

# ACIAR–DFAT PNG Economic Development Program and Bougainville Agriculture Program

Transformative Agriculture  
and Enterprise Development Program

**Annual Report**  
1 July 2016 – 30 June 2017

DEVELOPMENT



Australian Government  
Australian Centre for  
International Agricultural Research



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## Glossary

ABG	Autonomous Bougainville Government
ACIAR	Australian Centre for International Agricultural Research
ARB	Autonomous Region of Bougainville
BU	Baptist Union
CCI	Cocoa Coconut Institute
CDW	Community Development Worker
CPB	Cocoa pod borer
CMFT	Cocoa model farmer-trainers
CUG	Closed User Group
DAL	Department of Agriculture and Livestock
DFAT	Department of Foreign Affairs and Trade
DPI	Department of Primary Industries
FPDA	Fresh Produce Development Agency
IFAD	International Fund for Agricultural Development
LAMP	Loop-Mediated Isothermal Amplification
MAD	Mobile Acquired Data
MDG	Millennium Development Goal
MFAT	New Zealand Ministry of Foreign Affairs and Trade
MTDP2	Medium Term Development Plan 2
M&E	Monitoring and Evaluation
NARI	National Agricultural Research Institute
NATTB	National Apprenticeships and Trade Testing Board
PAU	Pacific Adventist University
PMV	Public Motor Vehicle
PPAP	Productive Partnerships in Agriculture Project
PT	pathogen tested
R4D	Research for Development
SME	small medium enterprises
SRA	Small Research Activity
TADEP	Transformative Agriculture and Enterprise Development Program
TEAM	Technology Evaluation and Marketing
UC	University of Canberra
VCE	village community educators
VEW	village extension worker
VfC	Voice for Change
VRC	Village Resource Centre

## Executive Summary

The Transformative Agriculture and Enterprise Development Program (TADEP) is a multidisciplinary research program that aims to improve the livelihoods of rural men and women in Papua New Guinea through five component research projects. TADEP is co-funded by the Department of Foreign Affairs and Trade (DFAT) and the Australian Centre for Agricultural Research (ACIAR). This Annual Report summarises activities and progress in the period from 1 July 2016 to 30 June 2017.

Since inception of the program, the following five projects have commenced and are at varying stages of implementation:

- ASEM/2014/095 Improving opportunities for economic development for women smallholders in rural Papua New Guinea (Family Farm Teams)
- FST/2014/099 Enhancing private sector-led development of the Canarium industry in Papua New Guinea (Galip Nut)
- HORT/2014/094 Developing the Cocoa value chain in Bougainville (Bougainville Cocoa)
- HORT/2014/096 Enterprise-driven transformation of family Cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea (PNG Cocoa)
- HORT/2014/097 Supporting commercial Sweetpotato production and marketing in the Papua New Guinea highlands (Sweetpotato)

Representatives from each of the component projects attended the Inception Meeting in April 2015 and TADEP Annual Meetings in May 2016 and June 2017. All of these events have demonstrated the projects' willingness and commitment to cooperate and collaborate to realise the overall program goal. Given the varying project length and stages of implementation, each project is progressing through the delivery of research activities and early outputs, working towards the longer term outcomes and impacts, as illustrated in the performance framework. The progress made within each of these projects is detailed in this report.

The two key focus areas of TADEP is enterprise development and women's economic empowerment, aligning strongly to both the Australian and PNG government priorities. Despite the program still being in relatively early stages of implementation, there have been notable achievements in each area by each project, including:

1. Galip Nut has been retailing in commercial outlets in East New Britain and given its success, further interest has been generated with RH Trading, Paradise Foods and FoodWorld to explore other market and investment opportunities.
2. Two successful Bougainville Chocolate Festivals in July 2016 and September 2017 of which the Bougainville Cocoa project team have invested significant time and resources. Whilst the latter was hosted outside the timeframe of this reporting period, much of the organisation was concentrated within. Business relationships catalysed at the 2016 event have progressed so much so that a number of brands have developed chocolate from cocoa grown by Bougainvillean cocoa farmers involved in the project, some of which have been awarded international accolades.

3. CMFTs have been trained and established in more than 20 villages in each province, each linked to a farmer group consisting of 25 farmers. The scalable model requires CMFTs to co-invest in budwood gardens and nurseries to propagate their clones for farmers within their and outside of their allocated groups.
4. The spontaneous involvement of women in the CMFT groups, to the extent that most CMFTs are in fact husband/wife teams, has shown the enthusiasm and determination of women to be more fully involved in cocoa farming.

The success of TADEP as a program will be judged in part by (i) the extent to which it delivers value beyond the sum of the component projects and (ii) the extent to which the projects contribute to the overall TADEP performance indicators. To oversee these functions as well as provide program-level logistics and communications, a part-time program coordinator was recruited. The program coordinator has, in particular, led the development and implementation of a coherent program logic, performance framework and communications plan, drawing together the projects into a common understanding of the program objectives, performance indicators and their contributions to these. The performance framework is reported in this document. It has been developed in consultation with DFAT, ACIAR and key program stakeholders and will continue to be an adaptive document as the program progresses and evolves. It is anticipated that research outcomes and impacts will begin to emerge mid-way through TADEP and by year five, the projects will be providing comprehensive evidence of development impacts.

One indicator of success of a program model like TADEP is strong functional collaboration between the component projects, such as:

1. The adoption of the Family Farm Teams approach in the PNG Cocoa project's CMFT farmer training.
2. Collaboration of the Bougainville Cocoa and PNG Cocoa project teams with an ACIAR soils project in PNG.
3. The utilisation of Closer User Groups across the program.
4. The adoption and rollout of CommCare as a tool for collecting and collating digital data.

The program coordinator will continue to seek similar ways in which targeted funding and support to the projects will add value to the TADEP program.

## 1. Background

Despite the robust economic growth Papua New Guinea has experienced in the past decade, the nation's social indicators remain among the most challenging in the Asia Pacific region. High international prices for PNG's mining and agricultural exports boosted economic growth and increased government spending and expenditures. However, as public debt has increased and international commodity prices have declined, this inflated prosperity has failed to translate into equitable development for Papua New Guineans.

Over 80 per cent of PNG's population are rural-based subsistence smallholder farmers. Enhancing the livelihoods of rural men and women in PNG will enable the nation to reduce poverty and promote sustainable economic development. Increasing agricultural productivity and supply-chain efficiency for both domestic and export commodities is essential to promote economic growth in the rural sector.

Key components of Australia's involvement with the agriculture sector in PNG are the ACIAR – Department of Foreign Affairs and Trade (DFAT) economic development program and Bougainville agriculture program, in which DFAT and ACIAR co-invest. The program—Transformative Agriculture and Enterprise Development Program (TADEP)—has five impact-focused research for development (R4D) projects centred on enabling economic development opportunities. The program focuses on opportunities to scale up successful innovations from previous ACIAR projects, with impetus provided by private-sector involvement, over larger areas and for more people. This will achieve economic benefits, especially increased employment and incomes in rural areas, and enhanced rural–urban supply chains. It works in the sectors of greatest benefit to rural communities, and has a particular focus on the empowerment of women and commodities that can be brought to market.

In line with the increased emphasis on gender and youth in both Australian and PNG government policies, and because of the experience in many commodity projects of male-dominated farmers' groups, new skills are needed to engage with men, women and youth in communities, to support and build their contribution to their families and their community. One of the five TADEP projects focuses specifically on empowering women and rural families to engage in a range of agriculture-based economic activities and acts as a source of ideas and approaches for the other projects.

Commencing in April 2015, the multidisciplinary research Program aims “to improve livelihoods of rural men and women in Papua New Guinea”. To achieve this, the five multidisciplinary adaptive research projects are addressing the following Program level objectives:

- To stimulate and strengthen inclusive private sector-led development in agriculture
- To sustainably increase agricultural productivity, quality and value
- To improve access to markets and strengthening value chains
- To promote gender equity and women's empowerment in rural communities
- To build individual and institutional capacity

The projects are:

- ASEM/2014/095 Improving opportunities for economic development for women smallholders in rural Papua New Guinea (Family Farm Teams)
- FST/2014/099 Enhancing private sector-led development of the Canarium industry in Papua New Guinea (Galip Nut)
- HORT/2014/094 Developing the Cocoa value chain in Bougainville (Bougainville Cocoa)
- HORT/2014/096 Enterprise-driven transformation of family Cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea (PNG Cocoa)
- HORT/2014/097 Supporting commercial Sweetpotato production and marketing in the Papua New Guinea highlands (Sweetpotato)

The purpose of this report is to provide an update on progress towards project and Program level objectives for the period July 2016 to June 2017.

## 2. Relevance of the Program

Poverty is a significant issue for all Papua New Guinea's provinces, including the Autonomous Region of Bougainville, with over 80% of the nation's population being rural-based subsistence smallholder farmers. Enhancing the lives of rural people and promoting stability in PNG are central to Australia's interests. In response, there is a strong focus in Australia's development cooperation programs on economic development as a pathway out of poverty and on empowering women and girls. These objectives are reflected in the PNG development priorities articulated by both the PNG and Australian governments.

In 2015, the PNG Government released its Medium Term Development Plan 2 (MTDP2), 2016–2017, which describes the intentions, priorities and activities towards achieving its 'Vision 2050' aspirational long-term strategy. The National Agriculture Development Plan also aligns with Vision 2050 and MTDP2, and aims to enhance agricultural productivity, scale of production, market access and income generation through smart partnerships and innovative, sustainable and entrepreneurial farming systems and agro-industry. Australian assistance aims to complement, not substitute for, PNG's own investment in priority areas.

In line with the PNG Government strategy, the five projects within TADEP collectively aim to foster private sector-led development in agriculture, increase agricultural productive capacity and improve access to markets for farmers, particularly women farmers.

### 3. Summary of Program developments

The **2017 TADEP Annual Meeting** was held in Cairns on Tuesday 20 and Wednesday 21 June and welcomed 55 attendees from across Papua New Guinea and Australia. There was representation from each of the five TADEP component programs including all Project Leaders, our key partner organisations in PNG, three ACIAR Research Program Managers as well as Peter Horne and Maree Livermore from the ACIAR Country Programs team, two of DFAT colleagues from Port Moresby and Canberra, four of the MAD4TADEP NARI CommCare certified staff, researchers from other linked ACIAR projects, local businesses from the chocolate industry and a farmer involved first-hand in the Bougainville cocoa project.

The TADEP Annual Meeting reconfirmed the willingness of TADEP projects to cooperate and develop functional cross-project collaboration. The meeting identified a broad interest in building the capacity of project teams to capture stories of impact and it was agreed that the program should facilitate relevant training and ultimately short videos demonstrating the impacts of each of the projects.

Since February 2016, Elizabeth Brennan was contracted as a **part time Program Coordinator** (2 days/week) to coordinate TADEP. The initial contract expired and in November was advertised through the appropriate AusTender process. Elizabeth was awarded the contract and was officially offered the part-time Program Coordinator contract in February 2017 until December 2020. This role provides coherent communication between the projects and throughout the program, and facilitates opportunities for value-adding to the projects, ensuring that the program 'is greater than the sum of its parts'. Elizabeth works closely with DFAT and ACIAR in country and in Canberra to ensure that the program achieves its overall goal.

**Monthly Updates** that provide information on progress and plans of the projects and the program are being delivered to all relevant stakeholders. These form part of a broader **Communications Plan**, which identifies specific target audiences and channels, with relevant outputs assigned to each. All projects have produced a **Project Information Sheet** which provides key information about project activities in a format that is suitable for a general audience (included in Annexe I).

As identified in the 2016 Annual Meeting, two of the TADEP projects had been utilising Closed User Groups (CUGs) which allow a predetermined group of people to make and receive unlimited calls within that group. A program-wide CUG was established after the Annual Meeting and is being well-utilised by each of the five projects for communication within the projects and across the program.

A key focus of the TADEP work plan this year has been the rollout of **MAD4TADEP**, a small research activity seeking to understand whether the adoption of CommCare by individual projects within TADEP add value to both the projects and the program. The small research activity included one-on-one support to each of the projects to adopt Commcare, an evaluative process to answer the research questions, showcasing at the 2017 TADEP Annual Meeting, building institutional capacity in NARI as a key program partner and the production of a video illustrating the lessons learnt from the small research activity.



## 4. Engagement with the private sector

Enterprise development will be key for the research impacts of the projects and program to sustainably improve rural livelihoods in PNG. Whilst it is understood that close involvement of the private sector is critical to improving farmers' access to and understanding of markets, the process for private sector engagement can seem complex and is often foreign to traditional research projects. Understanding the motivations of the private sector to invest in a project and involving them early on the project helps manage expectations, create trust and foster positive working relationships. Each of the five TADEP projects have engaged with the private sector at varying capacities and this will continue to be a focus for each of the project teams.

The Family Farm Teams project has brokered training with Nationwide Microbank, FPDA and the PNG University of Technology to support the business and agricultural development of the VCEs and their families was completed in the highlands. The project has also piloted a professional development module in partnership with the Education School of Pacific Adventist University for primary school teachers to enable them to teach agricultural development content. As part of the Family Farm Teams modules, a written farm plan is developed to enable families to plan their cash crop production and improvements to ensure diversified production. From this, a range of small-medium enterprises are starting to be developed by farmers, both men and women.

In the first year of the Galip Nut project, the biggest barrier for smallholder farmers was uncertainty of investment given the overwhelming alternatives for their farming systems. As these initial barriers were overcome through proactive private sector engagement, issues arising now relate to inconsistent supply, factory capacity, increased demand, time management for smallholder farmers,

packaging issues for consumers and how to engage youth. The nature of the challenges indicates how the project has overcome and progressed productive capacity, whilst simultaneously developing private sector partnerships and markets for the product.

The numbers of smallholder farmers selling galip to the factory as a result of the increased factory capacity more than doubled in 2016 and around 650 farmers are now participating the emerging industry. There are multiple avenues that the private sector is being engaged and fostered in the Galip Nut project from the development of a solar drier, food safety and canarium nut processing training packages to the ENB Women and Youth in Agriculture and other female entrepreneurs, to discussions with potential partners such as RH Trading, Paradise Foods and FoodWorld. Other donors such as IFAD and MFAT are also interested in investing in galip processing to seed public private partnerships.



The Inaugural, annual Bougainville Chocolate Festival was held in Buin and Arawa in July 2016. The Festival showcased new cocoa planting materials and technology, engaged a range of stakeholders, and was a valuable exercise in community building. The centrepiece of the Festival was the Chocolate Competition, with six gold medals awarded to growers by Australian judges, who gave a well-attended feedback seminar to growers. As a direct consequence of this judging, trial shipments of beans have been sent to chocolate makers in Australia, with one chocolate winning a Gold award at the June 2017 Academy of Chocolate World Championships in London, plus another four medals at the International Chocolate Awards in New York.



As the largest company in the PNG cocoa industry, NGIP continues to provide strong support to the PNG Cocoa project through the provision of resources and development of ideas. Their industry knowledge and networks has been critical to the practical development and implementation of the project. Another key component of the project is the embedded enterprise development model through the CMFTs. So far, CMFTs have been trained and established in more than 20 villages in each province, each linked to a farmer group consisting of 25 farmers. The scalable model requires CMFTs to co-invest in budwood gardens and nurseries to propagate their clones for farmers within their and outside of their allocated groups. One CMFT is already functioning as a commercial nursery, one village nursery is selling clones and another has a mature budwood garden ready to support a commercial nursery.

The FPDA team used CommCare to conduct interviews with 88 commercial growers and traders of sweetpotato in the Asaro, Minj, Hagen Central and Mul regions, to generate an accurate value chains map. Engagement with the private sector will be critical to identify and understand the value chains research activities and the required project training support.

## 5. Increasing women's economic empowerment

Women farmers not only play a significant role in the agricultural industry in PNG but are also key to PNG family livelihoods. The role is often concentrated in early stages of production and they rarely participate in marketing and financial decision making. In addition, women often face significant constraints that further gender inequity such as including low literacy, limited access to resources, limited access to finance, lack of understanding and access to markets, primary responsibility and burden for household labour, restrictions to mobility, and overall safety issues. Earlier research has shown that to promote gender equity and increase women's economic empowerment, an understanding of the different roles and input of women and men along the value chain and appropriate training needs to be embedded in the family and community.

The TADEP Family Farm Teams project seeks to scale out the family farm teams approach across a broader range of commodities and geographies including the highlands and islands, as well as across other TADEP projects. The premise of the approach is to engage with women, men and the entire family to work in a more equitable and effective way to improve their livelihoods. By actively recognising the unique roles that each play within the family and integrating inclusive learning approaches into the training modules, the ability of women involved to access training and resources, with support and assistance from their husbands and families, has improved significantly.

Given the geographical dispersion of the research sites, the Family Farm Teams project was engaged with the PNG Cocoa project in New Ireland to value add to the CMFT training already being undertaken in the project. For a number of reasons there was a bias toward male farmers in selection of the CMFT farmers but with the introduction of the family farm teams approach, many CMFTs are working more closely with their wives and families, exceeding the expectations of project progress and whole-of-family cooperation. The spontaneous involvement of women in the CMFT groups, to the extent that most CMFTs are in fact husband/wife teams, has shown the enthusiasm and determination of women to be more fully involved in cocoa farming. Furthermore, one of the senior CCI research staff, Dr Josephine Saul-Maora, has taken up the extra task of promoting the involvement of women in cocoa farming and processing, and has been working with Family Farm Teams in New Ireland to this end.

The Galip Nut project held a training day in Kerevat in September 2016, targeting women who are actively engaged in the selling of Galip nuts from the Kokopo, Rabaul, Kerevat and roadside markets. The workshop was well attended and received by 25 participants on the day with many others expressing interest in attending, though could not afford to miss a day of sales from their markets. This was the first in a series of these style events planned in the area with the intention of engaging a broad range of smallholders and small scale entrepreneurs working within the Galip industry. A second workshop was hosted in November 2016 for female entrepreneurs in Kokopo. Local business owner, Votausi Mackenzie-Reur, described her vision for Lapita café and their growth over the past 10 years. She highlighted challenges and how they overcame them, how she targeted her marketing particularly towards the tourism sector and explained how the PNG government's promotion of tourism in East New Britain province is providing opportunities for suitcase exports. The importance of hygiene and adhering to government food regulations to ensure a safe product for consumers was emphasised.

## 6. Project Updates



### **ASEM/2014/095 Family Farm Teams**

#### **Improving opportunities for economic development for women smallholders in rural Papua New Guinea**

##### **Background**

This project aims to improve the lives and economic security of women smallholder farmers in PNG. Women farmers are key to PNG family livelihoods. They produce essential subsistence crops whilst undertaking valued social roles in the community and provide the majority of family care. However, women farmers face significant agricultural constraints including low literacy, limited access to productive resources, low banking rates, limited financial skills, lack of understanding and access to markets, unequal gendered family roles and division of labour, gender based violence, and mobility restrictions. Although most women aspire to improve their family livelihoods, very few women farmers have the necessary agricultural and business acumen.

A previous ACIAR project (ASEM/2010/052) demonstrated that a whole of family approach to farmer learning has enabled farming families to work in a more equitable and effective way to improve their livelihoods. The family farm teams approach integrates family farm teams modules, banking and saving training and agricultural planning techniques as well as the training of peer village community educators (VCEs). This project now seeks to understand the effectiveness of the approach at scale and across a broader range of commodities and geographies.

##### **Progress summary**

###### ***Highlands Hub***

The first half of the report year focused on the Highlands Hub scale-out. Partners and locations were:

- National Agricultural Research Institute (country leader)
- Baptist Union (BU) (Western Highlands - Alona ward, Mul-Baiyer district)
- Fresh Produce Development Agency (FPDA) (Eastern Highlands - Goroka and Daulo districts)
- Voice for Change (VfC) (Jiwaka - North Waghi, South Waghi and Anglimp districts)

Local women and men were trained as Village Community Educators (VCEs). These farmers were trained in four Family Farm Teams modules:

- Working as a family farm team for family goals
- Planning your family farm as a family team
- Feeding your family farm team
- Communicating and decision-making as a family team

Module 3 “Feeding your family team” was developed as a response to the drought in the Alona ward and further developed in the Eastern Highlands and Jiwaka sites.

Women’s leadership teams were formed and supported in all three areas. These teams supported the VCEs as they rolled out the modules to other farming families. A range of brokered training to support the business and agricultural development of the VCEs and their families was also conducted. The VCEs trained a total of 896 other farmers.

The end-line study was completed in all three areas. This involved the end-line livelihood survey, plus surveys with farmers who were trained by the VCEs and capacity development surveys with VCEs and women leaders. This was supplemented by participatory workshops with women leaders, VCEs and farmers, and one-to-one interviews. The data is currently under analysis.

### ***Islands Hub***

The second half of the report year focused on the Islands Hub scale-out. Work began in late November, 2016, with the identification of project partners, sites and target groups. Two staff members have been employed in each site.

- Autonomous Region of Bougainville - Bougainville Women’s Federation, Halia constituency, with a focus on widows.
- New Ireland - Department of Primary Industries, Tikana Local Level Government Ward 7 (Manggai/Loosuk/Livitua) and Ward 11 (Luaupul), linking to the Cocoa Model Farmer Trainers from TADEP PNG Cocoa project

The baseline study and ethics permission process was conducted in March 2017 in all sites: baseline livelihood surveys with women and men; community leaders focus group, community members focus group, community learning plan workshop, key informant interviews, and farm observations.

The first brokered training was conducted by the University of Natural Resources and Environment’s Integrated Agricultural Training Program (Sustainable livelihoods: Record and book-keeping) in all three sites. Nationwide Microbank training was conducted in Halia.

The training for VCEs in Module 1 *Working as a Family farm team for family goals* was conducted in June 2017. VCEs are rolling out the training to their families, extended families and wantok and are planning their roll-out to local groups such as churches.

### ***Other research activities***

Two University of Technology Masters students research projects are in progress.

- Elizabeth Owa Innovations adopted by women and their impact on their family livelihoods in selected villages in the highlands of Papua New Guinea (to be submitted December 2017)
- William Nano Performance and impact evaluation of peer education learning in animal production for women in selected rural areas in the Highlands of Papua New Guinea (to be submitted July 2018)



Pacific Adventist University (Business School) has completed the piloting of a business literacy project for illiterate women farmers in two Central Province sites and in the Eastern Highlands (in partnership with CARE). The development of a manual is in progress.

A research partnership project between UC and CARE began in August 2016 and will be completed by the end of 2017. As both UC and CARE have been developing a family teams approach in the training and development of women smallholders and their families, this research seeks to understand more about the enablers and barriers for women as families move towards a more 'family teams' approach. The methodology is ripple effect mapping. The research sites are where the CARE Family Business and the UC Family Teams work have already been conducted. The overall aim of the research is to identify what are the key factors required for the 'family teams' model to become a sustainable and scalable approach to development in PNG. The farmers' uptake and use of 'family teams' concepts will also inform the further refinement of project materials

The Mid-Term Review was held in Mount Hagen on 28- 29 November 2016.

### **Achievements against project objectives:**

#### ***Objective 1: To examine the capacity development of women as community-based agricultural leaders***

Women's leadership teams were formed and supported in all three highlands areas. Each woman leader was responsible for supporting a team of six VCEs in the delivery of the peer education. The leadership program used strengths-based training that helped the women recognise their existing skills and the leadership roles they already have in the community and identified other possible leadership pathways. Women leaders were also trained in project planning and management skills, communication and monitoring and evaluation.

- Eastern Highlands: 6 women, plus 1 staff member
- Jiwaka: 7 women, plus 2 staff members
- Western Highlands: 7 women plus 1 staff member

In the Eastern and Western Highlands, it became apparent that there needed to be some male leaders in order for the women to gain credibility in the community. Seven male leaders in Western Highlands and six in the Eastern Highlands agreed to become project community leaders and work as a support to the women leaders.

***Objective 2: To explore ways in which communities can develop partnerships with the private sector, schools and training providers that are relevant to the local context and culture***

A range of brokered training to support the business and agricultural development of the VCEs and their families was completed in the highlands.

- Nationwide Microbank - Budgeting, banking and saving, plus the training of two selected VCEs per area as mobile phone bank agents (all three areas)
- FPDA - Bulb onion and cabbage commercial production model farm (Eastern and Western Highlands)
- PNG University of Technology - poultry production (Jiwaka)

The piloting of a professional development module for primary school teachers to enable them to teach agricultural development content has been completed in partnership with the Education School of Pacific Adventist University. The module materials are now being designed for distribution to teachers using videos as well as written materials. This will be trialled in East New Britain, Central Province and Bougainville using an SD card format.

***Objective 3: To further develop the peer education model of agricultural extension***

Teams of VCEs were trained as peer educators in the three highland areas. Three models of VCE teams were trialled: female only, females with male leader support, female and male teams. The numbers of VCEs who received Certificates of Completion in recognition for their training in and delivery of the Family Farm Team modules to local families were:

- Eastern Highlands: 14 F, 2 M
- Jiwaka: 19 F, 14 M
- Western Highlands: 36 F, 7 M

VCEs who did not reach the required standard received a Certificate of Participation. The VCEs trained a total of 896 other farmers

***Objective 4: To examine the uptake and impact of a family team approach to farming for women and girls***

The Family Farm Team modules were further refined with a focus on women and men with low literacy and a visual workbook process is being piloted. Module 3 “Feeding your family team” was developed as a response to the drought in the Alona ward and was trialled in the Eastern Highlands and Jiwaka sites.

## Publications

Gwahirisa, P. Pamphilon, B and Mikhailovich, K (2017) Coping with drought in rural Papua New Guinea: a Western Highlands case study, *Ecology of Food and Nutrition* DOI: 10.1080/03670244.2017.1352504

Pamphilon, B and Mikhailovich, K (2017) Bringing together learning from two worlds: Lessons from a gender-inclusive community education approach with smallholder farmers in Papua New Guinea, *Australian Journal of Adult Learning*, vol 57, no. 2, pp. 7–32

Pamphilon B., Mikhailovich K. and Gwahirisa P. 2017. The PNG Family Farm Teams Manual. ACIAR Monograph No. 199. Australian Centre for International Agricultural Research: Canberra. 84 pp.

Pamphilon B., 2017. The farmer-to-farmer adult learning manual: a process and resources for the development of farmers as peer educators. ACIAR Monograph No. 198. Australian Centre for International Agricultural Research: Canberra.

Simoncini, K, Pamphilon, B and Mikhailovich, K (2017) Place-based picture books as an adult learning tool: supporting agricultural learning in Papua New Guinea, *Adult Learning*, vol 28, no 2 pp. 61–68

Pamphilon B. and Mikhailovich K. (2016,). Building gender equity through a family teams approach: a program to support the economic development of women smallholder farmers and their families in Papua New Guinea. ACIAR Monograph No. 194. Australian Centre for International Agricultural Research: Canberra

## Upcoming

Final project work in the Highlands Hub is in progress across 2017.

- Voice For Change: trailing further training for four VCEs who will further extend the project reach to six more communities and become Family Farm Teams Community Extension Workers as specialists within the Voice for Change Community Extension Worker team.
- Partnership with the TADEP sweetpotato project to train families in clean seed processes and market opportunities of sweet potato (all three areas). This will enable a comparison of the engagement of women in communities that have had Family Farm Teams training and those that have not. This will also enable an assessment of the Family Farm Teams training as a preliminary activity to specific technology training.
- Baptist Union: development of a food crop demonstration garden at Kwinkya Women's Resource Centre to be led by VCEs from ASEM/2010/052 for the VCEs and communities of ASEM/2014/095. This site will also be used as part of HORT/2014/096.

Further research is planned in the following areas:

- The role and development of farmers as peer educators.
- The coherency of the Family Farm Team principles and the theology of gender equality
- The design and impact of training materials for low literacy multi-lingual environments
- Visual storytelling as an educational tool
- Women as grass-roots leaders in the agricultural sector
- Ripple effect mapping as an impact evaluation tool





## **FST/2014/099 Galip Nut**

### **Enhancing private sector-led development of the canarium industry in PNG**

#### **Background**

This project seeks to increase commercial processing and expand markets for canarium nuts in East New Britain, Papua New Guinea. This project includes a range of interventions to reach this goal including market research, technical advice, capacity building, business mentoring and access to infrastructure for both private and public sector stakeholders.

#### **Achievements against project objectives:**

##### ***Objective 1: Assess the needs of the private sector to participate in the canarium industry***

Most activities relating to objective 1 were completed in the first year of the project. In brief,

- Baseline data has been collected and small scale surveys of smallholder tree planting, survival and bearing have been undertaken.
- Informal interviews with smallholders and young people, market stall holders, industry representatives and government staff have been conducted. Key barriers to scaling up the sale and processing of canarium nuts are that smallholders remain unsure of investing given the range of agricultural options, and they remain unaware of the supply chains.

Year 2 themes on key barriers for smallholder women to scaling up the sale and processing of Canarium nuts are:

- Women remain unsure of how to sell to the NARI factory as there are inconsistent buying practices.
- Current capacity of the pilot factory limits a wider community engagement, and more smallholders could be engaged when the factory has greater capacity to process large volumes.
- Women have variations in the amount of time they can devote to local market, wholesale products and tourist products especially when transport is limited and they have other livelihood commitments.
- Tourists are currently advised not to purchase fresh nut in testa (wrapped in a banana leaf) and smallholders require packaging/processing standards to meet this market.

Year 2 themes on key barriers for small scale entrepreneurs are:

- Small scale entrepreneurs need to improve processing, packaging and labelling
- Small scale entrepreneurs need training on processing and marketing
- Female smallholders continue to emphasize training for younger generations

***Objective 2: Develop and undertake research-based interventions that address the needs of the private sector at all scales***

The project team developed a solar drier, food safety and canarium nut processing training packages to the ENB Women and Youth in Agriculture and other female entrepreneurs.

This includes:

- Cracking, drying, processing, packaging, labelling for 25 small-scale entrepreneurs (already engaged in the marketing and sale of galip).
- Mechanical crackers were demonstrated to several hundred people at the World Environment Day event, NARI, Tinanagalip and Vunamarita training days
- Solar drying training was conducted for 37 female smallholders and small scale entrepreneurs at two training events (one a remote community without power).
- Food safety, health and hygiene training was delivered by a local trainer to 50 female smallholders and small-scale entrepreneurs over three training days.
- Training on packaging to increase the shelf life of galip and other produce was delivered to over 50 female smallholders and small scale entrepreneurs.

Three small-scale entrepreneurs were mentored to source raw materials locally and improve processing, packaging and labelling. Local suppliers of packaging, printing and a label designer are now working with these women who have labelled product this season (2017). Fifteen participants requested further support in building their capacity to engage in local markets. We have been working intensively with two women in particular whom demonstrated a committed interest in introducing some of these technologies into their current practices and are currently in the process of value adding by further processing the galip nut (drying, roasting, salting, flavouring), packaging in plastic packets, developing labels and marketing innovations.

A factory standard operating procedures manual was developed and produced for SMEs to train staff in procedures for high quality canarium products. Minimum standards for raw blanched and roasted galip nut have been developed. A food safety booklet was created targeting female entrepreneurs in the market.

***Objective 3: Develop an appropriate commercial model for a medium scale value adding factory for the canarium industry***

The project team has greatly upscaled factory production from less than 1 tonne of raw material (nut in pulp) since the start of the project in 2014 to 25 tonnes of nut in pulp purchased and processed in 2016. We have developed and refined methods for processing canarium and the factory has produced a range of products including raw and roasted kernel and oil. The pilot factory sold galip nuts commercially for the first time in 2015. Sales of canarium nut product to commercial retail outlets is a first for PNG. These products are sold into formal markets in East New Britain and sell for PGK86 per kg. Market testing by the team has proven sales demand exceeding supply and products are out of stock awaiting the new season.

The numbers of smallholder farmers selling galip to the factory as a result of the increased factory capacity more than doubled in 2016 and around 650 farmers are now participating the emerging industry. At least 60% of these are female smallholders.

Year	Nut in pulp purchased (PGK1 - PGK1.50 per kg)	No of farmers selling	Farm gate value
<b>2014</b>	Small volumes (<1000 kg) for research trials	N/A	N/A
<b>2015</b>	11 tonnes nut in pulp	243 smallholder farmers	PGK10,669
<b>2016</b>	25 tonnes nut in pulp	647 smallholder farmers	PGK26,349

The factory continues to increase production and new equipment installed this season will enable production to scale up further. The Jessie roller cracker has been imported into PNG and has been tested. It needs further adjusting but should be able to produce 50% whole kernels. A new drier has been installed. This was developed by NARI staff from a modified shipping container and has a capacity to dry 8 tonnes of nut in shell in 1 week.

Some major constraints have been identified. The financial analysis in year 2 has identified purchasing nut in pulp and de-pulping as the most expensive components of the current factory. Electricity is another major issue for the factory both in terms of cost and reliability of supply

***Objective 4: Create a model for public- private partnerships in the canarium industry in PNG***

The project has played a major role in building interest and confidence in the emerging industry with demonstrations, showcasing the pilot factory and technical advice to private sector partners. Other Donors are interested in investing in galip processing to seed public private partnerships. IFAD (International Fund for Agricultural Development) markets for village farmers project includes a sub-component aiming at setting up a commercial galip nut processing factory with a private sector partner. They will invest if knowledge gaps such as the resource availability, market research and the value chain before the factory are addressed. Another project on commercial galip processing has recently been approved by MFAT (see below). Both of these applications were supported by the project team with demonstrations, technical advice and information.

Meetings with potential partners such as RH Trading, Paradise Foods and FoodWorld in PNG to progress private sector engagement and new partnerships to support consumer product placement plans have been conducted. Two opportunistic private/public-private partnerships have been mooted. Further opportunities have been explored with several large companies.

Nine young people from agricultural backgrounds who were not working or studying, participated in a work experience program with the galip project. They were trained and exposed to all aspects of the Galip Factory activities including collecting, buying, pulping, cracking, drying, processing, packaging and labelling.

A processor information package is currently being developed.

## Upcoming

There are some commercial partners interested in investing in galip. MFAT has recently agreed to support a commercial partner to invest in a galip processing facility in East New Britain. This could see the first public/private partnership investing in a commercial canarium factory. We continue to support this application with advice and information since their first scoping visit in 2016, where we demonstrated the progress that the project has made in processing. This played a major role in building the confidence of the group to progress their application to co-invest in the industry.

We are also working with another group with an interest in commercial processing. This group is planning a canarium project based around single species plantings as a timber species, with the opportunity to develop the canarium industry on the side. They are presently putting together a proposal to begin processing and are being assisted by the project with information and advice on how to proceed.

There has been an increase in nuts being delivered to the factory by smallholder farmers with more awareness and a higher price being offered for nut in pulp delivered to NARI. Similar to copra and cocoa buying points, the factory has been fielding farmers each day selling their galip to the factory at PGK1.50 per kilo. Many of the sellers have been mothers with their children, whom have sometimes carried up to 30kg with them, caught PMV's and walked the rest of the way.

We expect the coming season will be bigger again as the throughput capacity of the factory has been greatly increased with new equipment.

The new processing line has been completed and sent to Johannesburg for crating and freighting. It is anticipated that it will arrive at NARI by the end of October.



## **HORT/2014/094 Bougainville Cocoa**

### **Developing the cocoa value chain in Bougainville**

#### **Background**

The specific aim of this project, funded since mid-2016, is to improve the profitability and vitality of smallholder cocoa farming families and communities in Bougainville. We aim to foster and strengthen public and private sector partnerships and facilitate the development of enterprises that enhance productivity, access to premium markets and diversify incomes, while improving livelihoods through the promotion of gender equity, community health and well-being.

#### **Achievements against project objectives:**

##### ***Objective 1: To improve the productivity, profitability and sustainability of cocoa farming and related enterprises***

AGB-DPI is building capacity and establishing the Research and Training Hubs in Southern, Central and Northern Bougainville. These Hubs, the first built in Buin, will become DPI stations and training centres for Village Extension Workers from 33 villages across Bougainville as the project continues, but are still in the early stages of development. Three Hub Coordinators, two male and one female, have been appointed and a range of equipment purchased.

Our project partners, CCIL and UNRE continue to give training sessions to farmers, and our marketing team has run workshops across Bougainville and publishes regular market reports. In January a study tour to the Mars Cocoa Academy in Sulawesi was arranged for Hub Coordinators, DPI, CCIL and UNRE staff and farmer representatives. On this tour they were exposed to new technologies and awareness of the benefits of transforming cocoa farming into business enterprises. The farmer representatives went on to a marketing tour presenting bean samples to buyers in Indonesia, Singapore and Malaysia.

Good progress has been made on establishing budwood gardens and nurseries in the 33 village assemblies across the three regions. Whilst six budwood gardens have been established in central, many of the clones have been mixed so polybags are being prepared to establish for the 11 village assemblies to establish new budwood gardens. In the north and south, the polybags have been prepared for each of the regions' 11 village assemblies, ready for budding and planting in the coming months.

Sites have been selected to sample soils and establish composting trials as part of a collaboration with another ACIAR project, SMCN/2014/048 'Optimising soil management and health in PNG integrated cocoa farming systems'. Composting facilities have been built at Tavilo in East New Britain in conjunction with trials of goat and chicken manure composting systems at the Buin DPI Station.

33 integrated pest and disease management (IPDM) demonstrations plots are being identified and advice will be given to each of the correlating village extension workers to ensure that each site is brought up to a suitable demonstration plot standard.

***Objective 2: To understand and raise awareness of the opportunities for improved nutrition and health to contribute to agricultural productivity and livelihoods***

A household survey across Bougainville has now interviewed over 3,000 households in Southern Bougainville and continues in Central and Northern areas. The tablet-based survey uses CommCare software to collect information on family demographics, livelihoods, cocoa farming, livestock, foodcrops, health and nutrition. We trained over 50 local volunteers as interviewers and facilitators, significantly adding to local capacity. The survey in the Southern region (completed July 2017) found that most cocoa trees are old and poorly maintained, with little training available to farmers. Poor health and nutrition is emerging as a major constraint to improved productivity, with alarmingly high levels of childhood undernutrition present. The survey process for the Central (Arawa) and Northern (Tinputz) regions are continuing.

Extensive consultations continue to take place with stakeholders within the ABG, including the Department of Health, with NGOs and other ACIAR and donor-funded projects, and with industry and Australian Governments to identify areas for collaboration. In particular, we work closely with the PNG Cocoa project, the Family Farm Teams project, and the new Soils project. We have contributed to the development of Participatory Impact Pathway Analysis for our project, and for the TADEP.

***Objective 3: To foster innovation and enterprise development at community level***

The Buin DPI Station is being supported by CCI with a Combo shed, 10,000 capacity nursery, budwood garden, cocoa germplasm plot and a labourer to man the station with the help of the Field Extension Officer. Southern Hub to be relocated to Siwai.

Sites for Central and Northern Hubs identified but yet to be developed. Northern Hub was identified but is still in a forest state and needs to be cleared by the DPI before CCI moves in.

UNRE has established one goat model farm in Buin in July 2016 and has facilitated food crop and livestock training in November 2016. The university has also identified sites for goat holding and breeding centres at Konga DPI station for the Southern Hub and Tinputz (Michael Pearson Goat Farm) for the Northern Hub.

Three cocoa marketing businesses have been established.

Baseline surveys that monitor farming systems have been completed in the south with surveys in the central and northern regions currently underway.

***Objective 4: To strengthen value chains for cocoa and associated horticultural products***

A key element of improving cocoa quality is to improve postharvest handling, fermentation and drying processes. The current standards and regulations relating to cocoa drying and fermenting

have been audited, informing the construction of solar driers and purchase of necessary equipment at each of the Hubs.

Numerous training programs on cocoa quality and marketing have been delivered by Grant Vinning, Andrew Sale and Kenny Francis. They have also delivered additional TOT training with Anton Varvaliu, Anton Kamuso and the UNRE team to each of the Hub Coordinators and Village Extension Workers.

The Inaugural, annual Bougainville Chocolate Festival was held in Buin and Arawa in July 2016. The Festival showcased new cocoa planting materials and technology, engaged a range of stakeholders, and was a valuable exercise in community building. The centrepiece of the Festival was the Chocolate Competition, with six gold medals awarded to growers by Australian judges, who gave a well-attended feedback seminar to growers. As a direct consequence of this judging, trial shipments of beans have been sent to chocolate makers in Australia, with one chocolate winning a Gold award at the June 2017 Academy of Chocolate World Championships in London, plus another four medals at the International Chocolate Awards in New York.

### ***Upcoming***

The focus of the project in the coming year will be:

- Complete livelihood and health surveys.
- Establish and equip DPI Resource and Training Hubs, staff accommodation.
- Establish Village Resource Centres, village nurseries, fermentaries, diversification.
- Work with Department of Health to address health issues.
- Work with Family Farm Teams to engage women and youth.
- Improve stakeholder linkages.



## **HORT/2014/096 PNG Cocoa**

### **Enterprise-driven transformation of family cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea**

#### **Background**

Cocoa production in East Sepik, Madang and New Ireland provinces, along with other provinces, was greatly reduced by the incursion of cocoa pod borer (CPB) from Indonesia in 2006, accelerating malaise in cocoa production in PNG linked to poor performance of hybrid seedlings and production lost by Phytophthora Pod Rot (Black Pod). Cocoa is grown in PNG overwhelmingly by smallholders, and the incursion of caused them to lose interest in the crop. Research and development work at the PNG Cocoa and Coconut Institute (CCI), Tavilo, East New Britain Province over the last two decades, partly sponsored by ACIAR, have produced a set of 18 new 'hybrid clones', selected from the best of the hybrid seedlings, and methods of integrated pest and disease management (IPDM) that were shown to be effective in greatly reducing damage by CPB and Black Pod. Using these new clones and the new management methods it was shown that production could be increased from the current average of about 200 to over 2000 kg/ha/yr. The aim of this project is to spread the application on farms of these transformative clones and methods. This was to be achieved by recruiting an enthusiastic, entrepreneurial farmer from a village, giving them a short, intensive training in the new methods and supporting them to return to their village as a Cocoa Model Farmer-Trainer (CMFT), to establish a budwood garden of the 18 new clones, a nursery to propagate the clones by budding seedlings, and to train their fellow farmers. The aim was to recruit an equal number of men and women, but in the event, in nearly all cases spouses attended the training with their partners and so CMFTs are nearly always husband/wife teams.

In addition, CCI had success in testing the production of cocoa in a trial block at an altitude of 1,200m above sea level in the Karamui Valley in Chimbu Provinces, double the altitude considered suitable for cocoa. This opened up the possibility of expanding cocoa production in the highlands of PNG and so Chimbu Province was included in the project to further select clones suitable for higher altitudes and promote the new methods of growing cocoa through CMFTs.

#### **Achievements against project objectives:**

***Objective 1: To foster the development of self-supporting, village-based cocoa extension and other services as micro-enterprises supported by financial institutions, commercial cocoa buying and supply companies, and existing extension services***

So far, CMFTs have been trained and established in more than 20 villages in each province, each linked to a farmer group consisting of 25 farmers. The project was begun first in New Ireland, where 28 groups have been established, many of them with budwood gardens nearing an age when they can provide budwood and nurseries and trained budders able to propagate the clones for their fellow farmers in the group and for sale to other farmers. One CMFT is already functioning as a



commercial nursery. In East Sepik, one village nursery is already selling clones, and another has a mature budwood garden ready to support a commercial nursery. It has become evident that the development of nursery businesses will enable these groups to become self-supporting in the first instance. CMFTs are supervised by either project/CCI staff or provincial government DAL extension staff, and the involvement of provincial government staff, from the highest level down to the field extension staff, has been critical to the project. Some provincial government staff have been provided with motor bikes to facilitate their work.

The husband of one of our CMFTs in New Ireland attended the training there with his wife, and with her advice and the help of project staff in East Sepik, has established with his own resources an entire CMFT project network in his home province of West Sepik. He now has over 40 CMFT groups supported by a central budwood garden and nursery that is building budwood gardens and nurseries in the villages of the CMFTs.

One of the senior CCI research staff, Dr Josephine Saul-Maora, has taken up the extra task of promoting the involvement of women in cocoa farming and processing, and has been working with (ASEM/2014/095) in New Ireland to this end.

***Objective 2: To introduce and evaluate on farms, with farmer participation led by village extension workers (now called Cocoa Model Farmer-Trainers), transformative new cocoa cultivars and cocoa selection, propagation, production and postharvest methods***

Budwood gardens of the 18 latest-release hybrid clones from CCI and nurseries and trained budders to propagate clones are being established by all CMFTs in the coastal provinces, and in West Sepik as a spontaneous extension of the project. Trevor Clarke, our country project co-manager, has stimulated the production of cheap budding knives, and local budders have developed cheap alternatives to expensive imported budding tape. Budding skills and capacity have spread widely among the villages and given people a feeling of self-sufficiency in propagating the best types of cocoa, including those they have observed on their own farms.

The construction and testing of solar driers, based on a model developed in the Solomon Islands by Trevor Clarke, has proceeded with enthusiasm in all provinces, with models under commercial testing in New Ireland, and East and West Sepik.

Having first established budwood gardens and nurseries, farmer groups are now beginning to rehabilitate blocks or clear old cocoa blocks ready for planting the new clones. Rehabilitation involves severely cutting back the old overgrown cocoa and shade, with the possibility of budding new clones onto chupons on the old trees, using the budding skills developed in nurseries. Small chainsaws have been provided to groups to help with this work.

The next round of training will emphasise the rehabilitation of old cocoa blocks and the integrated management of productive cocoa blocks, especially for control of CPB and Black Pod.

***Objective 3: To introduce and evaluate on farms, with farmer participation led by village extension workers, options for development of new cocoa farming systems integrating food crops, livestock and high-value shade and other trees***

In establishing budwood gardens, most groups have been planting food crops while the cocoa and shade trees are becoming established. Smallholder farmers already tend to combine cocoa with food crops and this is being encouraged in the project. Emphasis is placed on managing a small cocoa block (1 ha) well, leaving adequate land for food and other crops. Formerly, larger areas of land were planted to cocoa which was then managed poorly and deteriorated.

Sources of seed for galip nut are being located to promote the use of the nut as a valuable shade tree, while other trees such as eaglewood are also being promoted. The use of kalava and pigeon pea as cocoa shade that produces edible seeds is also being pursued.

Tethered and penned goats are becoming common in the highlands and their incorporation into cocoa farming systems, in which the prunings from cocoa and *Gliricidia* shade provide valuable fodder, is being promoted.

### **Upcoming**

Subsequent rounds of training of CMFTs will be conducted in decentralised locations, and often on-site in the separate villages, by supervising staff. The enthusiasm generated by the initial establishment of budwood gardens and nurseries, and training of budders, has helped build a demand for local training of farmer groups.

The senior livestock officer of the East Sepik provincial government DAL has proposed that goats (four female and a male) be obtained from the DAL livestock centre at Erap in Morobe Province to stock a test centre at a CMFT village in East Sepik to test and promote the use of goats in a cocoa farming system. This will be another aspect of the close collaboration between the CCI/ACIAR Project and a provincial government DAL.

On 14 November 2017 the first field day at a CMFT site will be held by the project coordinator in New Ireland, Kula Daslogo, at Komalabuo Village in central New Ireland. This will showcase the development of the project with the farmers' group, all of whom have established a 1 hectare block to be planted with the new clones from the local nursery.

In November 2017, the project management team will visit Mussau Island where we have two CMFT sites with a strong interest in promoting goat husbandry linked to cocoa.



## **HORT/2014/097 Sweetpotato**

### **Supporting commercial sweetpotato production and marketing in the PNG highlands**

#### **Background**

The economy of the PNG Highlands, especially in those areas with relatively good transport infrastructure, is evolving rapidly, with smallholders continuing to turn from subsistence farming to market-oriented production. Sweetpotato plays a key role in this evolution, becoming a cash crop in its own right and assuring food security in more diverse systems with coffee, vegetables and small livestock providing a cash income. This project will support smallholders to turn from subsistence farming towards market-oriented Sweetpotato production, producing specifically for the market and managing production to meet market/customer requirements.

This project will support an expansion in market-oriented Sweetpotato value chains by strengthening supply chains to selected high value markets and promoting enterprise development along supply chains, and by improving crop production capacity by introducing a scheme to supply clean, high performing planting material. An increase in market oriented production will create income generating opportunities for growers as well as enable other groups to enter into Sweetpotato fresh product and Sweetpotato-based food product supply chains.

#### **Achievements against project objectives:**

##### ***Objective 1: To develop and strengthen market oriented sweetpotato supply chains***

A socio-economic review of sweetpotato production and marketing in the Papua New Guinea highlands was completed. The report identified several factors which are driving the expanding commercial production and sales, particularly from the Hagen Central area. Sweetpotato is being moved from Mt Hagen to urban centres and resource camps in Enga, Southern Highlands and Hela provinces, as well as to Port Moresby. This transfer from Mt Hagen to adjacent provinces has not been previously reported. Tubers from the Asaro Valley are sold in Port Moresby and, to a lesser degree, in Lae. Tubers from the Minj area are mostly sold at nearby roadside markets and in Kundiawa in Simbu Province, with small volumes going to Lae. Some tubers from Mt Hagen and Goroka are also being shipped to other lowland centres.

Detailed mapping of sweetpotato value chains was undertaken using a Commcare app developed by the FPDA team. A total of 88 commercial growers/traders were interviewed to generate an accurate picture of specific value chains operating in the Asaro, Minj, Hagen Central and Mul regions. This mapping is being used to identify chains for value chain research activities and project training support.

Recommended pest management approaches have been documented by HORT/2014/083 with input from FPDA and NARI.

### ***Objective 2: To build capacity of sweetpotato value chain players***

Material for delivery of training to grower groups involved in commercial kaukau production using clean seed have been developed. The training program has been designed to meet the Community Development Worker (CDW) standards set by the National Apprenticeships and Trade Testing Board (NATTB) and support has been received to allow accreditation by portfolio instead of workplace assessment for the National Standard for CDWs. This would mean that FPDA can issue accreditation for extension workers in-house, keep the evidence (observation checklist by in-house assessor, copies of work-plans, reports, etc.), and then later submit it to NATTB for their accreditation. FPDA have submitted an EOI to request that the NATTB Director approve the use of portfolio for the National Standard for CDWs. This strategy could be more widely adopted, and already has gained support from other groups including CARE.

### ***Objective 3: To develop a 'clean seed' scheme to increase availability of clean planting material of sweetpotato***

Multiplication and distribution of clean planting material is proceeding, with more than 30 commercial farmers having received material multiplied at 3 locations (Asaro, Minj, Hagen Central) in insect-proof screenhouse for crop performance trials. The varieties Gimani, Wanmun and Wahgi Besta are being multiplied and distributed. The important commercial varieties Korowest and Rachel have been introduced into the tissue culture collection at NARI Aiyura and are undergoing treatment to remove pathogens present in the material. Availability of pathogen tested, clean seed of these varieties is important as they are the key commercial varieties in the Mul Baiyer region as well as being in demand by commercial growers in other regions. Agreement has been reached with 17 growers located in EHP, Jiwaka and WHP to construct larger insect-proof screenhouses for clean seed multiplication.

Clean seed foundation stock preparation and virus testing protocols used by NARI staff at Aiyura were reviewed and plans drawn up for incorporation of new screenhouses into the clean seed production program. Low supply of *I. setosa* seeds for virus indexing was identified as a risk, so new seed stock was delivered to PNG from Australia and experiments established to determine optimum conditions for multiplication of seed stocks to maintain seed supplies at Aiyura. A LAMP (Loop-Mediated Isothermal Amplification) unit has been purchased and initial protocols established for rapid virus testing.

### **Upcoming**

A promotion and awareness campaign of the benefits of new sweetpotato technologies will be launched in late 2017, with timing corresponding to commissioning of larger propagation facilities able to supply greater volumes of clean seed.

## 7. Program Annual Meeting, June 2017

The 2017 TADEP Annual Meeting was held in Cairns on Tuesday 20 and Wednesday 21 June and welcomed 55 attendees from across Papua New Guinea and Australia. There was representation from each of the five TADEP component programs including all Project Leaders, our key partner organisations in PNG, three ACIAR Research Program Managers as well as Peter Horne and Maree Livermore from the ACIAR Country Programs team, two of our DFAT colleagues from Port Moresby and Canberra, four of the MAD4TADEP NARI CommCare certified staff, researchers from other linked ACIAR projects, local businesses from the chocolate industry and a farmer involved first-hand in the Bougainville cocoa project.



To help set the context of the TADEP program, brief overviews of priorities from both ACIAR and DFAT were presented, followed by a country-specific overview of ACIARs work in PNG and how TADEP forms part of the country program.

As illustrated in the diagram to the left, TADEP is co-funded by DFAT and ACIAR, each with varying organisational structure and reporting requirements. This visual map of how TADEP is funded and operates assisted attendees to

conceptualise and gain a greater understanding of processes within the program, especially relating to reporting and communications.

Each of the five TADEP component projects gave updates on their respective projects followed by an interactive Q&A session. During the presentations the audience was encouraged to consider, a) what

is that project doing that could be useful for my project and vice versa, and b) what *good news stories* or early stories of impact are starting to evolve?



These *good news stories* were captured on a sticky-note, colour-coded to the respective project, and added to over the duration of the Annual Meeting.

Potential cross-program ideas captured during the project presentations were then discussed amongst the five TADEP projects in a small group session. Projects also brainstormed any other opportunities for capacity building within their respective projects and/or across the program. These ideas were briefing shared to the whole group.

Day one concluded with a relaxed program dinner at the Annual Meeting venue, allowing for more informal discussion and networking.

The first session on the second day aimed to ‘ground truth’ the research findings from the MAD4TADEP small research activity. Each of the projects were asked to consider, a) how did you apply CommCare in your project, b) what did you expect the outcomes would be, and c) what (if anything) was surprising? Each of the TADEP projects have had varying utilisation and success in adopting CommCare within their projects and the presentations highlighted some key opportunities for CommCare to be used both at a program level but also for further institutional capacity building within our key partner organisations.

Project teams then reformed for another workshop session in the afternoon to review the *good news stories* that had already been captured over the day before and add to them, considering a range of themes to reflect potential target audiences. Each project team reported back their *front page worthy* story which was followed by a facilitated discussion about the communications strategy and how the program can best share information for planning, learning, collaboration and sharing of research and development impacts. This discussion led into reviewing progress against the Program Performance Framework, which will be reported against in the TADEP Annual Report.

Throughout the two-day event there were also a range of additional presentations, all linked to TADEPs priorities or impact. These included:

- Optimising soil management and health in Papua New Guinea integrated cocoa farming systems
- The benefits of interdisciplinary linkages that expand the impacts of TADEP
- Experiences from cocoa farmers involved in the Bougainville cocoa project
- Strategies for private sector engagement and/or understanding market channels to consumers



To ensure that energy levels were maintained for the final few hours of the event, a delicious chocolate taste testing session was organised by the Bougainville cocoa project. There were 12 different chocolates made from cocoa beans grown in Papua New Guinea, Fiji, the Solomon Islands and Vanuatu. Participants tasted all varieties, and also judged the packaging and the name of each chocolate.



On Thursday 22 June, an optional field trip was organised to visit Daintree Estates in Mossman and Oaklands organic sweetpotato farm in Kairi. Both locations were selected given their applicability to the TADEP component projects and also due to their relative scale. Those that attended found the hands on visit and candid discussions very insightful and interesting.



In concluding the 2017 TADEP Annual Meeting, it was agreed that the 2018 event be hosted in host the 2018 Annual Meeting in Arawa (1st preference), with contingencies in Buka (2nd) and Kavieng (3rd), in the second or third week of June, to be confirmed by January 2018.

## 8. Communications

The outcomes of each of the five TADEP projects correlate to the overarching programmatic goals, as outlined in the Performance Framework below. The success of the TADEP is amplified when there is cross-project collaboration and realisation of these higher level goals. Various channels, stakeholders and formats of communications across the projects and program is integral to facilitating this collaboration.

### Monthly Updates

Each month, progress reports are collated by the Program Coordinator and circulated to a database of +120 recipients including TADEP project team members, relevant DFAT and ACIAR contacts, project and program stakeholders, inter-related ACIAR or other projects and other interested parties. Whilst these Monthly Updates provide a valuable snapshot into the progress of each of the TADEP projects, they also encourage the sharing of context-specific approaches, ideas or lessons learnt that exemplify the collaborative aims of the overall program.

The format of the Monthly Updates are designed to be less formal and structured which allows the projects to share relevant information beyond the scope of the project. Various resources and novel ideas have been adopted across projects resulting in positive unintended outcomes. Feedback from all stakeholders on the Monthly Updates is continually embedded into the process and production.

### Stakeholder meetings

In this reporting period, the TADEP Program Coordinator travelled twice to both Papua New Guinea and Canberra to meet with various DFAT and ACIAR representatives along with key stakeholders to the program. Whilst each of the projects have unique project partners, there are a number of mutual key stakeholders such as National Agricultural Research Institute (NARI), Cocoa Coconut Institute Limited (CCI), Fresh Produce Development Agency (FPDA), University of Natural Resources and Environment (UNRE), Department of Primary Industries (DPI) in numerous provinces and regions, and many others. Maintaining proactive communication and positive relation management is critical to the success of the projects and overall program.



### Media

There have been opportunistic features of various project and program outcomes online, in print media and on the radio. The ACIAR website has also published numerous blog entries relating to various project successes, linking to the multiple social media platforms in utilises including Facebook and Twitter.

There have been unforeseen delays in developing a specific website for TADEP, as it is planned to be hosted as part of the ACIAR website which is undergoing significant redevelopment. This will be a strong focus for the next six



months to ensure that the valuable resources being developed and outcomes being achieved by the program are duly communicated.

During the 2017 TADEP Annual Meeting, each of the five projects identified various communications needs including photography and videography training, capture of impact stories and other multimedia outputs. A series of short impact videos communicating the objectives and early research outcomes of the projects are scheduled to be filmed in first quarter of 2018. These videos will align thematically to each of the higher level program goals. During the scheduled site visits to each of the projects, a series of communications training workshops will also be held to build the capacity of each of the project teams.

## **Closed User Groups**

During the 2016 Annual Meeting, Closed User Groups (CUGs) were identified as a tool to enable projects to communicate more effectively. CUGs allow a specified group to make unlimited calls to each other and the assigned numbers you choose for one low, monthly, flat-rate fee. The PNG Cocoa project team were already utilising the tool through a local telecommunications provider, Digicel, and it was agreed that this tool could be embedded at a program level.

A TADEP CUG was established toward the end of 2016 so that any project team member included in the group to communicate both within their respective project team and across the program. This has overcome issues relating to project team members not having enough phone credits to make and receive phone calls for project-related matters.

## 9. MAD4TADEP

As mobile technology has become increasingly available and accessible, there has been a growing interest from ACIAR Projects to explore opportunities such as Apps for digital data collection. ACIAR commissioned a Small Research Activity (SRA) GMCP/2015/016 'Assessment of digital data collection applications (DDCAs) to support ACIAR's M&E - Mobile Acquired Data (MAD) 1' to shortlist Apps for piloting and ultimately make recommendations on which App/s have the greatest usability, scalability, affordability, security and user support appropriate for use in Projects. The extensive piloting process identified CommCare as the preferred App, which was rolled out to four ACIAR Projects in Vietnam, Pakistan, Myanmar and Vanuatu as part of a follow on SRA, GMCP/2016/004 'At-Scale Evaluation of Digital Data Collection Apps (DDCAs) in ACIAR projects - Mobile Acquired Data (MAD) 2'.

Simultaneously, the TADEP Bougainville Cocoa project had engaged Jessica Hall from University of Sydney, who has utilised CommCare for public health research, to integrate the use of Apps into baseline research being undertaken to understand how malnutrition and ill health compound labour shortages in the Bougainville cocoa industry.

Project team members from each of the four selected Projects within MAD 2 SRA attended a MAD Masterclass on 14-16 June 2016 in Canberra, along with two Project team members from the Bougainville Cocoa project. The TADEP Program Coordinator and representatives from two other TADEP Projects, Galip Nut and Family Farm Teams, were also able to attend components of the MAD Masterclass. At the time, each of the four selected MAD 2 SRA Projects and the additional TADEP Projects were at varying stages of considering and/or implementing CommCare into their Projects. The Bougainville Cocoa team was in the process of developing their CommCare application (survey), which was piloted at the 2016 Bougainville Chocolate Festival. As part of the MAD Masterclass, representatives from the three TADEP Projects present were able to discuss opportunities of how CommCare could be more widely utilised in each of the Projects.

There was strong interest from both the Galip Nut and Family Farm Teams project to learn from the Bougainville Cocoa team's roll out of CommCare and in the case of the Family Farm Teams Project, even scope to integrate components of their baseline data collection into the Bougainville Cocoa teams survey. As ideas to integrate CommCare into TADEP Projects and potential areas for collaboration between TADEP Projects ensued, it became evident that there were also further opportunities for TADEP to utilise the key learnings from the current rollout of CommCare into the four MAD pilot projects to value add to the TADEP projects.

Following the MAD Masterclass, an additional Small Research Activity was commissioned specifically for the program entitle Mobile Acquired Data for TADEP (MAD4TADEP). The research questions to be address by the MAD4TADEP small research activity are as follows:

1. Does the adoption of a common app (CommCare) by individual projects within an ACIAR program (TADEP) add value to both the projects and the program?

A less generic way of framing question 1 might be:

2. What are the specific advantages and disadvantages to an ACIAR program (such as TADEP) when all projects implement the same app technology and receive coordinated adoption support?
3. What are the specific advantages and disadvantages to an ACIAR project within TADEP when all projects implement the same app technology and receive coordinated adoption support?

And question 4 is attempting to capture NARI capacity building into the SRA:

4. Are the lessons learned from ACIAR projects adopting a common app within the TADEP program applicable to an in country partner (NARI) looking to develop sustainable institutional capacity in the adoption of apps?

The MAD4TADEP SRA represented a natural progression in learning from the MAD series – commencing with a desktop review of commercially available app technologies; field testing two apps in a simulated ACIAR project; evaluating the adoption of apps within individual ACIAR projects; and finally understanding the benefits of adopting a common app across diverse projects within an ACIAR Program (TADEP).

The specific outcomes for MAD4TADEP small research activity are as follows:

1. CommCare support
  - a. One-on-one support
  - b. Masterclass
  - c. Evaluation
  - d. TADEP Annual Meeting
2. Capacity Building for NARI
3. Video capture and capacity building

As the commissioned organisation for the MAD small research activities, AgImpact, undertook an assessment of the capacity and needs of each of the five TADEP projects to adopt CommCare and proposed customised plans for one-on-one support to implement the digital data collection tool into their respective project activities. Evaluation was embedded into the SRA design, focused on addressing the research questions (above) and documented what the program/institutional advantages are for TADEP of its individual projects all adopting CommCare, how will it help people communicate, share, etc.

During the scoping interviews to determine the level of support required for each TADEP project to adopt CommCare, the project leaders emphasised the importance of building the capacity of partner organisations in MAD technology within the TADEP network. As three of the five TADEP projects (Family Farm Teams, Galip Nut and Sweetpotato) have the National Agricultural Research Institute (NARI) as a key partner, it was agreed that there should be a coordinated effort to foster CommCare capacity building within NARI. The aim was to benefit NARI projects broadly (one example given was nursery monitoring) and to create a skilled resource pool of both app builders and enumerators that could be utilised in future ACIAR projects. The TADEP projects that do not have NARI as a partner

organisation (Bougainville Cocoa and PNG Cocoa) also agreed that a resource pool of this nature would be valuable.

After a competitive selection process, five NARI staff were selected to undertake four days of intensive face-to-face training with AgImpact CommCare Support team as part of CommCare Certification Program. Each of the NARI staff identified an idea for an app relevant to a NARI research project and transformed this idea into an app ready to be deployed in the field.

Aside from the intensive face-to-face CommCare training, the five NARI staff continued to be supported in their learning by the AgImpact CommCare Support team over the following six months to achieve CommCare Application Building Certification. Four of the five NARI staff completed the certification process and showcased their learning at the 2017 TADEP Annual Meeting:

- Jeromy Kavi
- Elly Solomon
- Raywin Ovah
- Isadora Ramita

To capture the lessons learnt in the lessons learnt in an easily digestible format, a short video was created by AgImpact and videographer/visual storyteller, Conor Ashleigh.

<https://www.youtube.com/watch?v=E-BpaQdaREg>



MAD4TADEP Lessons Learned

A full report on the MAD4TADEP small research activity is being finalised and will be made available once published.

## 10. Program Performance Framework

### Purpose of the Program Performance Framework

A performance framework allows a program or project to reflect on the desired research outputs and outcomes or helps defines “what will success look like” and to plan how to monitor progress towards those development outcomes and impacts.

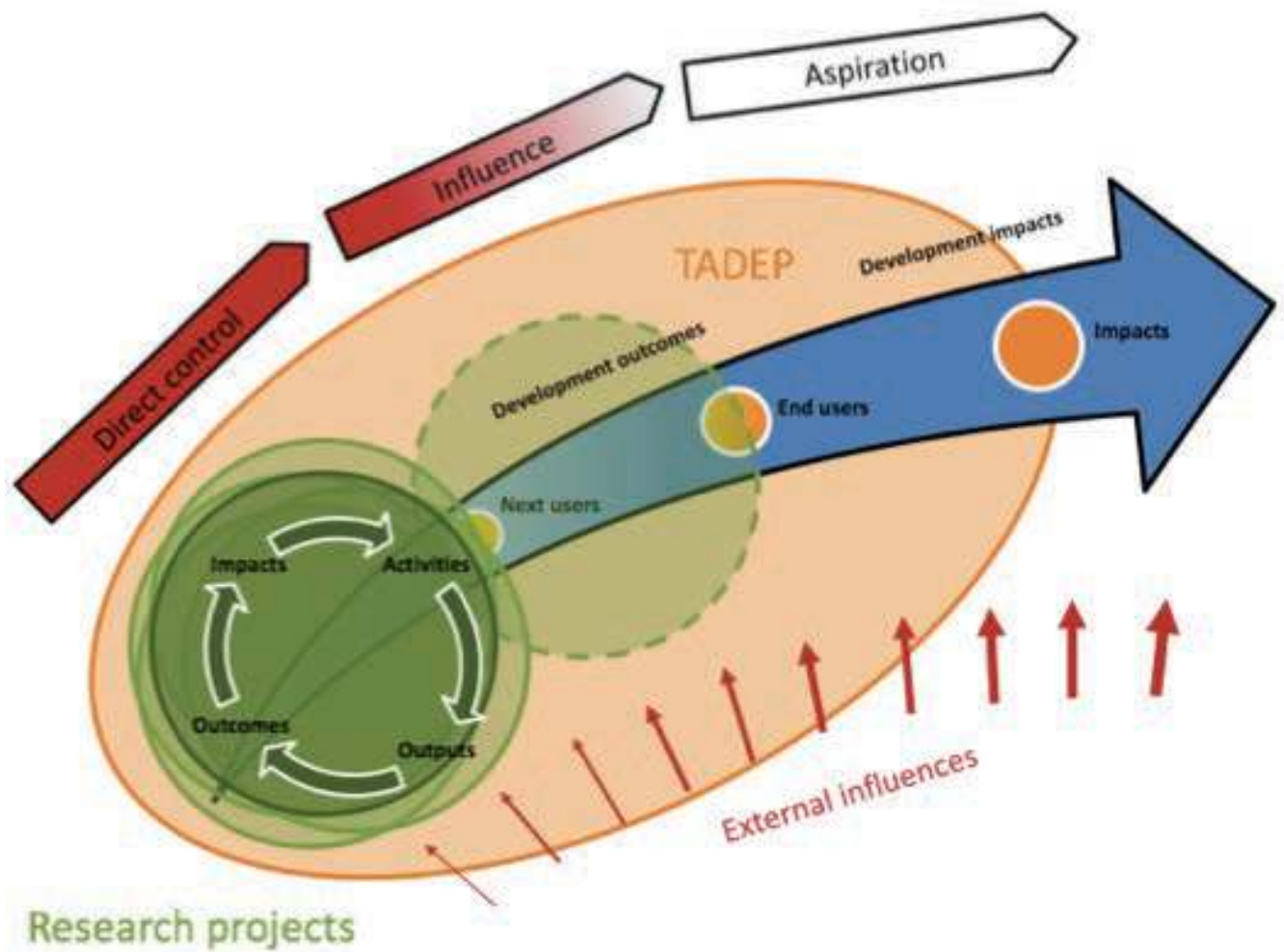
**Table 1: Typical elements of project monitoring and evaluation**

Inputs	Activities	Outputs	Outcomes or impacts
<b>what resources go into a project</b>	research activities the project implements	the direct product of those activities	the changes or benefits that result from the activities or outputs
<b>funding, staff, equipment</b>	surveys, field experiments, PRAs, adaptive research trials, extension efforts	publications, varieties identified, workshops held, people trained, policy engagement events held	net change in farmer income, changes in labour allocation, reduced incidence of disease in aquaculture systems

For the research projects, it is especially important to define clearly the area in an impact pathway over which the project team has direct influence (Figure 1). This is generally limited to the footprint of the project (the area bounded by the green circle) plus the managed relationships with ‘next users’. For research projects, ‘next users’ might typically include government extension services, NGOs, private sector, and a small group of end users.

This impact pathway concept was discussed the TADEP Annual Meeting in May 2016. It is especially useful to note the concepts of the Area of Control, the Area of Influence and the Area of Aspiration. The projects have direct influence over their Area of Control in the impact pathway. Beyond the area under the direct control of the research teams, the projects have a broader area of influence, in which the demonstrated benefits of the research are sustained and promoted on a larger scale by the commitment of the ‘next users’. Finally, the Program has higher level impact goals to which each of the projects contributes to – the Program’s Area of Aspiration on the impact pathway. These impacts are the broad changes that, in the longer term, might be impacts on the lives of the target beneficiaries at a large scale. The further from the project’s area of control, the more external influences affect the delivery of these aspirational impacts.

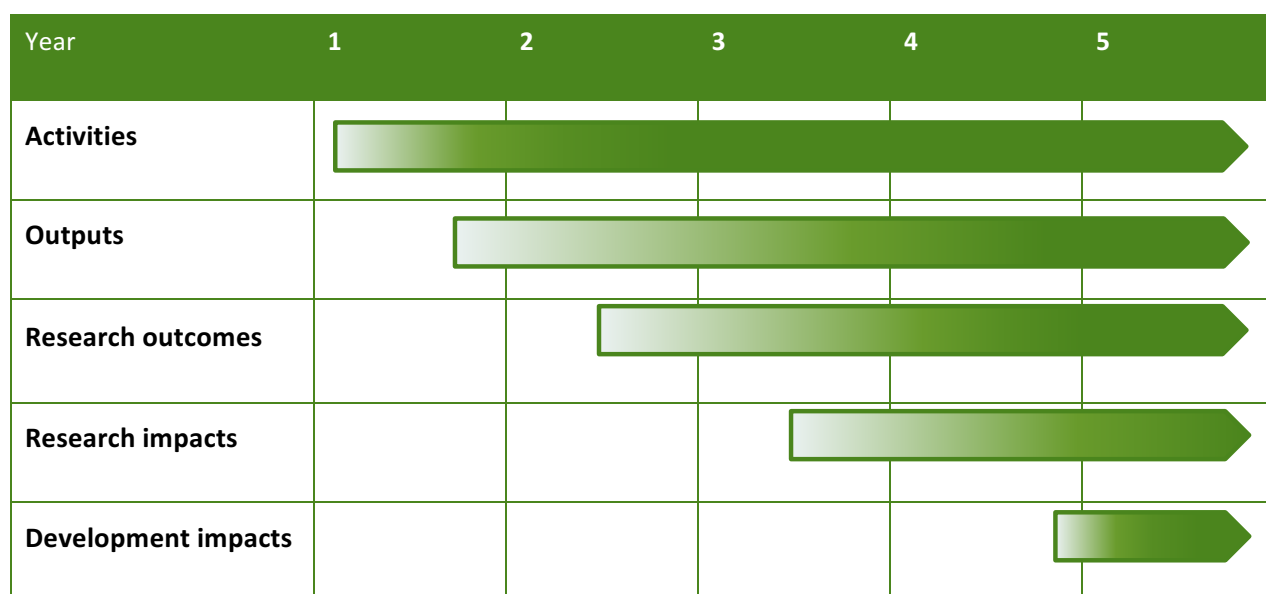
Figure 1: Impact pathway for research projects and TADEP



In the context of TADEP, the five projects are part of an overall program which has five aspirational goals. It is intended for each of the projects to have their own M&E plan which monitors and reports both (i) outcomes and impacts within the direct control of the project and (ii) the relationship management and some outcomes of the 'next users'.

Given the early stage of the program, each of the projects are necessarily and quite rightly focused on bedding-down the project teams and early implementation of research activities and outputs. As the projects progress, research outcomes and impacts will begin to emerge and by the end of the program, the evidence provided by the projects will be to demonstrate program level development impacts.

**Figure 2: Anticipated timing of emergence of outputs, outcomes and impacts**



## Development of the Program Performance Framework

The development of the Program Performance Framework has been an iterative process and incorporates feedback from within the program via the projects and from external stakeholders including DFAT and ACIAR. The Performance Framework draws from each of the TADEP Project Proposals and is informed by development priorities of the PNG and Australian governments.

The Program Objectives align with the draft TADEP Umbrella Document and the each of the Visions of Success articulate ‘what success will look like’ to provide a narrative and context to the Program Objectives.

Success of the program will be measured by (i) the extent to which it adds value beyond the sum of the component projects and (ii) the extent to which the projects contribute to the program level performance indicators.

The purpose of this performance framework is therefore to:

- Ensure projects are aware of and contribute to Program objectives (including higher level targets of the Australian aid program) and that these objectives/targets are effectively integrated into project level monitoring and reporting.
- Improve communication mechanisms between and among projects and the program and with program stakeholders.
- Provide effective monitoring and evaluation to support adaptive management at project and program level.
- Provide evidence of potential policy options flowing from the program to relevant government agencies.



This Performance Framework does not prescribe specific M&E practices necessary for monitoring inputs, outputs and outcomes within each of the projects. Rather, each project team is responsible for its own detailed M&E practices in order to ensure that program objectives and higher level targets of the Australian aid program are effectively integrated into project level monitoring and reporting.

The Verifiable Indicators developed for this Performance Framework were discussed by all projects at the TADEP Annual Meeting in May 2016 and reviewed at the TADEP Annual Meeting in June 2017. Each project subsequently provided feedback on how each contributes to some or all of these indicators (Table 2).

Projects will continue to report progress towards each of the Verifiable Indicators annually as part of their annual reporting process.

### **The Program Performance framework – contributions of each project**

The following table describes the contributions of each of the individual projects to the overall Program Performance Framework. As the program progresses, more evidence will emerge of how each project is contributing to the overall project objectives and higher level development goals.

Project contributions are highlighted as per the following:

- (F)** ASEM/2014/095 Improving opportunities for economic development for women smallholders in rural Papua New Guinea
- (C)** FST/2014/099 Enhancing private sector-led development of the Canarium industry in Papua New Guinea
- (B)** HORT/2014/094 Developing the Cocoa value chain in Bougainville
- (P)** HORT/2014/096 Enterprise-driven transformation of family Cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea
- (S)** HORT/2014/097 Supporting commercial Sweetpotato production and marketing in the Papua New Guinea highlands



**Table 2: Contributions to Program Performance Framework**

**Program goal:** To improve livelihoods of rural men and women in Papua New Guinea

Program objective	Vision of success What will success look like?	Verifiable Indicators	
		When considering how each Project has contributed to a VI, specify both the scale (quantity) and nature (narrative) of the impact	Evidence your Project will provide
To stimulate and strengthen inclusive <b>private sector-led development</b> in agriculture	The private sector is engaged and actively contributing to economic development in partnership with government in the agricultural industry. Poverty in PNG is being addressed through local economic development driven by new and innovative private sector engagements with a focus on women and youth participation. The strengths of current private sector partnerships in PNG are built upon and new ways to support inclusive business models are explored.	Number and size of <b>agribusiness SMEs, micro-enterprises</b> and companies (current, new and potential)	(G) Canarium project is currently working with 2 micro-enterprises, potential for many more (15 have expressed interest) (B) Three cocoa marketing businesses have been established.
		Number of <b>partnerships and engagements</b> with agribusiness SMEs, micro-enterprises and companies (current, new and potential)	(G) Potential private sector partners have visited canarium factory and expressed interest in engaging with project. 2 donors have invested in galip processing in partnership with the private sector (IFAD and MFAT) (P) CMFTs are becoming small enterprise-driven businesses initially through development of budwood gardens, nurseries and teams of competent cocoa budders; the project has been responsible for initiating about 25 CMFTs in each of New Ireland, East Sepik and Madang provinces, 7 in Chimbu and been linked to 40 in West Sepik. (B) Partnership with Paradise Foods for chocolate production at The Bougainville Chocolate Festival. (B) Engagement with multiple international chocolate makers and chocolatiers.
		Number of men and women <b>farmers and workers engaged</b> with agribusiness SMEs, micro-enterprises companies and formal markets (current, new and potential)	(F) Number of farmers engaged in markets by type (G) 650 farmers now engaged with selling canarium to the factory from areas close to the factory. Potential for many more as factory scales up production.

Program objective	Vision of success What will success look like?	Verifiable Indicators	
		When considering how each Project has contributed to a VI, specify both the scale (quantity) and nature (narrative) of the impact	Evidence your Project will provide
			(P) Each CMFT is working with about 25 farmers in their group (client farmers of disciples)
		Evidence of positive <b>private sector engagement</b> outputs, outcomes and <b>impacts</b> for men and women farmers and workers	(F) Number of staff of NGOs and agricultural agencies trained in Family Farm Teams activities, plus their reach to farming families (F) Number of primary school teachers who have access to professional development on an SD card which will enable them to teach agricultural content. (G) There are some commercial partners interested in investing in canarium (galip). MFAT has recently agreed to support a commercial partner to invest in a galip processing facility in East New Britain. We are also working with another group with an interest in commercial processing. This group is planning a canarium project based around single species plantings as a timber species, with the opportunity to develop the canarium industry on the side. (P) The initial nurseries are functioning as commercial businesses, selling clones to farmers and to PPAP. (B) Awards being attributed to chocolate made with Bougainville cocoa.
		Number of smallholder farmers that have <b>transformed from subsistence</b> or opportunistic farming to small-medium enterprises (SMEs) and the nature of the transformation	(F) Number of farming families who have a written farm plan (F) Range of SMEs begun by farmers. (G) Two small-scale entrepreneurs selling raw galip in the market were mentored to value add and produce packaged and labelled products. These plan to have labelled product for the 2017 season.

Program objective	Vision of success What will success look like?	Verifiable Indicators	
		When considering how each Project has contributed to a VI, specify both the scale (quantity) and nature (narrative) of the impact	Evidence your Project will provide
		Potential number of beneficiaries (men and women) that can reasonably be expected to benefit from developing <b>partnerships</b> between the private sector, schools, institutions and training providers and the nature of the impact	

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
To sustainably increase <b>agricultural productivity, quality and value</b>	The livelihoods of rural men and women are transformed through improvements in and adoption of production technologies in agriculture.	Actual <b>increase in agricultural productivity</b> of target livelihood systems resulting from Project interventions and the nature of the impact	(F) Number of families growing new crops (F) Number of families growing crops for sale (P) Once the new clones have been widely planted on rehabilitated blocks, and the new methods of growing cocoa as a smaller tree with IPDM have been applied (about 2 years hence) it should be possible to determine increases in production.
		Actual <b>increase in quality of agricultural produce</b> of target livelihood systems resulting from Project interventions and the nature of the impact	(G) The project team has greatly upscaled factory production of value added canarium (galip) from less than 1 tonne of raw material (nut in pulp) since the start of the project in 2014 to 25 tonnes of nut in pulp purchased and processed in 2016. This retails for PGK86 per kg wholesale (PGK1/kg at farm gate, PGK1.50/kg at factory gate). (B) Marked increase in cocoa quality year-on-year noted by the judges at the Bougainville Chocolate Festival.
		Actual <b>increase in agricultural value</b> of target livelihood systems resulting from Project interventions and the nature of the impact	(F) Family income increases from agriculture (G) Farmgate value of canarium industry has increased from negligible in 2014 to PGK26,349 in 2016
		Actual number of target beneficiaries that <b>adopted and maintained new technology and systems</b> and the nature of the impact	(F) Number of families with a written farm plan (F) Number of families working as a family farm team (F) Number of families working as a small business (F) Number of families adopting new farming techniques (F) Number of farmers with a bank account (G) NARI canarium factory has adopted new technology (mechanical crackers driers)- expected that other processors will adopt but too soon for impact yet (S) Clean seed foundation stock preparation and virus testing protocols used by NARI staff at

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
			Aiyura were reviewed and plans drawn up for incorporation of new screenhouses into the clean seed production program.
		Potential <b>increased agricultural production and quality</b> of target livelihoods systems and the <b>value</b> of this increase to rural livelihoods that can reasonably be expected within five and ten years after completion of this Program and the nature of the impact	(P) In about a year the quality of cocoa produced on the new solar driers will be assessed and the popularity of the driers will be determined (number of driers built).
		Potential number of target beneficiaries that <b>adopted and maintained new technology and systems</b> and the nature of the impact	

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
To improve <b>access to markets</b> and strengthening <b>value chains</b>	Smallholder farmers and their families are connected to business opportunities and markets in PNG and internationally that can improve livelihoods and provide employment opportunities around all links in the value chain.	Actual number of activities targeted at farmers to increase their <b>capacity to access markets</b> and the nature of the impact	<p>(F) Numbers of training activities plus farmer attendance by gender</p> <p>(G) canarium has engaged with 650 smallholder farmers to purchase galip nuts for factory where previously market for galip nuts did not exist.</p> <p>(B) Tour to Cocoa Mars Academy to expose Hub Coordinators to new technologies and awareness of the benefits of transforming cocoa farming into business enterprises.</p> <p>(B) Various market channels developed with international chocolate makers and chocolatiers.</p> <p>(S) Detailed mapping of sweetpotato value chains was undertaken using a Commcare app developed by the FPDA team. A total of 88 commercial growers/traders were interviewed to generate an accurate picture of specific value chains operating in the Asaro, Minj, Hagen Central and Mul regions. This mapping is being used to identify chains for value chain research activities and project training support.</p>
		Actual number of activities targeted at value chain partners and institutions to increase their <b>capacity to support access to markets</b> and the nature of the impact	<p>(F) Numbers of training activities plus farmer attendance by gender</p> <p>(G) Many activities in canarium project aimed and supporting access to markets, e.g. working with retailers to provide value added nuts, working with NARI to develop processing technologies</p> <p>(S) Detailed mapping of sweetpotato value chains was undertaken using a Commcare app developed by the FPDA team.</p>
		Actual number of activities targeted at developing opportunities for improved <b>post-harvest handling, processing and marketing</b> and the nature of the impact	<p>(G) Many activities in canarium project are aimed at developing processing techniques, e.g. factory research, post-harvest training for women, marketing research.</p> <p>(B) Numerous training programs on cocoa quality and marketing have been delivered by Grant Vinning, Andrew Sale and Kenny Francis.</p>

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
			(B) Additional TOT training with Anton Varvaliu, Anton Kamuso and the UNRE team to each of the Hub Coordinators and Village Extension Workers.
		Actual number of <b>new markets</b> identified and the nature of the impact	(F) Number of commercial crop markets accessed by farming families (G) Formal markets have developed for canarium products in east New Britain (5 retail outlets) with more planned for Port Moresby. Private sector partners are showing interest in domestic and export markets
		Actual number of <b>new markets</b> developed and the nature of the impact	(G) As above- Formal markets for canarium have been developed in East New Britain. (B) Various market channels developed with international chocolate makers and chocolatiers
		Potential increased number of farmers and potential increased capacity of farmers to access markets and the nature of the impact	
		Potential number of beneficiaries (men and women) that can reasonably be expected to benefit from improved <b>post-harvest handling, processing and marketing</b> within five and ten years after completion of this Program and the nature of the impact	



Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
To promote <b>gender equity</b> and <b>women's empowerment</b> in rural communities	Gender equity is evident in farm, financial and decision-making in families, SMEs and rural communities. Men and women have equal access to economic opportunities, information and leadership development or representation.	Actual number of activities specifically targeted towards <b>women's decision making capacity, leadership and representation</b> , actual number of women and men actively participating and the nature of the impact	(F) Number of women attending women's leadership training (F) Types of new leadership positions taken up by women (F) Impact stories (G) Two women selling raw galip nuts at the markets have been intensively mentored to introduce some processing packaging and labelling technologies into their existing practice and to value add galip nut.
		Actual number of activities specifically targeted towards women's <b>economic opportunities</b> , actual number of women and men actively participating and the nature of the impact	(F) Number of women and men attending financial literacy and agricultural development training (G) Female entrepreneurs and smallholders have participated in a range of demonstration and training activities for canarium including: <ul style="list-style-type: none"> <li>Cracking, drying, processing, packaging, labelling training day for 25 small-scale entrepreneurs who were already engaged in the marketing and sale of galip.</li> <li>A workshop for small scale female entrepreneurs. In addition, three women have been intensively mentored to value add galip nut and two have adopted training.</li> <li>Mechanical crackers were demonstrated to several hundred people at the World Environment Day event, NARI, Tinanagalip and Vunamarita training days</li> <li>Solar drying training for 37 female smallholders and small scale entrepreneurs at two training events (one a remote community without power).</li> <li>Processing, food safety, health and hygiene translated by a local trainer to 50 female smallholders and small-scale entrepreneurs</li> </ul>

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
			over three training days.
		Actual number of activities specifically targeted towards <b>improving women's skills and access to information</b> , actual number of women and men actively participating and the nature of the impact	(F) Number of female and male VCEs and their reach to the community (G) As above
		Actual number of women and men actively involved as <b>members of research teams</b> and the nature of the impact	(F) Number of women and women trained in participatory M & E, adult learning facilitation, digital data collection, and research management and reporting. (G) 7/13 of the canarium research team are female. In addition the canarium factory has recruited three young women from the area, one of whom is a graduate of the 2016 Youth Work Experience Program run by the project team.
		Potential increased number of <b>women in leadership and representative roles</b> and the nature of the impact of both women and men actively participating	(P) In HORT/2014/096 women have clearly taken equal roles with men in setting up CMFT partnerships in villages. This has occurred in 90% of CMFTs in all provinces. In one case in New Ireland, an unmarried man is being partnered as a CMFT by his mother – they attended training and meetings together.
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from <b>increased economic opportunities for women</b> and the nature of the impact of both women and men actively participating	
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from <b>improved skills and access to information for women</b> and the nature of the impact of both women and men actively participating	(P) Women as well as men are training as budders e.g. as seen in the thriving commercial nursery in Saparu Village, on the Yuat River in East Sepik. A woman, Grace Klembasa, is a co-leader of the commercial nursery in West Sepik and is also an active cocoa farmer and leader of a farmer group. She was awarded several prizes in the Warwagira Cocoa Festival in Kokopo in May 2017, one of which will take her to a Chocolate

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
			exposition in Paris later in 2017.
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from being actively involved as <b>members of research teams</b> and the nature of the impact	

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
To build <b>individual and institutional capacity</b>	The sustainability of the agricultural industry in PNG has been transformed through targeted capacity building of individuals and institutions across geographically and socio-economically diverse locations. At the conclusion of TADEP, the Project research outcomes have translated into long-term Program development impacts that respond to the Program goal.	Actual number of activities targeted towards <b>building the capacity of farmers, SMEs and micro-enterprises</b> , the number of beneficiaries (men and women) and the nature of the impact	(F) Female and male attendance at VCE training activities (F) Total of farming families reached by VCEs (G) Female entrepreneurs and smallholders have participated in a range of demonstration and training activities for canarium (described below). (S) Material for delivery of training to grower groups involved in commercial kaukau production using clean seed have been developed.
		Actual number of activities targeted towards <b>building the RD&amp;E capacity of institutions</b> , the number of beneficiaries (men and women) and the nature of the impact	(F) Number of staff actively involved in research and M&E (F) Number of joint publications/conference papers (G) Research team has worked intensively with NARI staff in processing research, marketing and social research (2 female and 3 male beneficiaries at NARI).
		Actual number of <b>Project participants</b> (men and women) whose <b>knowledge, attitudes, skills and aspirations</b> (KASA) have specifically benefited through involvement in Project team and the nature of the impact	(F) Reported changes in VCEs KASA. (G) The numbers of smallholder farmers selling galip to the factory as a result of the increased factory capacity more than doubled in 2016 and around 650 farmers are now participating the emerging industry.
		Actual number of short-term <b>training events</b> and <b>post-graduate training opportunities</b> , the number of beneficiaries (men and women) and the nature of the impact	(F) Total of training activities for VCEs (F) Total of farmers reached by VCEs (F) Number of Masters projects (G) Female entrepreneurs and smallholders have participated in a range of demonstration and training activities for canarium including: <ul style="list-style-type: none"> <li>• Cracking, drying, processing, packaging, labelling training day for 25 small-scale entrepreneurs who were already engaged in the marketing and sale of galip.</li> <li>▪ A workshop for small scale female entrepreneurs. In addition, three women have been intensively mentored to value</li> </ul>

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
			<p>add galip nut and two have adopted training.</p> <ul style="list-style-type: none"> <li>▪ Mechanical crackers were demonstrated to several hundred people at the World Environment Day event, NARI, Tinanagalip and Vunamarita training days</li> <li>▪ Solar drying training for 37 female smallholders and small scale entrepreneurs at two training events (one a remote community without power).</li> <li>▪ Processing, food safety, health and hygiene translated by a local trainer to 50 female smallholders and small-scale entrepreneurs over three training days.</li> </ul>
		Actual number of activities undertaken in <b>geographically and socio-economically diverse locations</b> and the nature of the impact	(F) Total of activities by region (5)
		Potential number of beneficiaries (men and women) including the farmers themselves who can reasonably be expected to benefit from <b>increased capacity of farmers</b> within five and ten years after completion of this Program and the nature of the impact	
		Potential number of beneficiaries (men and women) including the institutions themselves who can reasonably be expected to benefit from <b>increased RD&amp;E capacity of institutions</b> within five and ten years after completion of this Program and the nature of the impact	
		Potential number of beneficiaries (men and women) whose <b>knowledge, attitudes, skills and aspirations</b> (KASA) can reasonably be expected to benefit from involvement in Project team and the nature of the impact	
		Potential number of beneficiaries (men and women) who can reasonably be expected to	

Program objective	Vision of success	Verifiable Indicators	Evidence your Project will provide
		benefit from short-term <b>training events</b> and <b>post-graduate training opportunities</b> and the nature of the impact	
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from activities undertaken in <b>geographically and socio-economically diverse locations</b> and the nature of the impact	



# Improving opportunities for economic development for women smallholders in rural Papua New Guinea

## Overview

This project aims to enhance the economic development of PNG women smallholders and their families by building their agricultural and business acumen.

Women smallholders are key to PNG family livelihoods. They produce essential subsistence crops whilst undertaking valued social roles such as family care. They face, however, significant constraints, including limited access to productive resources, limited financial skills, lack of understanding and access to markets, unequal gendered family roles and division of labour, restrictions to mobility, and overall safety. They are educationally disadvantaged because few have completed school and their access to training or extension services is limited. Although most women aspire to improve their family livelihoods, very few women farmers have the necessary agricultural and business acumen.

A previous ACIAR project (ASEM/2010/052) demonstrated that when families see their agricultural work as a small family business and use a family team approach, farming families are more equitable and effective and improve their livelihoods. Grass-roots village community educators (VCEs) are trained to share the Family Farm Teams program through farmer-to farmer and group learning activities. This project now seeks to understand the effectiveness of the approach at scale and across a broader range of commodities and geographies.

## Research

The research objectives are to:

1. examine women's capacity development as community-based agricultural leaders
2. explore ways in which communities can develop partnerships with the private sector, schools and training providers that are relevant to the local context and culture
3. further develop the peer education model of agricultural extension
4. examine the uptake and impact of a family team approach to farming for women and girls.

ACIAR project number

Start date and duration

Location

Budget

Project leader and  
Commissioned  
Organisation

Partner country  
project leaders  
and their institutions

ACIAR Research  
Program Manager

**ASEM/2014/095**

July 2015 ( 3 years)

Papua New Guinea

**\$3,000,000**

Barbara Pamphilon, University of  
Canberra

Dr Norah Omot, National  
Agricultural Research Institute,  
(NARI)  
Associate Professor Lalen Simeon  
& Dr Elisapesi Manson, Pacific  
Adventist University (PAU)  
Ms Fredah Wantum, Baptist Union  
of PNG (BU)  
Ms Lilly Be'soer, Voice for Change  
(VfC)  
Ms Barbara Tanne, Bougainville  
Women's Federation (BWF)  
Mr Robert Lutelele, Fresh Produce  
Development Agency (FPDA)  
Associate Professor Rajashekhar  
Rao, University of Technology, PNG  
(UniTech)  
Mr Gideon Bogosia, New Ireland  
Department of Primary Industries  
(NI DPI)  
Ms Anna Bryan, CARE PNG

**Jayne Curnow**

**Research partners:** National Agricultural Research Institute (country leader), Pacific Adventist University (evaluator), University of Technology (agricultural development), CARE PNG (ripple effect mapping)



## Achievements

### 2015—2016 Highlands Hub

- Baptist Union (Western Highlands—Alona ward, Mul-Baiyer district)
- FPDA (Eastern Highlands—Goroka, Daulo districts)
- Voice for Change (Jiwaka—North Waghi, South Waghi, Anglimp districts)

### 95 women and 21 men were trained as VCEs in the Family Farm Team modules:

- Working as a family team for family goals
- Planning your family farm as a family team
- Feeding your family team (a new module developed in response to the PNG drought)
- Communicating and decision making as a family team

### PNG agencies provided specialist training

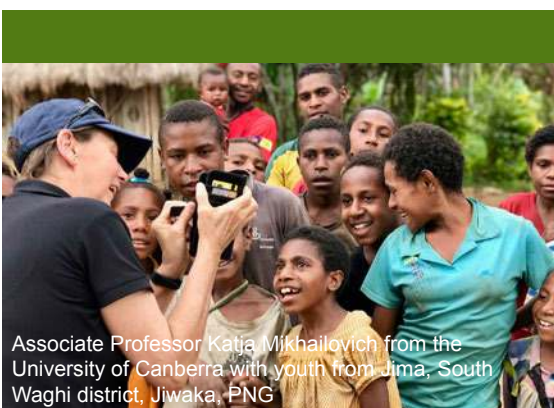
- Nationwide Microbank —Budgeting, banking and saving, plus training two VCEs per area as mobile phone bank agents (all areas)
- FPDA —Bulb onion commercial production model farms (Eastern and Western Highlands)
- UniTech — poultry production (Jiwaka)

The VCEs trained 896 other farmers (573 women, 323 men).

Financial training for illiterate farmers and professional development for primary teachers in agricultural topics were piloted (PAU).

### 2017 Islands Hub

- Bougainville Women's Federation, Tinputz Local Level Government
  - o Halia constituency: 26 F, 24 M VCEs
- New Ireland Department of Primary Industries, Tikana Local Level Government
  - o Ward 7 25 F, 24 M VCEs
  - o Ward 11 24 F, 20 M VCEs



Associate Professor Katia Mikhailovich from the University of Canberra with youth from Jima, South Waghi district, Jiwaka, PNG

## Impact story

Rose Koyean is the Western Highlands area leader for five women leaders and their teams of village community educators. She undertook the women's leadership and the Family Farm Teams training in 2015/6. These are her words.

'This training really helped me to humble myself and to be patient ... I used to be a very shy person ... I never had the courage to make a speech ... Today, I am leading six communities – when I call them to come, they all come ... I visit everyone in the community and I have seen changes in some families.'

'The seasonal calendar has really helped me. In the past I would plant different crops on my plot and would not plant another garden until I'd harvested the first one. I now plan what to plant and when to plant it. We always have enough food these days. I have realised that the new technique of planting a single crop on one plot has increased the yields.'

'My husband is now attending church with me ... In the past my husband and I never talked about the budget ... but today we are planning our budget together. The training truly changed my family to be united and happy.'

<http://pngwomen.estem-uc.edu.au/stories-of-change/>



Rose Koyea, Mul-Baiyer district woman leader.  
Photo: Barbara Pamphilon



# Enhancing private sector-led development of the canarium industry in PNG

## Overview

This project seeks to expand markets and processing of galip nuts in East New Britain, by strengthening private sector capacity and engagement using nuts from existing trees. Women conduct most canarium nut growing and trading activities, including cultivating, harvesting, processing and selling the nuts.

Nuts have huge potential to improve the livelihood of the rural poor in developing countries, and help to eradicate poverty and hunger. Nuts are highly nutritious, and can be stored, sold for cash, processed, and exported to distant markets. Galip nut (*Canarium indicum*) is an edible nut produced by an agroforestry tree, and donor agencies have focused on commercializing the industry in PNG and the Pacific.

The project is a partnership with NARI and offers interventions such as market research, technical advice, capacity building, business mentoring, and access to infrastructure for both private and public sector stakeholders. The private sector is targeted at three different scales: smallholder and small scale entrepreneurs, SMEs, and large scale processors. This is one of five projects in the TADEP program that aims to foster private sector led development in agriculture, increase agricultural productive capacity, and improve access to markets for farmers in Papua New Guinea and Bougainville, particularly women farmers.

## Research

There are four key objectives:

1. Assess what the private sector needs to participate in the canarium industry.
2. Develop and undertake research-based interventions that address the needs of the private sector including smallholders, small scale entrepreneurs (especially women), SMEs, and large scale processors.
3. Develop an appropriate commercial model for a medium scale value-adding factory for the canarium industry.
4. Create a model for public- private partnerships in the canarium industry in PNG.

ACIAR project number

**FST/2014/099**

Start date and duration

**30/06/2015-30/06/2018**

Location

Papua New Guinea

Budget

\$3,518,000

Project leader and  
Commissioned  
Organisation

Professor Helen Wallace,  
University of the Sunshine Coast

Partner country  
project leaders  
and their institutions

**National Agricultural Research  
Institute, Papua New Guinea**

ACIAR Research  
Program Manager

**Tony Bartlett**



Women from the local markets attending the PNG Galip project training day.

Photo: Emma Kill



## Achievements

The project team has

- set up a pilot factory at NARI Kerevat and developed processing technologies. These include a solar assisted large scale drier that can dry 8 tonnes of nuts a week using only a 2 kilowatt element.
- developed and refined methods for processing canarium; the factory products include raw and roasted kernels.
- tested the local markets' demand for canarium product. The products sell for 86 kina per kg and there is strong repeat demand. Products are out of stock awaiting the new season.

Female entrepreneurs and smallholders have participated in training activities, including:

- 25 small-scale entrepreneurs already marketing and selling galip were trained to crack, dry, process, package, and label the nuts.
- A workshop for small scale female entrepreneurs showcased a female entrepreneur from Vanuatu. Three women have been intensively mentored to introduce some technologies into their practice and to value add galip nut. Three small-scale entrepreneurs were mentored to source raw materials locally and improve processing, packaging and labelling.
- 37 female smallholders and small scale entrepreneurs were trained in solar drying at two training events (one in a remote community without power).
- 50 female smallholders and small-scale entrepreneurs were trained in processing, food safety, health and hygiene over three days.

## Impact story

The project has given many smallholder farmers access to markets for their galip nuts. Around 650 smallholder farmers are now selling galip nuts to the factory. The number of smallholder farmers selling galip to the factory more than doubled in 2016, as a result of the increased factory capacity.

Two small-scale entrepreneurs from the Kokopo markets, Anna Kopang and Doreen Frank, were trained to add value to galip nuts. These women were selling galip nuts the traditional way, as fresh kernels in a karamup (wrapped in banana leaves). Nuts sold this way have a very short shelf life, and must be sold or consumed within 2 days. The women received mentoring and training in food safety, drying, packaging, and labelling their products. Drying and value adding will give their galip nuts a shelf life of around 3 months, and allow them to ask a higher price for their products. These women have prepared labelling and packages, and are planning to sell their own dried and labelled product this coming galip season.



Anna Kopang selling nuts at Kokopo markets, East New Britain, Papua New Guinea. Photo: Simaima Ling Kapi



APRIL 2017

# Developing the cocoa value chain in Bougainville

## Overview

Bougainville is an autonomous Papua New Guinean province recovering from a decade-long crisis that disrupted society and the economy. Before the crisis, cocoa was a major contributor to the economy; over 80 per cent of Bougainvilleans were involved in cocoa production.

This project's specific aim is to improve the profitability and vitality of smallholder cocoa farming families and communities in Bougainville. The project will foster and strengthen public and private sector partnerships and help to develop enterprises that enhance productivity and access to premium markets, while promoting gender equity, community health and well-being. Its key partners are the Autonomous Bougainville Government (ABG) Departments of Primary Industries and Marine Resources, Local Government and Health, the University of Natural Resources and Environment, and the PNG-Cocoa and Coconut Institute.

## Research

The project has four objectives:

- » To improve the productivity, profitability and sustainability of cocoa farming and related enterprises;
- » To understand and raise awareness of the opportunities for improved nutrition and health to contribute to agricultural productivity and livelihoods;
- » To foster innovation and enterprise development at community level; and
- » To strengthen value chains for cocoa and associated horticultural products

ACIAR project number	HORT/2014/094
Start date and duration (years)	2016, 6 years
Location	Autonomous Region of Bougainville, PNG
Budget	AUD \$5,994,982

### Project leader(s) and Commissioned Organisation

David Guest, The University of Sydney

### Partner country project leaders and their institutions

Thomas Betitis, ABG Department of Primary Industries and Marine Resources

### ACIAR Research Program Manager

Richard Markham



**ACIAR**  
aciar.gov.au

## Achievements

While the project officially started on 1 January, funds were not received until mid-2016

During this period the researchers consulted with project partners, Government, NGO and private stakeholders and planned their project in detail. Project staff participated in DFAT's "Gender in cocoa value chains" (Brisbane, October 2015) and "Nutrition-sensitive agriculture" workshops (Canberra, November 2015)

In collaboration with the Australian High Commission, the researchers led a tour of Sulawesi for ABG Ministers (November 2015). They planned the Bougainville Chocolate Festival (5 & 6 July 2016)

PNG project manager appointed (January 2016) and relocated to Buka (June-Dec 2016)

Inception workshop, PIPA and project workplan developed (February 2016)

Establishment of Project Stakeholders Reference Group (February 2016)

Participated in the annual TADEP meeting (May 2016)

Ran cocoa marketing skills training (May 2016)

Renovated accommodation for project staff (May 2016)

Drafting and piloting of Baseline surveys and Ethics Approvals (February-June 2016) TADEP meeting (Tavilo, May 2016)



# Enterprise-driven transformation of family cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea

## Overview

Cocoa production in PNG, always low due to poor management, was nearly destroyed by the incursion in 2006 of the Cocoa Pod Borer (CPB). The industry can be revived only by more intensive management of the crop using new clonal varieties and methods the PNG Cocoa Coconut Institute (CCI) developed that can increase yields to high levels.

The aim of the project is to have these new varieties and straightforward methods applied more widely on the smallholder farms that make up more than 90% of production.

This will be done by linking the existing extension services of CCI, Provincial and District Governments and private cocoa companies to develop village-based cocoa advisory (Cocoa Model Farmer-Trainers, CMFTs), budwood gardens and nurseries, and other services (e.g. fermentaries, farm supplies, cocoa buying) as self-sustaining micro-enterprises. CMFTs (usually a man and woman team) are being recruited from at least 20 wards in each Province; given a short, hands-on training in the new methods of cocoa propagation and management; and supported to return to their home villages to establish, with their farmer group, commercial budwood gardens and nurseries and to teach other farmers. CMFTs will introduce and evaluate the new methods and varieties on farms with farmer participation, as well as new cocoa farming systems integrating food crops, high value shade trees (e.g. galip nut, coconut, betel nut, bananas), and livestock such as goats.

## Research

- An important research question is whether the project's proposed capacity building method (the recruitment of Cocoa Model Farmer Trainers from villages and their training and return to their homes as a source of advice and training for others) will be successful in providing a permanent, effective and self-sustaining source of training and advice in villages and wards. This depends to some extent on farmers' willingness to pay the CMFTs a small fee for advice. (We expect that a sharp jump in profits

ACIAR project number	HORT/2014/096
Start date and duration	Feb 2016 (5 years)
Location	Papua New Guinea
Budget	\$4,990,000
Project leader and Commissioned Organisation	Dr Philip Keane, LaTrobe University
Partner country project leaders and their institutions	Mr Alfred Nongkas, PNG Cocoa Coconut Institute Ltd. Dr Samson Laup, PNG University of Natural Resources and Environment
ACIAR Research Program Manager	Dr Richard Markham

from more intensive management of cocoa will encourage farmers to support the sources of advice in their midst.) So far it appears that the establishment of budwood gardens and nurseries will be commercially successful.

The project will facilitate scientists from CCI and project staff to conduct research into:

- maintaining soil fertility on farms in various locations;
  - collecting new sources of Trinitario cocoa clones that have thrived for many years on farms;
  - the possible build-up of biological control of Cocoa Pod Borer (as has occurred in Indonesia);
  - the physiology and performance of cocoa clones at high altitude at Karamui and the selection of cocoa varieties adapted to this location;
  - integrating food crops, high-value shade trees and livestock with intensive cocoa farming; and
  - developing cheaper plastic-covered solar driers that farmers can construct.
- The possibility of establishing cocoa and Gliricidia shade on the kunai grasslands of the Sepik River Plains has developed as an important research question.



## Achievements

- The Project Managers, Alfred Nongkas and Trevor Clarke, have initiated the project, initially working with Kula Daslogo in New Ireland, and later with Jimmy Risimeri in East Sepik and Aitul Weoh in Madang Provinces. They have conducted village awareness meetings and recruited and trained Cocoa Model Farmer-Trainers (CMFTs), leading to the establishment of many budwood gardens and nurseries able to propagate the new CCI cocoa clones for widespread distribution to farmers.
- Provincial and District Government officers have been involved enthusiastically in all aspects of project implementation, while NGIP-Agmark and the Productive Partnerships in Agriculture Project (PPAP) have provided on-going advice.
- A meeting of the Simbu Cocoa Development Steering Committee was led by John Konam and Damien Tokei in Karamui Settlement in 2016, with the enthusiastic participation of Provincial and District Administration staff and farmers. Selection of the best adapted types from the CCI trial planting at Karamui has begun.
- Project Managers have received support from authorities to test a relatively cheap, plastic-covered solar drier that will help reduce the problem of smoke tainting of cocoa beans caused by kiln driers. Several of these driers have been built for testing.
- Following the enthusiasm farmers and government agricultural officers expressed during the awareness meeting, the number of CMFTs to be supported in the project has been doubled to 66 (more than 20 in each coastal province).
- The CCI Extension Manual and a PNG Cocoa Farmer's Handbook have been edited and are being published; Trevor and Alfred have translated the Handbook into Tok Pisin. These books should be available to project participants in late 2017.

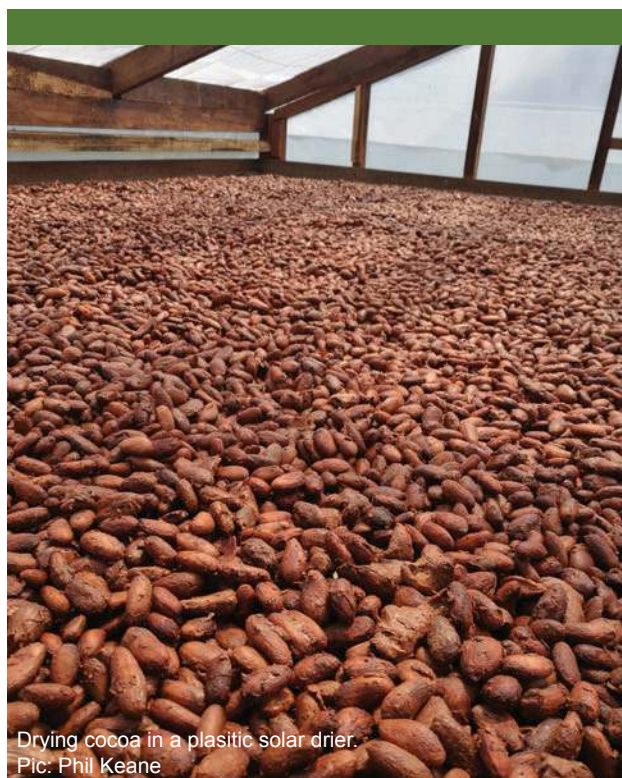


Farm nursery in West Sepik.  
Pic Phil Keane

## Impact story

Thompson Fafungian, a former police inspector, has been assisting his home village in East Yangoru, East Sepik Province, to expand cocoa production to improve the livelihoods of his people. His niece, Nola Sasingian, and her husband Chris have trained as CMFTs. They have developed a nursery and a budwood garden with the new cocoa clones, and constructed a group nursery, a fermentary, and a new design of solar cocoa drier.

Wilson Miroi, a civil engineer who runs a successful road-building and construction business in Aitape, set up his cocoa project using his own funds and mainly employing his company staff to give them a livelihood between construction projects. He attended Kula Daslogo's training session in Nov 2016 with his wife Cathy, a CMFT in New Ireland. He has since implemented the CCI/ACIAR Project strategy in his father's home area of Malol, near Aitape in West Sepik. He has established a budwood garden of the latest CCI clones, and an extremely active nursery with many capable budders. Altogether he has established over 40 CMFT groups servicing nearly 2,000 farmers throughout West Sepik. Wilson. He has already built a new style combination solar/kiln drier, successfully dried his first batches of cocoa, and is fielding interest from niche markets. One of his lead nursery staff, Grace Klembasa, who is also a lead cocoa farmer, won several awards in the Cocoa Warwagira Festival in Kokopo in May 2017; she will travel to Paris as part of her award. Grace is leading a group of 16 farmers, most of whom have cleared and marked blocks ready for planting. Many villages in the Malol, Poro and Arop areas, including Grace's, were severely affected by the disastrous tsunami there in July 1998.



Drying cocoa in a plastic solar drier.  
Pic: Phil Keane





# Supporting commercial sweetpotato production and marketing in the PNG highlands

## Overview

The economy of the PNG Highlands, especially in those areas with relatively good transport infrastructure, is evolving rapidly, as smallholders turn from subsistence farming to market-oriented production. Sweetpotato (kaukau) plays a key role in this evolution; it has become a cash crop in its own right and assures food security in more diverse systems with coffee, vegetables and small livestock providing a cash income.

This project supports smallholders to turn from subsistence farming towards market-oriented production, producing specifically for the market and managing production to meet market/customer requirements.

This project will support an expansion in market-oriented sweet potato value chains by strengthening supply chains to selected high value markets and promoting enterprise development along supply chains. It will also improve crop production capacity by introducing a scheme to supply clean, high performing planting material. An increase in market-oriented production will create income generating opportunities for growers, and enable other groups to enter sweetpotato fresh product and sweetpotato-based food product supply chains.

## Research

The project has three specific objectives:

1. To develop and strengthen market-oriented sweetpotato supply chains
2. To build the capacity of sweetpotato value chain players
3. To develop a 'clean seed' scheme to increase availability of clean planting material of sweetpotato

The project's long term outcome will be increased, sustained contribution of sweetpotato to the cash income and food security of producers and their communities in selected PNG Highland communities.

ACIAR project number	<b>HORT/2014/097</b>
Start date and duration	1ST March 2016 (5years)
Location	Papua New Guinea
Budget	\$4,998,084
Project leader and Commissioned Organisation	Prof Phil Brown CQUniversity
Partner country project leaders and their institutions	Mr Robert Lutulele Fresh Produce Development Agency, PNG Dr Ramakrishna Akkinapally National Agricultural Research Institute, PNG
ACIAR Research Program Manager	Dr Richard Markham

To achieve this outcome, the project is:

- identifying and prioritising value chain opportunities, and addressing technical and capability gaps in these chains
- ensuring availability of clean (pathogen-free) planting material for growers and adoption of associated production management practices to achieve higher yields, better quality and greater returns per labour input.

## Achievements

- Three commercial growers have multiplied foundation clean planting material stock in insect proof screenhouses. Clean planting material from these sites has been distributed to more than 25 commercial and semi-commercial growers in the Jiwaka, Hagen and Asaro regions.
- 17 growers have given their consent to establish larger scale commercial nurseries for multiplying clean planting material.
- Korowest and Rachel, two commercially important varieties of sweetpotato, have been tissue cultured and are being treated to remove viruses so they can be included in the clean seed scheme.
- We have established initial protocols for rapid virus testing using Loop-Mediated Isothermal Amplification.
- We have completed a socio-economic review of sweetpotato production and marketing in PNG.
- We have mapped sweetpotato supply chains and interviewed 88 commercial growers/traders using the Commcare app.
- We have developed training materials for grower communities, and reached an in principle agreement for the training to be accredited under the PNG National Standard for Community Development Workers.
- All project staff appointments have now been made, with a PNG-based training coordinator and an Australia-based value chain researcher appointed in 2017.

## Impact story

Growers in Jiwaka and Western Highlands provinces have reported that crops grown from clean seed supplied through the project not only produce higher yields but that the quality of the harvested roots is higher. One benefit of this improved quality is that buyers at roadside and town marketplaces prefer these sweetpotatoes, so the produce sells faster.

As women are nearly always responsible for selling produce in the markets, faster sales mean that they need to spend less time at the markets. Facilities are often lacking at markets, and security can be an issue for women, so the opportunity to sell produce faster is a welcome benefit of the project's clean seed technology.

