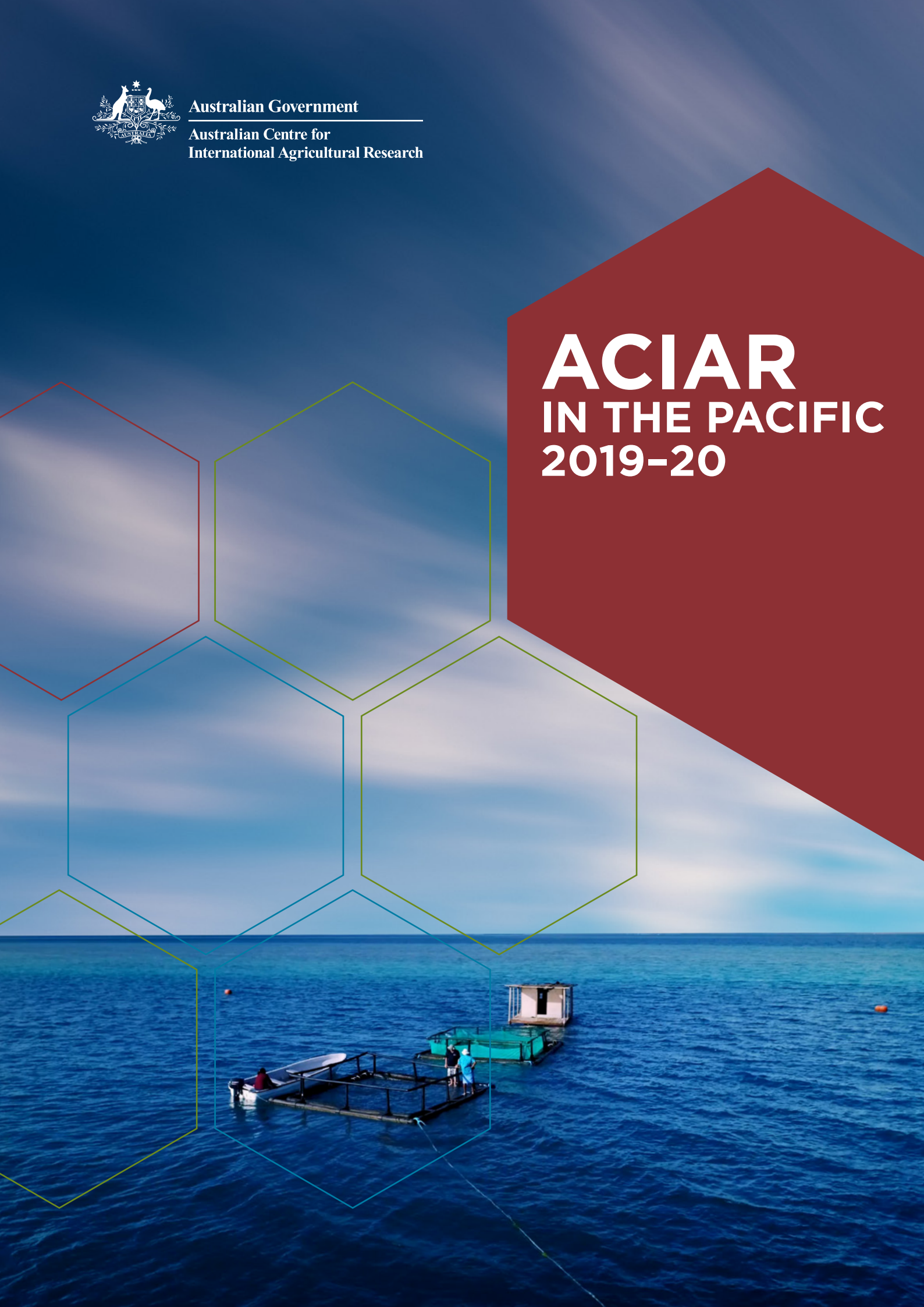





Australian Government  
Australian Centre for  
International Agricultural Research

# ACIAR IN THE PACIFIC 2019-20





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This report should be attributed as the  
ACIAR Annual Operational Plan 2019–20

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# ACIAR IN THE PACIFIC 2019-20

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ACIAR Annual Operational Plan  
2019-20. For the full document  
please contact ACIAR or  
visit [www.aciar.gov.au](http://www.aciar.gov.au)



**ACIAR**

[aciarc.gov.au](http://www.aciar.gov.au)

# About ACIAR

## Research that works for developing countries and Australia

**200 agricultural**  
research-for-development projects

**35 partner countries**  
throughout the Indo-Pacific

**25 significant partnerships**  
in multilateral programs and  
co-investment alliances

## Responsible minister

ACIAR is part of the Australian Government's Foreign Affairs and Trade portfolio, and is accountable to the Minister for Foreign Affairs, the Hon. Marise Payne MP.

## Enabling legislation

ACIAR is established by the *Australian Centre for International Agricultural Research Act 1982*, as amended. Also established under the Act are the Commission for International Agricultural Research, and the Policy Advisory Council.

## Governance

ACIAR has an executive management governance structure headed by the Chief Executive Officer.

## Vision

ACIAR looks to a world where poverty has been reduced and the livelihoods of many improved, through more productive and sustainable agriculture emerging from collaborative international research.

## Mission

To achieve more productive and sustainable agricultural systems for the benefit of developing countries and Australia, through international agricultural research partnerships.



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# Preface



**The Australian Centre for International Agricultural Research (ACIAR) is the Australian Government's specialist agricultural research-for-development agency, within the Australian aid program. ACIAR is established by the Australian Centre for International Agricultural Research Act 1982 and is an agency of the Foreign Affairs and Trade portfolio.**

Our mission is to achieve more productive and sustainable agricultural systems, for the benefit of developing countries and Australia, through international agricultural research partnerships. We broker, facilitate, invest in and manage strategic partnerships in agricultural research-for-development in the Indo-Pacific region.

Global aggregate food supply has kept up with population growth over recent decades, however the Food and Agricultural Organization (FAO) of the United Nations estimates that the world needs to increase overall food production by around 50% by 2050 to feed the predicted global population of almost ten billion people. As productivity growth flattens in the major staple crops, this is a big task. Moreover, need is not evenly distributed: Sub-Saharan Africa and South Asia need to more than double food production by 2050, compared with an average of 34% elsewhere.

Food security, however, cannot be considered in isolation from water security, energy security or biosecurity. These 'converging insecurities' are all amplified by climate change, the ultimate risk multiplier.

Another layer of complexity in the regions where we work is the 'triple burden' of nutrition facing many low- and middle-income countries, where acute hunger and malnutrition (including micronutrient deficiencies), co-exist with increasing levels of obesity, and associated diseases such as diabetes and heart disease.

Australia's world-leading agricultural innovation system is a strategic national capability that ACIAR is able to mobilise in international research partnerships to address food insecurity. Tackling shared challenges through agricultural research collaboration is a compelling element of Australian soft power in the Indo-Pacific region. Australia is well equipped to play a leading role within our region and globally, disproportionate to the size of our population or our economy.

Our work is organised across nine research areas: agribusiness, crops, livestock, horticulture, fisheries, forestry, social sciences, soil and land management, and water and climate. The ACIAR 10-Year Strategy 2018–2027 sets out how we intend to work with partners across the Indo-Pacific region on the knowledge base to underpin six high-level development objectives:

- » food security and poverty reduction
- » natural resources and climate change
- » human health and nutrition
- » gender equity and women's empowerment
- » inclusive value chains
- » durable scientific and policy capability.

The ACIAR Gender Equity Policy and Strategy 2017–2022 informs the design and implementation of our research activities with partners, and our own internal organisation. Many ACIAR projects work towards improving women's access to resources and decision making, as this is a direct route to reducing poverty and boosting food security at family, community and societal levels. There is increasing evidence, in both the public and private sectors, that organisations drawing equally on the talents of women and men at all levels outperform those that do not. Within ACIAR, the proportion of women in senior roles increased from 11% in 2016 to 63% by July 2019.

The knowledge base generated by ACIAR projects and programs empowers smallholder farmers, extension agents, scientists and policymakers to take on the intersecting challenges of growing more food and reducing poverty, using less land, water and energy.

Partnerships with other international research and development agencies are integral to our work. In recognition of the importance of these to our core business, our performance framework to government reports on the establishment and management of these relationships.

To ensure our work and achievements align with the ACIAR 10-Year Strategy 2018–2027, and its strategic objectives, we will continue to develop our Monitoring and Evaluation Strategy during 2019–20. The strategy provides an integrated and portfolio-wide approach to assessing the performance of our programs and understanding how our work is contributing to change in our partner countries. This complements our long-established impact evaluation at the research project level and longitudinal analysis of uptake of research results.

ACIAR is highly regarded nationally and internationally for facilitating research that works for developing countries and Australia. Our monitoring and evaluation program has several complementary components that work together to measure and understand our impact against the performance criteria set out in our Corporate Plan 2019–20. Our performance is measured against the achievements of three areas of investment, which all have the common goal of engaging with partners to progress our objectives.

- » Our Global Program fosters and manages multilateral research collaborations and co-investment.
- » Our Bilateral Program brokers and manages bilateral research partnerships in partner countries.
- » Our Capacity Building Program identifies and establishes opportunities for individuals and institutions in partner countries to boost technical, policy and management skills in agricultural research-for-development.

This Annual Operational Plan provides a comprehensive outline of the investment by ACIAR of around 2.5% of the Australian aid budget during 2019–20. It explains the context and priorities of our program areas, and describes our partnerships and projects ranging from our support and governance role with our largest partner, the CGIAR system and its 15 international research centres, to our brokering and management role of approximately 200 individual bilateral projects. The bilateral projects focus on aspects of productivity, resilience, sustainability, opportunity and equity of agriculture, forestry and fisheries systems throughout the Indo-Pacific region, to reduce poverty and improve livelihoods.

I have every confidence that together, our committed and skilled staff and partners will deliver successfully on this plan. Through ACIAR partnerships, we will continue to grow the knowledge base for agricultural research-for-development, and in turn, improve livelihoods of smallholder farmers and fishers in our partner countries. Along the way, we will introduce new technologies, risk management and capabilities to Australian agriculture and agricultural sciences, generating a very high return on public investment.



**Andrew Campbell**  
Chief Executive Officer  
ACIAR







1

## Overview

# Overview

**The Australian Centre for International Agricultural Research (ACIAR) works with regional partners to tackle the complex and intersecting challenges of growing more food, improving human nutrition and reducing poverty, while at the same time using less land, water and energy, and adapting to and mitigating climate change.**

As an agency of the Australian Government, the purpose of ACIAR is to contribute to reducing poverty and improving the livelihoods of many in the Indo-Pacific region, through more productive and sustainable agriculture emerging from collaborative international research.

Our work aligns closely with Australia's broader development assistance program. We support research collaboration, while emphasising individual and institutional capacity building and private sector-led development to improve livelihoods in agriculture, forestry and fisheries. This work also focuses on economic diplomacy and women's economic empowerment.

Australia's security and economic interests remain inter-linked with the countries of the regions in which ACIAR operates: Pacific, East and South-East Asia, South Asia and Eastern and Southern Africa.

Investment by the Australian Government in agricultural development, through ACIAR, supports regional processes for promoting peace and economic growth, ensuring Australia is a trusted science partner and leader in the agriculture and natural resources sectors.

ACIAR-funded research primarily helps smallholder farmers and rural communities in developing countries, but it also continues to deliver benefits to Australian agriculture through new production technologies, access to improved crop varieties, protection from pests and diseases, and increased skills and knowledge of Australian researchers.

While diversity and flexibility are key to our work, it is equally important that all programs, projects and partners are working towards some common objectives and goals. Six high-level strategic objectives guide our partnerships and research programs. These objectives are consistent with the purpose stated in our enabling legislation.

Our objectives reflect the Australian Government's policy imperatives articulated in the:

- » Australian Overseas Development Assistance policy framework
- » Sustainable Development Goals of the United Nations 2030 Agenda for Sustainable Development
- » Paris Agreement under the United Nations Framework Convention on Climate Change.

## Results through partnerships

ACIAR is a small agency that achieves outstanding results throughout the Indo-Pacific region. A dedicated team of 81 staff in Australia and overseas works with partners to improve the productivity and sustainability of agricultural systems and the resilience of food systems in partner countries.

Partnerships are at the heart of all we do. We work with public and private research institutions in Australia and partner countries to address complex and intersecting challenges.

ACIAR generates and establishes research partnerships through three pathways:

- » multilateral research collaborations
- » co-investment alliances with development partners
- » bilateral country partnerships.

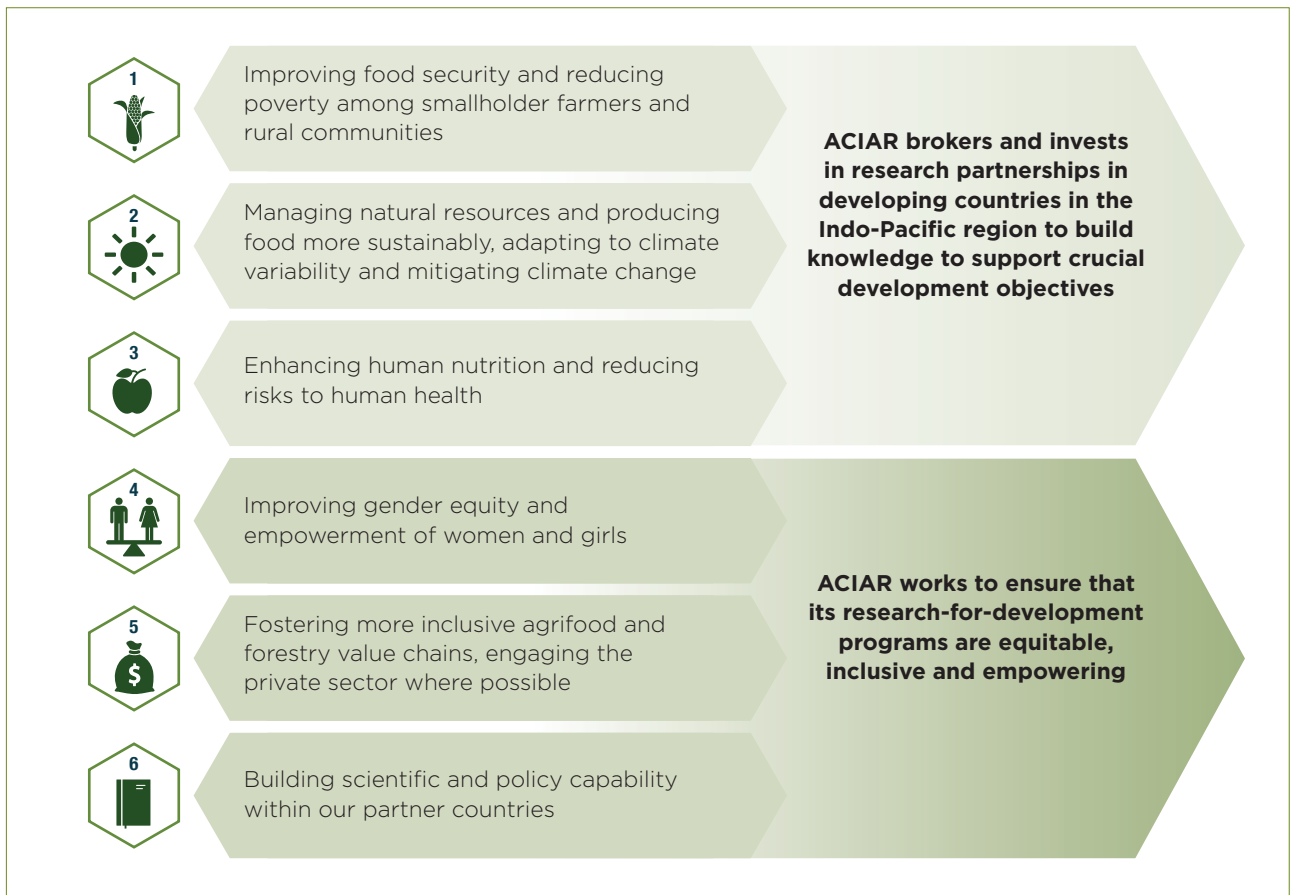
Each of the partnership models has its own procurement pathways, governance frameworks, quality assurance and risk management.

Chief among our multilateral collaborations is support of ACIAR to CGIAR (formerly known as the Consultative Group for International Agricultural Research). ACIAR manages Australia's contribution to CGIAR, which in 2019-20, will be just over A\$25 million of restricted and unrestricted funding. Australia's expertise in, and commitment to, international agricultural research is reflected in ACIAR staff and Australian research leaders being involved in the highest levels of governance of the CGIAR system.

In line with our 10-Year Strategy 2018-2027, ACIAR develops and fosters co-investment partnerships with development donors and the private sector, particularly around issues where our research is ready to be implemented at scale. Co-investment partnerships complement our well-established traditional bilateral partnerships and our long-term commitment to multilateral international research.

Chapter 2 'Global partnerships' describes our multilateral research collaborations and co-investment partnerships.

**Figure 1.1: Strategic objectives**



There are more than 200 projects active during 2019–20 that are established as bilateral country partnerships. These partnerships have the fundamental aim of lifting the productivity, profitability and sustainability of agriculture, forestry and fisheries sectors in developing countries, in a changing climate. Australia has outstanding capabilities in these fields.

Projects and partnerships will operate in 35 countries in the Indo-Pacific region, as well as in Australia. ACIAR works with partner countries to identify research priorities, and then to broker research partnerships and commission research projects. Generally, ACIAR commissions an Australian scientific organisation (for example, universities, Commonwealth Scientific and Industrial Research Organisation (CSIRO), state government agencies or private firms) to undertake a research project, which is consistent with jointly agreed priorities, and informed by regular consultations between ACIAR and partner countries.

Chapter 5 ‘ACIAR in the Indo-Pacific’ presents our regional and country, and describes the research projects underway in each of our partner countries.

### High return on investment

Independent evaluations of ACIAR projects and programs have consistently found high returns on investment, reflecting the quality of Australian agricultural science and our partnership model, which ensures a high level of engagement with in-country partners, and a high level of adoption of research results.

The findings of the independent evaluations are consistent with studies by the United States Agency for International Development in 2017, which unequivocally concluded that lifting agricultural productivity in ways that help smallholders to access higher-value markets is among the most effective forms of international development for reducing poverty and catalysing economic growth.

Figure 1.2: Research structure



## In-country consultation

Our work aligns closely with the Australian Government development assistance program. We support research collaboration, while emphasising human capacity building and private sector-led development in agriculture, forestry and fisheries. The aid investment plans of Australian overseas missions also inform our bilateral and regional research partnerships.

To ensure that our core business as an agricultural research-for-development agency is as effective as possible, ACIAR has 10 country offices throughout the Indo-Pacific region. The country offices guide the development and regular adjustment of the strategic directions of our research investments with country partners. They also provide immediate oversight and liaison for in-country project operations.

The strength of our partnership model will be maintained through regular strategy discussions with country partners, consultation with Australian, regional and international research agencies, and continued support to the strategic capabilities of our network of country offices. To ensure alignment with, and relevance to, Australia's broader aid initiatives, ACIAR will maintain active communication with the Australian Government Department of Foreign Affairs and Trade (DFAT), and Heads of Mission, Ambassadors and High Commissioners in partner countries.

To strengthen and maintain our partnerships with countries and organisations in our region, we continue to invest in our long-term 'compacts' with Cambodia, Myanmar, Pakistan, Papua New Guinea, Vietnam and implement a regional strategy for eastern and southern Africa.

Chapter 3 'Country partnerships' outlines the location and roles of our country office network, and introduces our country managers.

## Research planning and evaluation

Our operations are—to a large extent, but certainly not exclusively—planned and managed on a regional basis. The focus of the research program in each country and region is determined through various processes, consultations and forums. As a result of this process, ACIAR-supported research addresses the specific challenges and opportunities arising in the local environment, as well as building on established relationships.

ACIAR builds its research portfolio on nine program areas that encompass:

- » key agriculture sectors—crops, fisheries, forestry, horticulture and livestock
- » science and research fields supporting the sectors—agribusiness, social sciences, soil and land management, water and climate.

The program areas encompass key cross-cutting issues, such as climate change, economics and policy, gender, integrated farming systems, and the link between livestock and human health risks.

Review, evaluation and monitoring are important to ensure we are on track, are achieving objectives and are allocating valuable resources of time, talent and money to achieve the best result. With more than A\$100 million budgeted for investment in research-for-development programs in the Indo-Pacific region during 2019-20, it is essential that outcomes and benefits are identified and articulated.

ACIAR undertakes and values a vigorous and independent system of impact assessments of its investments, not only for accountability, but importantly, for learning. Understanding the impact of ACIAR investment is critical to improving the efficiency and effectiveness of current and future research-for-development programs.

During 2019-20, we will continue to build on our strong project-level impact evaluation process with the design and implementation of a more sophisticated portfolio-level monitoring and evaluation system. This will enable us to better analyse and report against our six high-level objectives, and better measure our performance against criteria and targets set out in the annual Corporate Plan. The monitoring and evaluation system will also inform portfolio management and outreach strategies.

Chapter 4 'Programs' outlines our research areas and priorities. It also introduces our portfolio planning, monitoring and evaluation process.

## Building capability

While science and innovation are critical to advancing agriculture and livelihoods in the Indo-Pacific region, the development of individual and institutional science and policy capability in our partner countries is equally important.

One of our strategic objectives is to develop durable scientific and policy capability. The ACIAR Capacity Building Program identifies and establishes opportunities for individuals and institutions in partner countries to boost technical, policy and management skills in agricultural research-for-development. Building capacity in partner countries is a key priority for ACIAR to extend and maximise the adoption of new knowledge and technologies.

During 2019–20, the program continues its focus on leadership and career development, while maintaining an ongoing commitment to support postgraduate study. A new element of the program will be introduced, with the launch of a new leadership program for women in agricultural research and the roll-out of an executive leadership program.

Chapter 6 'Building capability' outlines the work of the Capacity Building Program for the coming year.

## Increasing influence and impact

The Outreach Program communicates the work of ACIAR to various audiences both in Australia and overseas. The program has the broad objectives to increase the influence and impact of ACIAR research, as well as build our reputation as a trusted and valued research broker in the Indo-Pacific region.

A series of comprehensive plans, programs and projects will be developed and/or implemented during 2019–20 to achieve our objectives. Through its Outreach Program, ACIAR will continue its efforts to increase understanding within Australia of the impact of Australian aid investment, through ACIAR, and ensure that more audiences in Australia and in our partner countries can access, understand and use our research findings.

Chapter 7 'Increasing influence and impact' outlines the work of the Outreach Program for the coming year.

## Executive management

ACIAR is established by the *Australian Centre for International Agricultural Research Act 1982* (the ACIAR Act), as amended. It is a non-corporate Commonwealth entity under *the Public Governance, Performance and Accountability Act 2013* and a statutory agency under the *Public Service Act 1999*. ACIAR is part of the Australian Government Foreign Affairs and Trade portfolio.

ACIAR has an executive management governance structure headed by the Chief Executive Officer (CEO), who reports to the Minister for Foreign Affairs. The CEO manages the administrative and financial affairs of ACIAR and its staff, subject to, and in accordance with, any directions given by the Minister.

An Executive Team supports and advises the CEO on strategic priorities and corporate and operational policies.



# ACIAR Executive management



**Chief Executive Officer**  
**Professor Andrew Campbell FTSE FAICD**

The Chief Executive Officer is directly responsible to the Minister for managing the affairs of ACIAR, in a way that provides proper use of the Commonwealth resources for which the CEO is responsible. As agency head, the CEO is also responsible for managing the agency with direct accountability to the Australian Government.

Professor Andrew Campbell commenced the role of CEO on 1 August 2016. Previously, Andrew was the inaugural Director of the Research Institute for the Environment and Livelihoods at Charles Darwin University, in the Northern Territory. Andrew has played influential roles in sustainable agriculture and natural resource management in Australia for over 30 years. He has a Diploma of Forestry from Creswick, a Bachelor of Forest Science (Hons) from the University of Melbourne and a Master of Science (Management of Agricultural Knowledge Systems) from Wageningen University in The Netherlands. Andrew is an elected Fellow of the Academy of Technology and Engineering, Fellow of the Australian Institute of Company Directors and an honorary Professorial Fellow at the Australian National University and Charles Darwin University.



**Chief Finance Officer**  
**Ms Audrey Gormley**

The Chief Finance Officer is responsible for providing strategic financial advice to the organisation, in addition to managing human resources, business services (IT), procurement, legal, property and other corporate activity.

Ms Audrey Gormley joined ACIAR in July 2017 and has over 30 years' experience in all facets of finance and accounting both at strategic and operational levels, working in investment banking and insurance sectors before joining the Australian Government. Prior to joining ACIAR, Audrey was Chief Finance Officer at Food Standards Australia New Zealand for over 10 years. She holds a Bachelor of Commerce from University College Dublin and is a Fellow of the Association of Chartered Certified Accountants.



**Chief Scientist**  
**Dr Daniel Walker**

The Chief Scientist oversees the strategic science focus of the ACIAR research portfolio and its impact assessment, monitoring and evaluation work. The Chief Scientist also provides leadership for Research Program Managers across nine research areas, and oversight of our relationship with the Australian innovation system.

Dr Daniel Walker joined ACIAR in November 2017 to take up the newly-created role of Chief Scientist. Prior to ACIAR, Daniel spent 23 years at CSIRO, where he was Research Director for Agriculture and Global Change with CSIRO Agriculture and Food and previously, Chief of CSIRO Ecosystem Sciences. Daniel has a Bachelor of Science (Hons) in agriculture, forestry and rural economy from the University of Edinburgh and a PhD from the University of Wales.



**General Manager, Country Programs**  
**Dr Peter Horne**

The General Manager, Country Programs is responsible for leading and setting the research strategy for ACIAR country (bilateral) programs, managing the ACIAR country office network, and leading the engagement with key research partners and stakeholders, in Australia and overseas.

Previously, Dr Peter Horne was Research Program Manager for Livestock Production Systems for ACIAR. Peter has spent most of his career based in Asia involved in agricultural research-for-development, with a particular focus on forages and livestock systems. Peter has a Bachelor of Science (Hons) in environmental sciences from Griffith University and a PhD in tropical forage agronomy from University of New England, Australia.



**General Manager, Global Program**  
**Ms Mellissa Wood**

The General Manager, Global Program leads the formulation and implementation of Australia's international stakeholder engagement strategies with CGIAR and other international agricultural research centres, and is responsible for ACIAR engagement with global and multilateral fora, such as the G20 and the United Nations Food and Agriculture Organization. The General Manager, Global Program also oversees ACIAR co-investment alliances, notably with DFAT and the Canadian International Development Research Center (IDRC).

Ms Mellissa Wood joined ACIAR in 2012 as Director of the new Australian International Food Security Centre. She was appointed General Manager, Global Program in 2015. Prior to ACIAR, Mellissa held a number of positions developing expertise in improving the adoption of research outputs for food and nutrition security, through partnering with policymakers and the private sector, including several years with the Crop Trust in Rome. She holds a Bachelor of Science in resource and environmental management and Master of Public Policy in development.



**General Manager, Outreach and Capacity Building**  
**Ms Eleanor Dean**

The General Manager, Outreach and Capacity Building leads the development and implementation of the ACIAR outreach strategy and leads and directs a team responsible for ACIAR communications, stakeholder engagement, capacity building and outreach activities.

Ms Eleanor Dean has worked in public affairs and communication for the Australian Government for more than 25 years, on a diverse range of issues including natural resource management, biodiversity, education and training. Prior to joining ACIAR in 2017, Eleanor led the safety promotion and communication branch at the Civil Aviation Safety Authority. She has a Bachelor of Communication (Hons) from the University of Canberra.



# Funding and expenditure

**Table 1.1: Overview of planned funding and expenditure, 2019–20**

<b>2019-20 (budget estimate)</b>	
<b>Funding</b>	<b>A\$ million</b>
<b>Administered</b>	
Administered appropriation	92.15
Special accounts	19.25
<i>Total administered funding</i>	<i>111.40</i>
<b>Departmental</b>	
Departmental appropriation	9.31
s74 retained revenue receipts <sup>(a)</sup>	1.95
Expenses not requiring appropriation <sup>(b)</sup>	0.54
<i>Total departmental funding</i>	<i>11.81</i>
<b>Total funding</b>	<b>123.21</b>
<b>Expenditure</b>	
<b>Administered</b>	
Bilateral partnerships	66.92
Co-investment alliances and partnerships	13.74
Multilateral partnerships <sup>(c)</sup>	19.89
Capacity Building Program <sup>(e)</sup>	8.76
Outreach Program	2.00
<i>Total administered costs</i>	<i>111.40</i>
<b>Departmental</b>	
<i>Total departmental costs<sup>(f)</sup></i>	<i>11.81</i>
<b>Total expenditure</b>	<b>123.21</b>

(a) Revenue from external sources.

(b) Depreciation, amortisation and audit fees.

(c) Includes program support and impact evaluation.

(d) Unrestricted funding to international centres.

(e) Does not include training and communication activity within projects.

(f) Includes salaries, executive, Commission, Policy Advisory Council and corporate support.

**Table 1.2: Planned project expenditure, by country, 2019-20**

Region and country	Target appropriation budget allocations	ACIAR base appropriation	DFAT and other external funding	2019-20 total allocation
	(%)		A\$ million	
<b>Pacific</b>	<b>28</b>	<b>17.99</b>	<b>4.63</b>	<b>22.62</b>
Fiji	—	3.87	0.78	4.65
Kiribati	—	0.41	0.46	0.87
Samoa	—	0.83	—	0.83
Solomon Islands	—	0.87	0.46	1.33
Tonga	—	1.11	—	1.11
Tuvalu	—	0.11	—	0.11
Vanuatu	—	1.85	0.45	2.30
Pacific region—other	—	0.27	—	0.27
Papua New Guinea	—	6.33	2.48	8.81
Timor-Leste	—	2.34	—	2.34
<b>East and South-East Asia</b>	<b>49</b>	<b>32.24</b>	<b>5.17</b>	<b>37.41</b>
Cambodia	—	2.58	0.35	2.93
China	—	0.41	—	0.41
Indonesia	—	11.52	4.30	15.82
Laos	—	3.98	0.52	4.50
Mongolia	—	0.13	—	0.13
Myanmar	—	4.92	—	4.92
The Philippines	—	3.52	—	3.52
Vietnam	—	5.18	—	5.18
<b>South Asia</b>	<b>12</b>	<b>7.89</b>	<b>3.87</b>	<b>11.76</b>
Bangladesh	—	2.90	0.59	3.49
India	—	1.04	1.35	2.39
Nepal	—	0.76	0.58	1.34
Pakistan	—	3.11	1.35	4.46
Sri Lanka	—	0.08	—	0.08
<b>Eastern and Southern Africa</b>	<b>12</b>	<b>7.65</b>	<b>7.65</b>	<b>7.65</b>
Burundi	—	0.05	—	0.05
Ethiopia	—	1.51	—	1.51
Kenya	—	1.09	—	1.09
Malawi	—	0.62	—	0.62
Mozambique	—	0.81	—	0.81
Rwanda	—	0.51	—	0.51
South Africa	—	0.74	—	0.74
Tanzania	—	0.52	—	0.52
Uganda	—	1.16	—	1.16
Zambia	—	0.10	—	0.10
Zimbabwe	—	0.54	—	0.54
<b>Total project expenditure</b>	<b>100</b>	<b>65.77</b>	<b>13.67</b>	<b>79.44</b>

Note that due to rounding, not all subtotals add up to the total

MWood: there is external funding to Africa through IDRC and Syngenta Foundation that should be included if this is broader than DFAT

**Table 1.3: Planned expenditure of DFAT funding, by country, 2019-20**

Country/program	2019-20 (budget estimate)
	A\$ million
<b>Pacific</b>	
Papua New Guinea	2.48
Pacific island countries	2.15
<b>East and South-East Asia</b>	
Cambodia	0.35
Indonesia	4.30
Laos	0.52
<b>South Asia</b>	
Bangladesh	0.59
India	1.35
Nepal	0.58
Pakistan	1.35
<b>Other</b>	
Postgraduate scholarships	4.18
Food Futures	0.50
Funding under negotiation	0.90
<b>Total</b>	<b>19.25</b>

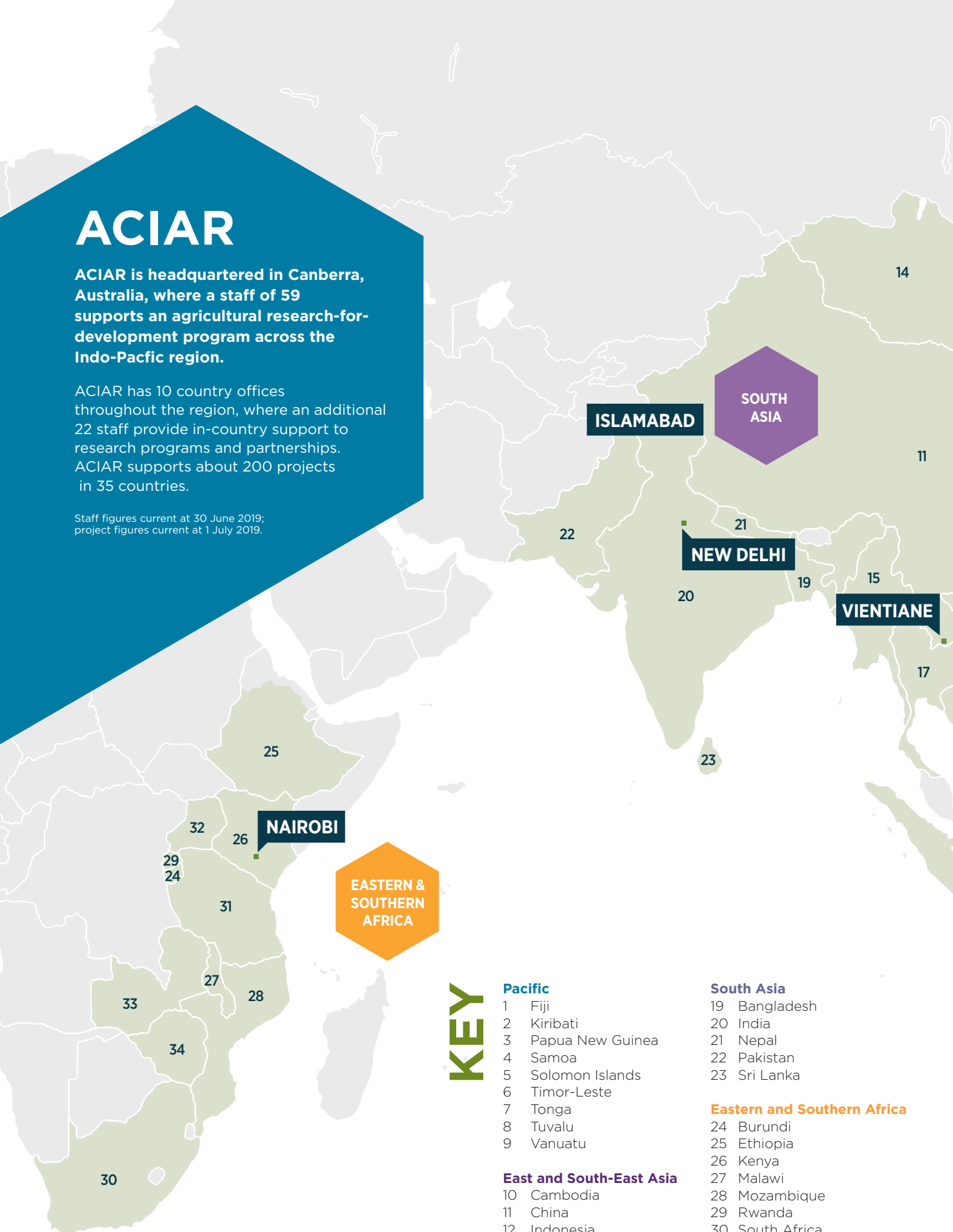
Note: There is no external funding expenditure on projects and programs in Africa by DFAT.

# ACIAR

ACIAR is headquartered in Canberra, Australia, where a staff of 59 supports an agricultural research-for-development program across the Indo-Pacific region.

ACIAR has 10 country offices throughout the region, where an additional 22 staff provide in-country support to research programs and partnerships. ACIAR supports about 200 projects in 35 countries.

Staff figures current at 30 June 2019; project figures current at 1 July 2019.



## KEY

### Pacific

- 1 Fiji
- 2 Kiribati
- 3 Papua New Guinea
- 4 Samoa
- 5 Solomon Islands
- 6 Timor-Leste
- 7 Tonga
- 8 Tuvalu
- 9 Vanuatu

### East and South-East Asia

- 10 Cambodia
- 11 China
- 12 Indonesia
- 13 Laos
- 14 Mongolia
- 15 Myanmar
- 16 Philippines
- 17 Thailand
- 18 Vietnam

### South Asia

- 19 Bangladesh
- 20 India
- 21 Nepal
- 22 Pakistan
- 23 Sri Lanka

### Eastern and Southern Africa

- 24 Burundi
- 25 Ethiopia
- 26 Kenya
- 27 Malawi
- 28 Mozambique
- 29 Rwanda
- 30 South Africa
- 31 Tanzania
- 32 Uganda
- 33 Zambia
- 34 Zimbabwe

Ghana (not shown)



# Vision

ACIAR looks to a world where poverty has been reduced and the livelihoods of many improved, through more productive and sustainable agriculture emerging from collaborative international research.

# Mission

To achieve more productive and sustainable agricultural systems for the benefit of developing countries and Australia, through international agricultural research partnerships.

BEIJING

EAST & SOUTH-EAST ASIA

HANOI

MANILA

PACIFIC

JAKARTA

PORT MORESBY

SUVA

CANBERRA

Current at July 2018



Image: ACIAR/Conor Ashleigh



2

**Global  
partnerships**

# Global partnerships

**ACIAR fosters and maintains active working relationships with international agricultural research centres, and provides timely, reliable and consistent funding, as well as strategic advice on research and governance.**

The ACIAR Global Program builds and manages multilateral partnerships with international organisations, institutes and associations engaged in agricultural research and the delivery of global public goods. The program implements one of our mandated roles of funding and supporting the international agricultural research centres. The program also manages co-funded programs across many countries in the Indo-Pacific region.

The largest component of support is provided to CGIAR—a network of 15 research centres dedicated to reducing rural poverty, increasing food and nutrition security for human health and improving natural resource systems and ecosystem services. The CGIAR is explained in detail on page 17.

Multilateral partnerships also encompass support of and/or engagement with other organisations relevant to our mission. During 2019–20, relationships will continue with:

- » African Union
- » Asia-Pacific Association of Agricultural Research Institutions (APAARI), where ACIAR Chairs the Executive Committee for 2019–21
- » Association of Southeast Asian Nations (ASEAN)
- » Australia Africa Universities Network (AAUN)
- » Centre for Agricultural Biosciences International (CABI)
- » Food and Agriculture Organization of the United Nations
- » Global Forum on Agricultural Research
- » The Group of 20—Meeting of the Agricultural Chief Scientists

- » The Pacific Community (SPC)
- » Global Research Alliance on Agricultural Greenhouse Gases
- » The World Bank
- » World Vegetable Center (WorldVeg).

Also significant for ACIAR global partnerships are developing and managing co-investment alliances and partnerships with like-minded donors such as DFAT, the Australian Government Department of Agriculture, Canada’s International Development Research Centre, the Syngenta Foundation for Sustainable Agriculture, and organisations in the private sector. Co-investment partnerships signify strong trust, and enable each partner to leverage complementary research strengths, build a critical mass of resources, and invest in more ambitious research than either could achieve alone.

The Global Program also establishes research activities at a regional level, where coordination of approaches is the best way to address an agricultural challenge, such as managing biosecurity risk and trade harmonisation. Research initiated by the Global Program also aims to be innovative and future-focused, especially when co-investing with a like-minded partner.

The ACIAR strategy under the Global Program is to be a valued, engaged donor, and a strong, innovative partner in international agricultural research. Partnerships built through our multilateral engagement contribute to Australia’s global citizenship goals. Our deep engagement in global forums helps ensure that Australia is influential and held in high esteem by the international agricultural research sector, national governments and donor communities.

During 2019–20, ACIAR will provide effective funding support on behalf of Australia to about 25 partnerships through multilateral, co-investment and regional relationships managed by the Global Program.

**Table 2.1: ACIAR funding to the Global Program, 2019–20**

Year	International agricultural research centres	Other research organisations and programs(a)	Total
A\$ million			
2019–20 (budget)	17.3	4.9	22.2

(a) Includes regional research funding and funding contributions to other multilateral (non-CGIAR) partners, such as SPC, AAUN, APAARI, CABI and WorldVeg and regional and co-investment research.



## Multilateral partnerships

### CGIAR

CGIAR<sup>1</sup> is the world's largest global agricultural innovation network, comprising 15 international agricultural research centres and about 9,000 scientists who work mostly in developing countries. The centres work towards a world free of poverty, hunger, malnutrition and environmental degradation. With a presence in more than 70 countries, and a deep knowledge of local customs, values and market operations, the CGIAR research centres work closely with more than 3,000 partner organisations. These include national and regional research institutes, civil society organisations, academia and the private sector.

CGIAR is more connected with the international development agenda and associated partners at global, national, subnational and local levels than any other agrifood research entity. CGIAR research centres are responsible for hands-on research programs and operations guided by policies and research directions set by the System Management Board. The centres conduct world-class, interdisciplinary research that combines biophysical and social sciences to deliver development impact at scale. CGIAR operates on an annual budget of about US\$900 million.

Our key multilateral partnership is with the CGIAR, which receives the largest proportion of the Global Program budget. As part of its mandated role, ACIAR has been a regular and significant funder and research partner to CGIAR since 1982. Accordingly, Australia has high-level representation on the CGIAR governance bodies, which in 2019–20 includes the System Council and its Strategic Impact Assessment Monitoring and Evaluation Committee, the System Reference Group and the System Management Board.

Through ACIAR, Australia works in the governance of CGIAR alongside the US, World Bank, United Kingdom, Europe Commission, Bill and Melinda Gates Foundation, Germany, Japan and China, among others. Australia is also well represented at the highest levels of leadership within the CGIAR as board chairs and board members, directors general and Research Program leaders.

CGIAR donors work together to deliver greatest impact. One current example is The Crops to End Hunger Initiative, which aims to improve and modernise CGIAR crop breeding programs, so that CGIAR can respond optimally to the food security and related human welfare and climatic challenges articulated by the Sustainable Development Goals.

Significant Australian leadership has been provided—including the University of Queensland developing the tool to assess modern breeding program performance—and 2019–20 will see the initiative being implemented after two years of planning.

CGIAR delivers significant economic and social returns on investment. Over its lifetime, the return on investment for every US\$1 provided to CGIAR is evaluated at US\$17. The outcomes of CGIAR investment contribute to the Sustainable Development Goals of the United Nations 2030 Agenda for Sustainable Development, and advance the interests of developed and developing countries alike.

Australian agricultural industries have benefited from CGIAR research, with research outputs helping to keep Australian farmers competitive in world markets, by increasing yields and/or reducing costs. For example, CGIAR germplasm has been incorporated into, and greatly improved, the Australian sorghum breeding system. Similarly, chickpea improvements in Australia have been heavily dependent on germplasm from the CGIAR in India and Syria, while research collaboration with the CGIAR, through exchange of livestock germplasm, has led improvements in the productivity of Australia's livestock sector. Benefits of CGIAR wheat research, for example, range from US\$2.2 billion to US\$3.1 billion per year—up to a 100-fold return on investment.

As CGIAR moves towards celebrating its 50th anniversary in 2021, it is assessing its narrative and forward vision against 21st century and future challenges, to develop an ambitious CGIAR System 2030 Business Plan. This will include exploring a revised compelling and aligned mission and research portfolio, new ways of organising the transformative research programs, institutions and governance to ensure CGIAR's long-term relevance is based on its unique comparative advantage. ACIAR is actively contributing to these deliberations to ensure CGIAR is well placed to deliver against both the Sustainable Development Goals and Paris Agreement, as well as to attract new funder contributions.

ACIAR provides both unrestricted (core) and restricted project funds to the CGIAR Fund. More than half of our funding is unrestricted and are reviewed annually. The remainder (restricted) is delivered through specific research projects between ACIAR programs and individual centres in the CGIAR network. Through ACIAR, Australia's annual contribution to the CGIAR system is shown in Table 2.2.

**Table 2.2: Australia's funding, through ACIAR, to the CGIAR system, 2019–20**

Year	Unrestricted	Project specific (restricted)	Total
A\$ million			
2019–20 (budget)	17.3	8.4	25.7

## Centres of the CGIAR system

1. Africa Rice Center—AfricaRice
2. International Rice Research Institute—IRRI
3. Bioversity International—Bioversity
4. International Center for Tropical Agriculture—CIAT
5. Center for International Forestry Research—CIFOR
6. International Centre for Agroforestry (World Agroforestry Centre)—ICRAF
7. International Center for Agricultural Research in the Dry Areas—ICARDA
8. International Crops Research Institute for the Semi-Arid Tropics—ICRISAT
9. International Food Policy Research Institute—IFPRI
10. International Institute of Tropical Agriculture—IITA
11. International Livestock Research Institute—ILRI
12. International Maize and Wheat Improvement Center—CIMMYT
13. International Potato Center—CIP
14. International Water Management Institute—IWMI
15. WorldFish

To ensure the quality and value for money of Australia's ongoing contributions to CGIAR, during 2019–20, ACIAR will:

- » participate in the highest level of governance of the CGIAR system through active membership and leadership on the CGIAR System Council, the Strategic Impact Monitoring and Evaluation Standing Committee
- » lead Theme 1 'Research Objectives and Focus' of the System Reference Group to deliver options on defining a transformative and compelling portfolio coverage to the System Council
- » participate as an active observer on the CGIAR System Management Board, with a focus on implementation of the 2019–2021 Business Plan
- » collaborate with key donors through participation in multi-funder activities, where they align with the ACIAR strategy and Australian interests
- » lead the development of a coordinated Australian engagement with CGIAR, including consultation with DFAT and other Australian agencies, primarily through the International Agricultural Coordination Group and CGIAR Australian Leadership Group, which ACIAR established in 2015
- » ensure involvement of ACIAR Research Program Managers in the technical oversight of CGIAR Research Programs.

## Other international research organisations and networks

ACIAR also has multilateral partnerships with five international agricultural research centres and networks outside the CGIAR system. These organisations are:

- » Asia-Pacific Association of Agricultural Research Institutions (APAARI)
- » Australia Africa Universities Network (AAUN)
- » Centre for Agricultural Biosciences International (CABI)
- » Pacific Community (SPC)
- » World Vegetable Centre (WorldVeg).

The ACIAR contribution to these organisations has grown over the past 10 years, and A\$1.59 million is budgeted for support in 2019–20.

### Asia-Pacific Association of Agricultural Research Institutions

The Asia-Pacific Association of Agricultural Research Institutions<sup>2</sup> (APAARI) promotes and coordinates the national agricultural research institutes in the Asia-Pacific region, through inter-regional and inter-institutional cooperation. APAARI's Strategic Plan 2017–2022—*Pathways to strengthened agrifood research and innovation systems in Asia and the Pacific*—identifies strategic priorities, which are used to inform our input into its wider regional consultation process.

ACIAR provides annual, unrestricted funding to APAARI for research communication, knowledge management, advocacy for agricultural biotechnology, support for capacity building and participation in expert consultations with national agricultural research system leaders in the region.

During 2019–21, ACIAR will chair the APAARI Executive Council and the Asia-Pacific Consortium on Agricultural Biotechnology and Bioresources, and support APAARI to become the long-term coordinating agency for the Agricultural Science and Technology Indicators (ASTI) for the South-East Asia and Pacific region.

### Australia Africa Universities Network

Launched in 2012, the Australia Africa Universities Network<sup>3</sup> (AAUN) is a group of 22 leading universities—10 in Australia and 12 in Africa—that connects researchers and academics through institutional partnerships, forming sustainable teams to address major challenges facing both continents.

With a small secretariat led by the University of Sydney and the University of Pretoria, the network fosters a growing relationship between Australia and Africa, by building on educational and research links. The vision is to build equal partnerships between leading research universities, develop active teams and communities of scholars who are ready and able to address mutual challenges, and engage allied research and education networks and institutions in the program.

AAUN has established 50 intercontinental, multidisciplinary research programs that address mutual challenges in the areas of agriculture and environment, food and nutrition security, public health, and related higher education and economic development. Further information is at <www.aaun.edu.au>.

Australian universities participating in the network are:

- » Curtin University
- » Murdoch University
- » The University of Melbourne
- » The University of Newcastle
- » The University of Queensland
- » University of New South Wales
- » University of Western Australia
- » University of Technology Sydney
- » University of Wollongong
- » Western Sydney University.

The African universities participating in the network are:

- » Makerere University (Uganda)
- » Tshwane University of Technology (South Africa)
- » University of Botswana (Botswana)
- » University of Cape Town (South Africa)
- » University of Ghana (Ghana)
- » University of Ibadan (Nigeria)
- » University of Malawi (Malawi)
- » University of Mauritius (Mauritius)
- » University of Nairobi (Kenya)
- » University of Pretoria (South Africa)
- » University of Zambia (Zambia)
- » Addis Ababa University (Ethiopia).

The four-year (2018–21) partnership arrangement between ACIAR and AAUN supports an annual competitive call for multi-institutional research proposals in the selected research areas. African and Australian senior and emerging research leaders engage in the research programs, keynote forums, workshops and conferences. AAUN fosters mobility of researchers and students, and links with alumni and diaspora communities.

This work will continue in 2019–20, building the quality, feasibility, impact and sustainability of programs. Many programs are directly relevant to global and national policy initiatives, including the United Nations Sustainable Development Goals, the African Union Africa 2063 Agenda, and the Australian International Policy.

## Centre for Agricultural Biosciences International

The Centre for Agricultural Biosciences International<sup>4</sup> (CABI) is an intergovernmental, not-for-profit organisation established by a United Nations treaty, of which Australia is a member country. With its headquarters in the United Kingdom, CABI has a network of offices throughout Europe, the US, Africa, South America and Asia.

CABI addresses issues of global concern through science, information and communication, with a focus on international development and research, publishing and microbial services. CABI works to improve global food security, combat threats to agriculture and the environment from pests and diseases, protect biodiversity from invasive species, and improve access to agricultural and environmental knowledge.

Australia's investment in CABI has contributed to improved agricultural outcomes for developing countries, and delivered benefits to Australian agriculture. CABI has been an instrumental partner in fostering a partnership between the Australia Africa Plant Biosecurity Partnership and the Common Market for Eastern and Southern Africa, to support the sustainability of the African Plant Biosecurity Network.

The four-year (2019–23) partnership arrangement between ACIAR and CABI supports Plantwise, an Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee award-winning global program led by CABI, which helps farmers lose less of what they grow to pests and diseases.

## Pacific Community

The Pacific Community<sup>5</sup> or SPC, which was previously known as the Secretariat of the Pacific Community, is the principal scientific and technical organisation working to support development in the Pacific region, and has been doing so since 1947.

Owned and governed by its 26 country and territory participants, SPC is an international development organisation. It works in seven key areas pertinent to development in the Pacific region, including climate change, disasters, non-communicable diseases, gender equality, youth employment, food and water security and biosecurity for trade.

SPC is a key partner for ACIAR and DFAT in delivering Australia's wider strategies to support strong benefits from the region's fisheries, agriculture, forestry and biosecurity sectors. The four-year (2018–21) strategic partnership arrangement between ACIAR and SPC supports core scientific, technical and management capacities, and activities in agriculture and fisheries that add value to the development activities of Pacific Island countries and territories in these areas. ACIAR works directly with the two divisions of SPC—Land Resources Division and Fisheries, Aquaculture and Marine Ecosystems.

ACIAR is committed to supporting SPC to maintain the institutional capacity to sustain the capabilities of these divisions. During 2019–20, ACIAR and SPC will collaborate to progress strategic regional initiatives, including the Pacific Plant Biosecurity Program and the Coconut Genetic Resources Network. ACIAR will also engage with SPC on supporting the 2019 Pacific Week of Agriculture in Samoa.

### World Vegetable Centre

The World Vegetable Center<sup>6</sup>, known as WorldVeg, is an international non-profit research and development institute committed to alleviating poverty and malnutrition in the developing world through increased production and consumption of vegetables. Through its extensive networks and research partnerships WorldVeg disseminates improved varieties of vegetable crops, and promotes improved production methods to farmers in developing and developed countries. This results in higher vegetable harvests, higher incomes, more jobs and healthier, more nutritious diets.

Investment in WorldVeg is an investment in research into the nexus between agriculture, livelihoods, nutrition and health. ACIAR provides WorldVeg with both unrestricted funding and project-specific funding for research led by, or implemented in, partnerships that include WorldVeg.

WorldVeg has brought significant benefits to Australian agriculture through its mung bean breeding program, which has provided the varieties being grown across much of northern Australia for many years. WorldVeg also holds breeds of tomato with genetic resistance to tomato yellow leaf curl virus. This virus poses an ongoing threat to the Australian tomato industry.

During 2019–20, work will continue against the four-year (2019–22) strategic partnership between ACIAR and WorldVeg, which supports breeding activities and capacity-building in the developing countries in Asia and sub-Saharan Africa. This includes:

- » developing improved lines of vegetables with higher yields, tolerance/resistance against pest and diseases and/or higher nutrient content
- » introducing improved agricultural practices, before and after harvest, for safe, sustainable and competitive value chains
- » collaborating with, and building capacity of, partners from the public and private seed sectors.

## Co-investment programs

Co-investment programs enable ACIAR to harness the complementary skills of partners, leverage ACIAR funds, and engage in larger and more ambitious programs than it could fund alone. These relationships take the two main forms of:

- » alliances—where the design and management of research programs are shared between all contributing donors
- » partnerships—where a donor will co-fund an ACIAR project, and ACIAR manages the project, such as projects managed by ACIAR under the DFAT-ACIAR Record of Understanding.

### Cultivate Africa's Future, Phase 2

During 2019–20, ACIAR will continue the successful Cultivate Africa's Future (CultiAF) partnership with the Canadian International Development Research Centre (IDRC). The first phase of CultiAF began in 2013, and supported eight projects across five countries in eastern and southern Africa, addressing post-harvest management, food processing, nutrition, business opportunities and value chains.

Phase 2 of CultiAF<sup>7</sup> was launched in May 2019, and during 2019–20, five projects selected for Phase 2 will begin. These are:

- » Improving agricultural productivity and resilience with satellite and cell phone imagery to scale climate smart crop insurance
- » User-driven approaches to make government and farmer-led smallholder irrigation schemes in Mozambique more productive, self-sustaining and equitable
- » Alien invasive fruit flies in southern Africa—implementation of a sustainable integrated pest management program to combat these menaces
- » Harnessing dietary nutrients of under-utilised fish and fish processing by-products to reduce micronutrient deficiencies among vulnerable groups in Uganda
- » Climate smart interventions for smallholder farmers in Ethiopia.

A further four projects from CultiAF Phase 1 will be rolled over to Phase 2. These are:

- » Insect feed for poultry, fish and pig production in Kenya and Uganda
- » Business opportunities for youth in the fish and poultry sectors in Kenya
- » Improved fish processing technologies in Malawi
- » Supply and utilisation of pre-cooked beans for improved food and nutrition security in Kenya and Uganda.

Through CultAF2, ACIAR and IDRC, will invest more than A\$20 million (over 5 years) in high-quality applied research that addresses food and nutrition insecurity in Africa. The ACIAR-IDRC partnership will jointly invest more than A\$37 million for the two phases.

### Food Futures Research Program

The Food Futures Research Program<sup>8</sup> is an innovative partnership between ACIAR and the IDRC. The program seeks to canvass and support strategic agricultural research that will have a potential breakthrough and/or transformative impact on global food security into the foreseeable future. ACIAR and IDRC have jointly committed A\$5 million to the program, which ACIAR is managing on behalf of the partnership.

During 2019–20, the program will finalise its foresight and impact analysis work to understand prevailing macro and sector trends in food security, and identify the major future obstacles and key gaps in the research. The USA's Foundation for Food and Agricultural Research (FFAR) is co-investing in this foresight work being undertaken by XPRIZE. The program will design and commission innovative agricultural research to address these obstacles and help deliver a sustainable and food and nutrition secure future.

### Alliance for Agricultural Research and Development for Food Security

The Alliance for Agricultural Research and Development for Food Security is a joint initiative between ACIAR, the Syngenta Foundation for Sustainable Agriculture and the Crawford Fund. Alliance partners co-fund innovative approaches to research-for-development activities and delivery, using the unique and diverse strengths and expertise of the parties, to better promote and achieve food security.

The first of these co-investments is a highly successful project—*Demand-led plant variety design for emerging markets in Sub-Saharan Africa*<sup>9</sup>. Phase 1 of the project increased the availability of highperforming plant varieties that meet market demands. An external review of Phase 1 noted that the project has engaged extensively with the plant-breeding and university sectors in many countries, towards having a truly comprehensive and transformative effect on plant breeding, smallscale agriculture and food security in Africa.

Phase 2 of the project will build on research outcomes from Phase 1 during 2019–20. The new phase will provide wider access to plant breeders, and focus on implementation of best practice in demand-led plant breeding programs, using beans (*Phaseolus* sp.) and tomatoes to demonstrate best practice. It will also build capacity within plant breeding programs on demand-led variety design, by strengthening education and training programs for plant breeders across Africa. This will include new curriculum development and professional development courses, based on private sector best practice.

### Pacific Plant Biosecurity Partnership

The Pacific Plant Biosecurity Partnership<sup>10</sup> aims to strengthen biosecurity capacity in Pacific island countries, Papua New Guinea and Timor-Leste. Led by ACIAR, the partnership is implemented by Kalang Consultancy Pty Ltd, and is supported by the Australian Government Department of Agriculture and the Crawford Fund.

The partnership is based on the format and approach used between 2014 and 2017 in the successful delivery of the ACIAR plant biosecurity capacity-building program in eastern and southern Africa.

Biosecurity is a highly important area of work for Australia and the Pacific region, as plant pests and diseases negatively affect food production and biodiversity, and can limit trade and market access opportunities for plant products, including safe food access and importation.

By targeting regional, national/institutional and individual needs, and placing people in Australian biosecurity agencies, providing mentoring and training, and developing a long-term regional network, the program aims to build greater capacity and empower Pacific National Plant Protection Officers and their institutions.

The program goals are to improve:

- » the performance and capacity of biosecurity agencies in the Pacific, in surveillance, diagnostics, pest risk analysis, import border controls, export inspection and trade negotiation
- » supply chain compliance by the private sector, to meet the biosecurity requirements of export markets
- » value chains for selected commodities, by addressing plant biosecurity impediments to production and market access
- » food security and livelihoods across the region.

A total of 19 fellows from the Pacific completed the first phase of the program during 2018–19, sharing expertise, research and national plant biosecurity challenges through a market access simulation workshop, communications masterclass and placements with Australian biosecurity institutions.

During 2019–20, the program will continue to strengthen biosecurity capacity, through continued training in the region. This will include additional fellows from the region's biosecurity agencies and private sector, and establishing a home for the biosecurity network to support ongoing liaison between Pacific island and Australian biosecurity officials and experts. This is critical to advance plant biosecurity programs across the region and in the international market access arena.

## Reinvigorating the Coconut Genetic Resources Network

Grown in more than 90 tropical countries, on more than 12 million hectares, coconut is important to millions of smallholder households. The future of coconut production and livelihoods is threatened by senile plantings, which face further declines from pests and diseases, climate change and poor conservation and management of genetic resources. Access to coconut genetic diversity is vital to sustaining the livelihoods of millions of smallholders and their communities around the world, and particularly in the Asia-Pacific region.

In 2019–20, ACIAR, the Australian Government Department of Foreign Affairs and Trade (DFAT) and the International Coconut Community will collaborate on a new program to reinvigorate and sustain the Coconut Genetic Resources Network<sup>11</sup> (COGENT). Under the leadership of Mr Uron Salum, the program will focus on better coconut science, through a global coconut strategy to address these major challenges.

This program will collaborate with other organisations to ensure a viable COGENT Secretariat, to safeguard coconut genetic resources and to better address disease threats, through new leadership by the International Coconut Committee. ACIAR and DFAT will jointly invest \$500,000 to support this important initiative.

### Healthy diets and food systems

The EAT-Lancet Commission Report (2019) advocated for a universal healthy and sustainable diet, rich in plant foods, fruits and nuts and fish and low in animal sourced (especially meat) and discretionary foods (processed foods and sugars). While the report suggests a dietary pattern in very general terms, the recommendations need to be modified at the country level, adapted to local resources, cultural eating habits and also to the local modes of production and value chains.

A new project led by Dr Mario Herrero of CSIRO Agriculture and Food, *Towards local healthy diets from sustainable and inclusive food systems*<sup>12</sup>, will work in Vietnam and Fiji to test the recommendations through a range of activities, including developing prototypes of healthy diets with local stakeholders and assessing several sustainability criteria at the country level; analysing current production and trade patterns and identify mismatches to attain the healthy and sustainable diets; and engage with stakeholders in the food system (public and private) to identify pathways for transforming food systems towards the desired health and sustainability outcomes.

### Co-investments with other government agencies

Our largest and most important partnership with a government agency is with its portfolio partner, DFAT. The existing partnership agreement between ACIAR and DFAT was signed in 2006. It is a commitment to work together towards common objectives, against a principle of equal partnership, underpinned by mutual respect, professionalism, honesty, open communication and cooperation.

During 2019–20, ACIAR and DFAT will update the partnership agreement, under which ACIAR will manage 14 activities, and, through well-managed DFAT-ACIAR co-investment agreements, ensure the timely delivery of revenue and expenditure and risk mitigation for these activities.

**Table 2.3. ACIAR and partner investment in co-investment programs (funds are for the life of the project)**

Project	Project partner/s	ACIAR	Partner	Total	Leverage of ACIAR investment
		(A\$ million)	(A\$ million)	(A\$ million)	
<i>Demand-led plant variety design</i> (FSC/2013/019)	Syngenta Foundation	1.085	1.085	2.170	100%
<i>CultiAF2</i> (C2016-367)	Canadian International Development Research Centre	10.000	10.000	20.000	100%
<i>Food Futures Research Program</i> (GP/2018/218)	Canadian International Development Research Centre	2,500	3,237	5,737	129%
<i>Pacific Plant Biosecurity Program</i> (GP/2018/109)	Australian Department of Agriculture Crawford Fund	0.650	0.154	0.804	24%
<i>COGENT</i> (GP/2018/193)	Australian Department of Foreign Affairs and Trade	0.250	0.250	0.500	100%
<b>TOTAL</b>		<b>13.400</b>	<b>13.641</b>	<b>27.041</b>	<b>102%</b>

## Regional research programs

The Global Program supports regional research programs that vary both in nature and in the regions that benefit from the work. During 2019–20, there is one such program.

### Agricultural Science and Technology Indicators

The ASTI program<sup>13</sup>, active in South-East Asia and the Pacific (Papua New Guinea and Fiji), is led by the International Food Policy Research Institute, and hosted and coordinated by APAARI. The program works with national and regional partners to survey and analyse data on the funding, human resource capacity and outputs of agricultural research in the Indo-Pacific region. Data collection is ongoing, and, in 2019–20, ACIAR will support national and regional analysis of the data to inform future agricultural research policy and decision-making in the region.

The program also provides a basis to guide research investment decisions and build a foundation for the long-term monitoring of agricultural research investment and capacity. ACIAR, through the Global Program, will invest more than A\$1 million in this program over 2017–20.



Participant of the Pacific Plant Biosecurity Program communications masterclass. PHOTO: Patrick Duthie

## Current and proposed partnerships and projects 2019–20

Multilateral partnerships with international organisations and networks

1. CGIAR
2. Asia-Pacific Association of Agricultural Research Institutions (C000341)
3. AAUN Partnership Arrangement (C000425)
4. CABI Partnership Arrangement (C001048)
5. Strategic Partnership Arrangement with the Pacific Community (C000386)
6. World Vegetable Center Partnership Arrangement (C001047)

Co-investment alliances and partnerships

7. Cultivate Africa's Future, Phase 2 (CultiAF2) [Ethiopia, Kenya, Uganda, Malawi, Mozambique, Zambia, and Zimbabwe] (C2016/367)
8. Food Futures Research Program (GP/2018/218)
9. Demand-led plant variety design for emerging markets in Sub-Saharan Africa [Ghana, Kenya, South Africa, Tanzania] (FSC/2013/019)
10. Improving plant biosecurity in the Pacific islands [Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu] (GP/2018/109)
11. Reinvigorating the Coconut Genetic Resources Network (COGENT) [Fiji, Indonesia, Papua New Guinea, Samoa] (GP/2018/193)
12. Towards local healthy diets from sustainable and inclusive food systems [Vietnam, Fiji] (GP/2018/108)

Regional research programs

13. Monitoring agricultural research investments, capacity and impact in South-East Asia and the Pacific—Agricultural Science and Technology Indicators (ASTI) program [Cambodia, Indonesia, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, Vietnam, Laos, Timor-Leste] (GP/2016/093)

### General Manager, Global Program

Ms Mellissa Wood







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## ACIAR in the Pacific

# ACIAR in the Pacific

**ACIAR is well recognised and well regarded for its significant and diverse portfolio of work on productivity, resilience, sustainability, opportunity and equity of agriculture, forestry and fisheries systems throughout the Indo-Pacific region, to reduce poverty and improve livelihoods.**

Our on-the-ground work in the Indo-Pacific region is dominated by research projects facilitated by bilateral country partnerships. During 2019–20, about 200 projects will be active in our operational regions. These projects are collaborations between Australian scientists and in-country partners, and brokered by our Research Program Managers, across nine fields of research.

## Regional summary

Each ACIAR partner country in the Pacific region faces specific agricultural development challenges, and has specific opportunities to forge its own unique path to economic development. The challenges include economic shocks (such as abrupt changes in food and fuel prices), natural disasters (such as cyclones, floods, droughts, earthquakes and tsunamis), and high exposure to the impacts of changing climate patterns.

While many of the constraints are common to more than one country, they can affect each country or islands within countries differently, depending on local context. These constraints and uncertainties have limited the development of commercially-oriented agriculture, fisheries, and forestry sectors, and left some Pacific countries heavily dependent on imports of food and other commodities.

This vulnerability is increased by a narrow resource base (in the case of many Pacific island states), hot spots of vulnerability related to remoteness, and a depleted or poor resource base. In much of the region, economic growth is not keeping pace with population growth.

Pacific countries are also facing the consequences of a double burden of malnutrition with high prevalence of nutrition-related diseases—such as diabetes, obesity, heart diseases and some cancers—as well as micronutrient deficiencies. Unhealthy diets, lifestyles and environment are key risk factors contributing to this burden of malnutrition

ACIAR works with 10 countries in the Pacific region: the Pacific island countries of Fiji, Kiribati, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu, and Papua New Guinea and Timor-Leste.

## Drivers of regional collaboration

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

The ACIAR program in the region has a strong focus on enabling regional collaboration, especially through our close relationship with SPC. While our program focuses on eight countries in the region, SPC plays a key role in communicating research outcomes of relevance broadly across the region. Regional research programs and projects are implemented through agencies with regional capability (including SPC, the University of the South Pacific and CGIAR centres) and bilateral research and extension agencies.

## ACIAR program in the region

One of the highest priorities of Australia's 2017 Foreign Policy White Paper, was a commitment to 'step up' Australia's engagement with the Pacific to support a more resilient region. This intensified approach is essential to building a Pacific region that is strategically secure and economically stable. In 2019–20, ACIAR is building on its long engagement with the Pacific, by establishing a new regional office in Fiji and developing new 10-year strategies with the Pacific island states and with Papua New Guinea. ACIAR is developing its medium-term priorities under both strategies through consultation with national and regional research and development agencies. These priorities will be revisited and adjusted through consultations with the heads of these agencies once every two years at Pacific Week of Agriculture.

A key focus of our program within the region will be enabling regional research collaboration in research and capacity building to address common issues and opportunities. This regional approach includes various projects addressing biosecurity, climate resilient livelihoods, and opportunities for stronger agribusiness development. Specific multi-country projects and linked programs include:

- » fisheries (pathways to change in Pacific coastal fisheries in Kiribati, Solomon Islands and Vanuatu)
- » forestry (domestication and breeding of sandalwood, agroforestry and catchment rehabilitation)
- » crops (sweetpotato, indigenous vegetables, commercial vegetables, tropical fruits and cocoa)
- » soil information and soil health.

During 2019–20, 65 ACIAR-supported projects will be active in the Pacific region (Table 5.1).

**Table 5.1: Current and proposed projects in the Pacific region, 2019-20**

Project title	Country	Project code
<b>Agribusiness</b>		
Policy drivers for public-private partnerships in Pacific organics: improving extension policy through an evidence-based approach	Fiji, Vanuatu	ADP/2018/131
Pacific agribusiness research in development initiative, Phase 2 (PARDI 2)	Fiji, Tonga, Vanuatu	AGB/2014/057
<b>Crops</b>		
Developing a foundation for the long-term management of basal stem rot of oil palm in Papua New Guinea and Solomon Islands	Papua New Guinea, Solomon Islands	CIM/2012/086
Agricultural innovations for communities for intensified and sustainable farming systems in Timor-Leste (AI-Com)	Timor-Leste	CIM/2014/082
<b>Fisheries</b>		
Developing pearl industry-based livelihoods in the western Pacific	Fiji, Papua New Guinea, Tonga	FIS/2014/060
Improving technical and institutional capacity to support development of mariculture-based livelihoods and industry in New Ireland, Papua New Guinea	Papua New Guinea	FIS/2014/061
Improving technologies for cost-effective fish feeding strategies, husbandry and fingerling production for inland aquaculture in Papua New Guinea	Papua New Guinea	FIS/2014/062
Half-pearl industry development in Tonga and Vietnam	Tonga, Vietnam	FIS/2016/126
Strengthening and scaling community-based approaches to Pacific coastal fisheries management in support of the New Song	Kiribati, Solomon Islands, Vanuatu	FIS/2016/300
A nutrition-sensitive approach to coastal fisheries management and development in Timor-Leste and Nusa Tenggara Timur Province, Indonesia	Timor-Leste, Indonesia	FIS/2017/032
Monitoring and evaluation of socioeconomic impacts of pearl-based livelihood development	Fiji, Tonga	FIS/2018/129
Institutional strengthening in Papua New Guinea: translating fisheries research into policy and management	Papua New Guinea	FIS/2018/151
Improving livelihoods and human nutrition through inland aquaculture in Papua New Guinea and Vanuatu	Papua New Guinea, Vanuatu	FIS/2018/154
Agriculture for improved nutrition: integrated agrifood systems for the Pacific region	Kiribati, Solomon Islands, South Pacific general, Vanuatu	FIS/2018/155
<b>Forestry</b>		
Improving returns from community teak plantings in Solomon Islands	Solomon Islands	FST/2014/066
Enhancing value-added products and environmental benefits from agroforestry systems in Papua New Guinea and the Pacific	Fiji, Papua New Guinea, Solomon Islands, Vanuatu	FST/2014/067
Improvement and management of teak and sandalwood in Papua New Guinea and Australia	Papua New Guinea	FST/2014/069
Building research capacity among ACIAR's sandalwood-focused projects through a regional sandalwood workshop and publication	Indonesia, Vanuatu, Fiji, Papua New Guinea, Timor-Leste, Australia	FST/2016/024
Improving agroforestry policy for sloping land in Fiji	Fiji	FST/2016/147
Enabling community forestry in Papua New Guinea	Papua New Guinea	FST/2016/153
Enhancing returns from high-value agroforestry species in Vanuatu	Vanuatu	FST/2016/154
Domestication and breeding of sandalwood in Fiji and Tonga	Fiji, Tonga	FST/2016/158
Enhancing private sector-led development of the canarium industry in Papua New Guinea, Phase 2	Papua New Guinea	FST/2017/038
Promoting smallholder teak and sandalwood plantations in Papua New Guinea and Australia	Papua New Guinea	FST/2018/178

Project title	Country	Project code
<b>Horticulture</b>		
Bogia coconut syndrome in Papua New Guinea: developing biological knowledge and a risk management strategy	Papua New Guinea	HORT/2012/087
Enhanced fruit production and post-harvest handling systems for Fiji, Samoa and Tonga	Fiji, Samoa, Tonga	HORT/2014/077
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
Integrating protected cropping systems into high-value vegetable value chains in the Pacific and Australia	Fiji, Samoa, Tonga	HORT/2014/080
Developing improved crop protection options in support of intensification of sweetpotato production in Papua New Guinea	Papua New Guinea	HORT/2014/083
Developing the cocoa value chain in Bougainville [Papua New Guinea]	Papua New Guinea	HORT/2014/094
Enterprise-driven transformation of family cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea	Papua New Guinea	HORT/2014/096
Supporting commercial sweetpotato production and marketing in the Papua New Guinea highlands	Papua New Guinea	HORT/2014/097
Responding to emerging pest and disease threats to horticulture in the Pacific islands	Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga	HORT/2016/185
Coconuts for Pacific livelihoods	Fiji, Papua New Guinea, Samoa, Solomon Islands, Vanuatu	HORT/2017/025
Effective management of cocoa pod borer	Papua New Guinea	HORT/2018/114
Protecting the coffee industry from coffee berry borer in Papua New Guinea and Australia	Papua New Guinea	HORT/2018/194
Developing and deploying the diversity of root crops for greater climate resilience in the Pacific island countries	Fiji, Samoa, Solomon Islands, Tonga, Vanuatu	HORT/2018/195
<b>Livestock Systems</b>		
Increasing the productivity and market options of smallholder beef cattle farmers in Vanuatu	Vanuatu	LPS/2014/037
Smallholder cattle enterprise development in Timor-Leste	Timor-Leste	LPS/2014/038
Pig disease investigation in Timor-Leste	Timor-Leste	LS/2012/065
Increasing the productivity and profitability of smallholder beekeeping enterprises in Papua New Guinea and Fiji	Fiji, Papua New Guinea	LS/2014/042
Improving small ruminant production and supply in Fiji and Samoa	Fiji, Samoa	LS/2017/033
Trilateral support to smallholder cattle systems research in Timor-Leste	Timor-Leste	LS/2017/035
Establishing the linkages between foodborne bacterial enteropathies and malnutrition in Timor-Leste	Timor-Leste	LS/2018/184
Promoting business development pathways for more productive and profitable smallholder cattle systems in Vanuatu	Vanuatu	LS/2018/185
Supporting Fijian health and agricultural authorities implement the National antimicrobial resistance action plan (One Health)	Fiji	LS/2018/212
A One Health approach to establish surveillance strategies for Japanese encephalitis and zoonotic arboviruses in Papua New Guinea (One Health)	Papua New Guinea	LS/2018/213
Drug sensitive and resistant tuberculosis and zoonotic infections as causes of lymphadenitis in two provinces in Papua New Guinea (One Health)	Papua New Guinea	LS/2018/217
Enhancing the management of antimicrobial resistance in Fiji (One Health)	Fiji	LS/2019/119

Project title	Country	Project code
<b>Social Sciences</b>		
Identifying opportunities and constraints for rural women's engagement in small-scale agricultural enterprises in Papua New Guinea	Papua New Guinea	ASEM/2014/054
Improving livelihoods of smallholder coffee communities in Papua New Guinea	Papua New Guinea	ASEM/2016/100
Climate-smart landscapes for promoting sustainability of Pacific Island agricultural systems	Fiji, Tonga	ASEM/2016/101
Climate-smart agriculture opportunities for enhanced food production in Papua New Guinea	Papua New Guinea	ASEM/2017/026
The potential of International Landcare	Fiji, Indonesia, the Philippines, South Africa, Uganda	ASEM/2018/117
Improving agricultural development opportunities for female smallholders in rural Solomon Islands	Solomon Islands	SSS/2018/136
Gender equitable agricultural extension through institutions and youth engagement in Papua New Guinea	Papua New Guinea	SSS/2018/137
<b>Soil and Land Management</b>		
Sustaining soil fertility in support of intensification of sweetpotato cropping systems	Papua New Guinea	SMCN/2012/105
Optimising soil management and health in Papua New Guinea integrated cocoa farming systems	Papua New Guinea	SMCN/2014/048
Soil management in Pacific Islands: investigating nutrient cycling and development of the Soils Portal	Fiji, Kiribati, Samoa, Tonga, Tuvalu	SMCN/2016/111
Improving soil health, agricultural productivity and food security on atolls	Kiribati, Tuvalu	SMCN/2014/089
<b>Water and Climate</b>		
Agriculture based emission-reduction options to support nationally determined contributions in Vietnam and Fiji	Fiji, Vietnam	LWR/2017/029
<b>Global Program</b>		
Towards local healthy diets from sustainable and inclusive food systems	Fiji, Vietnam	GP/2018/108
Improving plant biosecurity in the Pacific islands	Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu	GP/2018/109
Reinvigorating the Coconut Genetic Resources Network (COGENT)	Fiji, Indonesia, Papua New Guinea, Samoa	GP/2018/193
Monitoring agricultural research investments, capacity and impact in South-East Asia and the Pacific—Agricultural Science and Technology Indicators (ASTI)	Cambodia, Indonesia, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, Vietnam, Laos, Timor-Leste	GP/2016/093

Note: More details (including project leader, commissioned organisation and partner organisations) are provided in the appendixes.

# Pacific island countries

Budgeted funding

**A\$11.5**  
million

ACIAR-supported projects

**36**

Multilateral & co-investment programs

**5**

The Pacific region continues to experience significant economic, social and environmental challenges. While extreme poverty—defined as the proportion of the population living below US\$1.25 per day—is rare in the Pacific, poverty remains a big challenge for many countries. More than 20% of people in most Pacific island countries live in hardship and are unable to meet their basic needs. Many people not currently in severe hardship remain vulnerable to economic and environmental shocks. The region is particularly prone to disasters, including cyclones, severe storms, flooding, droughts and earthquakes.

Overview of Australia's Pacific Regional aid program (DFAT 2019)

**Agriculture is an important sector in the Pacific region, particularly for its contributions to the livelihoods of the population, gross domestic product (GDP) and food security.**

According to the Food and Agriculture Organization of the United Nations, about 67% of the Pacific region's population depends on agriculture for livelihoods. Fisheries also plays an important role in the subsistence and cash economies of the region, with fish providing an important source of protein and income for most coastal communities. So, any improvements in the output of agriculture and fisheries benefits the population, by increasing its access to food, and improving its ability to meet dietary needs.

The Pacific's Multi-Country Programming Framework (2018–2022), developed by the Food and Agriculture Organization of the United Nations, identified common challenges that point to increasing vulnerability to economic shocks and natural disasters across the region. While many of the challenges are common throughout Pacific island countries, the impacts in each country and island might differ, depending on local context. Such constraints and uncertainties 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.

This context of each country is different and not static. Population growth of more than 2% per year in Solomon Islands and Vanuatu, for example, is leading to mounting concerns about local food security and increasing pressure on the natural resource base. Elsewhere in the Pacific, populations are either stable (increasing at less than 1% per year) or even falling (due to emigration), leading to shortages of labour, and making it harder to develop profitable enterprises. Further, everywhere in the Pacific, there is a strong trend towards urbanisation, 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 for Pacific islands agriculture is invasive pests and diseases, such as coconut rhinoceros beetle (Guam biotype) and Bogia coconut syndrome. Island environments have inherently limited natural resilience in the face of aggressive invasive species (due to the limited local diversity of 'natural enemies'), and recent years have been marked with rapidly spreading outbreaks of several devastating invasive pest species. Emerging diseases of livestock (and potentially fisheries) might be equally destructive.

Pacific leaders have, on various occasions, identified concerns about the uncertain impact of climate change. All Pacific countries are concerned about the potential effects of rising sea levels, given that much of the population and most of the productive agriculture in the Pacific islands are in coastal areas or coastal plains. Climate models suggest that, over the longer term, some Pacific islands will become drier, on average, and others wetter. In the meantime, stronger periods of drought and wet weather (in some cases causing destructive flooding) are expected, associated with El Niño cycles. There is also a prediction that cyclones might become more severe, even though fewer in number.

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 2 diabetes and heart disease. As well as taking a huge toll in terms of human wellbeing, this rise in the incidence of non-communicable diseases imposes a significant burden on health services and the economy of Pacific countries in general.

## Regional priorities

Australia's *Pacific Step-up* foreshadowed in the 2017 Policy White Paper, committed Australia to an intensified engagement in the Pacific region to support a more resilient region. The *Pacific Step-up* emphasises the importance of our ongoing and diverse program with the region, involving all research programs.

Protecting the fragile natural resource base of the Pacific islands is a closely linked priority in ensuring the resilience of agrifood systems. The SPC emphasises integrated approaches to increasing resilience, including that:

- » deploying a diversity of species and products in trees, crops, livestock and aquaculture offers a 'no regrets' approach to increasing resilience in the face of uncertainty
- » growing a greater number and diversity of trees in forestry, agroforestry and horticulture systems contributes to more sustainable and resilient agricultural landscapes
- » diversifying crops contributes in various ways to greater food security, nutrition and health
- » better managing coastal fisheries and aquaculture underpins healthier nutrition and more resilient livelihoods
- » strengthening markets chains for greater equity and inclusion contributes to improved and more resilient livelihoods.

Across the board, inter-disciplinary approaches are needed to reduce the vulnerability of the natural resource base, and to 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 and well-coordinated innovations in technology and ways of working.

Addressing issues of climate change is a very high priority, and includes research into climate-resilient livelihoods and climate-smart agricultural production systems. The region has also identified access to diverse crops and trees as a key resource in assuring resilience of food systems and livelihood facing these threats.

The report *Climate change and Pacific island food systems*, to which SPC and ACIAR were contributors, noted the need to develop more resilient food systems to reduce the dependence on imported rice and wheat, persuade people to eat tuna rather than coral reef fish, and develop the freshwater aquaculture systems that are expected to do well with warmer temperatures and higher rainfall.



Improving human nutrition and reducing risks to human health is of overwhelming concern to our Pacific partners. Addressing the consequences of the double burden of malnutrition and high prevalence of nutrition-related diseases is emerging as a new priority for ACIAR.

Strengthening regional biosecurity trade protocols and capacity to support the growth of export markets, increasing food security and conserving biodiversity is a priority throughout the Pacific region and for ACIAR.

Institutional capacity building remains a critical part of Australia's support to the Pacific region, but building and sustaining research capacity is an especially difficult challenge, with many small island states having low populations. ACIAR is developing a targeted capacity-building initiative at both individual and institutional levels.

## 2019–20 research program

ACIAR supports 36 projects in Pacific island countries, 23 of which are specific to one or more of these countries, and the remainder are part of regional projects. The projects address our high-level objectives, as outlined in the 10-Year Strategy 2018–2027, as well as specific issues and opportunities identified by ACIAR and partner organisations.

The following sections briefly describe individual ACIAR-supported projects and anticipated outputs in Pacific island countries, 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 ACIAR agribusiness program in the Pacific region seeks to better understand market opportunities to improve livelihoods, and increase economic benefits for farmers and communities. In Fiji and Vanuatu, a small research activity led by Associate Professor Katherine Warner of the University of the Sunshine Coast will review policies, policy drivers and programs to understand how government and non-government groups can best deliver public-private partnerships in extension. The project focuses on opportunities for export in the established high-value markets of coffee, ginger, cocoa and coconut.<sup>1</sup>

The Pacific Agribusiness Research and Development Initiative (PARDI) was implemented during 2010–15 to promote sustainable livelihood outcomes for Pacific islands households through research and innovation, catalysing and informing a more vibrant, diverse and viable agribusiness sector on a regional scale. Phase 2 (PARDI 2) is studying agribusiness developments to understand how and why they have succeeded. Led by Dr Lex Thomson of the University of the Sunshine Coast, this phase continues to document benefits to community livelihoods, and to investigate how economic benefits can be more inclusive and sustainable. The initiative aims to identify and overcome constraints and bottlenecks in value and supply chains for primary products in Pacific island countries, with Phase 2 focusing on Fiji, Tonga and Vanuatu. Additionally, PARDI links several ACIAR projects with other Pacific donor programs, such as the Pacific Horticultural and Agricultural Market Access program and the Market Development Facility.<sup>2</sup>





## Crops

Oil palm is a long-term, perennial crop of economic importance to both large plantations and smallholders in South-East Asia and Pacific island countries. But the oil palm industry is threatened by basal stem rot, caused by the fungus *Ganoderma boninense*, the incidence of which increases with each successive planting. A project in Solomon Islands and Papua New Guinea, led by Associate Professor Ian Godwin of the University of Queensland, has established a trial plantation in an infected oil palm block on Guadalcanal (Solomon Islands), to monitor the progress of infection in a set of diverse breeding lines. The trial is in place for 7 years (until 2021). The project, supported by the Papua New Guinea Oil Palm Research Association, has genotyped all the progenies in the trial, to identify resistant planting material and the genetic basis of resistance.<sup>3</sup>

## Fisheries

Pearl culture provides opportunities for communities in several Pacific island countries to generate income, at several stages along the supply chain. Two projects, led by Professor Paul Southgate of the University of the Sunshine Coast, are increasing resilience, productivity, community engagement and livelihood opportunities from mabé pearl farming. One project is strengthening collaborative research to consolidate and expand a community-based spat collection program in Fiji, expand mabé pearl and mother-of-pearl handicraft production by community and women's groups in Fiji, Tonga and Papua New Guinea, and evaluate economic and socioeconomic impacts of pearl-based livelihood development.<sup>4</sup>

Another project is supporting further development of community-based pearl farming in Tonga, and investigating the potential of similar development in Vietnam, with a particular focus on the production of cultured half-pearls.<sup>5</sup>

The impact of the two projects will be assessed in a small research activity that anticipates potential benefits related to local economies, livelihoods, lifestyle, culture and community. The assessment, to be done by Associate Professor Katja Mikhailovich of Sustineo Pty Ltd, will also look at the effects on opportunities for women and youth.<sup>6</sup>

Another project is working across the Pacific region to bring communities and fisheries agencies together to develop suitable co-management practices that influence fisheries sustainability. It is anticipated that a community-based approach will play a central role in securing the benefits of coastal resources in a sustainable way for Pacific coastal communities. The project, led by Professor Neil Andrew of the University of Wollongong, focuses on the adoption and scale-out of community-based fisheries management, with particular effort focused on Vanuatu, Solomon Islands and Kiribati. By engaging with, and directly responding to, the Pacific Commission's 2015 New Song policy to strengthen coastal fisheries governance, the project will provide critical knowledge for the implementation of community-based fisheries management.<sup>7</sup>

The Pacific food system is failing to provide the people of the region with nutritious food. The paradox of apparently abundant fish, vegetables and root crops in the region, but poor public health outcomes, presents a significant challenge for policymakers. A project starting in 2020, led by Professor Neil Andrew of the University of Wollongong, will support policies to promote healthier food supply and consumption by people in Pacific islands countries. This project spans all food production sectors (not just fisheries), and will use new integrated data sources to take a comprehensive food-system approach to address systemic issues in linking agriculture and nutrition in the region.<sup>8</sup>

Also with a view to improving nutrition, as well as livelihoods, another new project focuses on the potential and opportunities of inland aquaculture in Vanuatu and Papua New Guinea. Led by Associate Professor Jesmond Sammut of the University of New South Wales, the project will engage with Papua New Guinea's National Fisheries Authority and a network of local non-government organisations to focus on the adoption and scale-out of fish farming, and to strengthen farmer-level knowledge of fish husbandry. The project will also adapt and transfer fish farming knowledge from Papua New Guinea to Vanuatu, supporting tilapia farmers in Vanuatu to adopt effective farm management practices to support livelihoods and improve food security.<sup>9</sup>

## Forestry

ACIAR-supported forestry projects in the Pacific island countries strive to develop technologies and opportunities to improve returns from timber plantations throughout the region. As a result, these projects contribute to greater resilience for local communities and the environment. Transporting large round logs to wood yards, where the timber is prepared for export, is very difficult for community timber growers. A project, led by Dr Tim Blumfield of Griffith University, explores the possibilities of milling and drying teak in plantations. In its final year, the project will conduct a cost-benefit analysis to determine the level of profitability to the grower, as well as the commercial viability of a contract harvesting and milling operation.<sup>10</sup>

Identifying processing techniques and new markets for value-added fruit and nut produce grown in agroforestry systems in Fiji, Solomon Islands, Vanuatu and Papua New Guinea is the aim of another project designed to help landowners receive early returns from these systems. The project, led by Professor Helen Wallace of the University of the Sunshine Coast, will build capacity in communities to operate businesses to market products.<sup>11</sup>

Most land in Fiji is relatively steep, and large areas are deforested, underused and typically degraded. Previous research showed that appropriately designed and managed agroforestry systems (crop–livestock–tree) on sloping land can be productive and sustainable. But policy, institutional and governance frameworks are needed to encourage adoption of these systems. Extension material reports and economic models will be developed in a project, led by Dr Tyron Venn of the University of Queensland, to provide information to government agencies, landholder communities and individual farmers on system design and expected financial and economic performance.<sup>12</sup>

In Vanuatu, a project, led by Dr Tony Page of the University of the Sunshine Coast, aims to advance the Vanuatu agroforestry sector, by increasing the availability of improved tree germplasm to support wider adoption by smallholders of three high-value forestry species—canarium nut (*Canarium indicum*), sandalwood (*Santalum austrocaledonicum*) and whitewood (*Endospermum medullosum*), which yield nuts, oil and timber, respectively.<sup>13</sup>

In Fiji and Tonga, native sandalwood is commercially valuable, but the species has been overexploited in the wild, resulting in fragmentation and local extinction of natural populations. A short project, led by Dr David Bush of CSIRO National Research Collections, is improving the understanding of the species to increase conservation status in Fiji and Tonga, and develop strategies to improve the quality and availability of germplasm for smallholders and commercial investors.<sup>14</sup>

The high value of sandalwood on the international market has led to the decline of many natural sources of sandalwood around the world. This presents an opportunity for smallholders in sandalwood-producing countries of the Asia-Pacific region to capitalise on recognised future supply shortages, by planting local species. Led by Dr Tony Page of the University of the Sunshine Coast, a short research activity will leverage existing research investments by ACIAR in sandalwood, to improve capacity, scientific outputs and impacts among project partners. This will be achieved through a regional workshop and field tours, and publication of technical information.<sup>15</sup>

## Horticulture

The Horticulture Program aims to increase the productivity, profitability, sustainability and resilience of fruit, vegetable and ornamental crop production systems, often with an integrated approach that focuses on the whole value chain.

In Fiji, Samoa and Tonga, a project is supporting the development of resilient value chains for five regionally-significant fruit crops: papaya, pineapple, mango, breadfruit and citrus. In its final year, the project, led by Professor Steven Underhill of the University of the Sunshine Coast, will focus on targeted capacity building of private sector and government extension services, and increased engagement of smallholder farmers and communities in functional supply chains.<sup>16</sup>

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. An ACIAR-supported project, led by Mr Yan Diczbalis of the Queensland Department of Agriculture and Fisheries, is strengthening cocoa value chains in the Pacific island countries, as well as in Australia. In 2019–20, the project will focus on further development of market-orientated strategies for exchange and dissemination of superior cocoa genetic resources, to create a niche Pacific cocoa industry methods to intensify production systems to meet market opportunities.<sup>17</sup>

Vegetable production in the Pacific islands does not match local demand, and vegetables are imported for high-value hospitality and food service markets. A project, led by Professor Phil Brown of Central Queensland University, continues its demonstration of 'protected cropping' systems, to improve the supply of high-value vegetables to domestic tourism and hospitality markets in Fiji, Samoa and Tonga. Value-chain analysis will also identify strengths and weaknesses of different markets, and help farmers to successfully produce and sell into demanding markets.<sup>18</sup>

Integrated pest and disease management strategies are required for the sustainable intensification of fruit and vegetable crop production in Pacific island countries and Papua New Guinea. A project, led by Dr Michael Furlong of the University of Queensland, aims to address the threats posed to smallholder livelihoods and their communities by inappropriate use of pesticides, emerging pests and diseases, and climate change. The project will generate new knowledge, resources and opportunities to encourage the adoption of integrated management strategies.<sup>19</sup>

While coconut enterprises in the Pacific island countries face economic and environmental challenges, diversifying the range of products made from coconuts could offer a path to more resilient livelihoods. But much of the coconut resource in the Pacific is ageing or already senile and unproductive. A new project, led by Mrs Logotonu Waqainabete 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, and by addressing threats posed by the rhinoceros beetle and the Bogia coconut syndrome disease.<sup>20</sup>

Vegetatively propagated root crops are integral to food security in all Pacific island countries, and genetic diversity in root crops is dangerously narrow. A project, led by Mr Michael Hughes of the Queensland Department of Agriculture and Fisheries, endeavours to improve productivity and disaster relief readiness, by generating and distributing disease-free root crop planting material of traditional and improved varieties, and by appropriately increasing root crop genetic diversity across the Pacific region.<sup>21</sup>

## Livestock Systems

The Government of the Republic of Vanuatu has a priority to increase smallholder cattle productivity, linkages in the commercial cattle sector and income from cattle sales. A project concluding during 2019–20, led by Dr Simon Quigley of the University of Queensland, will consolidate baseline information on livelihoods, cattle production and marketing of beef cattle, and will identify constraints and opportunities for improvements in the production and value chain.<sup>22</sup> A new project will begin in 2020, to build on outcomes of the previous project, and extend the area of influence of the project to make smallholder cattle systems in Vanuatu more productive and profitable.<sup>23</sup>

The productivity and profitability of small ruminant (sheep and goats) production could be improved in Pacific island countries if production was better aligned with market requirements and smallholder could more easily participate in value chains. Under the leadership of Dr Frances Cowley of the University of New England, a four-year project starting in 2019–20 will address constraints to production efficiency of breeding and weaner animals from smallholder and semi-commercial sheep and goat production systems in Fiji and Samoa, for the benefit of all stakeholders.<sup>24</sup>

Globally, antimicrobial resistance is an increasingly serious threat to human and animal health, as well as livestock productivity. A scoping study in Fiji is identifying the research, capability and capacity development needs for reducing antimicrobial resistance in humans, animals and the environment, to build Fiji as a leader in mitigation efforts in the Pacific region. Led by Dr Paul Debarro of CSIRO Health and Biosecurity, the study is part of the Research for One Health Systems Strengthening program.<sup>25</sup> The project will lead to a follow-on project focused on risk assessment, management and communication of antimicrobial resistance in Fiji.<sup>26</sup>

Enterprises based on beekeeping offer many opportunities for smallholder farmers in Fiji and Papua New Guinea. In both countries, there is strong domestic demand for honey, and there is potential to export honey and other by-products of honey production, including beeswax. The enterprise has potential to complement smallholder incomes, and promote an income-earning activity for women. A new project, led by Dr David Lloyd of Southern Cross University, starts in 2019–20 to develop and test appropriate technical and business practices, improve control of the diseases that constrain production and trade of bees, honey and other bee products, and build the capacity of extension and development agencies to support beekeeping as a sustainable small enterprise.<sup>27</sup>

## Research for One Health Systems Strengthening

The Research for One Health Systems Strengthening program is a co-investment and partnership between ACIAR and DFAT, through the Indo-Pacific Centre for Health Security.

### Projects in the Pacific region

- » Supporting Fijian health and agricultural authorities implement the National Antimicrobial Resistance Action Plan (LS/2018/212)
- » Enhancing the Management of Antimicrobial Resistance in Fiji (LS/2019/119)
- » A One Health approach to establish surveillance strategies for Japanese encephalitis and zoonotic arboviruses in Papua New Guinea (LS/2018/213)
- » Drug sensitive and resistant tuberculosis and zoonotic infections as causes of lymphadenitis in two provinces in Papua New Guinea (LS/2018/217)

### Projects in South-East Asia

- » Zoonotic malaria in Indonesia (LS/2018/214)
- » Evaluating zoonotic malaria transmission and agricultural land use in Indonesia (LS/2019/116)
- » Developing and testing processes and tools to generate connected and live health security knowledge in Mekong communities (LS/2018/215)
- » Incentives for early declaration and effective prevention of avian influenza in the Mekong (LS/2018/216)
- » Veterinary economics in Mekong Countries – advancing One Health (Cambodia, Laos, Vietnam) (LS/2019/118)

## Social Sciences

The Social Sciences Program commissions trans-disciplinary research to deliver innovation and speed up poverty reduction. The program works across several key areas of agricultural research-for-development, with a people-centred approach being common to all projects.

A large proportion of the population in Fiji and Tonga relies on services from the landscape to support livelihoods. Agriculture is a sector for growth to support economic development and poverty alleviation, but smallholders are acutely vulnerable to the impacts of climate change and variability. A project, led by Dr Eloise Biggs of the University of Western Australia, is developing a geospatial platform, in collaboration with community and high-level stakeholders, to help find ways to make landscape climate-smart, and improve communication between multilevel stakeholders.<sup>28</sup>

Family Farm Teams is a peer education model of agricultural extension, and, in previous ACIAR-supported projects, benefited the economic development of women smallholders in nine areas of Papua New Guinea. Dr Deborah Hill of the University of Canberra leads a new project to improve agricultural development opportunities for female 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.<sup>29</sup>

Landcare is a grassroots community-led approach to sustainable land management. Dr Mary Johnson of RMIT University will study Landcare in five countries in the Indo-Pacific region, and analyse how sustainable agricultural land management mobilised through Landcare has contributed to development outcomes, including the ACIAR high-level objectives. The findings of the study will produce an evidence base for ACIAR to assess the role of Landcare for future agricultural research-for-development, and more broadly as an extension model in sustainable agriculture and natural resource management.<sup>30</sup>

### Soil and Land Management

Pacific island atolls are among the most vulnerable communities on this planet in the face of climate change. Producing food on atolls is challenging for many reasons. A project, led by Mr Gibson Susumu of SPC, aims to improve the livelihoods of the of coral atolls communities—Kiribati and Tuvalu, in particular—through increased and diversified agricultural production and improved soil nutrition, by developing effective compost technologies. Concluding in 2019–20, the final activities will be to ensure that the upskilling research and extension staff, as well as farming communities, is successful. This will maintain the benefits of new growing techniques and market opportunities identified by the project.<sup>31</sup>

Agriculture in the Pacific is generally confined to smallholder farms and household gardens, and its sustainability is threatened by nutrient imbalances, erosion, declining soil fertility and carbon and soil sealing. Across five Pacific nations, a project, led by Dr Ben Macdonald of CSIRO Agriculture and Food, is developing a soil information system, and finding appropriate technologies for improved soil health and efficient water and nutrient use. The soil information system provides farmers, farm advisers and other stakeholders with spatially explicit guidance on how to achieve sustainable soil management and secure resilience to climate change.<sup>32</sup>

### Water and Climate

A new project is assessing ways to reduce agricultural emissions in the Asia-Pacific region, as well as offset methods appropriate to developing countries (using Fiji and Vietnam as pilot examples). The project led by Professor Peter Grace of Queensland University of Technology leverages the success of Australian emissions accounting, carbon farming offset methods and emission-reduction research in the agricultural and land sectors. It will develop a governance checklist to enable user countries to identify, adopt and manage locally appropriate emission-reduction options. It will also provide a detailed analysis of potential cobenefits to food security, and existing capacity gaps to using carbon farming methods or emissionreduction options in Fiji and Vietnam, in delivering to their commitments under the Paris Agreement.<sup>33</sup>

### Global Program

The Global Program manages several programs in the Pacific region addressing multidisciplinary challenges and/or opportunities, in partnership with international agricultural research-for-development agencies. The work of the Global Program is described in Chapter 2.

Global Program projects operational in Pacific island countries during 2019–20 are:

- » Towards local healthy diets from sustainable and inclusive food systems<sup>34</sup>
- » Improving plant biosecurity in the Pacific islands<sup>35</sup>
- » Reinvigorating the Coconut Genetic Resources Network (COGENT).<sup>36</sup>

#### Country Manager, Pacific region

Ms Florence Rahiria

#### Research Program Managers

Agribusiness—Mr Howard Hall

Crops—Dr Eric Huttner

Fisheries—Dr Ann Fleming

Forestry—Dr Nora Devoe

Horticulture—Ms Irene Kernot

Livestock Systems—Dr Anna Okello

Social Sciences—Dr Jayne Curnow

Soil and Land Management—Dr James Quilty

Water and Climate—Dr Robyn Johnston

#### General Manager, Global Program

Ms Mellissa Wood

## Current and proposed projects

1. Policy drivers for public-private partnerships in Pacific organics: improving extension policy through an evidence-based approach [Fiji, Vanuatu] (ADP/2018/131)
2. Pacific agribusiness research in development initiative, Phase 2 (PARDI 2) [Fiji, Tonga, Vanuatu] (AGB/2014/057)
3. Developing a foundation for the long-term management of basal stem rot of oil palm in Papua New Guinea and Solomon Islands (CIM/2012/086)
4. Developing pearl industry-based livelihoods in the western Pacific [Fiji, Papua New Guinea, Tonga] (FIS/2014/060)
5. Half-pearl industry development in Tonga and Vietnam (FIS/2016/126)
6. Monitoring and evaluation of socioeconomic impacts of pearl-based livelihood development [Fiji, Tonga] (FIS/2018/129)
7. Strengthening and scaling community-based approaches to Pacific coastal fisheries management in support of the New Song [Kiribati, Solomon Islands, Vanuatu] (FIS/2016/300)
8. Agriculture for improved nutrition: integrated agrifood systems for the Pacific region [Kiribati, Solomon Islands, South Pacific general, Vanuatu] (FIS/2018/155)
9. Improving livelihoods and human nutrition through inland aquaculture in Papua New Guinea and Vanuatu (FIS/2018/154)
10. Improving returns from community teak plantings in Solomon Islands (FST/2014/066)
11. Enhancing value-added products and environmental benefits from agroforestry systems in Papua New Guinea and the Pacific [Fiji, Papua New Guinea, Solomon Islands, Vanuatu] (FST/2014/067)
12. Improving agroforestry policy for sloping land in Fiji (FST/2016/147)
13. Enhancing returns from high-value agroforestry species in Vanuatu (FST/2016/154)
14. Domestication and breeding of sandalwood in Fiji and Tonga (FST/2016/158)
15. Building research capacity among ACIAR's sandalwood-focused projects through a regional sandalwood workshop and publication [Indonesia, Vanuatu, Fiji, PNG, Timor-Leste, Australia] (FST/2016/024)
16. Enhanced fruit production and post-harvest handling systems for Fiji, Samoa and Tonga (HORT/2014/077)
17. 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)
18. Integrating protected cropping systems into high-value vegetable value chains in the Pacific and Australia [Fiji, Samoa, Tonga] (HORT/2014/080)
19. Responding to emerging pest and disease threats to horticulture in the Pacific islands [Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga] (HORT/2016/185)
20. Coconuts for Pacific livelihoods [Fiji, Papua New Guinea, Samoa, Solomon Islands, Vanuatu] (HORT/2017/025)
21. Developing and deploying the diversity of root crops for greater climate resilience in the Pacific island countries [Fiji, Samoa, Solomon Islands, Tonga, Vanuatu] (HORT/2018/195)
22. Increasing the productivity and market options of smallholder beef cattle farmers in Vanuatu (LPS/2014/037)
23. Promoting business development pathways for more productive and profitable smallholder cattle systems in Vanuatu (LS/2018/185)
24. Improving small ruminant production and supply in Fiji and Samoa (LS/2017/033)
25. Supporting Fijian health and agricultural authorities implement the National Antimicrobial Resistance Action Plan (LS/2018/212)
26. Enhancing the management of antimicrobial resistance in Fiji (LS/2019/119)
27. Increasing the productivity and profitability of smallholder beekeeping enterprises in Papua New Guinea and Fiji (LS/2014/042)
28. Climate-smart landscapes for promoting sustainability of Pacific Island agricultural systems [Fiji, Tonga] (ASEM/2016/101)
29. Improving agricultural development opportunities for female smallholders in rural Solomon Islands (SSS/2018/136)
30. The potential of International Landcare [Fiji, Indonesia, the Philippines, South Africa, Sri Lanka, Uganda] (ASEM/2018/117)
31. Improving soil health, agricultural productivity and food security on atolls [Kiribati, Tuvalu] (SMCN/2014/089)
32. Soil management in Pacific Islands: investigating nutrient cycling and development of the Soils Portal [Fiji, Kiribati, Samoa, Tonga, Tuvalu] (SMCN/2016/111)
33. Agriculture based emission-reduction options to support nationally determined contributions in Vietnam and Fiji (LWR/2017/029)
34. Towards local healthy diets from sustainable and inclusive food systems [Fiji, Vietnam] (GP/2018/108)
35. Improving plant biosecurity in the Pacific islands [Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu] (GP/2018/109)
36. Reinvigorating the Coconut Genetic Resources Network (COGENT) [Fiji, Indonesia, Papua New Guinea, Samoa] (GP/2018/193).

# Papua New Guinea

Budgeted funding

**A\$8.8**  
million

ACIAR-supported projects

**33**

Multilateral & co-investment programs

**4**

Australia values its long-standing ties with Papua New Guinea, through a shared history and a shared geography. As our nearest neighbour and close regional partner, a stable and prosperous Papua New Guinea is in Australia's interest. We share a border, economic interests and common legal frameworks. Over time, our relationship has matured into one of economic and strategic partnership. Despite huge resource potential and proximity to Asian markets, Papua New Guinea faces economic challenges and fiscal pressures. Many factors challenge future prosperity, including lack of infrastructure, complex governance arrangements, inequality between men and women, and a rapidly growing population. Papua New Guinea also remains vulnerable to climate change and natural disasters, including earthquakes, volcanoes and tsunamis.

Overview of Australia's aid program to Papua New Guinea (DFAT 2019)

**Agriculture in Papua New Guinea is performing below its potential. Although it constitutes up to 26% of GDP, and supports up to 80% of the population, there is an imperative for the sector to expand, to accommodate Papua New Guinea's rapidly-growing population.**

The high annual population growth of 3.1% is a significant issue for the country's long-term economic development, and compounds existing problems, such as food and nutritional security. The growth of the sector would negate these effects, by securing a needed supply of food produce.

Most agriculture remains at subsistence level, and the main exported cash crops are oil palm, coffee, cocoa, copra, tea and rubber. But levels of production from commercial plantations have declined, due to fluctuating world prices, rising labour and overhead costs, poor management and land tenure issues. Additionally, challenges associated with climate change pose a longer-term threat to resource shortages related to food supply and consumption.

The majority of subsistence farmers have limited, and often costly, access to markets. Local market prices are often strongly influenced by local gluts, due to limited connections to more distant demand centres. This causes local prices to be low, affecting income-generating opportunities for those who depend on subsistence and semi-subsistence agriculture.

Although agricultural productivity is closely linked with overall food consumption and nutrition outcomes, according to the International Food Policy Research Institute (2019), the local food systems need improving to sufficiently meet the dietary needs of the rural communities—particularly communities with very high prevalence of stunting and wasting in children aged less than five years.

The agriculture sector is affected by invasive pests and diseases, including Bogia coconut syndrome, coffee berry borer and cocoa pod borer, which adversely affect the level of production of copra, cocoa and coffee.

The Papua New Guinea Government, under the new Medium-Term Development Plan 3 (2018-2022), remains focused on promoting economic growth through sustainable agriculture, fisheries and forestry management. Under the plan, the Papua New Guinea Government is also promoting growth opportunities for the rubber industry, and developing rice for domestic consumption. At the same time, the Australian Government, through the Pacific Step-up, seeks to support a more resilient Papua New Guinea.

Australia's support to agricultural research through ACIAR, plays a significant role in building resilience, and will continue to support Papua New Guinea in moving towards more sustainable agriculture, fisheries and forestry livelihood systems.

Within the national landscape, Papua New Guinea's National Research Agenda places a spotlight on the role of science and research in creating wealth, including by promoting research and innovation to improve agricultural systems and natural resource management, and to increase the resilience of livelihoods.

According to the World Bank, women in Papua New Guinea do 70% of the work in subsistence agriculture, fisheries and forestry, and traditionally women are responsible for food production and marketing, while men work on commodity crops. Women's contribution in the agriculture sector is significant. The Papua New Guinea Government has set out policies embedding gender in the agriculture and fisheries sector, to improve the livelihoods of women in rural areas, and push more women to engage in the sector.



## Country priorities

In 2019–20, as in previous years, ACIAR priorities for research collaboration with Papua New Guinea are to:

- » overcome social, cultural and policy constraints to gain benefits from agricultural technologies, particularly in terms of gender equity and the role of women
- » improve smallholder vegetable and starchy staple systems
- » analyse commodity and market chain to guide policy and improve production and marketing for cocoa, coffee, coconut and oil palm crops
- » improve germplasm quality for high-value tree species
- » improve community forestry and agroforestry systems
- » develop market opportunities for smallholder agricultural products
- » add value to wood and non-wood products, by working with private-sector partners and farmers to scale-up the adoption of promising agricultural technologies
- » improve livelihoods from smallholder coastal fisheries, and both inland and marine aquaculture
- » increase household income, through enterprise diversification
- » increase the sustainability and resilience of production systems, including livestock health and production
- » build capacity at both research and institutional levels
- » influence policy through research outcomes.

Institutional capacity building remains a critical part of Australia's support, but its development cooperation is now more targeted, precise and reflective of genuine partnerships. Australia's partnership with Papua New Guinea aims to improve the environment for investment, and to enable sustainable economic growth and better social outcomes.

Through this approach, ACIAR plays a significant role in helping Papua New Guinea move towards its goals on sustainable agriculture, fisheries and forestry development, and inclusive economic growth. A flagship program in this effort is the DFAT and ACIAR co-funded Transformative Agriculture and Enterprise Development Program (TADEP).

In 2020, working with key national partners and the Papua New Guinea Science and Technology Council, ACIAR will develop a 10-year strategy for research collaboration with Papua New Guinea (2020-2029) to align with a parallel strategy being developed with Pacific island countries.

### Transformative Agriculture and Enterprise Development Program

TADEP is a multidisciplinary research program, co-funded by DFAT and ACIAR, which aims to improve the livelihoods of rural men and women in Papua New Guinea.

The program focuses on opportunities to scale-up successful innovations from previous ACIAR projects, with private sector involvement, to extend benefits over larger areas and for more people. The program aims to facilitate economic benefits, especially increased employment and incomes in rural areas, and improved rural-urban supply chains. It works in the sectors that will have the greatest benefit to rural communities, and has a particular focus on the empowerment of women, and the development of commodities that can be brought to market.

Valued at a \$23 million over six years, the program is developing the following innovations:

- » integrated pest and disease management for cocoa
- » new genetic resources for cocoa (virus-free planting material)
- » improved crop management for sweetpotato
- » improved processing and value-chain development for galip nut
- » increased business acumen of women, leading to women-led enterprise development.





## 2019–20 research program

ACIAR supports 33 projects in Papua New Guinea, 23 of which are specific to this country, and the remainder are part of regional projects. The projects address our high-level objectives, as outlined in the 10 Year Strategy 2018–2027, as well as specific issues and opportunities identified by ACIAR and partner organisations.

The following sections briefly describe individual ACIAR-supported projects and anticipated outputs in Papua New Guinea, 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.

### Crops

Oil palm is a long-term, perennial crop of economic importance to both large plantations and smallholders in South-East Asia and Pacific island countries. But the oil palm industry is threatened by basal stem rot, caused by the fungus *Ganoderma boninense*, the incidence of which increases with each successive planting. A project in Solomon Islands and Papua New Guinea, led by Associate Professor Ian Godwin of the University of Queensland, has established a trial plantation in an infected oil palm block on Guadalcanal (Solomon Islands), to monitor the progress of infection in a set of diverse breeding lines. The trial is in place for 7 years (until 2021). The project, supported by the Papua New Guinea Oil Palm Research Association, has genotyped all the progenies in the trial, to identify resistant planting material and the genetic basis of resistance.<sup>1</sup>

### Fisheries

Pearl culture provides opportunities for communities in several Pacific island countries to generate income, at several stages along the supply chain. A project in Fiji, Tonga and Papua New Guinea, led by Professor Paul Southgate of the University of the Sunshine Coast, is increasing the resilience, productivity, community engagement and livelihood opportunities from mabé pearl farming. The project is strengthening collaborative research to consolidate and expand a community-based spat collection program in Fiji, expand pearl and mother-of-pearl handicraft production by community and women's groups in Fiji, Tonga and Papua New Guinea, and evaluate economic and socioeconomic impacts of pearl-based livelihood development.<sup>2</sup>

Mariculture enterprises have the potential to provide an alternative source of income for both men and women in coastal communities of the New Ireland province. Although the region enjoys healthy fish stocks, the local sea cucumber fishery has collapsed from overharvesting, with the associated loss of an important income source for communities.

A project, led Professor Paul Southgate of the University of the Sunshine Coast, supports staff at the Nago Island Marine Research Facility in Kavieng to develop skills in hatchery production of sea cucumber (for ranching and stock enhancement enterprises) and ornamental fish, each offering potential new income sources through export to international markets.<sup>3</sup>

Freshwater or inland aquaculture—such as production of tilapia and carp using low-cost and farmer-friendly grow-out methods—has the potential to significantly improve food and income security for smallholders. Research in the Eastern Highlands province, led by Associate Professor Jesmond Sammut of the University of New South Wales, is targeting technical and husbandry improvements, and identifying the social and economic benefits of increased fish production. In Goroka, the project works with low-security prisoners as a rehabilitation strategy, teaching new skills in fish farming to improving domestic security, and. The project will also continue its 'fish in schools' element, to promote the uptake of aquaculture in highland areas.<sup>4</sup>

Aquaculture and capture fisheries are increasingly important in Papua New Guinea for providing livelihoods and meeting the nutritional needs of a rapidly growing population. But fisheries are challenged by overexploitation, lack of adoption of new technologies and lack of information in some sectors. The National Fisheries Authority of Papua New Guinea recognises the need to integrate livelihood goals into management plans and policies, and the need to revise and introduce new policies and strategies to sustainably manage aquaculture and capture fisheries.

ACIAR is supporting a new project, led by Associate Professor Associate Professor Jesmond Sammut of the University of New South Wales, to strengthen the research and management capability of the National Fisheries Authority, by building core skills in research and management, to translate scientific findings into policy and management plans.<sup>5</sup>

Also with a view to improving nutrition as well as livelihoods, another new project focuses on the potential and opportunities of inland aquaculture in Vanuatu and Papua New Guinea. Led by Associate Professor Jesmond Sammut of the University of New South Wales, the project will engage with Papua New Guinea's National Fisheries Authority and a network of local non-government organisations to focus on the adoption and scale-out of fish farming, and to strengthen farmer-level knowledge of fish husbandry. The project will also adapt and transfer fish farming knowledge from Papua New Guinea to Vanuatu, supporting tilapia farmers in Vanuatu to adopt effective farm management practices to support livelihoods and improve food security.<sup>6</sup>

## Forestry

Forestry in Papua New Guinea has developed from a small domestic processing industry in the 1950s to a large log export-oriented industry. The Papua New Guinea Government now seeks to generate additional opportunities for economic growth, employment and increased value-added processing of harvested logs from its forest resources. The ACIAR Forestry Program focuses on the processing and value-adding of timber and nontimber products, increasing the availability of improved germplasm for tree growing and promoting community-based forestry.

Identifying processing techniques and new markets for value-added fruit and nut produce grown in agroforestry systems in Fiji, Solomon Islands, Vanuatu and Papua New Guinea is the aim of a project designed to help landowners receive early returns from these systems. The project, led by Professor Helen Wallace of the University of the Sunshine Coast, will build capacity in communities to operate businesses to market products.<sup>7</sup>

Strong international demand for forest products has substantially depleted timber resources in lowland Papua New Guinea. A project, led by Dr Tony Page of the University of the Sunshine Coast, successfully developed germplasm sources and smallholder-friendly silviculture systems for teak (Papua New Guinea) and sandalwood (Papua New Guinea and Cape York Peninsula) to improve smallholder livelihoods. In its final months, the project will continue to develop skills for ongoing genetic improvement of sandalwood in Papua New Guinea, and communicate and disseminate research outputs to improve uptake and impact.<sup>8</sup> A follow-on project, starting in 2020, will help advance the development of smallholder planted forests, by aligning smallholder and investor requirements.<sup>9</sup>

The high value of sandalwood on the international market has led to the decline of many natural sources of sandalwood around the world. This presents an opportunity for smallholders in sandalwood-producing countries of the Asia-Pacific region to capitalise on recognised future supply shortages, by planting local species. Led by Dr Tony Page of the University of the Sunshine Coast, a short research activity will leverage existing research investments by ACIAR in sandalwood, to improve capacity, scientific outputs and impacts among project partners. This will be achieved through a regional workshop and field tours, and publication of technical information.<sup>10</sup>

A project in the Eastern Highlands province, the Ramu-Markham valleys and the Lae region aims to improve rural livelihoods, through family-focused community reforestation and ecoforestry in community-owned natural forests. Led by Mr Grahame Applegate of the University of the Sunshine Coast, the project will implement family-focused community reforestation activities, identify methods for scaling out community-based reforestation to landscape scale, and identify institutional arrangements and policy recommendations that improve access to formal timber markets.<sup>11</sup>

In East New Britain, an earlier project focused on new value-added processing technologies and options for developing markets for the anticipated large volume of galip nuts, produced by the canarium or galip tree (*Canarium indicum*), which will become available around 2020. The project, led by Professor Helen Wallace of the University of the Sunshine Coast, provided market research, technical advice, capacity building, business mentoring and access to infrastructure for both private and public-sector stakeholders. It also provided opportunities to improve livelihoods and women's empowerment in the region. Phase 2 of the project will build on achievements of the first project, and foster private sector-led development of the galip nut industry, increase the efficiency of value chains, and establish commercially viable business prospects for private sector investment at different scales.<sup>12</sup>

## Horticulture

Bogia coconut syndrome has killed hundreds of coconut palms in Madang Province. A related pathogen affects bananas in the same region. A project, led by Dr Geoff Gurr of Charles Sturt University, is describing the biology of Bogia coconut syndrome, and quantifying the risk of the disease to different crops, industry sectors and smallholders. The project has developed a containment and management strategy, to protect the Pacific regional coconut gene bank, which is immediately threatened by the disease. In the final stages of the project, a whole genome analysis will be done on Bogia coconut syndrome and banana wilt-associated phytoplasmas, to distinguish between the two diseases.<sup>13</sup>

While coconut enterprises in Pacific island countries face economic and environmental challenges, diversifying the range of products made from coconuts could offer a path to more resilient livelihoods. But much of the coconut resource in the Pacific is ageing or already senile and unproductive. A new project, led by Mrs Logotonu Waqainabete of SPC, aims to support the first step in rejuvenation of coconut-based livelihoods in the Pacific islands, by strengthening the conservation and use of genetic diversity in coconuts, and by addressing threats posed by the rhinoceros beetle and the Bogia coconut syndrome disease.<sup>14</sup>

About 90% of Papua New Guinea's population consists of semi-subsistence smallholder farmers for whom sweetpotato is a major crop species. A project, led by Dr Geoff Gurr of Charles Sturt University, is supporting the intensification of sweetpotato production, and developing sustainable solutions to protect crops.<sup>15</sup> This project and another project on soil management and crop nutrition for sweetpotato<sup>29</sup> provide technical support for a larger project, led by Professor Phil Brown of Central Queensland University, under TADEP, which seeks to strengthen the entire value chain for sustainable and market-oriented sweetpotato-based production systems in the highlands.<sup>16</sup>

Cocoa is a profitable smallholder crop, and has the potential to drive rural development. It accounts for 18% of agricultural exports in Papua New Guinea, but production systems in some regions now need rejuvenation. Before the decade-long crisis that disrupted society and the economy, cocoa was a major contributor to the economy of the autonomous province of Bougainville.

A project, led by Professor David Guest of the University of Sydney, is working to improve the profitability and vitality of smallholder cocoa farming families and communities, by fostering and strengthening public and private sector partnerships, and helping to develop enterprises that increase productivity and access to premium markets.<sup>17</sup>

In East Sepik, Madang, New Ireland and Chimbu provinces, old cocoa plantings are overgrown, low yielding, underharvested, and susceptible to pests and diseases. Another project, led by Dr Phil Keane of La Trobe University, is underway to help smallholder farmers adopt new cocoa varieties and plant management methods to drive rural development.<sup>18</sup>

The cocoa pod borer is widely distributed and indigenous throughout South-East Asia and the western Pacific, and is a pest of cocoa and tropical fruits in several countries, including Papua New Guinea. Mitigation of this pest is a priority for the Cocoa Board of Papua New Guinea. A short research activity, led by Dr Leigh Pilkington of the New South Wales Department of Primary Industries, will conduct several fundamental studies to enable the cocoa pod borer to be effectively and sustainably managed.<sup>19</sup>

A project starting during 2019–20 aims to protect the coffee industry in Papua New Guinea and Australia from coffee berry borer. The project, led by Dr Ian Newton of the Queensland Department of Agriculture and Fisheries, aims to limit damage and protect the industry by managing infestations with world's best practices, and to find long-term sustainable integrated pest management solutions. In the first year of the project, current local and global management strategies will be reviewed to determine a 'best-bet' management package, and identify research priorities.<sup>20</sup>

Integrated pest and disease management strategies are required for the sustainable intensification of fruit and vegetable crop production in Pacific island countries and Papua New Guinea. A project, led by Dr Michael Furlong of the University of Queensland, aims to address the threats posed to smallholder livelihoods and their communities by inappropriate use of pesticides, emerging pests and diseases, and climate change. The project will generate new knowledge, resources and opportunities to encourage the adoption of integrated management strategies.<sup>21</sup>

## Livestock Systems

Enterprises based on beekeeping offer many opportunities for smallholder farmers in Fiji and Papua New Guinea. In both countries, there is strong domestic demand for honey, and there is potential to export honey other by-products of honey production, including beeswax. The enterprise has potential to complement smallholder incomes, and promote an income-earning activity for women. A new project, led by Dr David Lloyd of Southern Cross University, starts in 2019–20 to develop and test appropriate technical and business practices, improve control of diseases that constrain production and trade of bees, honey and other bee products, and build the capacity of extension and development agencies to support beekeeping as a sustainable small enterprise.<sup>22</sup>

Two small research activities are underway in Papua New Guinea, as part of the Research for One Health Systems Strengthening program (page 55).

Japanese encephalitis virus is an important cause of human viral encephalitis in South-East Asia. The virus is mosquito borne, with pigs and waterbirds acting as hosts, and is of public health importance. In Papua New Guinea, Japanese encephalitis has the potential to be an economically important disease of pigs. A short research activity, done by Dr David Williams of the CSIRO Australian Animal Health Laboratory, is using a One Health approach to establish surveillance strategies for Japanese encephalitis and zoonotic arboviruses in Papua New Guinea.<sup>23</sup>

Tuberculosis is a leading cause of death in Papua New Guinea, and, presently, a leading cause of death among infectious diseases worldwide. In addition to pulmonary tuberculosis, there is a high burden of suspected extra-pulmonary tuberculosis in the Pacific, which can be a sign that zoonotic and environmental strains of tuberculosis are also circulating, requiring different approaches to management and prevention. Dr Philipp Du Cros of the Burnet Institute is conducting a short research activity to determine the types of bacteria causing tuberculosis lymphadenitis, with a particular focus on risk factors associated with exposure to animals, by assessing consenting patients with suspected tuberculosis lymphadenitis.<sup>24</sup>



## Social Sciences

A project, led by Dr Gina Koczberski of Curtin University of Technology, studied the socioeconomic and cultural factors that influence smallholders' farming and livelihood systems, and their capacity to adapt and respond to stress on cocoa and oil palm production systems. During 2019–20, the study will assess programs that help women engage in agribusiness, and will identify pathways for entrepreneurialism. Researchers will collaborate with extension and private sector organisations and non-government organisations in cocoa, coffee, oil palm and fresh food produce to develop policies and programs that empower rural women to create agribusiness opportunities.<sup>25</sup>

Coffee is economically important for rural livelihoods in Papua New Guinea, but national production is declining, despite a rapidly growing population in the highland coffee-growing areas. A project, led by Professor George Curry of Curtin University, is determining how to increase returns to labour, particularly for women, through new technologies and farming practices that improve coffee quality and total production, while being compliant with the environmental criteria of the main certification organisations.<sup>26</sup>

Communities reliant on agriculture-based livelihood systems in Papua New Guinea have been identified as being particularly at risk from climate variability and change. A project, led by Dr Steven Crimp of the Australian National University, aims to provide farming communities with knowledge and skills related to seasonal climate risk and adaptive management, to help them reduce risk, and secure adaptive opportunities for food production.<sup>27</sup>

Another project, led by Dr Josephine Caffery of the University of Canberra, will adapt and apply the successful Family Farm Teams approach to develop the capacity of churches in Papua New Guinea to work in a gender inclusive way when engaging rural agricultural communities in smallholder farm development. The project will also provide pathways for increasing youth involvement in family farm teams and sustainable farming futures.<sup>28</sup>

## Soil and Land Management

Intensifying food production systems is necessary to feed the burgeoning population of Papua New Guinea, which has doubled in the past 30 years. This population growth is putting unprecedented pressure on the limited land available for agricultural production, and has resulted in the adoption of unsustainable agronomic practices. A project, led by Professor Neal Menzies of the University of Queensland, aims to identify soil and land management techniques to sustainably intensify the semi-commercial sweetpotato cropping system.<sup>29</sup>

This project operates in parallel with another that is supporting the intensification of sweetpotato production by developing sustainable solutions for crop protection.<sup>16</sup>

Yields of cocoa can be increased with improved soil management and better soil fertility, which in turn can lift incomes and result in healthier communities. A project, led by Associate Professor Damien Field of the University of Sydney, is evaluating opportunities to use green waste composts produced from smallholder cocoa farming systems, to supply nutrients to the soil and improve the management of cocoa plantations. The project is evaluating the influence of composts on soil health and nutrient content in cocoa produced in diversified cocoa farming systems, and is developing region-specific soil management strategies for smallholdings.<sup>30</sup>

## Global Program

The Global Program manages several programs in the Pacific region addressing multidisciplinary challenges and/or opportunities, in partnership with international agricultural research-for-development agencies. The work of the Global Program is described in Chapter 2.

Global Program projects operational in Papua New Guinea during 2019–20 are:

- » Improving plant biosecurity in the Pacific islands<sup>31</sup>
- » Reinvigorating the Coconut Genetic Resources Network (COGENT)<sup>32</sup>
- » Monitoring agricultural research investments, capacity and impact in South-East Asia and the Pacific—Agricultural Science and Technology Indicators (ASTI) program<sup>33</sup>

### Country Manager, Papua New Guinea

Mrs Doreen Iga

### Research Program Managers

Crops—Dr Eric Huttner

Fisheries—Dr Ann Fleming

Forestry—Dr Nora Devoe

Horticulture—Ms Irene Kernot

Livestock Systems—Dr Anna Okello

Social Sciences—Dr Jayne Curnow

Soil and Land Management—Dr James Quilty

### General Manager, Global Program

Ms Mellissa Wood

## Current and proposed projects

1. Developing a foundation for the long-term management of basal stem rot of oil palm in Papua New Guinea and Solomon Islands (CIM/2012/086)
2. Developing pearl industry-based livelihoods in the western Pacific [Fiji, Papua New Guinea, Tonga] (FIS/2014/060)
3. Improving technical and institutional capacity to support development of mariculture-based livelihoods and industry in New Ireland, Papua New Guinea (FIS/2014/061)
4. Improving technologies for cost-effective fish feeding strategies, husbandry and fingerling production for inland aquaculture in Papua New Guinea (FIS/2014/062)
5. Institutional strengthening in Papua New Guinea: translating fisheries research into policy and management (FIS/2018/151)
6. Improving livelihoods and human nutrition through inland aquaculture in Papua New Guinea [Papua New Guinea, Vanuatu] (FIS/2018/154)
7. Enhancing value-added products and environmental benefits from agroforestry systems in Papua New Guinea and the Pacific [Fiji, Papua New Guinea, Solomon Islands, Vanuatu] (FST/2014/067)
8. Improvement and management of teak and sandalwood in Papua New Guinea and Australia (FST/2014/069)
9. Promoting smallholder teak and sandalwood plantations in Papua New Guinea and Australia (FST/2018/178)
10. Building research capacity among ACIAR's sandalwood-focused projects through a regional sandalwood workshop and publication [Indonesia, Vanuatu, Fiji, PNG, Timor-Leste, Australia] (FST/2016/024)
11. Enabling community forestry in Papua New Guinea (FST/2016/153)
12. Enhancing private sector-led development of the canarium industry in Papua New Guinea, Phase 2 (FST/2017/038)
13. Borgia coconut syndrome in Papua New Guinea: developing biological knowledge and a risk management strategy (HORT/2012/087)
14. Coconuts for Pacific livelihoods [Fiji, Papua New Guinea, Samoa, Solomon Islands, Vanuatu] (HORT/2017/025)
15. Developing improved crop protection options in support of intensification of sweetpotato production in Papua New Guinea (HORT/2014/083)
16. Supporting commercial sweetpotato production and marketing in the Papua New Guinea highlands (HORT/2014/097)
17. Developing the cocoa value chain in Bougainville (HORT/2014/094)
18. Enterprise-driven transformation of family cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea (HORT/2014/096)
19. Effective management of cocoa pod borer [Papua New Guinea] (HORT/2018/114)
20. Protecting the coffee industry from coffee berry borer in Papua New Guinea and Australia (HORT/2018/194)
21. Responding to emerging pest and disease threats to horticulture in the Pacific islands [Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga] (HORT/2016/185)
22. Increasing the productivity and profitability of smallholder beekeeping enterprises in Papua New Guinea and Fiji (LS/2014/042)
23. A One Health approach to establish surveillance strategies for Japanese encephalitis and zoonotic arboviruses in Papua New Guinea (LS/2018/213)
24. Drug sensitive and resistant tuberculosis and zoonotic infections as causes of lymphadenitis in two provinces in Papua New Guinea (LS/2018/217)
25. Identifying opportunities and constraints for rural women's engagement in small-scale agricultural enterprises in Papua New Guinea (ASEM/2014/054)
26. Improving livelihoods of smallholder coffee communities in Papua New Guinea (ASEM/2016/100)
27. Climate-smart agriculture opportunities for enhanced food production in Papua New Guinea (ASEM/2017/026)
28. Gender equitable agricultural extension through institutions and youth engagement in Papua New Guinea (SSS/2018/137)
29. Sustaining soil fertility in support of intensification of sweetpotato cropping systems (SMCN/2012/105)
30. Optimising soil management and health in Papua New Guinea integrated cocoa farming systems (SMCN/2014/048)
31. Improving plant biosecurity in the Pacific islands [Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu] (GP/2018/109)
32. Reinvigorating the Coconut Genetic Resources Network (COGENT) [Fiji, Indonesia, Papua New Guinea, Samoa] (GP/2018/193)
33. Monitoring agricultural research investments, capacity and impact in South-East Asia and the Pacific—Agricultural Science and Technology Indicators (ASTI) program [Cambodia, Indonesia, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, Vietnam, Laos, Timor-Leste] (GP/2016/093).

# Timor-Leste

Budgeted funding

**A\$2.3**  
million

ACIAR-supported  
projects

**9**

Multilateral &  
co-investment  
programs

**2**

Timor-Leste is at an important moment in its history. It has achieved significant economic development, social progress and stability gains since independence, but still faces major challenges to achieve the ambitious goals set out in its Strategic Development Plan 2011-2030. These include reaching upper-middle-income status, eradicating extreme poverty and establishing a diversified non-oil economy by 2030. About 80% of households rely on agriculture activity as the major source of income and for their direct food needs, with an annual 'hungry season' from November to March. Timor-Leste has embarked on a program of economic diversification to reduce reliance on the oil and gas sector. This includes promoting private sector-led growth, particularly in agriculture and tourism. Despite significant gains, poverty levels remain high—particularly in rural areas where most people live. Stunting rates are among the highest in the world.

Timor-Leste Aid Program Performance Report (DFAT)

## Descriptions of the agriculture sector of Timor-Leste inevitably stray towards emphasising the seemingly insurmountable challenges facing the country.

This is not surprising, given that about 80% of the population is engaged in low input-output subsistence farming. Most rural households suffer medium to very high vulnerability as a result of the multiple causes of poverty. Many are on the edge of the cash economy, and face major and multiple challenges to achieving productive, profitable and resilient agriculture-based livelihoods, including very poor infrastructure, very low access to information, inputs and markets, and high vulnerability to climate variability and degraded natural resources.

Young people are moving from rural areas to the towns and the capital, Dili, where more than 30% of the population now lives. This is creating new problems in rural areas, including an ageing population and lack of incentives to increase agricultural production.

An ongoing challenge for the food crops sector in Timor-Leste how to sustainably increase production of the main staples and diversify into crops with higher nutritional value, especially legumes.

An additional challenge is achieving this transition in the face of increasingly variable climatic conditions. Livestock production is widespread, with more than 90% of households managing multiple types of animals. Traditional management systems and poor market access mean that farmers tend to maximise the numbers of unproductive animals. While these challenges are substantial, there are many opportunities to improve rural livelihoods through research addressing productivity, sustainability and marketing of agricultural and livestock products.

An earlier ACIAR program (Seeds of Life) showed this through research that identified new high-yielding varieties of staple food crops. By 2016, about 65,000 farming households had adopted these varieties. The new crop varieties showed substantially higher yields over local varieties in all 13 of the nation's districts. Yields on farmer fields rose by 50% for maize, 54% for peanut, 40% for cassava, 24% for rice and an impressive 130% for sweetpotato.

Farmers are also rapidly adopting improved mungbeans and climbing beans released in 2016. These results show what can be achieved through long-term research partnerships with Timor-Leste.

## Country priorities

ACIAR is maintaining a program of research collaboration with Timor-Leste. It is characterised by projects with a long-term view and a strong focus on capacity and partnership development. ACIAR does not currently have a formal agreement with Timor-Leste for research collaboration, but aims to start developing one during 2019–20.

Discussions on future priorities will likely focus on opportunities in aquaculture (inland and coastal), agroforestry, livestock (especially cattle and poultry) and cropping systems, as well as seeking opportunities for trilateral research collaboration with Indonesia.

## 2019–20 research program

ACIAR supports eight projects and programs in Timor-Leste, five of which are specific to this country, and the remainder are part of regional projects. The projects address our high-level objectives, as outlined in the 10Year Strategy 2018–2027, as well as specific issues and opportunities identified by ACIAR and partner organisations.

The following sections briefly describe individual ACIAR-supported projects and anticipated outputs in Timor-Leste, 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.

## Crops –Soil and Land Management

A project managed under two ACIAR research programs is helping farmers in Timor-Leste change from subsistence farming to income-generating farming. The project aims to improve agricultural productivity and profitability in pilot communities, by addressing technical and social impediments to intensifying annual crop establishing fodder tree legumes and sandalwood. This will help provide a sustainable income source, while sustainable land management will halt or reverse land degradation. Led by Professor William Erskine of the University of Western Australia, the research focuses on cropping intensification to produce legumes and grain for an emerging stock and food processing industry, and non-timber, native tree products (fodder tree legumes and sandalwood). This will help diversify farm income, and act as a buffer to climate variability. The research is being undertaken in two agroecological zones, covering a quarter of the country's population, and cropping systems and crop management packages are being developed.<sup>1</sup>

## Fisheries

A new project in 2019–20 aims to identify the livelihood and nutrition benefits of fisheries in Timor-Leste and the Nusa Tenggara Timur province of Indonesia. It will test approaches to nutrition-sensitive co-management systems for inshore fisheries, and look at ways to promote nutrition-sensitive fisheries management policy in each country context. The project, led by Dr David Mills of the WorldFish Center, will determine the importance of fish for the livelihoods of women and men, by focusing on two fishery case studies—fish-aggregating device fishing and intertidal gleaning. By evaluating the nutritional value of fisheries to households, and working to identify the factors enabling or limiting the consumption of fish, the project will highlight the potential of fish to reduce malnutrition, particularly during early childhood. Through a south-south collaboration the lessons learned in Indonesia from its extensive commercial fish-aggregating device industry will be used to guide policy development in Timor-Leste for sustainable inshore management that benefits poor households.<sup>2</sup>

## Forestry

The high value of sandalwood on the international market has led to the decline of many natural sources of sandalwood around the world. This presents an opportunity for smallholders in sandalwood-producing countries of the Asia-Pacific region to capitalise on recognised future supply shortages, by planting local species. Led by Dr Tony Page of the University of the Sunshine Coast, a short research activity will leverage existing research investments by ACIAR in sandalwood, to improve capacity, scientific outputs and impacts among project partners. This will be achieved through a regional workshop and field tours, and publication of technical information.<sup>3</sup>

## Livestock Systems

ACIAR supports a medium-term livestock research-for-development program in Timor-Leste, with a 10-year vision and strategy. The program involves on-station testing and on-farm adaptation of small-scale livestock production and health management technologies (especially for cattle and pigs), developed in similar biophysical conditions and farming systems in South-East Asia (especially Indonesia).

The vast majority of cattle producers in Timor-Leste use extensive grazing systems to grow cattle as a way to retain and accumulate capital. But strong and increasing demand for beef from urban areas is providing opportunities for farmers to sell fat cattle to these markets. A project, led by Dr Geoffry Fordyce of the University of Queensland, supports this transition, to increase the income of smallholder crop-livestock farmers and market-chain operators in Timor-Leste through more efficient, commercially-oriented cattle production, and improved access to markets.<sup>4</sup>

A new small research activity focuses on improving the diagnostic pathways from the field into the central veterinary laboratory in Dili, particularly around the management of classical swine fever, which is endemic in Timor-Leste and most of Indonesia. This project, led by Dr Jenny-Ann Toribio of the University of Sydney, aims to increase the understanding of causes of pig mortality, which will contribute to better smallholder pig husbandry and production techniques.<sup>4</sup>

A short project aims to further develop a vision and direction for ACIAR to support sustainable development of the smallholder livestock sector in Timor-Leste over the coming 5–10 years. Led by Dr Dominic Smith of the University of Queensland, the project will: evaluate the business case for ACIAR supporting research into smallholder pig production; evaluate key constraints and influencing factors related to formalising cross-border trade in livestock between Timor-Leste and Nusa Tenggara Timur; and conduct a comparative analysis of key smallholder livestock sectors, to identify best use of ACIAR resources.<sup>6</sup>

Since independence in 2002, Timor-Leste has moved from a post-conflict country to a lower-to-middle-income country. In 2013, it was reported that, for children under 5 years of age, the prevalence of stunting, wasting and underweight had significantly decreased since 2009–10, but it remained among the highest in the world. A pilot project, led by Dr Ben Polkinghorne of Australian National University, will seek to understand possible infection pathways, to establish linkages between foodborne bacterial enteropathies and malnutrition in Timor-Leste.<sup>7</sup>

## Global Program

The Global Program manages several programs in the East and South-East Asia region addressing multidisciplinary challenges and/or opportunities, in partnership with international agricultural research-for-development agencies. The work of the Global Program is described in Chapter 2.

Global Program projects operational in Timor-Leste during 2019–20 are:

- » Improving plant biosecurity in the Pacific islands<sup>8</sup>
- » Monitoring agricultural research investments, capacity and impact in South-East Asia and the Pacific—Agricultural Science and Technology Indicators (ASTI).<sup>9</sup>

### Country Manager

Dr Peter Horne

### Research Program Managers

Crops—Dr Eric Huttner

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Livestock Systems—Dr Anna Okello

Soil and Land Management—Dr James Quilty

### General Manager, Global Program

Ms Mellissa Wood

## Current and proposed projects

1. Agricultural innovations for communities for intensified and sustainable farming systems in Timor-Leste (AI-Com) (CIM/2014/082)
2. A nutrition-sensitive approach to coastal fisheries management and development in Timor-Leste and Nusa Tenggara Timur Province, Indonesia (FIS/2017/032)
3. Building research capacity among ACIAR's sandalwood-focused projects through a regional sandalwood workshop and publication [Indonesia, Vanuatu, Fiji, PNG, Timor-Leste, Australia] (FST/2016/024)
4. Smallholder cattle enterprise development in Timor-Leste (LPS/2014/038)
5. Pig disease investigation in Timor-Leste (LS/2012/065)
6. Trilateral support to smallholder cattle systems research in Timor-Leste (LS/2017/035)
7. Establishing the linkages between foodborne bacterial enteropathies and malnutrition in Timor-Leste (LS/2018/184)
8. Improving plant biosecurity in the Pacific islands [Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu] (GP/2018/109)
9. Monitoring agricultural research investments, capacity and impact in South-East Asia and the Pacific—Agricultural Science and Technology Indicators (ASTI) program [Cambodia, Indonesia, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, Vietnam, Laos, Timor-Leste] (GP/2016/093)





4

**Building  
capability**



## Building capability

**The Capacity Building Program works to boost capacity of individuals and institutions involved agricultural research-for-development. We facilitate programs in scientific research, leadership, management, policy and governance with our partners in the Indo-Pacific region.**

In 2019–20, the program continues its focus on leadership and career development, while maintaining an ongoing commitment to support postgraduate study. A key activity will be the launch of a new leadership program for women in agricultural research and the roll-out of the first two cohorts of an executive leadership program for John Allwright Fellows.

At the same time, ACIAR is building a stronger alumni program, working closely with past fellows in their home countries, to support ongoing collaborative capacity building that meets their self-identified needs. Alumni engagements highlight the diverse achievements, knowledge and influence of all alumni, and seek to create a network of professionals who support excellence in agricultural research.

Australian researchers are also being targeted through various initiatives designed to ensure the current and next generation of international agricultural researchers are exposed to the work of ACIAR, and that future expertise is nurtured and developed.

A new Monitoring and Evaluation Framework has been developed for the Capacity Building Program. The framework will ensure all programs are contributing to the goals of the ACIAR 10-Year Strategy 2018–2027. It will also support the program to work towards common aims, support effective monitoring and management, and enable lessons to be captured, shared and used to improve future work.

### **John Allwright Fellowship and Executive Leadership Program**

In 2019–20, John Allwright Fellowships will continue to be provided to agricultural researchers for PhD and masters scholarships administered through the Australia Awards system.

In 2019–20, about 75 John Allwright Fellows will be studying at 12 universities across Australia. Applicants for the fellowship are invited annually, and must be connected with an ACIAR project through current or recent work.

In January 2019, the first annual cohort of John Allwright Fellows started the new Executive Leadership Program within the John Allwright Fellowship, which is delivered by the University of New England. The cohort of 24 completed a 10-day intensive camp, and started a 15-month program of online learning, which will be completed during 2019–20. The online learning takes about 6 hours per month, and is completed alongside the fellows' postgraduate studies. The program concludes with a four-day camp.

Gender is mainstreamed and integrated into every aspect of the program, which includes leadership and communication skills, and people, finance, and project management.

On completion of the Executive Leadership Program, participants achieve half of a certificate qualification.

A second cohort of John Allwright Fellows will start the Executive Leadership Program in November 2019.

## John Dillon Fellowship

The John Dillon Fellowship is a six-week program that runs twice a year for 15 mid-career agricultural researchers connected to ACIAR projects. The program is delivered in Australia by the University of the Sunshine Coast. Fellows participate in workshops, field-trips and networking events, and undertake a short institutional placement.

An annual round of the John Dillon Fellowship specifically for institutions in the Pacific region began in May 2019. Starting with a group of fellows from Papua New Guinean institutions, this iteration of the program will engage with senior management in host institutions, develop specific institutional strengthening projects, and deploy mentoring and coaching alongside the formal training of the fellowship. The institutional focus has the potential to amplify the outcomes of the training program by garnering widespread buy-in of approaches, and delivering a tailored package of training to suit the identified needs of our partner organisations.

A second round of the traditional John Dillon Fellowship, made up of researchers from the Indo-Pacific and two Australian researchers, will be delivered in early 2020.

## New women's leadership program

In recognition of gendered inequalities in access to agricultural education and leadership positions, a new fellowship program for women agricultural researchers in the Indo-Pacific will open for applications early in 2019-20. The program delivers on our commitment in the Gender Equity Policy and Strategy to develop a leadership program for women in agricultural science.

Open to women with a bachelor qualification and above, the program will focus on leadership and high-level science skills. It also includes workshops for key people within the fellows' workplace and in-country mentors, recognising the importance of fostering institutional support for women's leadership.

The first cohort of the fellowship will start in early 2020 with workshops in Australia and an internship of up to 3 months. The program will run over 15 months. Before the program begins, a baseline study of the status of women's leadership in agriculture-for-development will be done. This will enable a benchmark to be established on which to measure progress over time.

**Table 6.1: Five-year history of participants in John Allwright and John Dillon fellowships**

	2015-16 (actual)	2016-17 (actual)	2017-18 (actual)	2018-19 (actual)	2019-20 (estimated)
John Allwright Fellows: total active in year	130	140	97	85	75
John Allwright Fellowships awarded in year	24	22	7	12	10
John Dillon Fellows: total active and awarded in year	10	10	10	28	28



## South Pacific capacity building program

In 2019–20, ACIAR will develop and implement a capacity-building strategy tailored to more effectively address the needs of the agricultural innovation system in the Pacific. The strategy will seek to strengthen relationships, increase talent, and work with institutions to help researchers and decision-makers in the Pacific address emerging agricultural challenges and opportunities.

The strategy will build on existing initiatives, such as the University of the South Pacific Scholarship Program, and develop new approaches, including academic exchanges, institutional support (such as the Pacific-focused John Dillon Fellowship) and an alumni network. The strategy is a whole-of-agency approach, that will improve coordination between research projects and capacity-building approaches.

## Other training activities

The ACIAR Launch Fund provides financial assistance to organisations or individuals wishing to conduct or attend events or training that directly benefits international agricultural research. Activities supported by the fund will develop skills and knowledge, and develop and maintain research partnerships, to improve international agricultural research.

ACIAR supports training activities delivered by the Crawford Fund. This includes the Master Class and Training Program, which is a key capacity-building program for international agricultural research-for-development in the region. Participants include mid-career international scientists and young scholars.



Leontine Baje from National Fisheries Authority, Papua New Guinea, is a John Allwright Fellow and is undertaking postgraduate studies of coastal sharks.

## Australian researcher activities

In addition to including two Australian researchers in the John Dillon Fellowship cohort each year, the ACIAR Capacity Building Program will continue to provide financial support for the Researchers in Agriculture for International Development network through The Crawford Fund. Researchers in Agriculture for International Development is an active network of early career researchers who share knowledge and opportunities related to agricultural research-for-international-development.

An internship program primarily focusing on placing Master of Business Administration students in agribusiness projects will also continue. Building on a pilot program of two internships in 2017, and a further seven in 2018–19, the program supports Australian masters students to work in-country alongside ACIAR projects on a specific task for 3–6 months. The program aims to address skills gaps within ACIAR projects, and offers real-world work experience opportunities for postgraduate students. In 2019–20, eight internships will be offered for masters students studying business and social sciences. The program will also be offered to PhD candidates.

## Alumni program

All participants in ACIAR capacity-building programs are considered alumni. The Alumni Program is driven through our country and regional offices, with support from the Capacity Building Program. In-country alumni are being consulted about the type of network they would like to create and activities they feel would benefit them. These range from workshops to improve their science communication skills, field trips to ACIAR projects, and presentations from experts.

In 2019–20, alumni activities will continue to be delivered in partner countries. A key event will be held in conjunction with Pacific Week of Agriculture, where a group of ACIAR Pacific alumni will participate in a week-long leadership training and networking program.

## Monitoring, evaluation and learning framework

In 2019–20, the capacity-building program will start using the newly developed monitoring, evaluation and learning framework. The framework aims to provide a structured approach to the collection, analysis and use of data about the progress, performance and results of activities within the Capacity Building Program. It clarifies the processes and resources applied to this work, and underpins well-informed and evidence-based program planning and management.

The framework will provide the information needed by the ACIAR Capacity Building Program and by service providers implementing subprograms to make sound day-to-day and strategic management decisions, based on timely and reliable information. It also supports strong accountability to ACIAR senior management, including the Training Committee, about the use of Capacity Building Program resources, supports achievement of positive outcomes, and enables deeper learning from program activities.

## Farmers Without Borders

In 2019–20, a pilot of the Farmers Without Borders program will continue to place Australian farmers in the Pacific, Myanmar and Kenya. This follows two placements in Kenya and Timor-Leste in the second half of 2018–19.

The farmer placed in Samoa will work with an organisation that supports local women in agriculture, strengthening the group's agricultural extension approaches. In Myanmar, a group of Australian farmers will be deployed to work with local cropping groups on topics such as improved cropping practices and fertiliser handling. In Kenya, the farmer will work with local smallholder farmers on applying zero-till farming practices.

The pilot will be reviewed during 2019–20, and recommendations considered for the future of the program.

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