundamental soil knowledge.

Basic soil fundamentals training in Fiji

To meet this skills gap, Soil Science Australia undertook a regional pilot training program in the fundamentals of soil. This pilot training program which was held in Fiji in September of 2024 and targeted the key areas of soil formation and function, physical, chemical and biological properties of soil, the nutrient cycle, soil

classification, and soil interpretation. The course was assessed in terms of relevance, clarity and regional and cultural relevance through a series of questions asked before and after the course. The pilot provided insights into the areas of soil skills development that is most needed for the region, and if this targeted training is an effective method for addressing skill gaps.

The participants of the training had self-identified as lacking in basic soil knowledge. They were from the following organisations: Scientific Research Organisation of Samoa; Ministry of Environment Lands and Agricultural Development, Kiribati; Ministry of Agriculture Food and Forests, Tonga; and Ministry of Agriculture and Rural Development, Vanuatu.

The FAO recently launched the "Integrated Agro-ecosystem Approach for enhancing Livelihoods and Climate Resilience in Tuvalu program" in Tuvalu. As such the FAO was contacted and offered the opportunity of sending participants to the training. Participant places were also offered to Fiji-based organisations: Fiji Agricultural Chemistry Laboratory, Fiji Ministry of Agriculture Lands Division, SPC (Pacific Community), and students from Fiji National University. This equated to 15 participants from across the Pacific region.

Dr Chris Guppy and Dr Ivanah Oliver from the University of New England developed the curriculum. Given that the knowledge status of participants was unknown, they used teaching methods adaptive to the skill levels demonstrated by answers to a questionnaire at the start of training. It was also designed to responsive to the weather, as the course had both indoor and outdoor activities.

Continuing efforts to make soil science more accessible and relevant will be key to overcoming the challenges faced by Pacific island countries and territories. The success of the project highlights the importance of providing flexible, practical, and regionally tailored training. Moving forward, there is a clear need to scale up these initiatives and embed the training into existing educational institutions, ensuring that future agricultural professionals across the Pacific region are empowered with the knowledge and skills to lead sustainable agricultural practices and protect soil resources that support their communities.

ACIAR PROJECT: 'Assessment of the capacity and sustainability of Pacific Agricultural Chemistry Laboratories' (SLAM/2022/181)

BELOW To meet a skills gap, Soil Science Australia undertook a regional pilot training program in the fundamentals of soil.

Engineered wood from coconut palms points to new industry for Fiji

An innovative new industry is poised to emerge in Fiji, creating engineered wood products from the country's thousands of hectares of senile coconut palms.

ACIAR-supported research in Fiji has developed new wood product engineering processes now being commercially trialled in both Fiji and Australia.

The engineering innovation has come from the Queensland Department of Primary Industries (QDPI) Forest Product Innovation team, which has been working with partners in Fiji and Australia on a process to create timber veneers from coconut palms.

The new veneer process recovers double the amount of timber of traditional sawn timber processes. It also requires less investment in equipment and uses less energy than conventional veneer processes. Project leader Dr Rob McGavin at QDPI said while veneer technology is used for many different timbers, his team has refined the traditional process primarily in response to the challenges of turning coconut palms into timber.

Fiji has about 40,000 hectares of senile coconut palms – trees that may be 50 years old or more and are no longer productive. Left in the ground, the trees are susceptible to pests and diseases that can infect productive palms.

But there has been limited incentive to remove senile palms and replant with either new coconut palms or other crops. If the palms hold value as a timber resource, it may help subsidise replanting, bringing more land back into

Key points

1. Fiji has about 40,000 hectares of senile coconut palms – trees that may be 50 years old or more and are no longer productive.
2. ACIAR-supported project is focused on the commercial adoption of new engineered wood product manufacturing processes.
3. The project is supporting new research and development capabilities for Fiji, to support the new wood engineering industry in the longer term, funding 6 postgraduate research students.

production and increasing income opportunities for local smallholders.

With this objective in mind, ACIAR has supported coconut timber-related research in Fiji for more than a decade. Two previous projects first confirmed that coconut palms could be used as a source of wood and then developed a production process that has worked effectively in a laboratory and then at a semi-commercial level.

Having overcome the technical challenges of production, the current ACIAR-supported project is focused on the commercial adoption of new engineered wood product manufacturing processes. As the manufacture of engineered wood products from coconut palms potentially creates a new industry, the project is also identifying training and employment opportunities for both women and men in Fiji and is assessing likely social impacts.

Coconut challenges

Dr McGavin said coconut palms are not actually trees, but a form of grass.

'The outside of senile coconut palms is incredibly hard, similar to ironbark, while the inside core is as soft as balsawood. The palms themselves are usually smaller in diameter than trees selected for milling. These characteristics mean sawn timber is a challenging option for coconut palms.'

LEFT A coconut log being peeled in a spindleless lathe. Photo: QDPI

Peeling the palms to create veneers has proved an attractive alternative; however, the conventional veneer technique uses steel spindles in either end of the log to hold it in place while it is peeled. Spindles have trouble gripping the soft core of the palms, and the size of the spindles means not enough timber can be recovered from each palm to make the process economically viable.

Undeterred, the QDPI research team has adopted an alternative drive system that turns the palms as they are peeled without the need for spindles, allowing almost all the palm to be recovered as veneer.

Another step in the veneer process is the heat treatment of logs before peeling, usually done by steaming the logs or putting them in hot water baths. Both processes require investment in expensive infrastructure, while hot water baths and steam create potential safety risks for staff.

The new process developed through the ACIAR-supported project uses a hot water shower, which is less expensive to set up, reduces the amount of water needed and allows that water to be recycled. It also reduces the energy required to heat the water and reduces safety risks.

Commercial adoption

Dr McGavin said this new heating method is still being trialled. One Australian company will launch the new shower-based system this year, while a partner mill in Fiji is trialling a hybrid system, as it already has steaming capacity in place. In Fiji, most of the mills are operating under capacity, with reduced access to timber, because of changes to government forestry policy that incorporate additional sustainability and environmental considerations.

'We are closely partnering with the Fiji industry, across the supply chain, from the farmers or organisations that own and manage coconut plantations through to harvesting and haulage contractors, the existing veneering industry in Fiji, and potential end users as well – builders and furniture manufacturers, the people who fit out buildings such as hotel resorts.'

Dr McGavin said there has been a considerable exchange of expertise between Fijian and Australian partners who are interested in engineered wood products, rather than coconut palms specifically.

In Fiji, partners include the Pacific Community (SPC), the Fiji Ministry of Forestry, Fiji National University, University of the South Pacific, as well as industry members including the Fiji Hardwood Board, and veneer import industry and local timber mills.

Australian partners with ACIAR include QDPI, the Australian Government's Pacific Horticultural and Agricultural Market Access Plus Program, University of Queensland, Griffith University, and industry members the Big River Group, Jowat Adhesives, Robertson Bros Sawmills and Eco Cottages.

Long-term resources

Mr Tevita Bulai is Executive Director of Research and Development at the Ministry of Forestry Fiji and said giving the palms some value at the end of their productive life may encourage more landholders to replant with coconut palms, rather than other crops such as kava.

And this will be essential if Fiji is to establish a long-term timber industry supported by palms as a timber resource. We also have options with engineered wood products to combine coconut with other local plantation timbers, such as pine or mahogany, and also the non-traditional forests commonly referred to as lesser-known species, to create finished products with the qualities the market needs.

'At the moment there is such a huge domestic demand for plywood timber that we cannot meet it. Being able to engineer plyboards or blockboards will help us to do that and reduce imports.'

ACIAR Research Program Manager, Forestry, Dr Nora Devoe said using non-traditional sources of materials, such as coconut palms, opens a significant opportunity for Fiji and other Pacific countries. She highlighted the value of the innovative technology developed through the research and its potential for widespread adoption. Dr Devoe said the project is also supporting new research and development capabilities for Fiji, to support the new wood engineering industry in the longer term, funding 6 postgraduate research students.

'At the same time, we're working with those at the beginning of the process, harvesting the palms, to establish protocols that will reduce the potential spread of pests and diseases that the senile palms often host,' said Dr Devoe. 'This is effectively taking what was a problem waste product to create a whole potential new industry.'

> **ACIAR PROJECT:** 'Coconut and other non-traditional forest resources for the manufacture of Engineered Wood Products' (FST/2019/128)

LEFT ACIAR-supported research has developed new ways to process coconut logs that allow them to be milled for veneers and other engineered wood products. Photo: QDPI

Advocating for agribusiness growth in Tonga

Spotlight on ACIAR PASS Scholar – Elisaia Ika

The agriculture sector in the Pacific is undergoing a quiet transformation, thanks to leaders like Mr Elisaia Sylvester Ika, who recently earned his master degree from Fiji National University.

Supported by the ACIAR Pacific Agriculture Scholarships and Support (PASS) program, Mr Ika has combined academic research with on-the-ground policy work in Tonga's agricultural sector. Now serving as Deputy CEO at the Ministry of Agriculture, Food and Forests in Tonga, Mr Ika shares his insights on Tonga's agriculture sector, and the role of research and agribusiness in shaping a strong future for Pacific farming communities.

Tell us a bit about your field of work and why you chose this area of study.

I pursued a Master of Agriculture with a focus on Economics and Agribusiness. My background is in economics, and I currently work for the Ministry of Agriculture in Tonga – specifically in policy development. This area of study aligns closely with my role, as it allows me to better understand the economic and business aspects of agriculture.

I am passionate about agribusiness and want to help the agriculture sector grow – not only economically but also socially. Agribusiness is a key driver of that growth and a vital area where I can make a meaningful contribution.

ABOVE Elisaia's research, titled 'An analysis of Tongan farmers' and market vendors' perceptions of domestic fruit production and marketing,' has provided valuable insights into Tonga's fruit industry.

How would you describe the agriculture sector in Tonga?

Tonga's agriculture sector is still developing, especially when compared to more advanced systems like Fiji's. Our private sector involvement in agriculture is limited, mostly centred around a small number of commercial farmers. However, agriculture continues to contribute around 18–20% of GDP, a figure that's remained steady over the past 5 years. There's room to grow, especially through strengthening agribusiness.

Currently, 90% of our farmers are smallholders, so a major focus should be transitioning some of them into semi-commercial and eventually full commercial farming. Developing the private sector in this way could enhance agricultural productivity and economic impact. While the Ministry of Agriculture focuses heavily on production, we need to simultaneously nurture the commercial mindset among our farmers.

As an ACIAR PASS scholar, you worked on a citrus fruit project in Tonga. Could you tell us more?

Yes, my master's research was conducted under the guidance of Professor Steven Underhill, who led the ACIAR citrus project in Tonga. My role involved looking at farmer behaviour and decision-making around citrus production, as well as the perspectives of market vendors on domestic fruit production and marketing. I studied both ends of the value chain, aiming to contextualise citrus and broader food production in Tonga.

What impact have you seen from your work on citrus production in Tonga?

When I returned to Tonga, I noticed that some of the findings from my research were being adopted by NGOs like MORDI Tonga Trust. For example, strategies I proposed to address pest management and improve citrus farming practices were taken on board. One key insight was that many farmers are willing to engage in citrus production even with limited support – the real barriers are access to quality planting material and a lack of capacity-building opportunities for farmers.

How have your skills and knowledge developed since undertaking studies under the PASS program?

One of the most valuable things I gained from the ACIAR PASS program was the ability to write in a structured and impactful way – particularly for research reports and project proposals. Professor Underhill and the research team provided continual guidance, especially on being precise and evidence-based in my writing. I also learned how to conduct effective literature reviews, develop solid research structures and frame findings in ways that are useful to policymakers and practitioners. These are critical skills I now use regularly in my role back home.

LEFT Elisaia Ika graduated with a Master of Science in Agriculture (Agribusiness) from Fiji National University this year. Photo: FNU.

Championing Pacific plant health

ACIAR flagship capacity-development program, the John Allwright Fellowship, provides scientists from ACIAR partner countries, especially in the Pacific region, with the opportunity to obtain a postgraduate qualification from an Australian institution.

The fellowship aims to strengthen scientific research capability and institutional links in ACIAR partner countries to undertake high-quality and impactful research.

The ACIAR John Allwright Fellowship offers scholarships to partner country scientists who wish to study in Australia. Established in the late 1990s, the fellowship program has seen 495 people graduate with PhD or Master degrees. Since 2017, women comprise at least half of all John Allwright fellows.

ABOVE With ACIAR support, Mr Mani Mua (right) is designing training activities to build the capacity of plant health trainees in the Pacific region.

Fijian plant health champion Mr Mani Mua was one of 4 applicants from the Pacific region who was awarded a fellowship in 2020. He was selected in recognition of his work responding to emerging horticultural pests and diseases in the Pacific.

'I am very grateful to be selected as a JAF recipient through ACIAR to pursue my doctorate on plant health and insect resistance management,' he said.

A former Plant Health Coordinator with the Pacific Community (SPC), Mr Mua was part of an ACIAR project Responding to emerging pest and disease threats to horticulture in the Pacific Islands, HORT/2016/185 with the University of Queensland and the SPC Land Resources Division for the past 5 years and was at the forefront in responding to emerging horticultural pests and diseases in Fiji, Samoa, Tonga and Solomon Islands.

With ACIAR support, Mr Mua is designing training activities to build the capacity of plant health trainees within these countries to identify common pests and diseases that affect horticulture.

'It is very inspiring to work with scientists and specialists from ACIAR and various Australian universities,' said Mr Mua.

'I have learnt a lot from ACIAR specialists, the project team leaders and the regional network of farmers and plant health trainees. The peer-to-peer learning approach encouraged me to apply for the JAF.'

> **ACIAR PROJECT:** 'Responding to emerging pest and disease threats to horticulture in the Pacific Islands' (HORT/2016/185)

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