Pacific island countries

A$11.85 million
Budgeted funding

26
Bilateral and regional research projects

9
Small projects and research activities

Agriculture, fisheries and forestry are vital sectors for the majority of Pacific island communities and countries, because of their contributions to rural livelihoods, gross domestic product (GDP) and food security, as well as increasing opportunities for local regional and international markets.

The Multi-Country Programming Framework for the Pacific Islands 2018–2022, developed in partnership with the Food and Agriculture Organization of the United Nations (FAO), identified the following common challenges across the Pacific island countries:

- limited land mass and dispersed population
- fragile natural environments and lack of arable land
- narrow resource bases and reliance on ocean resources
- high vulnerability to climate change, external economic shocks, and natural disasters
- exposure to increasingly frequent and more intense severe weather and climate events, including droughts, floods and tropical storms
- high dependence on food imports
- dependence on a limited number of economic sectors
- remoteness and distance from global markets
- high costs for energy, transportation and communication.

These constraints interact with one another and contribute to increased vulnerability to shocks – both economic shocks (such as abrupt changes in food and fuel prices) and natural disasters (such as cyclones, floods and droughts, earthquakes and tsunamis). These vulnerabilities have limited the development of commercially oriented agriculture, fisheries, and forestry sectors and left many Pacific island countries heavily dependent on imports of food and other commodities.

The vulnerability of Pacific island countries is increased by their narrow resource base, which implies the economic dependence of many islands on exports of a single commodity or limited range of commodities.

For much of the twentieth century, most Pacific island economies were heavily dependent on copra as their principal source of export income; however, with the falling value of coconut oil, this previous source of wealth has become a ‘poverty trap’ for many communities and countries that lack the resources to diversify into higher value products (which could support the rejuvenation of the industry) or into other crops and commodities.

Other countries are heavily dependent on marine resources, especially tuna, for their export earnings. In this case, significant vulnerability arises from the limited control that each country has over the management of this resource. An emerging threat is that rising sea temperatures, especially when accentuated by El Niño cycles, may affect the migration of some tuna species, potentially taking fish populations out of the waters of Pacific island countries that depend heavily on them economically.

Dependence on logging – and especially the export of round logs – is a challenge in western Melanesian countries (Papua New Guinea, Solomon Islands and, to a lesser extent, Vanuatu). The natural forest resource is declining rapidly, often accompanied by serious environmental degradation, and exploitation brings little lasting benefit to landowners or to the national economy. Partner countries wish to move towards more sustainable management of forest resources and local processing to add value to the timber but lack the economic resources and skills to make this transition.

This context is not static but evolves on a number of scales, in time and space. Changing demographics are one key factor, with populations increasing at more than 2% per annum in Solomon Islands and Vanuatu (as well as Papua New Guinea), leading to mounting concerns about local food security and increasing pressure on the natural resource base. Elsewhere in the Pacific region, populations are either stable (increasing at less than 1% per year) or falling (due to emigration), leading to labour shortages and making it harder to develop profitable enterprises. Additionally, there is a strong move towards urbanisation across the Pacific region, with more than one-third of the total population now living in cities. This has disrupted traditional food systems and diets and is leaving some rural areas and outlying islands with declining populations, hampering economic development and making it hard for governments to assure basic services.

Another widespread vulnerability of Pacific islands agriculture – though with different impacts in each country and island – is to invasive pests and diseases. Island environments have inherently limited natural resilience in the face of aggressive invasive species due to the limited local diversity of 'natural enemies'. Recent years have been marked with rapidly spreading outbreaks of, for instance, invasive ant species, the destructive 'Guam strain' of the familiar coconut rhinoceros beetle, and the giant African snail. Emerging diseases of livestock (and potentially fisheries) may be equally destructive, even if less visible to the general public.

Pacific region leaders have repeatedly identified 2 overriding threats to the economic development and wellbeing of people in the region:

1. **Climate change and its impact on food systems**

   Pacific island countries are disproportionately affected by climate change, while having little scope to influence the drivers of climate change. All countries in the Pacific region are concerned about the potential impacts of climate change on rising sea levels (given that much of the population and most of the productive agriculture in the Pacific islands is in coastal areas or coastal plains), food systems (including new threats from invasive pest species) and on their fragile marine resources.

2. **Rapid rise in non-communicable diseases, associated with declining diet quality**

   While under-nutrition remains a problem in some poorer, rural areas of Pacific island countries, changes in diets and lifestyles associated with increasing incomes and urbanisation have led to Pacific island countries having some of the highest levels of obesity in the world, along with record levels of Type II diabetes and heart disease. As well as taking a tragic toll in terms of human wellbeing, this rise in the incidence of non-communicable diseases imposes a huge burden on health services and the economy of Pacific region countries in general.

Fijian farmer, Mr Emosi Ravato, uses a high tunnel (a plastic covered structure) to increase production of certain crops, increase the length of the growing season and grow crops that otherwise could not be grown in his area. Photo: Central Queensland University

Given these challenges, Pacific leaders have strongly emphasised the need for greater resilience in Pacific region food and agriculture systems as a means to counteract vulnerabilities and to increase food and nutritional security. While investing in agriculture fisheries and forestry has been widely recognised as one of the most effective ways of stimulating broad-based economic growth, the effort to increase resilience, rather than focusing primarily on increasing productivity, has become a theme that underpins the entire agricultural development agenda in the Pacific region. Given the scale and complexity of the problems faced by Pacific island partner countries, it is fortunate that the Pacific region has a strong tradition of multilateral and bilateral institutions and partnerships that have supported many decades of collaboration and concerted action, to address a wide range of issues.

The Pacific Islands Forum provides the overall framework for policy development and action, while the technical agencies, especially the Pacific Community (SPC) and the Secretariat of the Pacific Regional Environment Programme (SPREP), provide support to member countries in taking action across a range of sectors and development issues, including health, education, the environment, biosecurity, trade, communications and infrastructure.

ACIAR has been a leading supporter of regional and bilateral research collaboration in the region with SPC, partner countries and other agencies, in agriculture, forestry and fisheries. These existing relationships provide a vital foundation for a portfolio of integrated and cross-sectoral research that will be needed to tackle the 2 high level challenges outlined above. ACIAR started working with partners in the Pacific region in 1983 and, for the next 2 decades, the majority of projects were sectorally and technically focused.

Country priorities

The ACIAR 10-Year Strategy 2018–2027 positions the agency's support to the Indo-Pacific region. Following the 2017 White Paper Pacific Step-up. Stepping up Australia's engagement with our Pacific family, ACIAR placed greater emphasis on supporting Australia's 'near neighbours' in the Pacific region. This was in response to the significant long-term challenges faced by our partners in the Pacific region, including: climate change and responding to natural disasters; sustaining economic growth and boosting education, developing skills and jobs for growing populations; pursuing gender equality and recognising the essential role of women in achieving better development outcomes; preventing major disease outbreak and tackling transnational crime.

Our regional partner SPC emphasises integrated approaches to increasing resilience, including:

- deploying a diversity of species and products in trees, crops, livestock and aquaculture to increase resilience in the face of uncertainty
- growing a greater number and diversity of trees in forestry, agroforestry and horticulture systems to contribute to more sustainable and resilient agricultural landscapes
- diversifying crops to contribute to greater food security, nutrition and health
- better managing coastal fisheries and aquaculture to underpin healthier nutrition and more resilient livelihoods
- strengthening market chains for greater equity and inclusion to contribute to improved and more resilient livelihoods.

Across the board, trans-disciplinary approaches are needed to reduce the vulnerability of the natural resource base and create climate-smart agricultural landscapes. Using national policy, land-use planning and community engagement to manage water, soils, livestock, crops, forests, natural vegetation and coastal marine resources, from 'ridge to reef', in an integrated manner can increase resilience and sustainably improve livelihoods. But achieving this will require numerous, well-coordinated technological innovations and ways of working.

ACIAR currently works with 7 Pacific island countries: Fiji, Kiribati, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

2022–23 research program

- **35 ACIAR-supported projects in Pacific island countries**
- **28 projects are specific to one or more of these countries**
- **7 projects are part of regional projects**

The research program addresses our high-level objectives, as outlined in the ACIAR 10-Year Strategy 2018–2027, as well as specific issues and opportunities identified by ACIAR and our partner organisations. The following sections briefly describe individual ACIAR-supported projects and anticipated outputs in Pacific island countries. The projects are grouped according to research program. Each project description is referenced in a list at the end of this section, which provides the project title and code.

Agribusiness

The viability of the coconut sector in the Pacific region is being challenged by the increasing proportion of coconut palms becoming senile. Many farmers are reluctant to renew palms due to the initial cost and reduced income until the newly planted palms yield fruit. A current ACIAR-supported forestry project is exploring the sale of senile stems by farmers to the timber industry, with revenue from sales expected to act as an incentive for farmers to remove the senile palms and offset the costs of replanting. A small research activity led by Mr Ian Buck of Buck Advisory will develop a framework for directly engaging private sector partners in the project to ensure new value chains for coconut veneer timber products are connected to viable markets via committed and capable processing and marketing entities. This framework will be applicable to other projects where understanding the business operating environment and engagement of suitably qualified private sector partners are essential to maximising the adoption and uptake of project lessons and outcomes.[1]

The Pacific Agribusiness Research and Development Initiative (PARDI) has been a significant program of work supported by ACIAR and DFAT. Starting in 2010, it promoted sustainable livelihood outcomes for Pacific islands households through research and innovation, with the regional goal of catalysing and informing a more vibrant, diverse and viable agribusiness sector. Phase 2 of PARDI, led by Professor Steven Underhill of the University of the Sunshine Coast, studied benefits to community livelihoods from successful agribusiness developments and ways to make economic benefits more inclusive and sustainable. Concluding in 2022, the project will finalise the delivery and evaluation of mentoring programs tailored to the honey, tilapia and agritourism sectors, provide technical and supervisory support to master students at partner universities, and develop and trial a profitability and accounting tool for smallholder beekeepers.[2]

Tuna is recognised as one of the greatest shared natural resources of Pacific island countries, providing jobs, government revenue and contributing to meeting the nutritional needs of the Pacific island communities. However, population growth, climate change and overfishing have placed increasing pressure on the sustainability of tuna resources. A small research activity led by Ms Deb Doan of Business for Development will identify innovation pathways and assess the commercial feasibility for improving returns (defined as sustainable resource management, maximum catch utilisation and increased retention of value) for Pacific island countries' tuna sectors and economies more broadly. Researchers will analyse previous projects to identify key barriers to success and critical success factors.[3]

Climate Change

Australia is a world leader in greenhouse gas mitigation research in agriculture. A new project in 2022–23 works with Fiji to strengthen its national greenhouse gas accounting systems for livestock towards the same high standard used by Australia and to use these systems to support the identification and implementation of on-farm management options that reduce emissions. The project supports the implementation of Fiji's Low Emission Development Strategy. Led by Dr Natalie Doran-Browne of Riverine Plains Inc, the project team will work with government institutions in Fiji and will help grow capability in the data management, analyses and reporting needed to support current and future emissions reduction commitments under the Paris Agreement. The project team will also collaborate within Fiji and across the region to support Pacific greenhouse gas inventory systems.[4]

Evidence suggests that responding to climate change requires collaboration, learning and community-based participatory processes – all 'softer' types of response that are rarely formally supported through institutional mechanisms. A small research activity, led by Dr Rowena Maguire of Queensland University of Technology, is exploring whether the relative lack of institutional support for 'softer' types of climate response, and the underrepresentation of women and particular cultures, are linked, acting as both causes and consequences of the insufficient action on climate change. The team will conclude the research with a multi-country workshop and the production of 3 country case studies. The research team will present their findings at COP27.[5]

The impacts of climate change and population growth are projected to lead to the collapse of coastal livelihoods dependent on coral reef-based fish and nearshore fish throughout Pacific island countries. Different food and livelihood options need to be progressed in ways that are owned and driven by local communities, facilitated by governments and civil society groups. Led by Dr James Butler of the Cawthron Institute, a new project will combine scientific analysis and local knowledge about pathways toward novel and transformative circular food production options, and develop the transformative capacity needed in local communities to identify leverage points and create transformative change.[6]

Smallholder farmers in Pacific island countries are vulnerable to reductions in the availability of fresh water under climate change and increasing demands from growing populations. Co-led by Professor Timothy Reeves and Dr Dorin Gupta of the University of Melbourne, the project will explore opportunities for sustainable intensification systems in smallholder farming systems in Samoa and Tonga. In other parts of the world, these systems which combine multiple interventions for benefits that may be 'more than a sum of the parts' have been successful in intensifying agricultural production while providing climate adaptation and mitigation benefits. This project will investigate whether such integrated management changes may help Pacific island countries in similar ways.[7]

Basal stem rot is a fungal disease that kills oil palm in plantations across South-East Asia and the Pacific region. An ACIAR-supported project is studying the eggectiveness of removing infected dead trees to reduce inoculum pressure (CROP/2021/130).

Crops

Basal stem rot is a fungal disease that kills oil palm in plantations across South-East Asia and the Pacific region. Growers have limited options to manage the disease. New trees are planted after the death of the infected trees but experience suggests that the incidence of the fungus seems to increase with each successive planting. Removing infected dead trees may reduce inoculum pressure but is costly and the benefit has not yet been demonstrated. A new research activity in 2022, led by Dr Agnieszka Mudge of the University of Queensland will continue monthly monitoring of an experimental plot established 11 years ago. Data will be analysed to determine if infection dynamics and impact differ between genetically characterised families of trees and if there is a difference between lots where infected stem bases and roots of dead trees are removed compared with plot where they are left in place.[8]

Fisheries

Unique among Pacific island countries is the production of half-pearls, or mabé, in Tonga from the winged pearl oyster. Although half-pearls are generally less valuable than round pearls, an individual oyster can produce multiple half-pearls (unlike round pearls). With appropriate training, pearl production can be accomplished by community members over a 10-month culture period, compared to approximately 2 years for round pearls. Professor Paul Southgate of the University of the Sunshine Coast completes a project in 2023 that is supporting further expansion of community-based pearl farming and handicraft production in Tonga and demonstrating the feasibility of similar development in Vietnam.[9]

Mabé (half-pearl) jewellery and shell handicraft industries provide income opportunities for coastal communities and women's social enterprises in the western Pacific. Previous projects have increased the technical skills of communities in producing juvenile oysters, farming mabé shell in Fiji and Tonga, and producing shell-based jewellery in Papua New Guinea. The development of greater technical capacity and a better understanding of gendered preferences and aspirations sets the basis for a new project in Fiji, Tonga, Papua New Guinea and Samoa, led by Professor Paul Southgate of the University of the Sunshine Coast. Country-specific interventions are required to ensure uniform mabé pearl jewellery/shellcraft production protocols and standards, improve capacity for sector governance within partner institutions and stakeholders, develop marketing strategies and ensure optimal benefits flow to both women and men across the value chains.[10]

In the Pacific region, there is an opportunity to transform seaweed fisheries into nutritionally sensitive food systems comprised of short supply chains, village-based processing, sustainable use of natural resources and marketing for families. Nutrition-sensitive agriculture ensures the sustainable production of nutritious, affordable and safe foods to meet the dietary requirements of local communities. Dr Libby Swanepoel of the University of the Sunshine Coast will complete a small research activity in 2022 that is designing a framework for equitable empowerment of women and men within seaweed harvester families. This will be achieved by developing and evaluating gender-inclusive activities in Kiribati and Samoa that broaden the focus of seaweed production from an export commodity to one that provides direct benefits to the health and wellbeing of communities.[11]

In Pacific island countries, the paradox of apparently abundant fish, vegetables and root crops but poor public health outcomes presents a significant challenge for policymakers. Professor Neil Andrew of the University of Wollongong leads a project that has analysed regional agrifood systems using newly integrated data sources that allow mapping and analysis of what food is being produced, distributed, traded and sold. During 2022–23, the analysis results will continue to inform regional and national policy. Diagnostic tools developed by the project will be linked to methods that pertain to different nodes of the agrifood system to form an overarching 'agrifood system diagnostic' that can highlight the key challenges and opportunities in the Pacific agrifood system.[12]

Securing the sustainable supply of coastal fish is a development priority for Pacific countries and regional organisations, as coastal fisheries are important for food and nutrition security and economic development. A project led by Dr Dirk Steenbergen of the University of Wollongong aims to scale up the proven approach of community-based fisheries management in Kiribati, Solomon Islands and Vanuatu to self-sustaining national programs that support resilient coastal communities. The project also aims to drive the spread of community-based fisheries management throughout the Pacific region. In 2022–23 the project team will implement an awareness raising strategy, assess food and nutrition security in the scaling of community-based fisheries management and develop a centralised information management system to monitor the impact of information dissemination activities.[13]

Livelihood improvement projects for small-scale fishing communities are increasingly promoted in the Pacific region to build resilience to global change and dwindling fisheries resources. Often these projects focus on a single sector and individual communities and households, failing to acknowledge the complexity of people's livelihoods. Such projects also risk obscuring broader-scale economic development trends, such as the establishment of extractive industries or technological innovations. Dr Amy Diedrich of James Cook University leads a small research activity to establish an integrated livelihoods approach to guide scientists, practitioners and decision-makers engaged in livelihood improvement project planning and assessment. The improved approach aims to achieve 3 desired outcomes in Pacific coastal communities: a fair and just society, sustainable natural resource use and resilient livelihoods.[14]

Fish-based livelihoods play a critical role in the economies of coastal communities in Solomon Islands and Timor-Leste, and participation in catching, processing or trading of fish is an important pathway to poverty reduction. A project led by Dr Hampus Eriksson of the University of Wollongong will identify and support community-identified opportunities for innovation within the coastal fisheries post-harvest sector, focusing on income benefits. This new approach addresses the historic lack of success at the community level of large state-led investments in fisheries sector infrastructure and advanced technologies. It seeks to influence policy on how fisheries institutions can support remote communities through appropriate community-led infrastructure and skill development investments. In 2022–23 activities will include monitoring fish distribution and marketing, documenting livelihood experiences and building the capacity of women in safe aquatic food handling practices.[15]

Coastal fisheries are critical for providing food security and local employment across the Pacific region. Increasingly ACIAR-supported projects are focused on building resilience to global change and dwindling fisheries resources. Photo: Conor Ashleigh

Forestry

Renewal of the coconut estate is a priority for governments, development agencies and researchers throughout the Pacific region. In Fiji, a project led by Dr Rob McGavin of the Queensland Department of Agriculture and Fisheries strives to create market pull for senile coconut stems by converting them to high-value engineered wood products. A market for old palms will encourage coconut growers to remove them, reducing phytosanitary risk and incentivising new, more productive planting. The project will deliver and validate wood-processing technologies to transform coconut and other low-value forest resources into high-value products suitable for local and international markets. In 2022–23, the project team will focus on mapping senile coconut stands and identifying opportunities to promote gender equity within the value chain.[16]

Kava is a major cash crop in the Pacific region and a revered, traditional crop, grown for at least 3,000 years. Using time series geospatial data and ground truthing, this project will examine changes in the area and methods of kava cultivation in leading Pacific region producer countries, Vanuatu and Fiji. Kava is becoming big business, with the number of producers, production, sales, revenue and exports climbing. Governments and aid agencies are promoting the kava industry, but kava cultivation has resulted in deforestation. Researchers aim to assess land cover change from kava cultivation and to consider whether environmental harm is resulting and can be mitigated.[17]

Although primary forest reduction is significant, Solomon Islands economy and livelihoods remain dependent on forests. Logging royalties account for 60% of government revenue and 92% of the population are subsistence cultivators who supplement their material economy with forest-derived building materials, food, fuel, medicines, tools and household items. Professor Helen Wallace of Griffith University leads a new project with the central aim of learning how to efficiently restore forests to meet critical needs of rural Solomon Islanders, accelerating and channelling forest development to support livelihoods. The project also strives to support positive leadership in forest governance to secure remaining forests and those restored. Starting in 2022 are activities to foster community ownership and enhance women's participation, as well as a review of restoration methods for logged forests and establishment of field sites to measure the impact of interventions.[18]

Horticulture

School meals programs based on home-grown models can serve as platforms for transforming food systems while improving education quality. A small research activity led by Dr Sarah Burkhart of the University of the Sunshine Coast aims to understand the current extent and status of school food provision and environments in Pacific island countries. The research will identify and enhance nutrition-sensitive institutional food procurement opportunities, including school feeding programs, to provide reliable markets for small-scale producers in Fiji. It will also investigate the potential to scale-up school feeding initiatives in the Pacific region.[19]

Developing safe, high-value fruit and vegetable industries is a priority for many Pacific island countries. Dr Michael Furlong of the University of Queensland leads a project to develop integrated pest and disease management strategies for the sustainable intensification of fruit and vegetable crop production, addressing the threats posed by the inappropriate use of pesticides, emerging pests and diseases and climate change. During 2022–23, the project will focus on providing technical training for extension staff and conducting in-country plant health clinics and pesticide awareness workshops. The project will continue to build surveillance and diagnostic capacity for managing emerging pests and diseases, including fall armyworm. The project will generate new knowledge, resources and opportunities to encourage the adoption of integrated management strategies.[20]

Coconuts contribute, directly and indirectly, to the livelihoods of coastal communities throughout the Pacific region. Much of the coconut resource in the Pacific region is ageing or already senile and unproductive. A project led by Dr Carmel Pilotti of SPC aims to support the first step in rejuvenating coconut-based livelihoods in the Pacific islands by strengthening the conservation and use of genetic diversity in coconuts, addressing threats posed by the rhinoceros beetle and Bogia coconut syndrome, and establishing and sustaining a platform for coordinating coconut research-for-development initiatives. In 2022–23 researchers will focus on training staff in field transfer of plantlets derived from embryo culture and identifying key varieties for preservation in the new cryopreservation facility that will be built and commissioned.[21]

Increasing vegetable consumption is a key food system change required in the Pacific region to address malnourishment. Mrs Aradhana Deesh (right) is pictured with vegetable seedlings, she has grown as part of an ACIAR-funded research project for ACIAR alumni. Photo: Sunayna Nandini

In the Pacific region, vulnerability of horticultural produce to post-harvest losses is often more dependent on where and how a product is grown, transported and sold, rather than on the commodity-type. A new project in Samoa, Fiji, Solomon Islands, Tonga and Vanuatu aims to reduce food losses through a market-based and gender-inclusive approach to identify where food loss is greatest. Dr Seeseei Molimau-Samasoni of the Scientific Research Organisation of Samoa will lead a project team to identify value chains of fruits, vegetables and root crops that are most critical to improving nutrition and livelihoods of farmers and vendors. The team will then engage with farmers and vendors to trial interventions to address these drivers of food loss, with the ultimate goal of reducing food losses. This project is part of the ACIAR–IDRC Food Loss Research Program (page 23).[22]

Sweetpotato is a necessary component of food, nutritional security and disaster reduction strategies in Pacific island countries. Rapid production of planting material, ease of planting, quick maturation and high nutrition makes sweetpotato an ideal option in disaster recovery. However, yields of sweetpotato are low in the Pacific region compared with developed countries, as farmers do not have access to pathogen-free planting material. In times of high demand, under government assistance schemes following natural disasters, quality cuttings are not available, and those distributed are invariably infested with pests and diseases. Dr Julie O'Halloran of the Queensland Department of Agriculture and Fisheries leads a new project that has the overall aim of building capacity in the provision of high-quality, pathogen-tested sweetpotato planting material to support a larger program for resilient root cropping systems that are responsive to the challenges of pests and diseases and climate change.[23]

Cocoa is an important agricultural export for more than 50,000 households in Papua New Guinea, Solomon Islands and Vanuatu. Significant domestic and potentially useful export opportunities also exist in Samoa and Fiji. A project led by Mr Yan Diczbalis of the Queensland Department of Agriculture and Fisheries is strengthening cocoa value chains in Pacific island countries, as well as in Australia. In 2022–23, the project will complete activities that deliver market-oriented strategies for the exchange and dissemination of superior cocoa genetic resources, methods for intensifying production systems to meet market opportunities and systems for improved post-harvest handling.[24]

Pacific island countries are some of the most malnourished in the world, with among the lowest vegetable availability and consumption globally. Increasing vegetable consumption is a key food system change, but the barriers and opportunities to vegetable consumption are not currently well understood. The PICfood project aims to assess food environments in Fiji and Samoa, strengthen links between agriculture and health and identify the most important entry points for food system change towards increasing the diversity of vegetables consumed. Research findings and citizen food forums will inform agriculture, food and nutrition policy and practice for healthy diets in the Pacific.[25]

Fruit industry development in the Pacific region enhances food security, rural economies and healthy eating initiatives. A previous project in Fiji, Samoa and Tonga worked towards these benefits by supporting the development of resilient value chains for 5 regionally significant fruit crops: papaya, pineapple, mango, breadfruit and citrus. A new project led by Professor Steven Underhill of the University of the Sunshine Coast will build on the community and school-based citrus orchards established in the first project using introduced improved planting stock. The project will develop viable and sustainable fruit value chains, enhance the local capacity to support these chains, and gain wider human health impacts by piloting school and community healthy eating gardens.[26]

Livestock Systems

Strong domestic demand for honey and the potential to export honey and its by-products offers an opportunity to smallholder farmers in Fiji and Papua New Guinea. A project, led by Dr Cooper Schouten of Southern Cross University, aims to increase the productivity and profitability of beekeeping enterprises to complement smallholder incomes and promote an income-earning activity for women. During 2022–23, the project will continue to develop best-practice pest and disease management programs, particularly in readiness for incursions of varroa and tropilaelaps mites. Development of post-harvest quality management programs for producers and packers will continue, for standards, certification and testing processes for export grade honey. The project will also provide capacity building opportunities for beekeeping associations to support smallholder industry development.[27]

The productivity and profitability of sheep and goat production in Pacific island countries could be improved if domestic production was better aligned with national market requirements and smallholder farmers could more easily participate in value chains. Dr Frances Cowley of the University of New England leads a project addressing the constraints to production efficiency for smallholder and semi-commercial sheep and goat production systems in Fiji and Samoa. During 2022–23, the project will continue the on-farm monitoring program to understand the use and costs of feed resources on farms and reproductive productivity and stock losses, across the course of a year. Innovative feed systems, such as fodder banks and creep feeding, will be demonstrated and trialled.[28]

Increasing smallholder cattle productivity and income from cattle sales is a priority of the Vanuatu Government. A project led by Dr Simon Quigley of the Central Queensland University aims to integrate recommendations from previous and new research on cattle production and marketing. A set of best-bet production options will be formulated, from which smallholder farmers can develop their own cattle farming business plan using the Cattle Farm Planning Tool (a decision-tree framework). Local support agency staff will be trained to mentor farmers in the implementation of cattle farming plans. The project will also start studies to determine low-input interventions, such as improved grazing management, introduction of legumes and improved animal management, to increase productivity and farm-gate prices for smallholder cattle.[29]

In Vanuatu, meat exports are processed through 3 vertically integrated abattoirs. Smallholder beef producers in Vanuatu are largely excluded from these high-value export markets because of poor quality, insufficient quantity, poor organisation and high transport costs. Dr Cherise Addinsall of Southern Cross University will undertake a feasibility analysis to determine if greater equity and inclusivity between smallholders and large cattle producers could occur through an agritourism approach, linking a high-value, sustainable beef brand to Vanuatu's tourism industry. The project concludes in 2022, with the development of a proposed design, recognised standards and governance structure of a third party verified voluntary sustainable certification program for key commodities (beef, cocoa, coffee and agritourism).[30]

ACIAR-supported projects have enabled cattle farmers in Vanuatu to increase on-farm productivity and cattle sales through accredited abattoirs, which is a critical step to increase national beef production and meet expanding market opportunities. Photo: Jean Pierre Niptik

Social Systems

The Livelihood Improvement through Facilitated Extension (LIFE) model of improved extension, based on a Landcare approach, was developed through research in the Philippines. It rapidly enhanced agricultural livelihoods by improving farmer-based learning networks and community social capital. Dr Mary Johnson of RMIT University, in partnership with Filipino collaborators, will contribute to understanding the adaptability and adoptability of the Landcare–LIFE combination by trialling the LIFE model for livelihood improvement within a Fijian smallholder farmer context. The project will broker an escalation of the Landcare approach to deliver sustainable land management outcomes with government and civic partners. In 2022–23, the project team will visit Fiji to conduct a review and implement capacity building activities with community-based research staff. The project will also focus on developing the research partnership between the Philippines, Fiji and Australia.[31]

The agriculture sector has been identified as a sector for growth to support economic development and poverty alleviation in Fiji and Tonga. Livelihoods and landscapes in these countries are highly interconnected, so the populations are acutely vulnerable to the impacts of climate change and variability as well as the impacts of policy-driven intervention. With a vision of climate-smart landscapes, Dr Eleanor Bruce of the University of Sydney and Dr Bryan Boruff of the University of Western Australia lead a team to develop a collaborative geospatial platform that will identify responses to climate-smart landscape adaptation. In the project's final year, researchers will evaluate the effectiveness of the platform for promoting community and multi-stakeholder exchange and engagement with landscape knowledge. The project will also identify adaptation objectives for communities within the landscape to foster climate resilience and enhance environmental livelihood security.[32]

Integrated 'Reef to Ridge' management means protecting and sustainably utilising connected environments to promote co-benefits of biodiversity and natural and cultural resources. Dr Cherise Addinsall of Southern Cross University will lead a new project, working with Vanuatuan communities in developing 'Community Conservation Area' agreements between communities and the government to establish sustainable agricultural livelihoods alongside existing formalised land tenure and conservation goals. The project also aims to investigate models of inclusive and evidence-informed decision-making processes under climate change. In 2022–23 the project will be engaged in partnership building with local communities, government bodies and potential scaling institutions.[33]

Family Farm Teams is a peer education model of agricultural extension that has benefited the economic development of women smallholders in 9 areas of Papua New Guinea. Dr Deborah Hill of the University of Canberra leads a project to improve agricultural development opportunities for women smallholders in rural Solomon Islands. The project will investigate the adaptability of the Family Farm Teams approach in Solomon Islands, and provide comparative learning to apply it to other Pacific island countries to help communities move from semi-subsistence to planned farming in a gender-equitable way. In 2022–23, researchers will continue adapting the Family Farm Teams manual and identify individuals to undertake Family Farm Teams training and other capacity building activities. These peer educators will deliver training modules for participating smallholder men and women.[34]

Soil and Land Management

Agriculture in the Pacific region is generally confined to smallholder farms and household gardens. Its sustainability is threatened by nutrient imbalances, erosion, declining soil fertility and soil carbon loss, and climate change. A new project in 2023 expands on previous research to build farming systems resilience in Fiji, Samoa, Tonga and Vanuatu. Led by Dr Ben Macdonald of CSIRO, the project will address knowledge gaps in understanding soil organic carbon and crop nutrition management and develop the next generation of agronomic advisors and appropriate networks for collaboration. The project will continue the development and extend the reach of the Pacific Soils Portal. Researchers will introduce cost-effective technologies for rapid soil and plant analysis and real-time data capture to agricultural extension services. The project seeks to improve linkages along the export value chain by developing information pathways between the grower, extension agent and exporter, focusing on soil nutrient and carbon management.[35]

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See page 186 for contact details.

Current and proposed projects

1. Defining priority commercialisation pathways and potential private commercialisation partners for viable long-term commercialisation of products emerging from FST/2019/128 [Fiji] (AGB/2021/172)
2. Pacific Agribusiness Research in Development Initiative Phase 2 (PARDI 2) [Fiji, Tonga, Vanuatu] (AGB/2014/057)
3. Landscape and opportunity analysis in the Pacific tuna sector: Foundation analysis to identify innovation pathways to enhance participation by the Pacific community and value retention in the region [South Pacific general] (AGB/2021/173)
4. Supporting greenhouse gas inventories and livestock data development in Fiji (CLIM/2021/160)
5. Institutional barriers to climate finance through a gendered lens in Fiji, Samoa and Solomon Islands (CLIM/2021/110)
6. Transformation pathways for Pacific coastal food systems [Kiribati, Solomon Islands] (CLIM/2020/178)
7. Sustainable intensification for climate-resilient development in Pacific island countries [Samoa, Tonga] (CLIM/2020/186)
8. Finding a genetic basis for oil palm responses to basal stem rot in a long-term infected block [Papua New Guinea, Solomon Islands] (CROP/2021/130)
9. Half-pearl industry development in Tonga and Vietnam (FIS/2016/126)
10. Towards more profitable and sustainable mabé pearl and shell-based livelihoods in the western Pacific [Fiji, Papua New Guinea, Samoa, Tonga] (FIS/2019/122)
11. Improving nutrition through women's and men's engagement across the seaweed food chain in Kiribati and Samoa (FIS/2019/125)
12. Agriculture and fisheries for improved nutrition: integrated agri-food system analyses for the Pacific region [Kiribati, Solomon Islands, South Pacific general, Vanuatu] (FIS/2018/155)
13. Coalitions for change in sustainable national community-based fisheries management programs in the Pacific [Kiribati, Solomon Islands, South Pacific general, Vanuatu] (FIS/2020/172)
14. Spatially integrated approach to support a portfolio of livelihoods [Solomon Islands, South Pacific general] (FIS/2020/111)
15. Innovating fish-based livelihoods in the community economies of Timor-Leste and Solomon Islands (FIS/2019/124)
16. Coconut and other non-traditional forest resources for the manufacture of engineered wood products [Fiji] (FST/2019/128)
17. Kava land use changes [Fiji, Vanuatu] (FST/2021/146)
18. Livelihoods in forest ecosystem recovery [Solomon Islands] (FST/2020/135)
19. Understanding school food provision in the Pacific: Scoping the potential of local food systems to improve diets, nutrition and livelihoods [Fiji] (HORT/2021/159)
20. Responding to emerging pest and disease threats to horticulture in the Pacific Islands [Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga] (HORT/2016/185)
21. Safeguarding and deploying coconut diversity for improving livelihoods in the Pacific islands [Fiji, Papua New Guinea, Samoa, Solomon Islands, Vanuatu] (HORT/2017/025)
22. Adopting a gender-inclusive participatory approach to reducing horticultural food loss in the Pacific [Fiji, Samoa, Solomon Islands, Tonga] (CS/2020/191)
23. Improving root crop resilience and biosecurity in Pacific island countries and Australia [Fiji, Samoa, Solomon Islands, Tonga] (HORT/2018/195)
24. Aligning genetic resources, production and post-harvest systems to market opportunities for Pacific island and Australian cocoa [Fiji, Samoa, Solomon Islands, Vanuatu] (HORT/2014/078)
25. PICfood: Driving vegetable food environments to promote healthy diets in Pacific island countries [Fiji, Samoa] (HORT/2021/141)
26. Enhanced fruit systems for Tonga and Samoa (Phase 2): Community based citrus production (HORT/2019/165)
27. Increasing the productivity and profitability of smallholder beekeeping enterprises in Papua New Guinea and Fiji (LS/2014/042)
28. Improving small ruminant production and supply in Fiji and Samoa (LS/2017/033)
29. A farm planning approach to increase productivity and profitability of smallholder cattle systems in Vanuatu (LS/2018/185)
30. Development of a third party verified voluntary sustainable certification program for beef and other key commodities in Vanuatu (LS/2020/155)
31. Climate-smart landscapes for promoting sustainability of Pacific Island agricultural systems (ASEM/2016/101)
32. Landcare - an agricultural extension and community development model at district and national scale in Fiji (SSS/2019/140)
33. Climate-smart coastal landscapes for sustaining fisheries-based livelihoods and food security in the Pacific [Fiji, Tonga] (SSS/2021/120)
34. Improving agricultural development opportunities for female smallholders in rural Solomon Islands (SSS/2018/136)
35. Soil management in Pacific island countries Phase 2: Investigating nutrient dynamics and the utility of soil information for better soil and crop management [Fiji, Samoa, Tonga, Vanuatu] (SLAM/2020/139)