

# Papua New Guinea and Pacific island countries

Principal Regional Coordinator  
Mr Les Baxter



# Papua New Guinea

Key statistics	
GDP per capita (US\$) <sup>a</sup>	1,218
Population (millions) <sup>a</sup>	6.7
Funding	
	\$m
2008–09 actual	4.70
2009–10 budget allocation	5.28
2010–11 budget estimate	4.49

<sup>a</sup> Data from 2008 & 2009 <<http://unstats.un.org/unsd/demographic/products/socind/>>

Sourced for current and following country tables

## Medium-term strategy

The main strategy of ACIAR's program in Papua New Guinea (PNG) is to secure improvements in food supply and rural incomes for smallholder farmers through increased productivity and enhanced access to markets and services, as they make up the bulk of the population and the bulk of the poor. This is in line with the PNG Government's Medium Term Development Strategy to promote economic growth in the rural sector (comprising agriculture, forestry and fisheries). This strategy aims to create an enabling environment

for smallholder farmers to mobilise their own resources to increase productivity and generate higher incomes. Thus, the ACIAR program is based on, and committed to, improved adoption of innovations that respond to real needs and deliver meaningful benefits to PNG smallholder farmers. Emphasis is placed on the fact that the research must be economically, culturally, socially and environmentally relevant to the smallholder farmers. In particular, ACIAR research in PNG has a focus on the role of women in agriculture from a variety of perspectives, such as marketing access and constraints to uptake of new technologies. There are emphases on plantation crops, root and other horticultural crops, forestry and fisheries. These include exported and domestically traded commodities that generate smallholder income and underpin improved food security and economic development.

The ACIAR program includes tightly linked clusters of projects that address problems faced by major commodities such as sweetpotato, coffee, oil palm and cocoa. Program design also encourages private sector, industry and NGO linkages in the design and delivery of activities. Through addressing issues of biosecurity



A forestry worker scaling a tree to gather seeds in Papua New Guinea

and sustainable management of land, forest and fisheries resources, sustainability of renewable resources is encouraged. The program has a strong emphasis on capacity building, with high priority given to both training within projects and postgraduate training. In addition to the project expenditures shown above, \$1.0–1.5 million is invested by ACIAR annually on training in PNG.

A key component of Australia's involvement with the agriculture sector in PNG is the AusAID and ACIAR partnership. AusAID co-invests in ACIAR-managed project activities, while ACIAR works closely with relevant AusAID programs, particularly the Agricultural Research and Development Support Facility.

## Position

PNG is one of Australia's most important development partners, and ACIAR's program in PNG reflects this. ACIAR's program recognises the many challenges to agricultural development in PNG, including poorly developed infrastructure, weak market signals and services, pressure on land and renewable resources as a result of population increases, new pest and disease threats, and poor product quality. Future impacts of population pressure and HIV/AIDS and other human diseases on the farming sector, including the effects on labour availability and productivity, will be addressed, and gender issues will be mainstreamed into the program.

Recognising the latent potential of agriculture for sustaining the basic livelihood of the people, the Papua New Guinea Department of Agriculture and Livestock has developed a National Agriculture Development Plan as a blueprint to guide future directions in agriculture and rural development. Village-based agriculture supports over 70% of the population, and domestic trading of fresh produce is a very important source of cash income. By far the most important crop in PNG is sweetpotato, the dominant staple for over 65% of the rural population. The main export tree commodities are timber, palm oil, coffee, cocoa and coconut products. Forestry is PNG's third largest revenue earner and a major contributor to economic and social development.

PNG has several significant competitive advantages in relation to the production of timber: available land, good soils and climate, and a long history of successful incorporation of trees into agroforestry systems. The PNG fisheries zone of 2.4 million km<sup>2</sup> is the largest in the South Pacific region. The fisheries zone includes an extended reef system, numerous islands and an extensive coastline. These create huge opportunity but also present an enormous challenge for monitoring and control. The total market value of the PNG catch is estimated at

\$A140–160 million. Pigs and poultry are important village animals and there are some live exports of cattle from PNG.

ACIAR will assist in the development of capacity to detect and manage infectious disease in the wider context of biosecurity arrangements and in collaboration with other Australian agencies. Where relevant, close linkages will be formed between ACIAR-funded programs in PNG and the Pacific island countries, for example in root and tree crops, fisheries and forestry. Key principles in designing and executing the program include the importance of:

- » engagement with the private sector, industry bodies and NGOs along with government in both research and implementation of research results
- » research that assists the engagement of smallholder farmers in the cash economy
- » understanding the social and economic issues affecting farmer decision-making and factors influencing adoption of new technologies.

Research is urgently needed into more-effective ways of increasing the adoption of R&D results from pilot-level involvement of communities to enable broader implementation. ACIAR will work with its counterparts to assist in communication and extension of the results of research. As well as a greater commitment to implementation of the results of research, the need for ongoing development of agricultural technologies remains strong. There are particular needs to develop the informal sector (including those involved in village-level production and marketing of root and horticultural crops and small livestock), improve the productivity of major tree crops (by increasing production and exports and lowering production costs) and support R&D that assists in diversification of the agricultural export product base. There are requirements for capacity building at both individual and institutional levels in all areas, but particularly to support analysis of social and economic constraints and opportunities, marketing and value-addition of agricultural products, and agricultural education. PNG's relative lack of human resources is a constraint in R&D activities and delivery of extension services. It is therefore crucial during design and implementation of projects to involve farmers and extension workers, and to include training and packaging of research results in a form that is useful to farmers, members of industry and policymakers.

## Research priorities

ACIAR has a formal program of consultation with PNG to establish priorities in research collaboration, as well as annual smaller consultations and industry workshops to finetune these priorities. A record of the most recent set

of formal consultations, held in May 2008, is provided at <[www.aciar.gov.au](http://www.aciar.gov.au)> under 'Partner country priorities / Papua New Guinea'. The ACIAR PNG portfolio emphasises the disciplines of agricultural systems (including postharvest activities); production and protection of root, horticultural and tree crops; and fisheries and forestry. Training priorities are mainly addressed through targeted activities within projects, although support for postgraduate degrees in Australia and an in-country scholarship scheme at the University of Technology, Lae, are also significant contributors to capacity development. The priorities are grouped under the following thematic subprograms.

## Subprogram 1: Addressing social, cultural and policy constraints to the adoption of agricultural technologies

- » Interventions to overcome cross-cutting social and cultural constraints to smallholder household profitability/productivity based on analysis of:
  - land mobilisation issues (tenure, registration, titles, communal)
  - applicability of new labour mobilisation models beyond the cocoa and oil palm industries
  - impact of smallholder involvement in participatory action, research activities and other group learning processes on adoption of technical innovations
  - effects of cultural factors on ability to replicate successful entrepreneurship in agriculture
  - analysis of income utilisation, savings incentives and microfinance access in smallholder families, particularly with respect to establishing criteria for successful engagement of women
- » Analysis of how current production and marketing systems impact on women in terms of efficiency and equity, and the role and effectiveness of women's groups in rural industries
- » Assessment of the role of cottage industries in contributing to livelihoods and household cash flow, and complementing engagement in formal markets and the national economy
- » Economic assessment of the rice trade and rice-based farming systems, including national demand (role of production and imports) and potential returns from investing in technical improvements
- » Improved management of water under climate variability and change, including:
  - management of water availability to meet market demand and food security

- identification of drought-vulnerable areas in PNG and potential policy and technical interventions

## Subprogram 2: Enhancement of smallholder income from horticulture and root crops

- » Matching of supply to demand, and marketing of highland root and horticultural crops, including:
  - understanding the sector to clarify demand of different product categories in major markets
  - understanding the relative effectiveness of different collaborative arrangements for mobilising smallholder farmers from social and cultural perspectives
  - economics of storage depots and the role of private sector versus government intervention
  - establishment of criteria for productive relationships between smallholder farmers, middlemen and private-sector buyers and sellers
- » Application of traditional staple crop varieties (sweetpotato, taro and banana) and identification of suitable crop varieties for processed products
- » Identification and development of opportunities and strategies for using floriculture to improve the livelihoods of communities, especially women
- » Identification of quarantine barriers to potential export of root crops and flowers to other countries
- » Use of legumes and fallow crops for soil fertility improvement and longer term nutrient supply in vegetable production systems
- » Analysis of and interventions in market chains for temperate vegetables, including collation of market information and strategies to improve postharvest operations
- » Assessment of simple technologies and mechanisation systems for family and community production, postharvest handling and storage of horticultural crops
- » Improvement of seed multiplication, distribution and marketing systems, including assessment of strategies for enhancing availability of high-quality seed
- » Improved productivity and profitability of sweetpotato-based farming systems, including:
  - development of breeding and selection strategies for important traits in sweetpotato for different regions in relation to yield, stress tolerance and consumer preferences

- development of integrated pest, disease, weed and nutrient management strategies
- evaluation of industrial opportunities for processed sweetpotato products
- » Identification of promising root crop–legume–tree–livestock systems that provide better use of crop residues for nutrient cycling and local sources of animal feed

### Subprogram 3: Improving smallholder returns from export tree crop production and marketing

- » Social and economic analysis of incentives for uptake of intensified management systems in cocoa, coffee and oil palm
- » Development and application of geographic information system (GIS) databases for coffee, cocoa and oil palm, with a focus on management of pest and disease outbreaks
- » Development and smallholder implementation of integrated management systems for major oil palm pests (*Zophiuma*) and diseases (*Ganoderma*)
- » Assessment of natural resources sustainability indicators for tree crop industries
- » Management systems for processing wastes from coffee and other tree crops to underpin development of environmentally sustainable production practices required for certain export markets

### Subprogram 4: New livelihoods from smallholder fisheries, aquaculture and forestry

- » Use of GIS-based tools that integrate aquaculture into existing land-use systems and socioeconomic contexts



*Removing the flesh from around the coffee bean in the highlands of Papua New Guinea*

- » Small-scale inland aquaculture, including cost-effective feeds and feeding strategies and increased availability of quality fingerlings
- » Evaluation of livelihood opportunities in recreational fishing resources such as black bass
- » Promotion of enhanced economic returns from agroforestry systems, addressing:
  - integration of high-value tree crops into agricultural systems
  - germplasm development, delivery and agroforestry demonstration sites
  - social, cultural and economic motivations for landowners planting trees
- » Social and economic approaches to improve smallholder involvement in forestry and agroforestry, addressing land tenure and user rights issues and participatory processes to foster community engagement
- » Improvement in economic returns from timber processing and manufacturing, including economic analysis of sawmilling strategies, improving sawn log recovery and use of small-diameter logs from secondary forests

### Subprogram 5: Agricultural biosecurity and sustainable management of forestry and fisheries resources

- » Optimisation of economic, social and environmental returns from planted and native forests, particularly addressing landowner land-use options, product diversification and income-earning opportunities for women
- » Climate change and sustainable forest management, including research on transparent instruments to foster landowner involvement in carbon trading (through ACIAR collaboration with whole-of-government programs)
- » Reforestation strategies for rehabilitation of degraded areas, including secondary (cutover) forests, mine sites and grasslands, in particular involving management by local communities
- » Management of shark fisheries, including target (shark longline) and non-target (tuna, purse seine and longline) fisheries
- » Responding to over-fished inshore fisheries through community-based fisheries management, restocking (especially of sea cucumber) and identification of aquaculture-based livelihoods



Farmers in Papua New Guinea selling their harvested pyrethrum flowers

- » Assessment of future risks, control and potential utilisation strategies for invasive or exotic fisheries species
- » Strengthening of surveillance systems to monitor and respond to livestock diseases
- » Assessment of the impact of cocoa pod borer infestation and potential coffee berry borer infestation on smallholder farmers; implementation of measures to contain their spread, both pre-border and post-border; and development and dissemination of management tactics for established infestations

### Current project portfolio

(Possible new projects commencing in 2010–11 shown as 'proposed')

#### Subprogram 1: Addressing social, cultural and policy constraints to the adoption of agricultural technologies

**ASEM/2005/094** Improving the profitability of village broiler production in Papua New Guinea

**ASEM/2006/023** Re-commercialisation of the Papua New Guinea pyrethrum industry and improving harvested yields in Australia

**ASEM/2006/127** Private sector / smallholder partnerships for improving incomes in oil palm and cocoa sectors in Papua New Guinea

**ASEM/2008/042** Postgraduate scholarship scheme at the University of Technology, Lae, Papua New Guinea

**ASEM/2009/042** Improving women's business acumen in Papua New Guinea: working with women smallholders in horticulture

#### Subprogram 2: Enhancement of smallholder income from horticulture and root crops

Root crops are traditional staple foods in PNG, and their vital contribution to food security is well recognised. However, the production of root crops, in particular sweetpotato, is declining as a consequence of competing land pressure, shortening fallow periods, soil degradation and other factors such as pests and diseases. The project cluster on root crops is designed with these constraints in mind. Its main focus is on identification and development of more-productive and sustainable production systems. Activities include efficient use of plant genetic resources; identification of promising nutrient, water, pest and disease management practices; and development of improved postharvest handling techniques. Capacity building and dissemination of promising technologies to farmers are critical and integral components of the program. High-value floriculture, on the other hand, offers various new opportunities to improve the livelihoods of communities. A new project will look at value chains for various decorative plants, strengthening nascent production of cut flowers by women's groups and developing potential new commercial products from among PNG's diverse native flora.

<b>ASEM/2006/035</b> Improving marketing efficiency and postharvest handling of sweetpotato in Papua New Guinea
<b>FST/2006/048</b> Processing of <i>Canarium indicum</i> nuts: adapting and refining techniques to benefit farmers in the South Pacific
<b>PC/2005/134</b> ( <i>multilateral</i> ) The use of pathogen-tested planting materials to improve sustainable sweetpotato production in Solomon Islands and Papua New Guinea (CIP)
<b>PC/2006/063</b> Integrated pest management for Finschhafen disorder of oil palm in Papua New Guinea
<b>PC/2008/011</b> ( <i>proposed</i> ) Floriculture to improve livelihoods in Indigenous Australian and Pacific island communities
<b>SMCN/2004/067</b> Management of soil fertility in sweetpotato-based cropping systems of the Papua New Guinea highlands
<b>SMCN/2004/071</b> Reducing pest and disease impact on yield in selected Papua New Guinea sweetpotato production systems
<b>SMCN/2008/032</b> Sustainable vegetable production in Central province, Papua New Guinea

### Subprogram 3: Improving smallholder returns from export tree crop production and marketing

#### Cocoa and oil palm

The scope for improvements in smallholder productivity and income within the export tree sector is large. There are approximately 150,000 families producing cocoa at very low levels of productivity and over 18,000 smallholder growers producing oil palm at less than 50% of plantation capacity. If productivity were to rise by even a small margin, the income gains would be significant for smallholder farmers, their families and their communities. This can be achieved through improvements in smallholder crop husbandry skills, application of fertiliser and management of soil fertility. The main aim of this cluster of projects is to raise smallholder productivity and income in the oil palm and cocoa sectors while sustaining the natural resource base. This will be achieved through identification of promising management practices to increase crop productivity, development of measurable and quantifiable environmental indicators of sustainability, and promotion of effective strategies for commercial sector partnerships with smallholder farmers.

<b>ASEM/2006/127</b> Private sector / smallholder partnerships for improving incomes in oil palm and cocoa sectors in Papua New Guinea
<b>PC/2006/063</b> Integrated pest management for Finschhafen disorder of oil palm in Papua New Guinea
<b>PC/2007/039</b> The control of basal stem rot of oil palm caused by <i>Ganoderma</i> in Solomon Islands
<b>SMCN/2009/013</b> Sustainable management of soil and water resources for oil palm production systems in Papua New Guinea

#### Coffee

The PNG coffee industry supports over 350,000 families and earns K300 million (A\$120 million) annually, but the consistency and reliability of coffee supply and quality has declined with the move to low-input management of the smallholder industry. Despite this general decline, premium PNG coffee retains a good reputation among customers and there is good scope to increase demand by improving marketing and quality. ACIAR's coffee program cluster aims to increase the profitability of coffee production for smallholder farmers through optimising the cost and adequacy of production inputs, improving reliability of supply and quality, processing for quality and exploring a range of alternative marketing approaches.

<b>ASEM/2008/036</b> Improving livelihoods of smallholder families through increased productivity of coffee-based farming systems in the highlands of Papua New Guinea
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### Subprogram 4: New livelihoods from smallholder fisheries, aquaculture and forestry

#### Fisheries and aquaculture

Inland fish farming is expanding rapidly in PNG, with an estimated 11,000 smallholder farmers contributing an annual production valued at A\$2.5 million. Key constraints include poor fingerling supply compounded by inefficient distribution channels (which limit the availability of seed to farmers), the high cost and limited availability of suitable feeds, and a general lack of aquaculture husbandry skills and knowledge. Identification of suitable sites for inland aquaculture at both regional and local levels is needed for planning purposes, to avoid constructing ponds in unsuitable areas and to help integrate aquaculture into other existing farming systems. Current projects are interlinked and collectively aim to improve the productivity of fish farms in inland PNG through increasing the supply of fingerlings to farmers; improving available feeding options, including fertilisation and on-farm feed production and the development and distribution of simple formulated feeds based on locally available materials; conducting dedicated training programs and strategies to increase farmer skills in pond husbandry; and investigating alternative culture species, with an emphasis on promising indigenous fish and crustaceans.

<b>FIS/2006/138</b> Developing aquaculture-based livelihoods in the Pacific islands region and northern Australia
<b>FIS/2008/023</b> Increasing fish production from inland farming systems in Papua New Guinea for food and income security
<b>FIS/2008/043</b> Advisory Committee: barramundi feed development trial in Western province, Papua New Guinea



Dr Caroline Lemerle from ACIAR visiting pyrethrum farmers in Enga province, Papua New Guinea

### Forestry and agroforestry

ACIAR's PNG forestry project cluster promotes the development of a smallholder- and community-based plantation industry with high-value species. This is based on significant domestic processing, involving both portable sawmills and static production facilities, together with enhanced production of non-timber forest products and services. Species addressed in this work include teak (*Tectona grandis*), galip nuts (*Canarium indicum*) and balsa (*Ochroma lagopus*).

**FST/2004/050** Value-adding to Papua New Guinea agroforestry systems

**FST/2004/055** Domestication and commercialisation of *Canarium indicum* in Papua New Guinea

**FST/2006/088** Promoting diverse fuelwood production systems in Papua New Guinea

**FST/2006/120** Increasing downstream value-adding in PNG's forest and wood products industry

**FST/2007/078** Germplasm development and delivery to underpin a Papua New Guinea timber industry based on planted forests

**FST/2009/012** Identification of researchable issues underpinning a vibrant balsa wood industry in Papua New Guinea

**FST/2009/016** (*proposed*) Enhancing incomes from Papua New Guinea's balsa industry

in PNG are invasive species that may be of biosecurity concern to Australia. ACIAR has a cluster of projects that investigate better ways to manage these pests and diseases using systematic and environmentally sound methods. These include integrated pest/disease management techniques and biological control options, some of which are focused on pest/disease surveillance, quarantine risk and incursion management. The projects aim to reduce crop losses and increase quality and productivity, providing better incomes for farmers. A new initiative will investigate the problems posed by invasive fish species to PNG and management options for controlling their geographic spread, particularly via traffic across national boundaries. The project will also examine opportunities to better use existing populations of introduced exotic species within PNG. The forestry work focuses on improved management of secondary forests via ongoing sustainable production and improved environmental services. All projects have capacity-enhancement components.

**AH/2006/157** Improved biosecurity for animal diseases in Papua New Guinea

**AH/2008/037** Potential economic impacts of the Varroa bee mite on the pollination of major crops in Papua New Guinea

**ASEM/2006/129** Early warning and drought preparedness for improved management of crop production in Papua New Guinea

**FIS/2009/015** Impact, management and utilisation of invasive and exotic fish species in Papua New Guinea

**FST/2004/061** Assessment, management and marketing of goods and services from cutover native forests in Papua New Guinea

### Subprogram 5: Agricultural biosecurity and sustainable management of forestry and fisheries resources

Many of the agricultural pests and diseases that ravage staple food crops and plantation and horticultural crops



Cossey Yosi (John Allwright Fellowship recipient) at work in the forests of Papua New Guinea

<b>PC/2003/029</b> Management of potato late blight in Papua New Guinea
<b>PC/2003/042</b> Fruit fly management in Papua New Guinea
<b>PC/2004/064</b> Biological control of 'mile-a-minute' ( <i>Mikania micrantha</i> ) in Papua New Guinea and Fiji
<b>PC/2006/114</b> ( <i>multilateral</i> ) Managing cocoa pod borer in Papua New Guinea through improved risk-incursion management capabilities, integrated pest management strategies and stakeholder participatory training (CABI)
<b>PC/2007/111</b> ( <i>multilateral</i> ) Incursion prevention and management of coffee berry borer (CBB) in Papua New Guinea and eastern Indonesia (CABI)

- » Potential high-return vegetable products and related value chains identified for planning interventions for future expansion of vegetable production and marketing in Central province of PNG
- » On-farm field trials provided of valuable management practices for effective and sustainable management of resources to increase productivity of sweetpotato-based cropping systems
- » Smallholder cocoa growers trained in practical options for managing cocoa pod borer and evaluating these options on their farms

## Key performance indicators (2010–11)

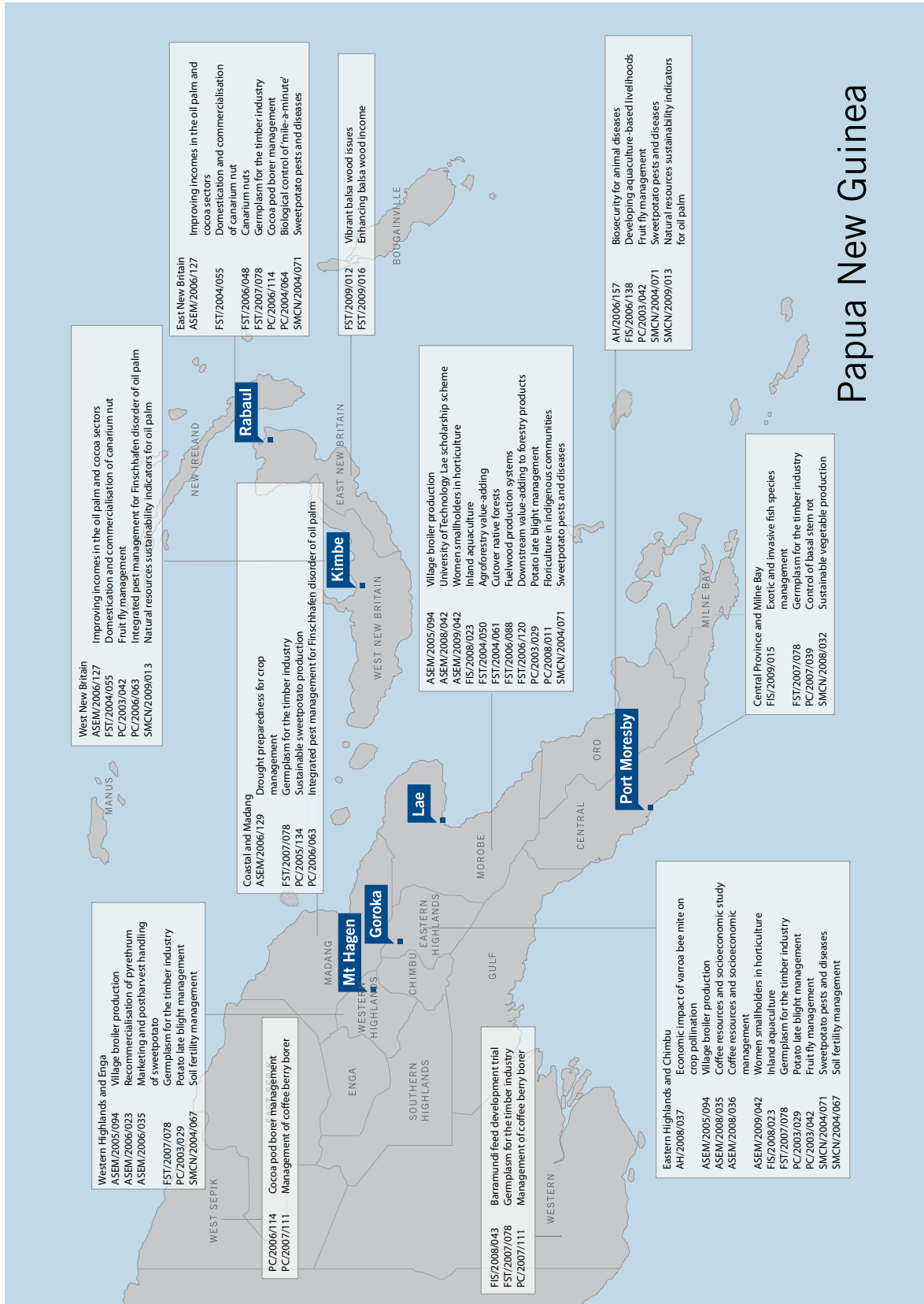
- » Inception workshop and socioeconomic surveys conducted of the new initiative commenced on improving livelihoods of highlands smallholder farmers through increased productivity of coffee-based farming systems
- » Integrated approaches for managing cocoa pod borer infestation, based on improved crop husbandry, crop sanitation and targeted pod spraying, trialled on-farm by growers in existing areas of infestation, and measures to contain spread to new areas implemented
- » Analysis of PNG's fuelwood economy completed
- » Initiatives commenced to improve the international competitiveness of the balsa growing and processing industry of East New Britain

## Key program managers

- Dr Chris Barlow, Fisheries
- TBA, Forestry
- Mr Les Baxter, Horticulture
- Dr Gamini Keerthisinghe, Soil Management and Crop Nutrition
- Dr Caroline Lemerle, Agricultural Systems Management
- Dr Richard Markham, Pacific Crops

## Country manager

- Ms Emily Flowers



# Papua New Guinea

# Pacific island countries

Key statistics	
<b>GDP per capita (US\$)</b>	
Fiji	4,264
Solomon Islands	1,280
Vanuatu	2,388
Samoa	2,988
Tonga	2,891
Kiribati	804
<b>Population (millions)</b>	
Fiji	0.8
Solomon Islands	0.5
Vanuatu	0.2
Samoa	0.2
Tonga	0.1
Kiribati	0.1

Funding	\$m
2008–09 actual	3.16
2009–10 budget allocation	4.75
2010–11 budget estimate	5.61

## Medium-term strategy

ACIAR's program in the Pacific island countries (PICs) embraces Solomon Islands, Samoa, Tonga, Vanuatu, Fiji and Kiribati, and works through regional organisations where appropriate. Our strategy recognises the importance of the agricultural, fisheries and forestry sectors within these countries and works towards underpinning the competitiveness and security of these sectors (see Box 1). It supports R&D and capacity building to address three thrusts: improved food and nutritional security; integrated and sustainable agriculture, fisheries and forestry resources management and development; and improved market integration in agriculture, fisheries and forestry products. It recognises the need to address individual PIC priorities arising from differences in climate and soils, availability of natural resources, institutional capacity, infrastructure and potential for economic growth, while at the same time recognising that many challenges are common and best addressed through regional collaboration. By working closely with Pacific partners, and adhering to the intent of the 'Pacific Partnerships for Development' approach (see Box 2), ACIAR significantly increased the size of its PICs program during 2009–10 and will continue this increase.



ACIAR CEO Dr Nick Austin discussing the merits of traditional sweetpotato varieties with lead farmer Mr Ferries Pupura in Solomon Islands

ACIAR focuses on six key stakeholder groups:

- » smallholder farmers who produce for commercial markets
- » entrepreneurs who develop value chains involving cooperative production, processing and marketing
- » corporate producers and exporters who provide market linkages for outgrowers
- » policymakers who provide an enabling environment
- » public sector researchers as a source of innovation and technical support
- » various farmer intermediaries (both public sector extensionists and NGOs) who provide inputs and other support to producers.

This strategy will also have a significant impact on the household food security of smaller and subsistence growers, resulting from training and capacity building for government R&D staff and extensionists, as well as NGO staff and lead farmers, and the development of crop production systems with broad applicability. The ACIAR program provides R&D solutions and capacity building with close linkages to other extension, technology transfer and community development programs implemented by the Secretariat of the Pacific Community (SPC), Pacific island governments, NGOs and other donors.

To achieve sustainable change, ACIAR will offer innovative approaches that engage, empower and invest in women. Women particularly have a central role in household food gardening, tree crop production, and marketing of horticultural, tree crop and fisheries products. ACIAR R&D activities and projects will consider

**Box 1. Pacific Agribusiness Research for Development Initiative**

Pacific island countries (PICs) are geographically isolated from key growth consumption markets, which minimises their ability to successfully access these markets. In addition, there has not been the coordination or optimisation of supply chains driven by modernisation of the food retail and food service sectors that has been seen in other developing regions.

The Pacific Agribusiness Research for Development Initiative (PARDI) uses research to underpin the development of targeted high-value agriculture, fisheries and forestry value chains. It focuses on a targeted number of chains that engage with domestic, international and niche markets to gain insights into overcoming constraints to competitiveness.

PARDI is working closely with the private sector and encouraging engagement of the government sector with the private sector. PARDI is improving the livelihoods of people in the partner PICs by underpinning development of more-competitive high-value agriculture, fisheries and forestry products that are based on strengthening the value chains.

how each project will specifically address gender inequity in agricultural development, for example inequity in decision-making and women’s access to appropriate technology and knowledge. This will include consideration of the optimum level of women’s participation to achieve maximum project impact on hunger, poverty and food security; significant increase in opportunities for women in income-generating activities and decision-making; and a growing understanding of gender issues in the community in which ACIAR operates. Projects will include appropriate gender-based objectives, milestones and performance indicators.

In agriculture the program will focus on adaptation to changes in microclimate, and identification and management of constraints to productivity and market engagement in both staple root and high-value crops. It will assist in the identification of suitable markets and in the development of new high-value horticultural crops (fruits, vegetables and ornamentals) for domestic, regional and international markets. In fisheries ACIAR will focus on addressing sustainable production of oceanic and inshore fisheries, the development of alternatives through aquaculture, and improvements in economic

returns through improved product quality and better market linkages. The forestry program will emphasise the development of emerging plantation opportunities through improved silvicultural management, enhanced genetic resources, new products, and development of disease and pest detection and management methods that are well connected to markets. There will be increased attention to the development and strengthening of agribusiness linkages with farming systems and marketing research undertaken to underpin the strategy. The program also has a strong emphasis on building R&D capacity within the region.

**Position**

ACIAR’s program in the PICs will continue to develop in line with broader Australian development assistance priorities. There is an increasing awareness of the importance of changing economic and environmental situations, and the increased vulnerability of small developing island states if flexibility, resilience and adaptation to change are not achieved. The PICs face a range of challenges, including eroding tariff preferences, population and urban growth, migration of skilled labour, resource depletion and degradation, and risks from climate change, as well as high and fluctuating food and energy prices. Ineffective policy implementation is seen as a significant impediment to development and progress.

Agriculture, forestry and fisheries sustain many households and these sectors will supply the majority of livelihoods and provide the main source of food security for PICs for the foreseeable future. In Solomon Islands local production of food crops contributes up to 71% of household income, while in Samoa and Tonga this figure is closer to 40%. Many smallholder farmers live in isolated rural communities that are dependent on household food production and intermittent crop, fish and small livestock sales. Transforming these systems into sustainable income-generating activities through improved productivity and marketing will enhance food security and self-reliance and reduce poverty. Key challenges for ACIAR and its partner agencies in working in the PICs include physical isolation of countries, poor transportation logistics, human and organisation capacity constraints, land tenure disputes and uncertainties, a lack of infrastructure, poorly developed supply chains, a lack of harmonisation between countries (e.g. in biosecurity laws) and the need to link with major domestic and international markets.

Participation in regional projects that address common problems can help overcome the limited capacity of many countries to engage in collaborative activities. ACIAR has a strong emphasis on working with Pacific regional organisations to ensure that R&D efforts are



*Community members of Natuvu Village, Wailevu, Fiji, and researchers involved in a project for the release of juvenile sandfish (sea cucumbers)*

targeted towards agreed national and regional priorities and improvement in effective delivery of outputs. In partnership with the University of the South Pacific (USP), ACIAR has implemented a postgraduate training program designed to increase capacity in the Pacific region through scholarships for research associated with relevant ACIAR projects.

### An expanded ACIAR–Pacific island countries program

ACIAR will continue to establish and implement a larger suite of projects based on the projected 65% increase in resources to be allocated to the Pacific region that was initially reported in the 2008–09 AOP. The additional resources will cover:

- » PARDI, which will address constraints in the value chains of selected high-value commodities of importance as sources of livelihood to Pacific islanders
- » research to improve the profitability of the plantation (tree) crop sector, predominantly in Solomon Islands and particularly in oil palm and cocoa; plantation tree crops are a priority due to the potential for economic growth and increase in grower incomes from these crops; for example, the estimated revenue to Solomon Islands economy from palm oil was US\$10 million in 2008; R&D and capacity building to remove production constraints could see this rising to over US\$30 million by 2014

- » new initiatives on research into agricultural technology transfer, especially for participatory research and extension approaches that underpin productivity, while sustaining the natural resource base; and capacity building, especially enhancement of the continuing USP postgraduate scholarship program, which emphasises the building of practical R&D skills through close involvement of students in ACIAR projects.

Close collaboration with SPC and USP, as the Pacific region's leading research, technical support and capacity-building organisations, in the design and implementation of these initiatives will result in enhanced and broader impact from the outputs of previous, current and future ACIAR investments.

### Research priorities

Priorities for ACIAR–PICs cooperation are reviewed and updated in regular consultation with relevant government, community and private sector stakeholders. In addition, ACIAR attends regional priority-setting meetings, including those of the Regional Conference of Heads of Agriculture and Forestry Services, and SPC Heads of Fisheries. ACIAR also participates actively in the Joint Country Strategy process of SPC, and undertook additional, closely targeted, stakeholder consultations during the design of the PARDI and other initiatives.

New projects will be considered under the following three thematic subprograms.



*Professor Gary Bacon, Dr Tim Blumfield and a Solomon Islands teak forest farmer discussing ways of improving the management of community teak plantations (Photo: Russell Haines)*

### Subprogram 1: Improving food and nutritional security

- » Identification, development and adoption of new market-driven opportunities for the improvement of horticultural and tree crops
- » Development and adoption of integrated and more-sustainable production management packages for food staple, fruit, vegetable and plantation crops
- » Selection and adoption of staple crops with enhanced nutritional content
- » Integration of existing knowledge into information packages for food staples and fruit and vegetable crops
- » Capacity building and training through postgraduate scholarships linked to ACIAR projects

### Subprogram 2: Integrated and sustainable agriculture, fisheries and forestry resource management and development

- » Stock status assessment and planning for the sustainable use of vulnerable inshore fisheries, with an emphasis on increased community-level management and co-management
- » New opportunities for inland aquaculture, including the domestication of promising indigenous species and integration into existing farming systems
- » Valuation of resources and economic analysis of smallholder and commercial fisheries
- » Domestication of multipurpose trees for forestry and agroforestry, including selection of suitable germplasm, silvicultural management and protection from pests and diseases

### Box 2. Pacific Partnerships for Development

In 2008 the Australian Government committed to a new and elevated engagement (Pacific Partnerships for Development) with our Pacific island partners, to work together to meet our common challenges, raise the standard of living for people throughout the region and, in particular, make more-rapid progress towards our partners achieving the Millennium Development Goals and their own development ambitions. In this context the Port Moresby Declaration suggests measures aimed at:

- » improving economic infrastructure and enhancing local employment possibilities through infrastructure and broad-based economic growth
- » enhancing private sector development, including better access to microfinance
- » achieving universal high-quality basic education
- » improving health outcomes through better access to basic health services
- » enhancing governance, including the role of civil society and that of NGOs in basic service delivery.

Pacific Partnerships for Development was established jointly by bilateral arrangements known as Partnership Frameworks, which address mutual respect and responsibility. Australia will provide new and additional bilateral assistance over time in return for commitments by Pacific partners to improve governance, enhance private sector development, increase investment in economic infrastructure, and achieve better outcomes in health, education and other areas.

- » Value-adding processing of forest and fisheries products
- » Capacity building and training in PICs through postgraduate scholarships linked to ACIAR projects

### Subprogram 3: Underpinning the competitiveness of agriculture, fisheries and forestry value chains

- » Use of marketing research to help producers and other value-chain stakeholders identify market opportunities for agricultural commodities
- » Analysis of strategic supply chains and design and implementation of interventions to improve supply-chain efficiencies

- » Development and strengthening of agribusiness linkages, including analysis of market-chain constraints
- » Identification and analysis of processing and value-adding opportunities for crops, aquaculture and forestry products, and design and implementation of R&D interventions
- » Identification of quarantine and pest risk issues for crop germplasm requiring exchange between countries
- » Development and adoption of quarantine pest and disease control measures for crop exports

ACIAR's Pacific program, through its three research emphases, contributes to the objectives of a number of the partnership priorities. In fisheries ACIAR will work in cooperation with AusAID's Pacific fisheries strategy released in November 2007. This has the dual strategic objectives of maximising the flow of benefits to Pacific island peoples from sustainable commercial and subsistence fisheries and implementing effective ecosystem-based fisheries management for sustainability. AusAID will commence the Pacific Horticultural and Agricultural Market Access (PHAMA) program in 2010. PHAMA will develop and progress market access submissions for export crop and livestock products, and support implementation of biosecurity and quadrant measures required to maintain market access. ACIAR will complement this through R&D work on productivity and marketing of target products, and through capacity building.

## Current project portfolio

(Possible new projects commencing in 2010–11 shown as 'proposed'.)

### Subprogram 1: Improving food and nutritional security

This subprogram has two major emphases. First, it aims to develop and implement strategies to underpin improved and sustainable productivity and quality of food staples and high-value horticultural crops, with a particular emphasis on integrated crop management including crop pests and diseases. The second emphasis is to increase household income through market-driven diversification of production by exploitation of new market niches, genetic diversity, new products and value-adding. Several projects in the subprogram focus on the integration and adoption of results from previous ACIAR research. The particular emphasis of this subprogram is on root crops, vegetables, fruit crops and ornamentals. A third, but currently minor, focus for this subprogram is the production of root crops with improved nutritional value.

<b>HORT/2007/072</b> Postgraduate scholarship scheme for University of the South Pacific (Fiji, Samoa, Solomon Islands, Tonga, Vanuatu)
<b>PC/2003/046</b> Integrated control of powdery mildew and other disease, weed and insect problems in squash in Tonga and Australia
<b>PC/2003/047</b> Improved plant protection in Solomon Islands
<b>PC/2004/063</b> Integrated pest management in a sustainable production system for brassica crops in Fiji and Samoa
<b>PC/2005/077</b> ( <i>multilateral</i> ) Integrated crop management package for sustainable home gardens in Solomon Islands (AVRDC)
<b>PC/2005/134</b> ( <i>multilateral</i> ) The use of pathogen-tested planting materials to improve sustainable sweetpotato production in Solomon Islands and Papua New Guinea (CIP)
<b>PC/2006/053</b> Evaluation of the effects of dasheen mosaic virus on taro yield (Fiji, Samoa)
<b>PC/2006/173</b> Tongan tropical fruit production: improving genetic diversity and production capacity building
<b>PC/2007/039</b> The control of basal stem rot of oil palm caused by <i>Ganoderma</i> in Solomon Islands
<b>PC/2007/118</b> Alternative disinfestation treatments for fresh produce commodities from Pacific island countries
<b>PC/2008/003</b> Strengthening the Fiji papaya industry through applied research and information dissemination
<b>PC/2008/011</b> Strategies for using floriculture to improve livelihoods in Indigenous Australian and Pacific island communities
<b>PC/2008/046</b> Rehabilitating cocoa towards improving livelihoods in the South Pacific

### Subprogram 2: Integrated and sustainable agriculture, fisheries and forestry resource management and development

This subprogram aims at developing and implementing strategies to sustainably manage, use and value-add to natural resources associated with agriculture, forestry and fisheries production. These are often community-owned and publicly managed resources that require broad-based and inclusive management strategies, while at the same time recognising that forestry and fisheries provide significant sources of income. The fisheries project cluster has two focuses: freshwater aquaculture and mariculture of sedentary species, which provide greater opportunity for income generation at the local level; and management of near-shore artisanal fisheries.

<b>FIS/2005/108</b> Freshwater prawn aquaculture in the Pacific: improving culture stock quality and nutrition in Fiji
<b>FIS/2006/138</b> Developing aquaculture-based livelihoods in the Pacific island region and northern Australia (Fiji, Samoa, Solomon Islands, Tonga, Vanuatu)

*Continued on next page*

<b>FIS/2007/116</b> ( <i>multilateral</i> ) Improving resilience and adaptive capacity for fisheries-dependent communities in Solomon Islands (WorldFish)
<b>FIS/2009/057</b> ( <i>proposed</i> ) Support of pearl industry recovery in Tonga—mabe pearl production
<b>FIS/2009/063</b> ( <i>proposed</i> ) Pacific islands near-shore fisheries management and development
<b>HORT/2007/072</b> Postgraduate scholarship scheme for University of the South Pacific (Fiji, Samoa, Solomon Islands, Tonga, Vanuatu)

The sustainability of agricultural production (including that of basic food crops, high-value horticultural crops and tree crops) in the Pacific islands is threatened by the erosion of the natural resource base, especially through degradation of soils and invasion by exotic pests and weeds. Two projects currently address these issues:

<b>PC/2004/064</b> Biological control of 'mile-a-minute' ( <i>Mikania micrantha</i> ) in Papua New Guinea and Fiji
<b>PC/2009/003</b> Improving soil health in support of sustainable development in the Pacific

The forestry project cluster underpins the development of emerging industry opportunities, in particular plantation programs with teak, sandalwood, whitewood and *Flueggea*, while identifying processing opportunities for coconut wood and non-timber forest products:

<b>FST/2004/054</b> Improving value and marketability of coconut wood (Fiji, Samoa)
<b>FST/2005/089</b> Improved silvicultural management of <i>Endospermum medullosum</i> (whitewood) for enhanced plantation forestry outcomes in Vanuatu
<b>FST/2006/048</b> Improved processing, storage and packaging of <i>Canarium</i> nuts (PNG, Solomon Islands, Vanuatu)
<b>FST/2007/020</b> Improving silvicultural and economic outcomes from community teak and rosewood plantations in Solomon Islands by interplanting with <i>Flueggea flexuosa</i> and other Pacific agroforestry species
<b>FST/2008/010</b> Development and delivery of germplasm for sandalwood and whitewood in Vanuatu and northern Australia

### Subprogram 3: Underpinning the competitiveness of agriculture, fisheries and forestry value chains

This subprogram aims to support the identification and development of opportunities for domestic, inter-island and international trade for agricultural, fisheries and forest products, with a view to increasing economic growth in PICs. It potentially includes a range of regional and individual country-based activities including market research, strengthening of agribusiness linkages, analysing and increasing the efficiency of value chains, and identifying and developing value-

adding opportunities. There are two major emphases: first, underpinning of the European Union-funded Facilitating the Agricultural Trade program and providing R&D support for the PHAMA program currently being developed by AusAID; and second, providing capacity building in quarantine, biosecurity, market access and market development within the PICs.

<b>HORT/2007/072</b> Postgraduate scholarship scheme for University of the South Pacific (Fiji, Samoa, Solomon Islands, Tonga, Vanuatu)
<b>PC/2008/044</b> Pacific Agribusiness Research for Development Initiative

## Country-specific issues

Although many of the challenges for agriculture, forestry and fisheries are common to most Pacific nations, it is recognised that specific priorities may differ between countries. ACIAR will support targeted and mutually agreed single-country projects on major issues of concern. Where possible, these are linked closely with regional extension and community improvement programs to foster opportunities for dissemination of the information between countries. Priority areas for each of the PICs with which ACIAR cooperates are provided below.

### Fiji

Fiji's poverty level is comparatively low although rural-urban income inequality is an increasing problem. In recent years ACIAR's project emphasis has shifted from crop and livestock production to horticulture, aquaculture and agribusiness. There are potential opportunities for economic and technical research aimed at developing crop and agricultural industry alternatives to sugar and, in coordination with other government and donor initiatives, to underpin opportunities for regional and international export market development in crops such as papaya, root crops and ornamentals. Developments in promising horticultural crops, and accompanying postharvest technologies and marketing options, could also be explored. The tourism market remains buoyant, and supplying high-value products to this potentially lucrative domestic market could be especially promising. A major constraint in Fiji's horticulture sector is capacity building in R&D, and this is another potential area for engagement with ACIAR programs.

Opportunities for research to improve livelihoods in fisheries include: more-productive inland farming systems, aquatic health including quarantine and import risk assessment, restocking as a tool to rehabilitate sea cucumber fisheries, and improved feed formulations for freshwater finfish and *Macrobrachium* shrimps. Research



*A drip-irrigation training workshop in Solomon Islands*

is also needed on the opportunities for value-adding to marine fisheries products. Some options for forestry cooperation include timber use, value-adding to mahogany and native species, plantation management and health, and increasing the potential of indigenous forestry species.

### Solomon Islands

Opportunities exist for ACIAR to participate in activities designed to redevelop export industries such as oil palm and cocoa (which is currently receiving major support through AusAID's Cocoa Livelihoods Improvement program). Most Solomon Islanders live in isolated rural communities dependent on subsistence agriculture and intermittent crop and small livestock sales, although many also have access to more-lucrative urban markets that are developing strongly with the return of stability. ACIAR's Solomon Islands program has had a strong fisheries emphasis, including holistic community-based approaches to the management of vulnerable fish resources, and economic and technical research to support the development of sustainable livelihood opportunities based on the culture of coral reef animals. Income generation initiatives, particularly in rural areas, remain important in the broader scheme of economic and social recovery in Solomon Islands, and much of this will need to occur in the area of crops, forestry and fisheries. There are opportunities for smallholder farmers to exploit lucrative market niches for high-value horticultural crops, value-added products and other

diversified products, particularly in the developing urban markets. A particular focus has been fostering the engagement of women smallholder farmers in the production and marketing of vegetable crops and poultry. The development of integrated approaches to pest and disease management in horticultural crops has also been important, along with efforts to draw together capacity-building efforts in this area. Widespread community interest in the planting of teak offers a development opportunity. ACIAR will continue to develop further opportunities for specific linkages with other donor programs and with AusAID's Transitional Support for Agriculture program.

### Vanuatu

Vanuatu's agriculture sector, along with tourism, remains the major focus of the country's development strategy. The main activities relate to coconut, cattle, cocoa and timber production, along with traditional food production for subsistence and local markets. Smallholder farmers also cultivate peanuts, potatoes, vanilla and pepper. Although Vanuatu is an agricultural exporter, the majority of the population is in the subsistence or informal sector.

The Vanuatu Government is currently developing a holistic agricultural plan for the country that will give direction to future ACIAR cooperation in agriculture and fisheries. For the current planning period the focus of ACIAR activities in Vanuatu will be in forestry. Forest



*Vaeno Vigulu (John Allwright Fellowship PhD candidate) at the mixed-species spacing trial at Ringii Scientific Area on Kolombangara Island, Western province, Solomon Islands, with ACIAR CEO Dr Nick Austin*

covers almost 40% of the total land area of the country; hence, policy and technical interventions for sustainable management of plantations and development of new species of commercial value for both plantation and smallholder farmers are important. In forestry, assistance is needed in relation to assessing commercial prospects for native species, including sandalwood and whitewood. The current high price of cocoa in world markets offers an opportunity to address supply-chain issues for this commodity through a newly launched ACIAR project.

### Samoa

Samoa has recently had comparatively strong economic growth across a range of sectors, including agriculture. There has been a strong emphasis in the ACIAR program on insect pest management (fruit flies, fruit-piercing moth, whitefly, aphids and lepidopteran pests of brassicas), virus indexing of taro and biological control of pests and weeds. Projects undertaken have studied forest nutrition and health as well as fisheries.

Samoa has expertise in germplasm selection of root crops and fruits, and in techniques of tissue culture propagation. Research opportunities include those that underpin the development of high-value horticultural products for both export and domestic markets,

including import substitution in the lucrative tourism sector, as called for in the recently released national fruit and vegetable strategy. This may require research to identify and alleviate supply-chain constraints, and to develop simple options for processing and adding value to tree and root crops. Research to assist improvements in niche marketing of commodities, potentially including organic produce, is of importance. This may include identification of alternative extension and information transfer technologies. In forestry, research opportunities may exist in: policy incentives for establishment of woodlots; nursery management techniques; forest weeds, pests and diseases; and better use of timbers. In fisheries, opportunities may include research on community-based approaches to the management of reef fisheries and technical interventions to underpin the development of village aquaculture industries.

### Tonga

Factors affecting agricultural development include geographical isolation, fluctuations in export markets for Tongan produce, a limited natural resources base and governance structures. Tonga has high natural disaster susceptibility, which limits income-generating opportunities, and relatively high youth unemployment. Opportunities exist for increased income generation

through the development of products for the local market and the exploitation of market niches.

For crop-related research, future support is likely to be in the areas of diversification, improved productivity, reduction in input costs and postharvest quality improvement. There is a current emphasis on farming systems, and development of markets (local and inter-island) is an ongoing challenge. Areas of research emphasis in Tonga include diversifying the options for, and increasing the productivity of, fruits, root crops and vegetables; introduction of new crops such as coffee and spices; and development of capacity in postharvest technology. Development of agroforestry-based farming systems (including tree legumes and fruit trees) is a priority in forestry since plantation resources are modest. Tuna is the main fishery export from Tonga and, together with snapper and aquarium fish, is a major export income source. Tonga has a particular advantage in the production of half-pearls from the winged oyster as, within the Pacific islands, this species is found only in Tonga (having been introduced there in the 1970s from Japan).

### Kiribati

Kiribati is one of the poorest PICs and faces problems in maintaining food security and optimum dietary balance. This is due to poor soils for agricultural production on the coral atolls and the adverse effects of climate change. A relative scarcity of arable land, poor soil fertility, lack of water for irrigation, soil salinisation, and contamination of groundwater with salt and other pollutants are major constraints to agricultural production. To assist in addressing these issues of food security and nutrition, and to provide market opportunities, the SPC and the International Fund for Agricultural Development (IFAD) are establishing a centre for atoll agriculture on Kiribati. ACIAR will develop targeted projects to support the activities of this centre, particularly where Australian and CGIAR centre expertise can add value.

## Key performance indicators (2010–11)

- » Pilot sites established in at least two countries for evaluating and promoting strategies to improve soil health
- » Integrated management packages for vegetable crops being used commercially in at least three Pacific island countries
- » New market-driven product opportunities (in high-value agriculture, fisheries and forestry sectors) identified, and PARDI addressing constraints in at least four supply chains
- » New work commenced on product development and marketing of at least two new forestry-related products
- » Increased capability to supply high-performing seedstock to support expansion of at least two aquaculture industries in the Pacific region

## Key program managers

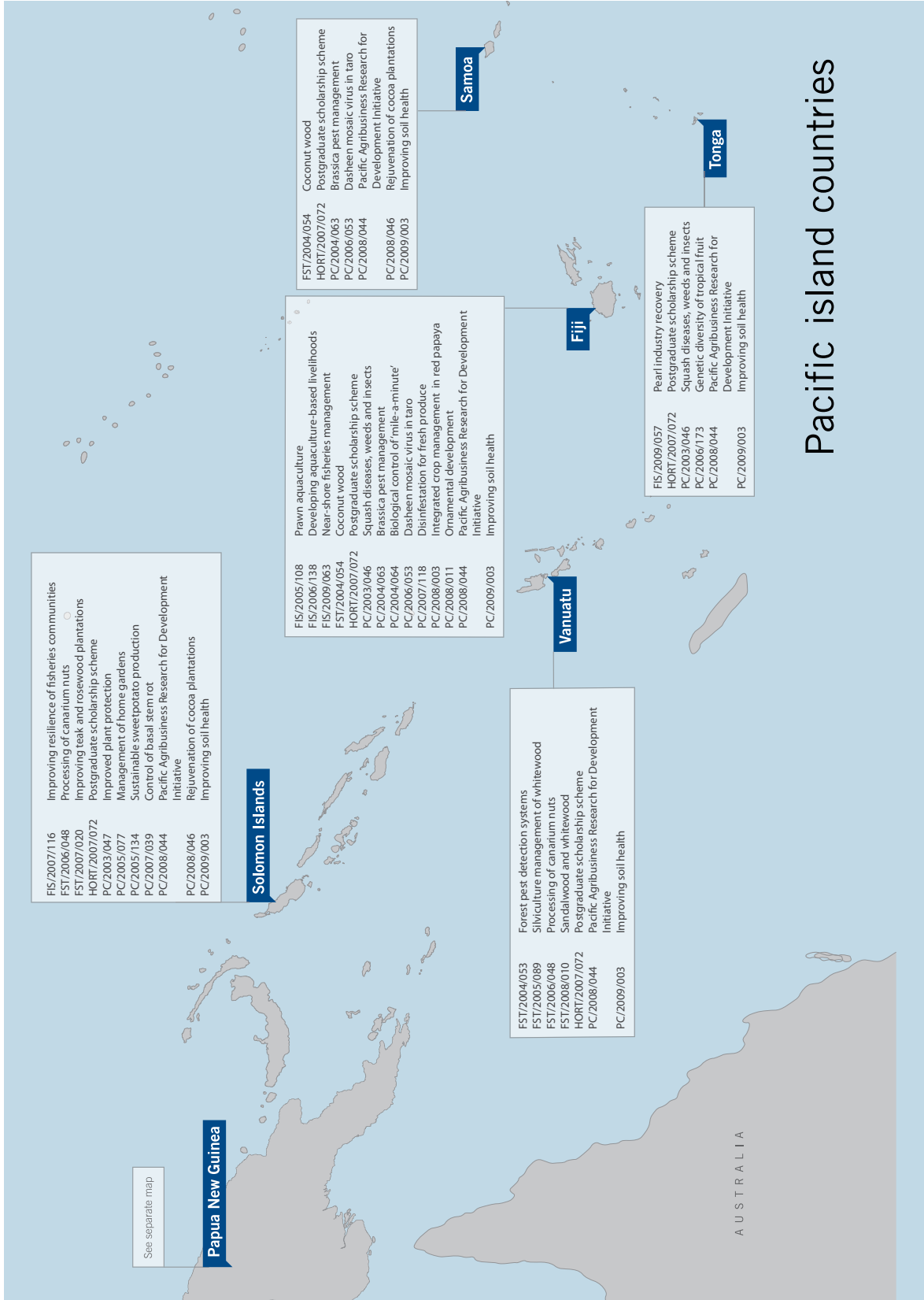
Dr Chris Barlow, Fisheries

TBA, Forestry

Mr Les Baxter, Horticulture

Dr Richard Markham, Pacific Crops

Mr David Shearer, Agribusiness



# Pacific island countries