

DFAT-ACIAR

PNG Economic Development Program
and Bougainville Agriculture Program



TADep+

TRANSFORMATIVE AGRICULTURE *and* ENTERPRISE DEVELOPMENT PROGRAM *plus*

A multidisciplinary research program
that aims to improve the livelihoods of
rural men and women in Papua New Guinea

2018/19 ANNUAL REPORT



Australian Government
Australian Centre for
International Agricultural Research

**Australian
Aid** 

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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 International Agricultural Research (ACIAR). This Annual Report summarises activities and progress in the period from 1 July 2018 to 30 June 2019.

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

Year	2015	2016	2017	2018	2019	2020	2021
Bougainville Cocoa		February 2016					December 2021
PNG Cocoa		March 2016				February 2021	
Sweetpotato		February 2016					December 2021
Family Farm Teams	July 2015			March 2019			
Galip nut	September 2015			December 2018			

Figure 1: Timeline of TADEP projects as components of the program.

Due to the staggered commencement dates of the projects and varying project lengths, two of the five projects have concluded in this reporting period with the remaining three to conclude in 2021. Whilst the Family Farm Teams and Galip Nut projects have concluded as formal component projects of the program, both project teams have agreed to continue to contribute to the program in the next phases of their research, either as a project with other donors or as an ACIAR project. To reflect this evolution, the program has been informally rebranded as TADEP+.

Whilst the timelines of the individual component projects vary, the design of the multidisciplinary research for development program, or its program logic, articulates what the program can expect to achieve along its six-year timeframe. As TADEP+ is over halfway through its program design, research outcomes and early evidence of research impacts have emerged, as reported in the program Performance Framework (refer to page 61).

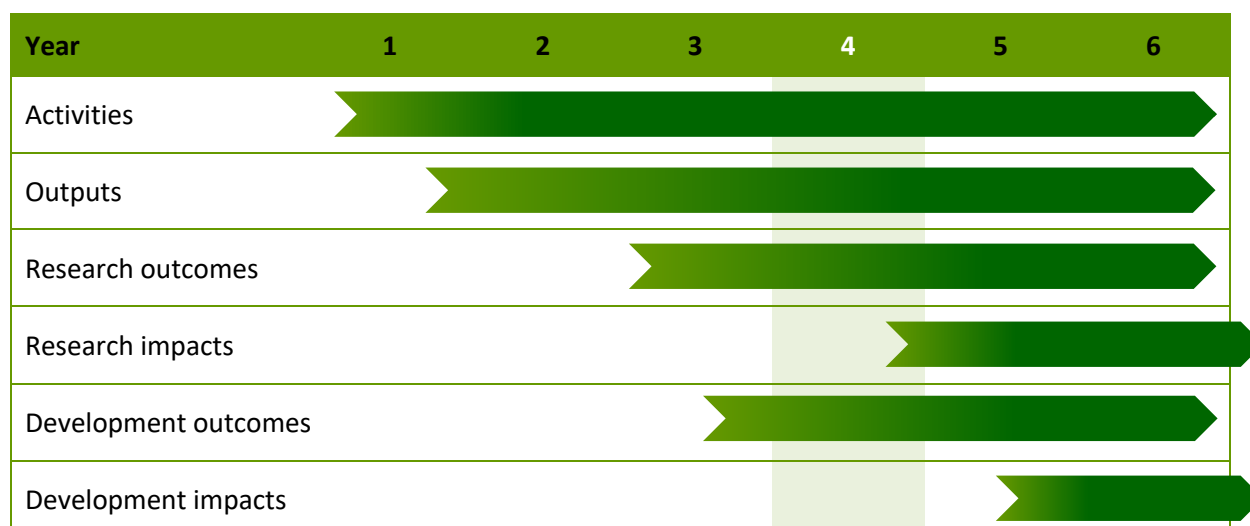


Figure 2: An example of anticipated timing of outcomes and impacts for a research for development (R4D) project or program.

The monitoring and evaluation (M&E) framework articulates how each of the projects are responding to the higher-level goals of the program. Other key roles of TADEP+ are to facilitate opportunities for cross-program collaboration and capacity building, deliver a coherent and coordinated communications strategy, and ensure that the guiding principles of gender equity and private-sector led development are embedded across all program-level activities.

This annual report distils the significant progress of the program against the guiding principles (refer to page 10) and towards each of the program elements (refer to page 17). The program elements describe the extent to which TADEP+ delivers value beyond the sum of the component projects, and are summarised as follows:

- Communications
 - Development and launch of a program website: www.tadep-png.com
 - Seven comprehensive Monthly Updates sent to +160 recipients detailing progress of the component projects and more broadly of the program
 - Annual Meeting which facilitates formal updates and exchanges of information as well as informal opportunities for interactions between projects, the program and partner organisations
 - Steering Committees meetings in February and June 2019
 - Numerous stakeholder meetings held in Canberra and various locations across PNG with donor agencies, project teams, partner organisations
 - Project teams meeting with DFAT representatives and other key stakeholders during transit through Port Moresby and other major centres
 - Stories communicating the impact of the projects featured in print media, online blogs and articles, social media
 - Development of a series of videos communicating stories of impact that align with five over-arching program objectives

- Collaboration
 - Ongoing, proactive relationship management with donor agencies, the projects and partner organisations
 - Identification and facilitation of synergies between projects and other relevant programs in PNG
 - Facilitated and approved a Collaborative Research Grant in addition to the three existing grants
 - Hosted the 2019 TADEP+ Annual Meeting and Mid-Term Review in Goroka, Eastern Highlands Province
- Capacity building
 - Exposure of project teams to other diverse and experienced researchers
 - Opportunities for project team members to learn from research and approaches from other disciplines
 - Formal training as part of project activities or Collaborative Research Grant activities

TADEP is progressing well against each of the program objectives and is delivering value as a multidisciplinary research for development program. The program will continue to evolve as it matures and ideas for greater or improved cross-program collaboration are identified.

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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.

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. About half of the labour force work in agriculture, which generates 15% of gross domestic product (GDP). While an estimated 30% of the land is suitable for agriculture, only 2.2% is used for commercial agriculture. 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. Long-term commitment and holistic approaches are needed to address these complex challenges and generate sustainable solutions.

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.

Late last year, the PNG Government released its Medium-Term Development Plan III (MTDP III) 2018–2022, which describes the objectives, strategies and financing plan towards achieving its aspirational, long-term Vision 2050. The PNG National Agriculture Development Plan also aligns with Vision 2050 and the MTDP III, 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.

2. Why a program?

Recognising the valuable role and outcomes that the Australian Centre for International Agricultural Research (ACIAR) has in brokering research for development (R4D) projects in Papua New Guinea, a new multi-disciplinary programmatic approach was developed to address priority areas of development in PNG. The Australian Department of Foreign Affairs and Trade (DFAT) partnered with ACIAR to co-fund the Transformative Agriculture and Enterprise Development Program (TADEP) which focuses on opportunities to scale up and scale out successful innovations from previous ACIAR projects in PNG. The program constitutes of two separate records of understanding (ROU), relating to areas of focus for both the PNG and Australian governments:

- PNG Economic Development Program (ROU 14376, Sch 53)
- Bougainville Agriculture Program (ROU 14376, Sch 54)

Commencing in April 2015, the multidisciplinary research program aims “to improve livelihoods of rural men and women in Papua New Guinea”. TADEP has a series of correlating objectives that help realise this fundamental aim and identify key areas of change that the program seeks to catalyse:

- 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 strengthen value chains
- To promote gender equity and women’s empowerment in rural communities
- To build individual and institutional capacity

The multidisciplinary and adaptive approach of TADEP intends to dispel the sometimes-siloed approach to research, policy and development practice, recognising the value of a systems-thinking methodology to address intrinsically interconnected and complex challenges. Whilst the PNG context is the commonality between the five impact-focused research for development (R4D) projects within TADEP, the projects are otherwise diverse in research subject and goal.

The five projects are:

- 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)
- *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)

*As mentioned in the Executive Summary, both the Family Farm Teams and Galip Nut projects have formally concluded as part of TADEP but have agreed to continue to contribute to the program as both see value in a multidisciplinary and collaborative approaches. This evolution is reflected in the informal rebrand of the program as TADEP+.

In partnership with multiple institutes in PNG, each of the projects has a legacy of research which TADEP+ seeks to build upon, or *transform* – as per the implicit transformative nature of the program. A critical element of this transformative agricultural research is also how it enables economic development opportunities, ultimately *transforming* the lives of rural men and women in PNG.

TADEP+ derives its name from, for example, the ability of women's groups to *transform* themselves and their businesses from subsistence to small enterprise; that sweetpotato can be *transformed* from a subsistence crop to a cash-crop for urban markets and also as a raw material for new products, that cocoa can be *transformed* from an opportunistic forest crop to an intensive and profitable garden crop; and that standing plantations of galip nut can be *transformed* into the basis of a new industry. *Transformation* and *enterprise development*, especially through women's groups and the private sector, are the essence of the program

The impetus for scaling up and scaling out of the project's successful innovations is enabled by private sector involvement at various points along the value chain, from increasing productive capacity to market development and access. This has and will continue to 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. The Family Farm Teams methodology 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, and has been widely adopted across the program.

The role of TADEP+ is to facilitate opportunities for cross-program collaboration and capacity building, deliver a coherent and coordinated communications strategy, develop and maintain a program-wide participatory monitoring and evaluation framework, and ensure that the guiding principles of gender equity and private-sector led development are embedded across all program-level activities. 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.

Ultimately, TADEP+ seeks to embody the agricultural research for development (R4D) methodology where emphasis is placed on the *impact* of the research, rather than just the *output*, which is afforded by the diversity, design, geographical spread and scalability of the five component projects.

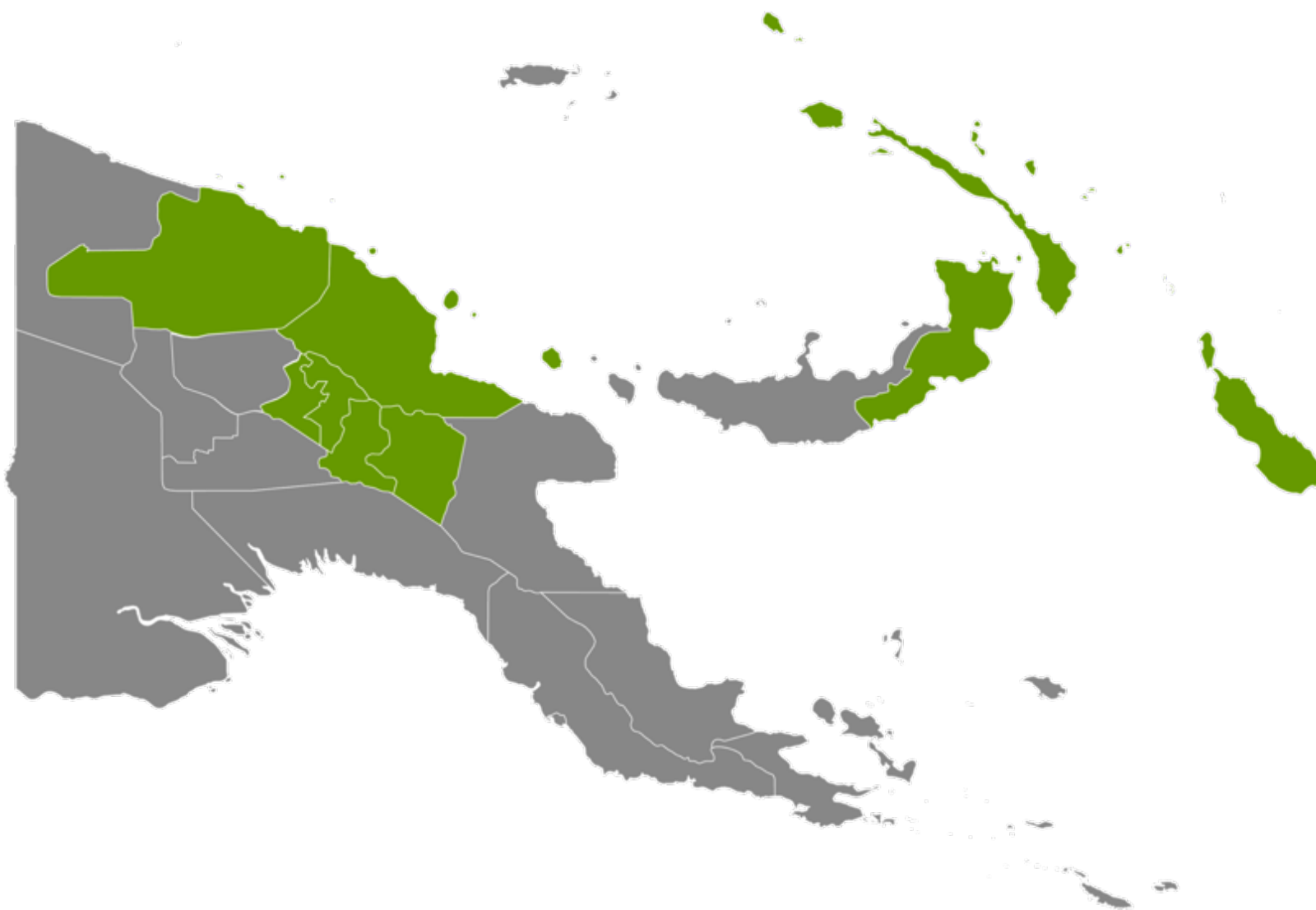


Figure 3: TADEP areas of focus in Papua New Guinea and the Autonomous Region of Bougainville. (Source: FreeVectorMaps.com)

3. Program principles

To support the projects in delivering against the TADEP+ goals, the program has focused on facilitating cross project learning relating to two core principles:

- i. Gender equity and women's economic empowerment, and
- ii. Private sector-led development.

Gender equity and women's economic empowerment

Context

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 cash crop marketing and financial decision making. In addition, women often face significant constraints that further gender inequity such as 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 research¹ 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.

Gender equality or equality between women and men refers to the equal enjoyment by men and women of all ages of rights, socially valued goods, opportunities, resources and rewards. Gender equity refers to fair treatment for women and men according to their respective needs.²

Progress

Whilst gender equity is a core focus of the PNG and Australian governments and an objective of TADEP+, the inclusion of the Family Farms Team project in the program has successfully translated this aspirational goal into practical approaches and considerations for ensuring that both men and women are actively and equally included and contributing. The Family Farm Teams project has sought to scale out the family farm teams approach across a range of commodities and geographies,

¹ ASEM/2010/052: Examining women's business acumen in Papua New Guinea: Working with women smallholders in horticulture

² ACIAR Gender Equity Policy and Strategy 2017-2021

as well as via the other TADEP+ project activities and Collaborative Research Grants (refer to page 24).

The premise of the approach is to engage 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 to access training and resources, with support and assistance from their husbands and families, has improved significantly.

To build on the existing relationships and progress already made by the PNG Cocoa project in its focus provinces, the Family Farms Teams project has been value adding to Cocoa Model Farmer-Trainer (CMFT) training already being undertaken with additional training in the family farm teams approach. Initially, there was a bias toward male farmers in the 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 leading to whole-of-family cooperation. Of the initial 75 CMFTs, about 65 involve both husband and wives, with one unmarried CMFT being supported by his mother, who attends training sessions with him. There is also one group of CMFTs that is considered as an all-women group, with strong support from their husbands. Furthermore, one of the senior research staff from the PNG Cocoa project, Dr Josephine Saul-Maora, has become an accredited family farm teams trainer and has been co-delivering training with other accredited trainers in New Ireland. This training will now be extended across the other provinces in the PNG Cocoa project.

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 recognised and involved in cocoa farming. Whilst women are traditionally more involved in the food crop production, the more manageably-sized and integrated cocoa systems of the PNG Cocoa project are providing more opportunities for them to be involved in cocoa production. When women are tending to the food crops, they are also checking the cocoa budwood gardens, which is helping the early identification of production issues and regular plot maintenance.



Aligned with the adage of *that which is measured, improves* is impetus of recording gender specific data for activities such as training and workshops. Sex-disaggregated data is data that provides a breakdown of men's and women's activities and perspectives by collecting separate data on men and women. Data can also be disaggregated by age, location, ethnic group, education, income and other demographic variables to help understand the differences between groups and to effectively target interventions and solutions.³

To assist in measuring the impact of the program in the livelihoods of rural men and women, the over-arching monitoring and evaluation performance framework for the program (refer to page 46) stipulates that attendance records for project activities are to be delineated by gender. This simple data point has helped highlight lack of diversity in some project activities, which has resulted in more proactive strategies to engage a broader cross-section of the community, including women and youth. The inclusive and considered nature of the family farm teams approach has also resulted in training being centric around whole of family involvement and collective decision making.

As women are equipped with greater knowledge and skills, their ability to meaningfully contribute in decision making and leadership is significantly improved. In the Bougainville Cocoa team there are more than 50 women directly involved in the project including interviewers trained to undertake the comprehensive household survey and hub coordinators. Similarly, the Sweetpotato and Family Farm Teams projects have almost equal numbers of women and men involved in the research team. One of the key staff to the Family Farm Teams and Bougainville Cocoa projects is a man employed with the Bougainville Women's Federation, championing and demonstrating the importance of gender equity. The Family Farm Teams project has also trained 183 female Village Community Educators (VCE) in the project's respective Highlands and Islands Hubs, along with 72 Islands women involved in leadership specific training in 2018.

The Galip Nut project has identified critical areas for improvement in small-scale processing, much of which is undertaken by women. From this, a mentoring program and multiple formal workshops were undertaken in East New Britain and Bougainville, which included tree maintenance, galip processing, food hygiene, income diversification, drying and value adding, depending on what is locally available. A Galip Club has also been formed in East New Britain and Port Moresby to support women to start and sustain micro-enterprises to add value and market galip products.

Many women are making small regular sales to the galip nut factory and this is improving their livelihoods. Female entrepreneurs and smallholders also have participated in a range of demonstration and training activities including multiple factory awareness and business

³ ACIAR Gender Equity Policy and Strategy 2017-2021

encouragement tours at the NARI Kerevat Islands Research Centre. Galip industry awareness, technologies and value adding expos have been held around the region catering to over 280 registered participants. The expos have demonstrated innovative ways to incorporate galip products into their livelihoods, including the use of solar driers and packaging to extend shelf life, value adding to galip nuts and baking with galip products.

Private sector-led development

Context

Given that 90% of Papua New Guinea's poor are living in rural areas and over 80% of the poor are rural-based semi-subsistence smallholder farmers, programs to promote sustainable economic development are critical to poverty alleviation. Most farmers are participating in some form of informal or formal market. By strengthening the markets themselves, improving farmer's access to these markets, increasing productivity, reducing limiting regulations and policy, building entrepreneurial skills and new enterprises, farmers are able to generate income and enhance their livelihoods. These strategies are central to the concept of private sector development, which seeks to promote economic growth and reducing poverty in developing countries by building private enterprises.

Private sector-led development (PSD) can seem complex and is often foreign to traditional research projects that focus mainly on research *outputs*. The five research for development (R4D) projects of TADEP+ contribute to longer-term and aspirational research and development *impacts* by capitalising on private sector development at varying levels.



Progress

The nature and scope of each of the TADEP projects has resulted in a wide range of engagement and partnerships with the private sector, and along the value chain. Understanding the motivations of the private sector to invest in a project and involving them early on the project has helped manage expectations, create trust and foster positive working relationships. An adaptive approach is also critical to success as markets shift and the supply and demand fluctuates.

The PNG Cocoa project has been training and working with 25 cocoa model farmer-trainers (CMFTs) in each target province to establish cocoa budwood gardens and correlating nurseries. Each of the 25 CMFTs has a group of approximately 75 farmers each that they will sell the best performing cocoa clones to and train in improved production practices. It was anticipated that these facilities would become self-sustaining SMEs but there are only few examples where CMFTs are acting as wet bean buying and drying businesses, and selling seedlings onto PPAP. There is a higher likelihood that the CMFTs will be able to sell their skills and knowledge of best practice in cocoa block management.

The Bougainville Cocoa project has also adopted a similar approach with Village Extension Workers (VEWs) and both cocoa projects have been leveraging partnerships with PPAP for seedling supply. Whilst the Bougainville Cocoa project is focused on improving productivity, the project has a stronger focus on market access and development, as evidenced by the Bougainville Chocolate Festival and the Taste and Tell event. The festival demonstrates best practice in production and processing of cocoa beans, but just as critically, invites potential private sector partners to attend and establish relationships directly with farmers. Similarly, the Taste and Tell event engages chocolate makers from across Australia to showcase the fine flavour cocoa from Bougainville with the intention of increasing demand. Both events have demonstrated that there is demand for high quality cocoa from Bougainville but challenges with licencing, logistics and value chain capacity are limiting further expansion.

Conversely, the sweetpotato project is focussed on leveraging opportunities in the PNG domestic market. Since mapping the supply chain of sweetpotato to its major markets, significant improvements have been made in product quality and logistics, and a trial shipment of high quality sweetpotato from EHP has been delivered to two supermarket chains in Port Moresby. The final product was graded and packed into boxes rather than large bags to retain quality during transport. Growers involved in the project are now increasing sales to supermarket chains.

As part of a strategy to create SMEs to propagate and disseminate the clean seed sweetpotato, 14 commercial propagation facilities have been established, each with a network of farmers that liaise with and purchase from these new commercial businesses. These 14 commercial farmers participated in a study tour to Australia, learning about production and marketing practices used by the Australian industry. Lessons learnt on the tour have been implemented in PNG to help drive an expansion in commercial production. One commercial seed grower has been successful in developing his business to supply other growers with clean vines and has reported proceeds of over PGK4,000 from sales.

As farming families transition from subsistence practices to the formal economy, they require support and practical skills to they are better equipped to build the strong, equitable and sustainable family units that are key to improved livelihoods. The family farm teams (FFT) program aims to provide a whole-of-family approach to farm planning and decision making, and the development of diverse income generating activities. The Fresh Produce Development Agency (FPDA) is a project partner and has delivered specific training to farmers in bulb onion production. FPDA has made a commitment to working with the eight women leaders on the establishment of further model farms for bulb onion in the Eastern Highlands Province. Similarly, Voice for Change (VfC) is working on a funded extension to further develop the skills of two female and two male leaders who will extend the FFT program to new communities in Jiwaka. Baptist Union (BU) is working on a funded extension to further develop the Kwinkya Women's Resource Centre as a regional demonstration farm in the Western Highlands Province.

At the commencement of the project, the supply and demand of Galip Nut in the domestic market was largely unknown. The project has since undertaken a series of product development research to better understand the product attributes and correlating market scope. The traditional markets still remain a strong feature in the value chain, with new retail markets in Kokopo and Port Moresby now

being serviced. Both markets have distinct differences in size and product offering, with the traditional markets dominated by SMEs and the new retail opportunities calling for a uniformly packaged and branded product.

An alternative market has also been established for galip nut farmers, whereby they can deliver their product to the factory at NARI Kerevat for PGK1.50/kg or have it collected by cooperatives such as the East New Britain Women in Agriculture for PGK1.00/kg. Of the data collected, there were 544 farmers selling directly to the factory with another 115 farmers selling via the cooperative.

Galip Clubs of SMEs in East New Britain and Port Moresby have been formed to provide additional processing and marketing training and mentorship, enabling the farmers and farming families to become more financial sustainable.

In the formal retail market, the Galip Nut project has created two public-private partnerships. The project team and NARI are working closely with The Canarium Nut Co, a NZ based investor, co-funded by MFAT in New Zealand. They are currently negotiating to lease the NARI factory and operate it commercially half time and will work closely with the project team. CPL, a PNG based company has agreed to partner with the project team to act as a distributor for the product for the market testing phase in Port Moresby. The success of the two launch events in Kokopo and Port Moresby mid-year has proven the market demand for the product, with supply now being the biggest constraint for further development.

The private sector interest in the industry has grown with four processors now investing in galip nut processing; DMS, Bisi Trading, Niugini Organics and Equanut. They are sourcing and producing their own value-added product separately to the NARI factory.

4. Program elements

The role of the program is to facilitate opportunities for cross-program *collaboration* and *capacity building*, deliver a coherent and coordinated *communications* strategy, develop and maintain a program-wide participatory *monitoring and evaluation* framework, and ensure that the guiding principles of gender equity and private-sector led development are embedded across all program-level activities, as mentioned above. The success of TADEP+ as a program will be judged in part by the extent to which it delivers value beyond the sum of the component projects, and the extent to which the projects contribute to the overall TADEP+ performance indicators.

The following three sections articulate how TADEP+ is adding value to the otherwise distinct component projects as a coherent multidisciplinary program. The participatory monitoring and evaluation (M&E) program performance framework is explained and reported against later in the report (refer to page 61).

Communication

Communication across and beyond TADEP+ is critical to the success of the program. The program communications strategy targets internal (projects, partner agencies, funding bodies) and external (other ACIAR projects, other programs in PNG) stakeholders with a multiple tools, regularity and purposes. The cross-program communication assists with the identification and facilitation of coordinated and collaborative activities.

TADEP+ Updates

Updates were previously circulated on a monthly basis but after feedback from the program Mid-Term Review, the frequency was reduced to bimonthly. Progress reports are collated by the Program Coordinator and circulated to a database of +160 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 TADEP+ 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 TADEP+ 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.



As of September 2017, the TADEP+ Updates were transferred into an online newsletter platform, MailChimp, which provides branded templates to customise content and improve readership. The format of the TADEP+ Updates altered slightly to feature a short summary of three or four dot points per project with links to the extended version with the full updates. MailChimp also provides useful data on open and click rates of featured hyperlinks. The open rate of the TADEP+ Updates has increased from 43.20% in the previous reporting period to 45.03% in the past 12 months, which is significantly higher than compared to 26.52% for government and 23.12% for agriculture and food services.

The TADEP+ Updates can be likened to an innovation platform, which is a mechanism to foster interactions that facilitate information exchange and learning amongst projects, leading to idea generation and innovation. Most of the connections generated across the program are of a serendipitous nature, when projects are working geographically in the same area or when a key learning is discovered and applied to a different context.

All TADEP+ Updates are available online: tadep-png.com/communications/monthly-updates

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 Matters magazine* and 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.

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.

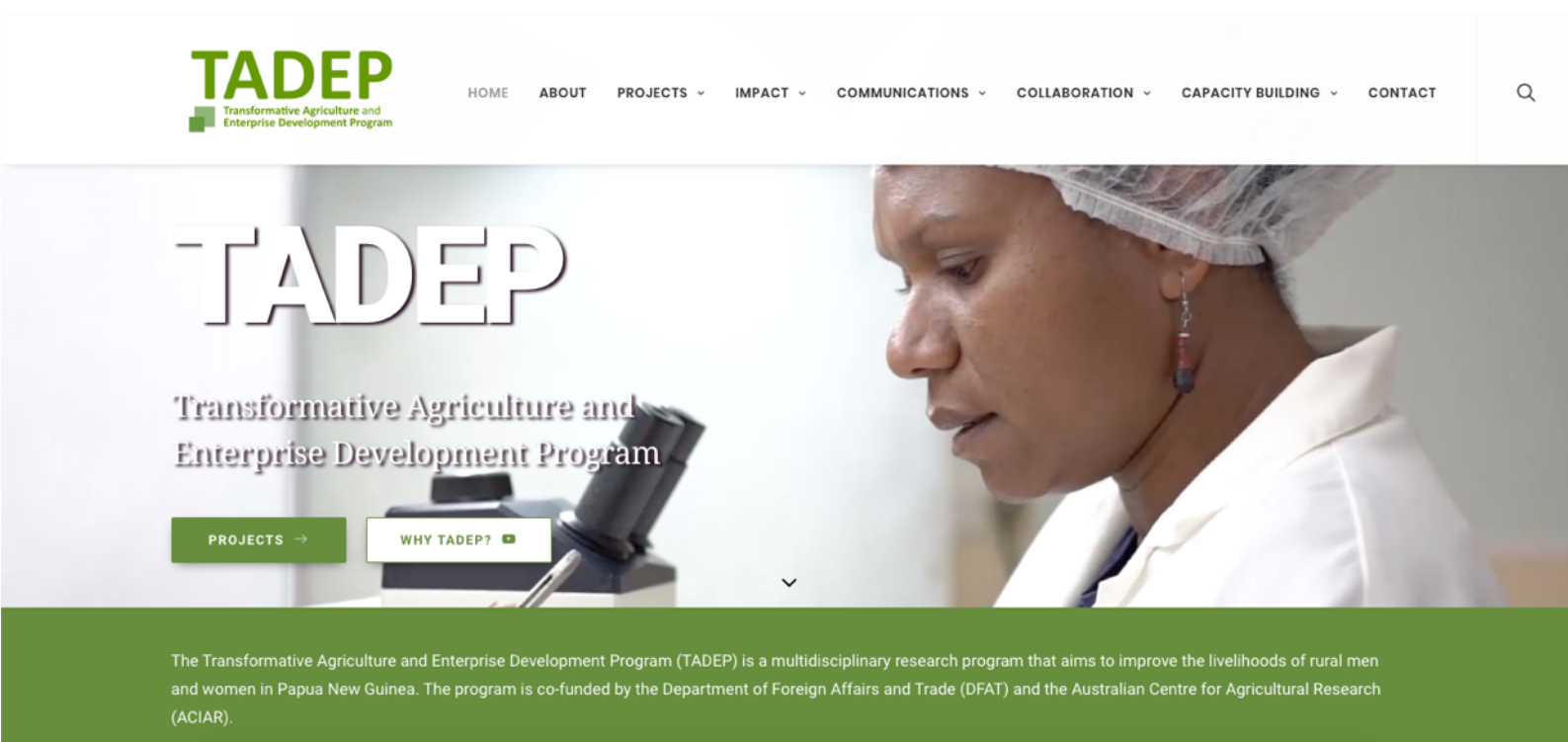
A TADEP CUG was established toward the end of 2016 so that any project team member included in the group to communicate both within their respective project team and across the program. This has overcome issues relating to project team members not having enough phone credits to make and receive phone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

At the 2018 Annual Meeting, it was identified that the CUG wasn't providing as satisfactory value as initially thought that would be provided for the program. The CUG has since been cancelled.

Website

Content for the TADEP website was developed and collated in the second half of 2018 and officially launched in January 2019. The website provides context for the program, updates and reports from the component project and the program, communicates the impact of the program against the program goals and shares resources relating to multidisciplinary research programs.

The TADEP website address: www.tadep-png.com



Story capture

As the TADEP projects have progressed, each have identified communications as an area that they would like assistance with and investment into. At the 2017 TADEP Annual Meeting it was agreed that TADEP would facilitate a multi-faceted communications initiative which would include capturing early stories of impact and building the communications capacity of the projects.

To assist with both elements, TADEP has engaged Conor Ashleigh (www.conorashleigh.com visual storyteller and development communications specialist) to create a series of short films and set of photographs that cover the work of the TADEP projects and also offer communications training and capacity development to interested project teams. The program coordinator travelled with Conor Ashleigh in February 2017 to film each project at various locations across country.

The Galip Nut and Sweetpotato projects requested communications training, and respective participatory workshops were hosted by NARI Kerevat and FPDA Goroka. The ACIAR Country Staff

also travelled for components of the filming to build their capacity in identifying and capturing stories of impact.

Whilst the footage that was captured was of the individual progress that each project had made, the short films are focused the intersecting themes that are fundamental to the TADEP program objectives. Each film reflects one of the program goals and features at least two of the projects that can demonstrate how the project is responding to the respective goal.

During the filming of the five short films that reflect the program goals, the idea to have an over-arching film explaining the role and justification of the program was identified. Further interviews with key stakeholders were scheduled into the four-week filming trip and an additional short film entitled *Why TADEP?* was created.

The stories of impact are featured on the TADEP website, have been showcased on multiple media platforms and have been made available online and via USBs for projects to demonstrate the outcomes and impact of their research.

Collaboration

Partnerships

The goal of TADEP+ is to improve the livelihoods of rural men and women in PNG. This lofty goal and many of the societal, environmental, business and humanitarian challenges faced by PNG are so complex and interconnected that they can only be tackled by different sectors working together. To stimulate innovation, ensure sustainability and create maximum value for all, project teams, partner organisations, funding agencies, all levels of government, the private sector, civil societies and NGOs all need to collectively unite resources and expertise.

Partnerships within and across the program are critical to the success of TADEP+. The program seeks to create common understanding of the role and aim of the program, foster strong relationships with funding agencies and key partner organisations, create a collaborative mindset and continually strive for collective action to realise the goal of improving livelihoods of rural men and women in PNG. With these elements in place, partnerships can achieve real impact.

Clear and regular communication and information to major stakeholders such as the TADEP+ Updates assists in sharing ideas and opportunities for partnerships to develop and collaborations to actuate. Many of the collaborative activities between the projects and program have been serendipitous, according to need and what skills the projects have to offer, but there have also been concerted efforts to create more structured and supported program initiatives to nurture deeper, more prevalent and effective partnerships and collaborations.

Steering committee meeting

A key recommendation from the TADEP+ Mid-Term Review was to improve planning processes and engage the key stakeholders in a more strategic capacity. As a result, biannual steering committee meetings were agreed to with the first being held with the five Project Leaders and the TADEP+ team in February 2019. The key outcomes were as follows:

- Projects gave in-depth update on progress and opportunities for the year ahead. Throughout this discussion there was emphasis on the importance of the richness of inter-disciplinarity within the Program leading to capacity building of members in each project involved.
- Strong support for greater strategic across the program, with other TADEP projects and with key stakeholders, including project partners and co-funders in DFAT and ACIAR. Mechanisms to facilitate this were discussed and broadly agreed to, especially noting the next months will be sensitive for Bougainville.
- Building on previous discussion and agreement that whilst the Galip Nut and Family Farm Teams projects have concluded, they are both keen to be involved with TADEP (hence TADEP+) in the new ACIAR project and Small Research Activity, respectively. The general ways in which they will be involved include:
 - Inclusion in the TADEP+ Update
 - Presence at the TADEP Annual Meetings
 - Involvement in biannual Steering Committee meetings (approximately February and June)

- As partners in the Collaborative Research Grants
- Sharing of lessons learnt across the program, especially private sector engagement and women's empowerment
- Ideas for building capacity in individuals and institutions arose whilst projects shared approaches that had been successful, especially in relation to gender equity and private sector engagement, consequentially two key elements of TADEP. Various models and types of capacity building activities were discussed, reflecting the diversity of need and ability to tailor approaches accordingly.
- Each acknowledged the significant value of 'good people' or 'star performers' in their projects and partner organisations, and the risks associated if they leave or are hindered by other factors. The draft TADEP Risk Management Framework provided a good scaffold for broader discussions about risks to the program and the projects, each acknowledging the diverse PNG context.
- A draft Annual Operational Plan was tabled, outlining key dates and deadlines, which will be added to as program activities are developed.
- The TADEP Performance Framework was also tabled for discussion, with general agreement that at over halfway through the program, the program objectives and verifiable indicators still reflected the overall goal and projects were contributing equitably. In addition to this, and as expected for a longer-term research for development program, the projects articulated that earlier outputs and outcomes were translating into longer-term impacts, and that there is greater capacity and willingness to collaborate.
- Given the limited formal face-to-face time that each Project leader and projects have to interact, various ideas about how to best use the Annual Meeting were discussed. Potential topics and guest presenters were suggested, aligning to the emerging needs of the projects and program. All agreed that the Annual Meeting is a great opportunity to have more 'middle-level' project team members attend and network.
- All project leaders thoroughly appreciated the opportunity to come together to speak openly about the opportunities and challenges they're having at a micro and macro scale. Each project leader added valuable insights and experiences, with helped crystallise potential solutions and opportunities for TADEP to support more collaborative activities.

Annual Meeting

The 2019 TADEP+ Annual Meeting was held in Goroka, Eastern Highlands on Tuesday 18 and Wednesday 19 June and welcomed 45 attendees from across Papua New Guinea and Australia. There was representation from each of the five TADEP+ component programs including the majority of Project Leaders, our key partner organisations in PNG, one ACIAR Research Program Manager as well as Peter Horne and Maree Livermore from the ACIAR Country Programs team, three of our DFAT colleagues from Port Moresby, representatives from the Eastern Highlands Provincial Government and guest presenters.



To help set the context of the program, there was a brief overview of ACIAR and the PNG country program as well as presentations from each of the three DFAT representatives, outlining the portfolio they represent – Economics, Gender and Bougainville. An overview of TADEP+ was also delivered, describing the evolution of the program into TADEP+ and its progress against the overarching performance framework.

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:

- What's been working? And why?
- What's not been working? And why?
- Up to three things you think other projects should know
- Up to three things you want to know from other projects
- What would you change? What are you planning to change?

These leading questions helped the projects identify and discuss potential collaborative activities or opportunities for capacity building. Each project brainstormed ideas and reported back to the whole audience.

A workshop was facilitated to brainstorm and share tools and tips for effective learning, monitoring and evaluation. In a survey circulated following the event, nearly 90% of respondents indicated that the workshops was very useful. Day one concluded with a relaxed program dinner at Steak Haus, Hotel Phoenix allowing for more informal discussion and networking.

A number of guest presenters were specifically invited to TADEP+ Annual Meeting to introduce new ideas and concepts that align with the scope of the program. These included;

- Overview of PNG Research, Science and Technology Council – Prof Lohi Matainaho
- Ripple Effect Mapping – Gloria Nema
- PHAMA+ – Jane Ravusiro
- Collaborations in Cocoa – John Moxon

After the sessions concluded and before each meal break, attendees were asked to reflect on the most useful ideas shared from the guest presenters and report back to the whole audience. This sparked broader discussions about how TADEP+ projects could adopt the methodologies and ideas, catalysing the foundations for potential Collaborative Research Grants.

An optional field tour was facilitated on Thursday 21 June to visit sites relating to the Sweetpotato project. The tour visited one particular farmer that had travelled to Australia on the study tour organised by the project and was able to share the insights he has gained and shared with his community from the opportunity.

Whilst it was announced that the 2020 TADEP+ Annual Meeting is to be hosted in Wewak, there have since been discussions about broadening the event and inviting key stakeholders to showcase the impacts of the program. Tentative dates have been suggested and will be finalised by the end of the year.

Collaborative research grants

Key recommendations from other DFAT-ACIAR partnerships have previously highlighted the importance of stronger program reporting and cross-project collaborations. Further discussions arose from discussions at the 2017 Annual Meeting, where the five component projects expressed interest in working together in a greater capacity. Therefore, a small competitive, merit-based fund for cross project collaboration has been developed. Opportunities include:

- Cross project collaboration
- Cross-project capacity building
- New activities that could directly address high-level targets of the Australian aid program, especially women's economic empowerment and private sector engagement
- Activities that promote collaboration between Papua New Guinean agencies

The goal of the grant is to enable newly-identified opportunities for cross project collaboration and in doing so, enhance the value of the program beyond the sum of its five component projects.

In the previous reporting period, there were four successful applications. An additional grant has also been approved;

- Initiating vegetable cultivation to improve nutrition in Bougainville

Goal: To improve vegetable production and nutrition for cocoa farmers through targeted education and training

Projects involved: Bougainville Cocoa, Family Farm Teams

Partners: ABG Department of Primary Industries, ABG Department of Health, Bougainville Women's Federation, University of Natural Resources and Environment

The initial round of Collaborative Research Grants is concluding and reports will be made available in the coming months.

Cross-program and cross-ACIAR

In addition to the formalised program activities that seek to facilitate collaboration across the program, there have also more informally formed partnerships within and beyond the program. Both of the TADEP+ cocoa projects have been working with the SMCN/2014/048⁴ soils project to

⁴ Optimising Soil Management and Health in PNG integrated Cocoa Farming Systems

develop composting field trials and demonstration sites. Similarly, the Family Farm Teams methodology has also been embedded into technical cocoa training for both TADEP+ cocoa projects.

Capacity building

ACIAR views capacity as the ability of individuals, organisations and systems to perform agricultural research for development effectively, efficiently and sustainably. Capacity building for ACIAR is thus a process of strengthening the abilities of individuals, organisations, and systems to undertake agricultural research and to continue to advance development outcomes. Capacity building occurs across multiple levels — individual, organisational and institutional — and is much more than merely transferring skills and knowledge through training. It includes on-the-job training, leadership, mentoring, two-way-transfers of ideas and technologies, and empowerment to undertake research. ACIAR considers capacity building holistically throughout all of our research activities, including investments in projects, fellowships, and interactions with Australian and developing-country scientists and project staff.⁵

Individual capacity building

Each of the five TADEP+ projects have delivered formal training as part of their respective project activities, as shown in the Performance Framework (refer to page 61). This training is in the form of hands on workshops and presentations as well as less formal mentoring and knowledge sharing. The audiences for training vary from staff directly involved in the project activities through to farmers that are part of the broader research.

Three Bougainville Cocoa project staff at Cocoa Board have been upskilled and are confident to work independently and professionally. They have shared their knowledge and skills with the village extension workers who have also gone onto to share that information with their communities. Additionally, two project officers, Elizabeth Pisiai (South Hub manager) and Inia Bunsu (UNRE) attended the International Vegetable Training Course (IVTC) at the World Vegetable Centre in Thailand in November. They have since applied their skills and knowledge by conducting vegetable cultivation training for ABG-DPI staff and 10 villages as part of the collaborative research grant. DPI and Health staff have been upskilled to deliver training and education in safe water, nutrition, healthy eating, healthy meals and vegetable growing and harvesting. These sessions helped to facilitate cross-sectoral collaboration within the ABG following the One Health approach.

The PNG Cocoa project has developed a model for an extension network linking REDS and Provincial Government DAL staff to farmers. There is observational evidence that the model can be effective with appropriate support from the provincial and national government level. In many cases, the project has boosted the morale and activity of REDS and DAL staff by providing a framework for their

⁵ ACIAR Capacity Building Policy

activity, extension literature and supporting their mobility through provision of bicycles and motor bikes. The project has been an important source of support for the three senior staff of REDS (David Yinil, Anton Varvaliu, Jeffrie Marfu) to continue functioning to try to rebuild the organisation.

The demand for extension of the family farm teams approach into the remaining four TADEP+ projects has been significant, with both the PNG Cocoa and Bougainville Cocoa project now having embedded components of the modules into existing training programs. To assist with this scaling out, Dr Josephine Saul-Maora, a plant pathologist working closely with both TADEP cocoa projects, has become an accredited family farm teams trainer and has been co-delivering training with other accredited trainers in multiple provinces.

As part of the Galip Nut project, NARI staff have developed agribusiness skills, public-private partnerships and processing techniques. NARI will be able to use these skills to support the growth of the emerging private sector. Project staff have worked with NARI staff on a one-to-one basis to build their skills with use of technology, food technology, health and hygiene, experimental design, plant and soil experiments and marketing. The project also facilitated Commcare training to be delivered to the galip project team and several other programs of NARI Kerevat including livestock, entomology and the nursery. This was identified by the participants as being a unique opportunity to build their capacity to engage in data collection using electronic methods

Institutional capacity building

The capacity building component of the Sweetpotato project has focusses on enhancing the extension service capacity within Fresh Produce Development Agency (FPDA) and demonstrating a community-driven model for community engagement. This has involved targeting the PNG National Standard for Community Development Workers to train and assess and accredit FPDA extension officers, hosting National Apprenticeships and Trade Testing Board (NATTB) workplace assessor training, policy development within FPDA, and working with national Government and peak bodies to develop national policy and technology associated with the Standard. The community development training (CDT) has been delivered in Wimbika village (WHP), Gusam village (Jiwaka Province), Kasena village (EHP) and Matiyufa village (EHP). The objective of CDT is to coordinate inputs to strengthen the community resolve for addressing technical problems identified by themselves and documented in their 'Community Development Plan'. The non-technical support the project delivers to farmer groups follows an organisation cycle and builds the capacity of farmer groups to follow an organisation cycle themselves. This training has assisted the commercial growers engaged in the project to develop their businesses and for their communities to develop plans incorporating commercial sweetpotato production.

Informal capacity building

One of the key strengths of the program is what happens outside the formal program activities. It provides an organic space for meaningful connections, networking and communication between participants. Ensuring these connections remain natural and don't become forced is important, particularly since the Family Farm Teams and Galip Nut projects have formally concluded.

The Project Leader to Project Leader mentoring and sharing has helped create more resilient and effective leaders and teams. It has also facilitated some instances of projects being able to work with the same communities, which allows a level of resource sharing and ultimately increases the benefits to those communities.

The program being across sectors, commodities and regions is particularly beneficial, as it enables teams to focus on fundamental commonalities and issues.

5. Mid-Term Review

Background

A Mid-Term Review was commissioned to align with the TADEP+ Annual Meeting in June 2018. The terms of reference (TOR) for the Mid-Term Review sought to examine the implementation of the program to date and to plan the remaining activities at the program level. Specifically, the MTR was directed to reflect upon and consider:

- 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.

The review also considered how the program is engaging with the private sector and increasing women's economic empowerment, which aligns closely to both the Australian and PNG government priorities. There were a number of general objectives of the review, including looking at progress against the Program Performance Framework and the DFAT Aid Quality Check criteria.

Key lessons learnt

- Establishing an effective program takes time, in particular the lead-up time to effectively engage stakeholders in the development of program strategic design documents.
- Finding the right person for the Program Coordinator is critical to the success of the program, and as much or more time and consideration should be given to staffing this role as is given to staffing project leader roles.
- External communication is essential for the program to influence at policy or system level, and internal communication is essential to ensure partners understand and appreciate the program beyond their direct work area. A separate, detailed communication plan for each would ensure the needs of stakeholders are best addressed.
- The program provides an organic space for meaningful connections, networking and communication between participants, outside of formal activities. This is more valuable because of the differences between project partners; sector, commodity and region, as it enabled teams to focus on fundamental commonalities and issues.

Key recommendations

Planning	
1	Engage with the project leaders, senior PNG partners, DFAT and ACIAR at a strategic level, rather than the currently primarily administrative level. Some strategic engagement opportunities may include recommendations 3, 4, 5 and 6.
2	Better incorporate the ACIAR Research Program Managers (RPMs) into the strategic planning, coordination and program level activities, to make use of their extensive knowledge and experience.
3	Jointly develop an operational plan with aligned performance metrics for the program activities.

4	Jointly review the current program performance framework to better incorporate the project activities and project performance frameworks, as well as the DFAT reporting requirements.
5	Reshape the collaborative grants design to discuss and identify potential opportunities that align with program objectives prior to initiating the grant process and streamline administrative processes, whilst allowing for flexibility with timing.
6	Involve all key stakeholders in the development of the Annual Meeting agenda to maximise face-to-face time and cross-program engagement, to tailor to participants' needs and interest, to increase group work and to provide opportunities for training or capacity building activities.
Partnerships	
7	Develop a risk management plan for TADEP, drawing special attention to the departure of two projects from the program and the role of the Program Coordinator, and considering the risks to individual partner agencies.
8	Engage with National Government, including strategic high-level discussions with relevant Government departments or other agencies such as the PNG Science and Technology Council, to incorporate research results into PNG planning and development cycles.
9	Engage DFAT at a deeper level to ensure the program reaches its full potential and to take more accountability. The program is having a substantial impact in the three focus areas of the Australia PNG partnership; gender, private sector engagement and Bougainville. There is a strong potential to leverage off the project activities with politicians and Government officials, and their support could in-turn assist the projects and program.
Collaboration	
10	Explore options for the Family Farm Teams project, team members and/or methodology to continue as part of the program.
11	<p>Maintain opportunities for informal and organic space for meaningful connections, networking and communication across the program. This may include:</p> <ul style="list-style-type: none"> ▪ Encouraging informal peer-to-peer learning and mentoring across projects ▪ Projects working within the same community and sharing resources ▪ 'Sharing' human resources across projects ▪ Recommendations of specific people or organisations with a particular skill or area of expertise
Communication	
12	Develop a more detailed internal and external communications plan, where all stakeholders contribute and distribute information, to increase awareness of the program and its ability to influence policy and systems. Outputs, channels and audiences are to be wide-ranging and targeted.
13	Reshape the Monthly Reports to be bimonthly and provide more guidance around the content. Provide short summaries from each project with each project rotating to provide a more detailed update. Refrain from collating and circulating updates during the quieter periods during the year (December/January).
14	Review the effectiveness of the Closed User Group (CUG) platform as a program activity.

15	Value-add to a project's planned media or awareness activities by offering the opportunity for other TADEP projects to be involved. Leverage opportunities to invite and engage politicians and key decision makers.
16	Develop a follow-on set of thematic TADEP videos at the end of the program to demonstrate the value of the program.
Capacity building	
17	Identify whether training, mentoring or capacity building in private sector engagement is required by projects, and if so, utilise existing skills and knowledge within the TADEP networks to ensure sustainability beyond the life of the projects and program.
18	Value-add to researchers already travelling for planned project work by offering opportunities to guest lecture at partner universities to upskill lecturers in specific areas, and share knowledge and introduce international agricultural research to students. These opportunities would also be made available to nearby institutes and agencies that are already program partners.

6. Project Updates

ACIAR actively monitors the TADEP+ projects via many means, including but not limited to;

- i. engagement in key project events by ACIAR Research Program Managers and Country Office staff,
- ii. formal (external/internal) mid-term and final reviews,
- iii. regular updates from the projects to the program, and
- iv. project annual reporting, which is designed less for milestone reporting and more for adaptive management.

Progress with each of the TADEP+ projects, in the 2018/19 reporting period is summarised below.



HORT/2014/094 Bougainville Cocoa

Developing the cocoa value chain in Bougainville

Background

This project aims to improve the profitability and vitality of smallholder cocoa farming families and communities in Papua New Guinea. Bougainville is an autonomous province in Papua New Guinea recovering from a decade-long crisis that significantly disrupted the society and economy. Before the crisis, cocoa was a major contributor to the economy; more than 80% of Bougainvilleans produced cocoa. The project will foster and strengthen public and private sector partnerships and develop enterprises that enhance productivity and access to premium markets, while promoting gender equity, community health and well-being.

Progress summary

Significant insights into the factors affecting cocoa productivity in Bougainville have been identified as part of the livelihoods survey⁶ undertaken by the project. The survey results indicated that the

⁶ Report on the results of a Livelihood Survey of Cocoa Farmers in Bougainville.

strongest correlations with cocoa production were education level, chronic health and physical afflictions, whilst neither farm size nor number of cocoa trees explained cocoa production or wealth.

The 'hub and spoke' model of networking 11 VEWs from each of the three regions of Bougainville to centralised, regional hubs has facilitated the successful roll out of training and relevant resources. These resources have included budwood materials to establish village level demonstration nurseries and budwood gardens which can also act as beginnings of potential microenterprises. As evidenced in the livelihoods survey, diversification of farming systems is important for both food and financial security. The training delivered to the participating VEWs reflect this and also include core cocoa management modules.

To meet this potential increased quantity and quality of cocoa from Bougainville, the project has made significant progress in assessing and accessing market opportunities. The annual Chocolate Festival both raises awareness about Bougainville as quality cocoa growing region and raises the understanding of cocoa farmers about what it takes to meet those market demands. Some of the major constraints to expanding the cocoa export industry in Bougainville have been identified with various solutions being tested to overcome them.

Achievements against project objectives

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

To equitably and efficiently undertake its research, the project selected 11 village assemblies from each of the three regions of Bougainville where no other development intervention was being undertaken. In each selected village assembly, a volunteer village extension worker (VEW) was nominated to receive training in nursery and budwood garden establishment, integrated pest and disease management (IPDM), cocoa pod borer (CPB) management, budding of clones, sustainable livelihoods and two business modules in small enterprises and record keeping and decision making. For each of the three regions, centralised research hubs where VEWs receive training and can observe demonstration plots are at varying levels of establishment. To date, each of the 33 VEWs has received all training components in addition to the three Hub Coordinators, and various Cocoa Board and DPI staff. In the recent year, a total of 81 training workshops were conducted on cocoa management.



Previously, budwood garden materials had been distributed fully to North Bougainville and in this reporting period, the balance have been distributed to the remaining VEWs in both Central and South Bougainville. Some are maturing and are ready for harvesting for clone seedling propagation. Each of the VEWs are to develop a Village Resource Centre in their given locations and to date, 70% of them now operate 3,000 to 5,000 capacity cocoa and vegetable nurseries for training and distribution.

Hamatana and Tsunpetz Primary Schools in North Bougainville received chocolate making training to enable them to be able to compete school

competition as part of the 2019 Bougainville Chocolate Festival. There has also been initial conversation with Hanahan Primary School to receive cocoa technology and vegetable production training workshops.

Aside from the project's focus on working with smallholder VEW farmers, the project is also investigating the feasibility of rehabilitating cocoa plantations abandoned during the Crisis as a means to increase overall cocoa productivity in Bougainville.

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

Following the livelihoods survey there has been a series of follow-up activities to enhance the health and nutrition of cocoa farming communities. Data from the livelihoods survey was analysed and a final report⁷ on results written and printed. Copies were distributed to key stakeholders including ABG Departments of Primary Industries, Health, Education and Law and Justice, PNG Cocoa Board, ACIAR and DFAT.

Preliminary discussions have been held with ABG Secretary for Health, Clement Totavun, about holding a Health Summit in 2020. The idea is to bring together key stakeholders in health to discuss findings from the survey and facilitate dialogue on priority health issues and interventions. Funding for this would be externally sourced.

As a result of the livelihoods survey, a TADEP+ Collaborative Research Grant (refer to page 2421) was developed and links the Bougainville Cocoa project with Family Farm Teams project to educate villagers about improved nutrition and vegetable cultivation. The first phase of the project was completed in May 2019. Baseline diet and garden surveys and nutrition and vegetable cultivation information sessions were conducted in 10 villages with a high incidence of childhood stunting

Discussions are underway with Bougainville Partners and CARE Plus to see if some of the Project's activities in Wakunai District can be handed over to CARE Plus with the view to releasing Project resources to concentrate on other districts.



⁷ Report on the results of a Livelihood Survey of Cocoa Farmers in Bougainville.

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

To complement the 33 Village Resource Centres across Bougainville, three DPI Stations or research hubs in each of the three regions have been established. The southern hub station in Buin is fully established with a 10,000-capacity nursery, a budwood garden, a new clone block and a combo shed built to store tools and chemical and at the same time used as a compost house with a full-time DPI officer manning the station. An addition southern hub has also been established at DPI Konga with a permanent goat house, a 5,000-capacity nursery, demonstration site for composting and diversified vegetable gardens and a mini weather station. Whilst here have been some land use issues with the previously identified hub sites in north and central Bougainville, hubs have been established at DPI Kubu and at a VEW site, respectively.

A foundation herd of 20 goats has been sourced from the PNG Highlands arrived in Bougainville in 2018. Since arriving, five goat kids have been born. Three breeding pairs have been distributed from Pearson's farm to VEWs in North Bougainville and to the DPI Kubu Research Station. A local youth has been engaged as a casual goat stockman at DPI Konga to take care of the goats and collect data on their growth performance.

At the core of the project is the support of VEWs to establish cocoa and vegetable nurseries in their 33 respective village assemblies. The project has assisted a smallholder farmer, Ishmael Toroama, from Tinputz to become a local drinking chocolate producer via basic processing equipment and training. Ishmael spoke at the World Food Day celebrations on the nutritional benefits of homemade, chocolate-based beverages.

PPAP and Bougainville Partners have invested in the construction of large combination dryers, which is being further supported by the Bougainville Cocoa project through the provision of training in cocoa processing and quality. A key element to producing high quality cocoa is through improved drying and fermenting processes, aided by improved processing equipment such as this. The chocolate competition during the Bougainville Chocolate Festival seeks to emphasise the importance of quality and encourage farmers to adopt best practice, and ultimately transforming their ad hoc cash crop into a financially sustainable microenterprise. One of the judges in the chocolate competition is the chocolate maker from Queen Emma, which also provides a direct link to the local chocolate industry.

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



The third annual Bougainville Chocolate Festival was held in September 2018 received great feedback from the community. A review of the Festival followed to inform preparations for the 2019 Festival. The steering committee for the Festival consists of key stakeholders from the Bougainville Cocoa project, ABG DPI and Bougainville Partners. The theme for the 2019 event is “World class beans for world class chocolate, creating opportunities for our farmers, for our future” and at the time of writing this report whilst outside of the reporting timeframe, the event had been held in Arawa in early August.

Steven and Elizabeth Saveke, winners of the Best in Show at the 2018 Bougainville Chocolate Festival, participated in the “Taste and Tell” event in Melbourne in March 2019: www.aciar.gov.au/publications-and-resources/news/Award-winning-Bougainville-cocoa-farmers-showcase-chocolate. The event was attended by chocolate makers from five states and territories of Australia, the ACIAR CEO and an ACIAR Commissioner. A highlight was bringing together Bougainville cocoa producers and some of Australia’s leading chocolate makers and potential cocoa buyers.



A Chocolate Research laboratory was established at DPI in Buka and will be used as a dedicated research, training and extension facility. Plans are in place to upgrade the Laboratory for pre-export quality assessments.

The project has initiated an inspection system for Bougainville cocoa beans being exported to chocolate makers in Australia to provide an objective baseline in the event of there being a dispute arising over product deterioration due to a shipping mishap. The project initiated the practice of the certification of quality prior to shipment.

Communicating to the multiple public and private sector stakeholders in this project is crucial. A blogsite was developed to provide daily ICCO cocoa prices through DPIMR, to better align the local

market with the global market dpimr.blogspot.com. The blogsite also provides paper articles, farming tips and resource information from other directorates including fisheries, forestry, agriculture and livestock. Nearly 20 Cocoa Market Newsletters were produced and freely distributed across the sector, including private and government subscribers. Presentations were made to farmer groups, public servants, donors, and other project leaders on how world cocoa prices are determined and the broad economics of moving cocoa beans into chocolate. The project also provided presentations to ABG-DPI, Law and Justice, and DFAT on options for regulating cocoa marketing on Bougainville.

To learn from and partner with neighbouring Pacific nations who have greater developed cocoa and chocolate markets, a number of collaborative activities have also been undertaken. Consultation with SPC in Fiji to discuss linking up with Fiji-based fermentation and drying survey data collection, with the aim to produce a country benchmark from which participants can then judge themselves. A mission was organised in June 2019 to Solomon Islands with senior members of the ABG Departments of Law and Justice and Primary Industries to examine issues associated with grower groups, regulatory aspects of marketing and managing a quality assurance laboratory. To assist the mission, the project commissioned two papers by cocoa marketing experts based in the Solomon Islands.





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 2,000kg/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.

Progress summary

Incorporation of the project's main collaborator, the Cocoa Coconut Institute (CCI), into the Cocoa Board (CB) as the Research Extension and Development Services (REDS) section, and the serious underfunding of REDS, has continued to disrupt the project's program of work. That being said, the project has continued to achieve significant outcomes and impacts.

In this reporting period, 1,000 copies of the extension book, *Buk Bilong Kakau Fama*, have been distributed to coordinators, Cocoa Model Farmer Trainers (CMFTs) and farmers. A Solomon Islands farmers handbook is also currently being revised for publication as a Pacific-wide cocoa extension book.



With the support of Agmark, models for more cost-effective solar dryers using rolls of plastic have been developed. The CMFT group at Yekimbole has built a successful business around these dryers, and similar dryers have also been built at in New Ireland, East Sepik and Madang. As the cost of and logistics for materials to establish nurseries was slowing down block establishment (eg; Karamui), project staff have promoted direct field planting of seedlings and field budding to produce clones, based on the increasing number of farmers with budding skills. Cheap alternatives to expensive budding knives (sharpened hacksaw blades and kitchen knives) and budding tape (shopping bags, Gladwrap) have become widely used.

After negotiations with the quarantine service, a sample of pigeon pea *Cajanus cajan* was received from India and distributed for testing at several locations in collaboration with the SMCN/2014/048⁸ project. It grew well at Yekimbole and Balama and shows potential to provide early shade for cocoa. Seed from intact pods has been collected for further testing and to select types adapted to PNG.

CMFT Leah Kowi has completed her diploma studies at the University of Natural Resources and Environment (UNRE) and is continuing her studies towards a degree. The broader partnership with UNRE has continued to strengthen, especially in the development of trial goat husbandry centres in Madang, East Sepik and New Ireland.

The project team undertook visits to 10 CMFT sites in Madang, three CMFT sites on Karkar Island, and several CMFT sites in New Ireland and East Sepik, as well as sites supported by the Governor of the latter mentioned province.

A Mid-Term Review of the project was undertaken by ACIAR Horticulture Research Program Manager, Irene Kernot, in May 2019 which included attendance at large Field Days and several CMFT site visits.

⁸ Optimising soil management and health in Papua New Guinea integrated cocoa farming systems

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

As articulated in previous reporting periods, the project has delivered training on budwood garden and nursery establishment, and in cocoa budding. Further training of CMFTs and farmers has been on-going through regular visits by project staff, including the project managers. As the training needs and implementation challenges have evolved, new ideas such as field budding of seedlings and sourcing of cheaper budding knife and tape alternatives have been introduced.

Whilst each CMFT is linked to a farmer group of 25 farmers as per the project design, there have been additional farmer groups called 'extension groups' formed, reflecting the demand and motivation to improve cocoa productivity. Extension groups in Madang have been setup and been provided training. Provincial Governments in New Ireland and East Sepik have committed additional funds to expand the CMFT model to more sites and farmers. These additional extension groups have also received core CMFT training. There have also been two CMFTs in East Sepik and Madang that have established many satellite groups of CMFTs.

The externally-funded Provincial Government cocoa projects in New Ireland and East Sepik are buying clones from the CMFTs originally set up in the ACIAR project and this is contributing to the viability of nurseries. The Hawain nursery in East Sepik, which was rehabilitated under the ACIAR project, has been the main supplier of clones in the province. CMFT budwood gardens and nurseries in Madang will become the main suppliers of clones following the transfer of the Murnass nursery to Kokonas Industri Koporesen (KIK). A CMFT in East Sepik is also now functioning as a commercial nursery, supplying cocoa seedlings to the World Bank managed Productive Partnership in Agriculture Project (PPAP). The Yekimbole CMFT group have established a successful wet bean buying and fermentary business. It has become evident that the CMFTs may not become self-sustaining as advisors, but rather through their nursery and fermentary activities.

Over 1,000 copies of the Tok Pisin version of the CCI cocoa farmers handbook *Buk Bilong Kakau Fama* have been distributed to CMFTs and farmers, given out on most CMFT visits by project and Cocoa Board staff. A pamphlet on the use of field planting and budding as a more direct and cheaper way to rehabilitate cocoa blocks has been prepared.



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

All CMFTs in each of the provinces have received 200 SG2 (hand pollinated) hybrid seedlings which form localised demonstration sites. These demonstration sites will enable the selection of the best adapted cocoa types that

can then be cloned and disseminated by the farmers receiving budding training as part of the project. Some farmers have already identified varieties that are performing well which will inform further breeding testing. To further bolster the cocoa industry development in the Highlands aside from Karimui in Chimbu, project team members have prepared proposals for respective provincial Departments of Agriculture and Livestock in the Eastern Highlands, Western Highlands, Southern Highlands and Jiwaka to encourage the large-scale planning of SG2 seedings.

Similarly, the 18 clones from CCI have been steadily disseminated to CMFTs for them to establish budwood gardens and nurseries. As per the *Buk Bilong Kakau Fama*, each budwood garden which also acts as a demonstration site, contains rows of at least 10 of each of the 18 clones. Training in budding has been carried out in all provinces and most CMFT groups. Women as well as youths have also been trained and many farmers are now competent budders. The budwood gardens and nurseries will ensure local supply of the best cocoa genotypes and will help gather G x E (genotype-environment interaction) information for the Cocoa Board Research Extension and Development Services (REDS) section. As New Ireland was the first to receive the 18 clones, most of the CMFT sites in that province have fully mature budwood gardens that are ready to supply budwood for cloning, with about a third each of CMFT sites in Madang and East Sepik.

The next stage for the CMFT demonstration sites is to incorporate improved cocoa management method such as rehabilitation pruning, frequent pruning of cocoa and shade trees, weekly sanitation pod removal and burial, and fertilisation trials. This activity is contingent on the readiness of budwood gardens and as they are yet to reach full maturity, results will be forthcoming in the next year or so. Similarly, demonstrations of soil fertility improvements through recycling of farm waste and use of soil amendments is yet to be undertaken. Small composting trials with SMCN/2014/048⁹ have been established in East Sepik and New Ireland as well as composting demonstrations at a field day in East Sepik.



As reported previously, field comparisons and surveys have been conducted to understand the merits and limitations of currently used fermentation boxes and driers against modified and/or most cost-effective alternatives. These studies ultimately seek to improve cocoa quality through better postharvest handling, fermentation and drying by identifying processes and infrastructure that best suits a particular region or community. Solar driers have been constructed in multiple locations in

⁹ Optimising soil management and health in Papua New Guinea integrated cocoa farming systems

each province using locally available materials. Whilst there are some limitations during extended periods of wet weather, some CMFTs selling their cocoa to niche exporters have demonstrated demand for these sun-dried, smoke taint-free beans.

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

As budwood gardens are being developed and cocoa shade trees are being established, most CMFT groups have also been incorporating food crops into their trial sites. Whilst it is not uncommon for smallholder farmers to develop an integrated farming system, there has been a tendency by some to plant out large areas of cocoa in a bid to maximise production, only to be poorly managed due to the untenable scale. The underlying impetus of the project to proactively manage a small 1ha cocoa block reinforces integration of diverse food crops.

As food crops are mostly tended to by women, incorporating food crops in the cocoa blocks has meant that women are becoming more involved in cocoa management. Following initial disappointment with recruitment of few women as CMFTs, all spouses attended the training sessions and now most CMFTs are husband/wife teams.

Galip Nuts are being promoted as one potential intercrop, as it is a valuable shade tree and good source of protein. A source of Galip Nut seeds has been located on New Ireland and links have been established to disseminate these seeds to field site trials. Eaglewood and Gliricidia are both existing shade tree options which are being widely adopted and interplanted with vanilla as another income stream for farmers. Pigeon pea has been introduced in East Sepik, Madang, New Ireland and East New Britain as an alternative shade crop.

Penned livestock is also being explored as another alternative in an integrated farming system, both to increase soil health and as income generation. Given the observed successes that the Seventh Day Adventist communities have had with goats in areas such as Karamui, Mussau Island, Usino and Madang, it is intended that goats could be integrated and extended into other cocoa growing areas. A goat breeding program has commenced at newly built goat enclosures in Madang and East Sepik.





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 is supporting smallholders to turn from subsistence farming towards market-oriented sweetpotato production, producing specifically for the market and managing production to meet market and customer requirements.

This project is supporting 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.

Progress summary

Growers in the 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. This has enabled the growers to increase sales, including entry to new markets such as the supermarket sector in Port Moresby. Skills and confidence have been enhanced through a structured training program.

- Commercial scale clean planting material nurseries have been constructed at 14 locations across the Eastern Highlands (EHP), Western Highlands (WHP) and Jiwaka provinces.
- Foundation clean planting material stock has been multiplied in the insect proof screenhouses, and clean planting material from these sites has been distributed to commercial and semi-commercial growers in the Jiwaka, Hagen and Asaro regions.
- Important commercial varieties of sweetpotato, Korowest and Rachel, have been tissue cultured and are being treated to remove viruses present in the material so that they can be included in the clean seed scheme.
- Initial protocols for rapid virus testing using Loop-Mediated Isothermal Amplification (LAMP) have been established.



- A trial shipment of high quality sweetpotato from EHP has been delivered to two supermarket chains in Port Moresby, with the graded produce moved in boxes rather than large bags to retain quality during transport. Growers involved in the project are now increasing sales to supermarket chains.
- Training materials for grower communities have been developed, and agreement reached for the training to be accredited under the PNG National Standard for Community Development Workers (CDWs).
- Four farmer communities have engaged in Community Development Worker training, identifying community goals and aspirations as well as training needs that the project can support.
- 14 commercial farmers participated in a study tour to Australia, learning about production and marketing practices used by the Australian industry. Lessons learnt on the tour have been implemented in PNG to help drive an expansion in commercial production.

Achievements against project objectives



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

Value chains connecting sweetpotato growers to supermarkets have been supported by the project through supply of higher quality roots from use of clean planting material. Growers are adopting grading and washing of roots prior to transport to higher value markets and are testing alternative packaging to reduce the damage to roots caused by packing into 100kg bags. A systematic review of literature on local value chain interventions and a conference paper presented at the 2018 International Horticulture Congress have been accepted for publication, and a survey of commercial farmers to explore the functionality of emerging sweetpotato value chains has been completed and drafted for publication.

Objective 2: To build capacity of sweetpotato value chain players

The capacity building component of the project has focussed on enhancing the extension service capacity within Fresh Produce Development Agency (FPDA) and demonstrating a community-driven model for community engagement. This has involved targeting the PNG National Standard for Community Development Workers to train and assess and accredit FPDA extension officers, hosting National Apprenticeships and Trade Testing Board (NATTB) workplace assessor training, policy development within FPDA, and working with national Government and peak bodies to develop national policy and technology associated with the Standard.



The community development training (CDT) has been delivered in Wimbika village (WHP), Gusam village (Jiwaka Province), Kasena village (EHP) and Matiyufa village (EHP). The objective of CDT is to coordinate inputs to strengthen the community resolve for addressing technical problems identified by themselves and documented in their 'Community Development Plan'.

The non-technical support the project delivers to farmer groups follows an organisation cycle and builds the capacity of farmer groups to follow an organisation cycle themselves. This training has assisted the commercial growers engaged in the project to develop their businesses and for their communities to develop plans incorporating commercial sweetpotato production.

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

The project has delivered access to virus-free clean planting material (*klin kaukau*) for farmers in the three main commercial sweetpotato (*kaukau*) production regions in the PNG Highlands. The foundation elements of a clean seed scheme for PNG are established and functioning, with four varieties (Gimani, Wanmun, Wahgi Besta and Beauregard) being produced by 14 commercial seed propagators for distribution in their communities. Supplying growers with clean vines is a new agricultural business opportunity and one of the growers has reported proceeds of over PGK4,000 from sales of clean vines. Resistance to the *klin kaukau* project from communities has gradually been overcome, with demonstration of the potential yield and quality benefits from using clean planting material leading to strong demand for vines.

The 14 growers operating the commercial propagation facilities were hosted on a week-long industry exposure tour to Queensland in 2019 and returned to PNG highly motivated to adopt new practices and grow their businesses and those of other farmers in their communities. Racheal Suak Mok, one of the growers who participated in the tour, stated *"When I came back everyone was excited to see me and eager to hear about my experience and what I learned from my trip. I am a proud woman now and I am pushing for further develop kaukau in Jiwaka. I want to go into mechanisation. I will establish a big nursery to supply the demand."*

Upcoming

- Open market surveys in Port Moresby to better understand the factors affecting price volatility in the fresh market. This research will include consumer surveys in the open market and supermarkets to identify value attributes, feeding in to value chain developments to better match product quality to consumer expectations.
- Advanced crop production and postharvest management training for commercial growers, including demonstrations of irrigation technology and washing/grading/packaging techniques applicable to PNG production systems.
- Development of quality assurance protocols for clean vine multiplication and supply scheme.
- Delivery of marketing and value chain training to commercial growers to better equip them to capture opportunities in emerging markets such as supermarkets in major urban centres.





ASEM/2014/095 Family Farm Teams

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

Background

Women farmers are key to Papua New Guinea family livelihoods. They produce essential subsistence crops and generate income from surplus crops. Women play significant roles in the informal economy, in community networks and as caregivers for children, the elderly and the ill. However, these social protection roles often impact on their ability to pursue income generating activities.

Typically, women farmers face limited access to productive resources, restricted mobility, unequal divisions of labour and low levels of schooling. To address these challenges, the Family Farm Teams (FFT) program was developed in ASEM/2010/052¹⁰ to encourage more effective, sustainable and gender-equitable farming and business practices. The program used a peer education approach where local farmers were trained as Village Community Educators (VCEs) to train others in their family and community.

This project investigated the expansion of the ASEM/2010/052 strategies through out-scaling into five areas of PNG with a focus on new commodity crops: Highlands Hub (Eastern Highlands, Jiwaka, Western Highlands) with sweet potato, coffee, vegetables; Islands Hub (Autonomous Region of Bougainville, New Ireland) with canarium, cocoa, traditional vegetables. The research explored the family, cultural, and gender factors that impact on the economic development of women semi-subsistence farmers. Here gender refers not to women and men as such, but the relationships between them. Gender is not the biological sex, but it is a cultural and social construction.

Progress summary

The project field work concluded in December 2018. Across the five areas, a total of 266 farmers were trained as VCEs (165 F, 101 M). These VCEs trained 2,491 other farmers (1,622 F, 869 M). A further 98 people (45 F, 53 M) from Fresh Produce Development Agency (FPDA), Oxfam, Pacific

¹⁰ Examining women's business acumen in Papua New Guinea: Working with women smallholders in horticulture

Women Shaping Pacific Development/Pacific Governance Facility funded agencies were trained as FFT trainers. At the time of the report, they had trained a further 1,271 farmers (592 F, 679 M).

Achievements against project objectives

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

Major activities: Women's leadership workshops, combined female and male leaders' workshops.

Main findings: The women's leadership activities demonstrated the value of helping women see that they were already leaders in their families and that they have transferable skills from these family roles. Although the instrumental management skills are important, the first building block needs to give women a sense of 'power within'. From this, they can develop their own concept of leadership.

Building women's capacity as leaders requires ongoing mentorship and support, especially when the women faced conflict and criticism. The most effective mentors were those who were able to offer 'just-in-time' advice through their regular meetings rather than formal training workshops. Village women who stepped into a leadership role did not always have the experience of managing even small amounts of money on behalf of a team, however with guidance they did build their skills and capacity. The family farm teams messages were valued in the target communities and in this way gave women a voice in the public sphere. This was especially notable in Jiwaka where young women in their 20s were encouraged by the community through the building of a training shelter, in New Ireland where women regularly spoke at 'community day' and in Bougainville where many women VCEs were invited to join community committees.

It is clear that the selection of both female and male leaders who work together models gender inclusion and enables greater community acceptance. This also enables both women and men to work in a complementary way. However, whilst mixed-gender training is relevant for a number of leadership topics, specialised women-only training is crucial. 'Groupness' or solidarity in helping women develop voice and leadership has been found to be an important factor for women's leadership development as it develops a shared consciousness from face-to-face interactions. Voice and enhanced agency are the pre-cursors of women's development as 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



Major activity 1: Brokered training for VCEs in sustainable livelihoods, record and book-keeping, budgeting, banking and saving and a range of agricultural improvements.

Main findings: The VCE skill development provided a channel through which FFT principles can be put into practice at the same time as producing visible results (eg; market garden plots, a small poultry project, marketing new vegetable varieties). Tangible or visible results are very important as evidence to others in the community of the validity of the efforts participants have put into their activities, and by extension the credibility of the training. Further, it increases the legitimacy of VCEs as peer educators.

Combining agricultural training with FFT training publicly legitimises participation in and implementation of FFT learning. It provides an avenue for the practice of FFT principles and increases the legitimacy of VCEs as peer educators. It follows that, if brokered training flows on from and explicitly connects with the underpinning FFT principles, this could make a significant difference to the

valuing and sustainability of FFT approaches. The challenge now is to encourage government and other institutions to invest in training opportunities that assist semi-subsistence farmers to move towards more commercially oriented agriculture.

Major activity 2: Professional Development (PD) for teachers to support the integration of agricultural learning in schools.

Main findings: The work with schools led to the development of a professional development (PD) package for in-service and pre-service teachers that brought together good teaching practice and agricultural and livelihood learning. A digital PD format was considered to be the most appropriate form of PD after a series of traditional face-to-face PD workshops were trialled. Secure digital (SD) cards, used with low-cost mobile phones, are pre-loaded with agricultural and livelihood teacher materials in addition to teaching strategies that promote 21st century skills. The aim of the PD package is to facilitate a community of practice where teachers can work together to unpack the materials and teaching strategies contained on the SD card. Teachers in PNG have limited access and opportunities to receive PD, and teachers can go back to the videos and re-watch them as many times as they need to understand a new skill or strategy.

With the majority of the PNG population living as subsistence farmers in rural and remote villages, school education should provide children with the skills and knowledge that will help them both now and in the future. Teachers in PNG need assistance in providing students with current and accurate

agricultural and livelihood information. Importantly, focusing on agriculture ensures that the curriculum is culturally relevant, thus supporting children's learning and motivation to attend and remain in school. It is expected that children will pass on knowledge to their families, as the assessment tasks focus on sharing knowledge with families and the community.

The teaching skills embedded within the agricultural modules focus on 21st century skills that are necessary for future global citizens. Although most PNG children live in farming families, they are part of a rapidly changing world. This has been an important pilot project for learning how to integrate agricultural and livelihood information into the curriculum in PNG. Given the keenness of PNG teachers to engage in place-based agricultural learning and assessment, the next research question to investigate is if, how and where FFT learning activities can be integrated into the school curriculum.

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

Major activities: Trialling a range of Family Farm Team training models (9 and 15-month VCE training, 3-day training for farmers, 3-day training for trainers, 1-day training at an agribusiness).

Main findings: Peer-to-peer learning is a congruent model in PNG as it builds on cultural norms that focus on the collective rather than individual. This does not mean that peer-to-peer learning will necessarily extend across a whole community as most people share primarily within their wantok network, the traditional process for ensuring the good of the collective through sharing and mutual support. Although the wantok system is seen to be breaking down and/or becoming a form of asset manipulation, it does provide a culturally sanctioned and long-standing sustainable practice for sharing and support. These sharing networks are enhanced by the role model or 'copy-cat' effect in which PNG farmers adopt new practices when they see the concrete effects of change in other families.

Although the four FFT modules have been designed to introduce the concepts of equitable and effective family farm businesses in a scaffolded way, as peer educators the VCEs take on and share what is relevant and valuable to them, their families and their context. The FFT participatory training model seeks to empower and hence trust the farmers we train. The VCEs know their family and know their community and know where to start. However, they also need to have on-going support and a safe environment to explore the challenges they face and see in others. With such support VCE peer educators can become effective and dynamic local change agents.

Many women found that being a VCE increased their confidence and raised their status in the community. The Christian faith was named by women in all areas as a source of strength. As VCEs, women found that the FFT principles were compatible with Christian family teachings. This provided a discourse for them to engage the men and youth of their family. Groups in the Islands noted that it had been easy to adopt the training concepts because of their faith and that their faith had also been enriched by some of the concepts from the training (eg; working as together as teams for the good of the community).

Although the major focus was on the further development of the VCE model that was first developed in ASEM/2010/052, four other models of training were piloted in the Islands Hub in order

to develop other forms of FFT module delivery that could be used in agricultural projects and agencies;

- **Intensive training for trainers:** This trial was conducted as part of the TADEP+ Collaborative Research Grant (refer to page 24) in partnership with HORT/2014/094¹¹. The aim was to train key staff in the cocoa project who could then deliver the training to farmers attending the resource hubs developed as part of that project. The three-day model was found to be adequate for initial training, but follow-ups and refreshers are now required.
- **Intensive training for farmers:** This trial was conducted as part of the TADEP+ Collaborative Research Grant (refer to page 24) in partnership with HORT/2014/096¹². The aim was to determine how to deliver intensive training for farmers. The trial indicated that the FFT activities could be covered in three full days, with module 1 on the first day, modules 2 and 3 on the second day and module 4 on the final day.
- **Training for fishing families:** This trial assessed whether the FFT modules could be adapted to meet the needs of fishing-based communities. It was conducted with the fishing families of Nusa Lik Island, near Kavieng, New Ireland, who were involved with the jewellery making training conducted as part of FIS/2014/060¹³. The trial showed that the modules could be successfully adapted for fishing families.
- **Family farm planning concepts for farmers:** This trial assessed whether a one-day introductory FFT training run at a local agri-business would be appropriate for the business and of interest and value to farmers. The evaluation showed that the farmers valued the concepts of a farm as a family business and the processes of planning (daily and across the year). The business believed this was a good value-add they could provide to farmers, that would have benefits to their business if farmers were able to plan for purchases such as tools, seedlings and pesticides.

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

Major activities: Training VCEs in FFT and brokered training, who then rolled out the training to their families, neighbours and through social organisations, such as churches.

Main findings: The concepts of a family farm business typically engage women and men in different ways: women connect with the focus on the family, whilst men respond to the notion of a farm

¹¹ Developing the cocoa value chain in Bougainville

¹² Enterprise-driven transformation of family cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea

¹³ Developing pearl industry-based livelihoods in the western Pacific

business. These are complementary and together provide a gender uniting discourse. Family goals are readily agreed in most families and provide an immediate point of consensus and shared focus. This enables women and men to work together over the longer time period with a sense of unity and purpose. As they achieve their short-term goals (the low-hanging fruit), these rewards further encourage women and men to continue to work in the new patterns. As others see the changes in the family, both women and men have a wider reward and increased status in the community.

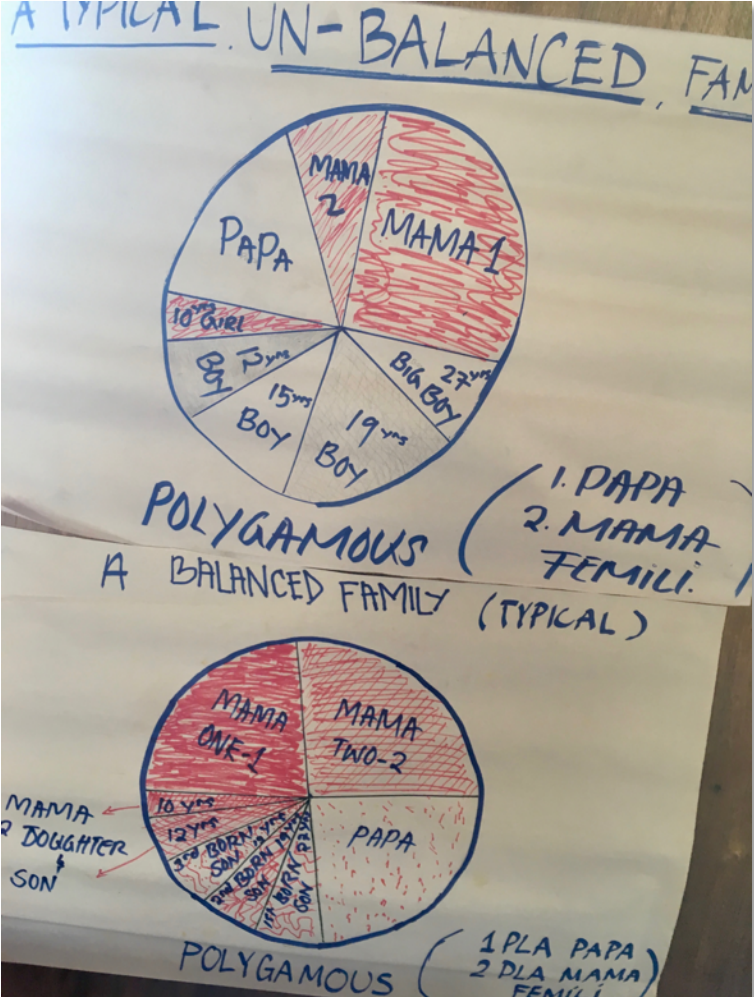
There are some areas that may initially be seen as resistant to change, however these need to be considered with a wider gender lens. For example, women may continue to take the major burden of marketing which initially suggests the lack of a shared workload. However, on investigation a number of women report that they choose to maintain this role as it gives them ready and regular access to money. In the ideal scenario, they are able to spend the money as mutually agreed within the family, or in the worst case be able to purchase key family needs as well as bring home some money to the man. This is an important indicator of (some) 'control over assets'. Similarly, a planned approach to harvesting and marketing would mean that women need to spend less time at the market as planned marketing can be done less frequently and more strategically, however for many women the time at the market is an important part of their social relationships and develops their social capital. It is also important to acknowledge the gift and exchange processes that PNG women utilise in the informal economy. Whilst asset exchange through the informal economy are important, many of the benefits in this economy are relational and cannot be monetarised.

It is well recognised that agricultural interventions can add to the workload of women and therefore women's workload must be assessed. Although the reduction of women's workload is a goal, and was achieved in a number of families, most importantly women's workloads did not increase. Women did report that having greater decision-making ability over their daily roles did reduce drudgery and gave them more variety across the week. Women's workloads are now visible and publicly acknowledged by men as well as women (who always knew this). This is the first step of gender change

Objective 5: To explore the capacity development of PNG agricultural focused agencies in gender inclusive and gender sensitive extension delivery

Major activities: FFT training for staff from FPDA, Oxfam, Oxfam Sustainable Livelihoods program partners, Pacific Women Shaping Pacific Development agencies, PNG Governance Facility (PGF) District Development agencies.

Main findings: There were a range of training backgrounds in the cohorts, which had a direct relationship to participants' ability to fully engage in the training. This ranged from farmers who had just begun to learn about being training facilitators (Oxfam, PGF) through to highly experienced trainers (FPDA, Pacific Women agencies). In the Oxfam and PGF groups, the trainers engaged as farmers first and learnt through applying the concepts to their own family, whereas the experienced trainers were able to move quickly to identify the gender and cultural dynamics that they could anticipate when training farmers. Despite the lack of experience of the Oxfam cohort, the 39 trainers trained 596 farmers (256 F, 340 M) in one month.



The training experience of the trainers was also evident in their feedback after delivering the FFT activities. A number reported being challenged when working in mixed-gender groups, where men took the right to speak and women needed encouragement to speak up. Some trainers found it difficult to work when children were present, again indicating a lack of experience, or experience working with technical training where only adults attend. Both female and male trainers reported that male farmers were often defensive and rationalised their actions. When the FFT is led by highly experienced trainers, this dynamic is rarely present, as the facilitation focuses on creating a strengths-based approach that privileges the family unit and raises questions of greater good, not individual blame. This is, however, an advanced skill that would require further training.

Some trainers found it difficult to move from English to Tok Pisin when training. This is not surprising, as most trainers would have had Tok Ples as their first language, then learnt Tok Pisin and finally English at school. For those who had only primary education, their competency in English would be minimal. A further complicating factor for even the educated FPDA trainers was that they have mainly been trained and train others in technical areas, where there are straightforward technical terms and skills (pruning, fertiliser measurements, etc) Working with social concepts and values-based learning is significantly different and, again, learnt through experience.

In all cohorts, both female and male trainers gave feedback that they found the focus on gender equity an empowering and inclusive approach. A number had experienced training based on a gender rights approach and had seen people walk out of such training. The UC training presented the key points of gender equity on the last day, after relationships had been built and a shared language about gender had emerged. This appears to have been an important process. The practical activities and the experiential learning process of the FFT training could be immediately grasped by most trainers, who could apply it to their own family and see the benefits. After the practical outcomes of each activity were obvious, the family issues could then be explored for their equity and effectiveness. Focusing on the farm as a family business seemed to be an easily transferable message from trainers to farmers, and within this the gender equity issues could be raised.

One issue that arose in all cohorts was that many of the female and male roles were seen as 'our cultural way'. However, in all groups there were trainers who expressed to the group that their culture was changing. In a patriarchal culture, male power is often invested in certain cultural practices; however, when men speak up about the need for change and identify the new

masculinities, this can have a powerful impact. This was seen in the Pacific Women group, where two young men challenged other men to value their culture as a living and changing entity.

All cohorts have recommended six-monthly or annual refresher training. Given the time needed to build skills in gender-inclusive training practices, this is a very logical recommendation. However, given the wide range of areas in which the trainers work, and the cost of transport and accommodation in PNG, this would be costly. PAU and UC are now exploring funding sources for an annual refresher training event.

The activities for this objective have shown that paid staff and farmer trainers are eager to explore how to engage both women and men in change, within their family and in their farm activities. The practical approach of experiencing the major FFT activities and then being invited to analyse them for their application in the trainers' own area appears to have been a non-threatening and empowering approach. It enabled them to identify and name for themselves the major gender inequities in farming families.

Further, in the training, the trainers were able to surface the many cultural dynamics that also needed to be considered. One of the most important indicators of changed gender awareness was that the majority of trainers reported that they now saw gender inequities in their own families and that most outlined priority areas for changing their own behaviour. This ownership of gender inequities augurs well for the future work of these cohorts of trainers.

Summary

The project identified that for maximum impact and the modelling of gender equity, VCE teams should have a gender balance, and that FFT training is the most effective when both women and men from a family attend. These have been recommended as key components for future delivery.



The project further demonstrated that there are two complementary components of the FFT model:

- i. The 'family farm team' development training workshops that focuses on reorienting women and men towards a gender equitable and more effective planned approach to farming as a small family business. The program helps families look at the work done by women, men and youth and to work towards a more equitable and effective distribution of agricultural and household work. It assists farming families to plan and make decisions together. It encourages opportunities for women to have access to their own income and promotes the wider benefits of women having a voice within the family and community.
- ii. The 'business of farming' training that introduces farming families to a livelihoods approach, better practice agriculture, foundational business practices and financial literacy, ideally delivered by PNG agencies.

The way in which the program can be best delivered will depend on the area and agricultural opportunities. However, it is recommended that all delivery models begin with the FFT training so that women and men can begin to adjust their roles, workloads and family decision-making and are then ready to engage in an equitable way as new farming activities generate greater income.

Further needed research includes examining how to engage government and major social institutions, such as churches, in agricultural development using a family farm teams approach; engaging youth in agriculture as a future; examining if/ where/ how the family farm teams approach could be integrated in the education system, from schools, through to higher education; and trialling the family farm teams model in other Melanesian settings and beyond.

There are now a number of committed VCE networks across PNG, but each network is relatively isolated. The Family Farm Teams Facebook page has provided one small connection space www.facebook.com/pngwomenfarmers. However, it is now crucial to consider ways to accredit and further support these key change agents. It is through these networks that the Family Farm Teams work can be further adapted by PNG people for PNG.

Program website: www.canberra.edu.au/research/faculty-research-centres/csc/family-farm-teams-program



FST/2014/099 Galip Nut

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

Background

This project seeks to expand markets and processing of canarium nuts in East New Britain, Papua New Guinea, by strengthening private sector capacity and engagement using nuts from existing trees. *Canarium indicum* is an agroforestry tree in Eastern Indonesia and the Pacific that produces edible nuts. Donor agencies have tried to commercialise the industry in Papua New Guinea and the Pacific. Nuts could improve the livelihood of the rural poor in developing countries and meet the Millennium Development Goal of eradicating poverty and hunger. Nuts are highly nutritious, can be stored for long periods, and can be sold for cash, processed and exported to distant markets. Women in Papua New Guinea grow and trade canarium nuts; they cultivate, harvest, process and sell them.

The project will take a whole of value-chain approach. It will research markets, provide technical advice, build capacity, mentor businesses, and give private and public sector stakeholders access to infrastructure. It will target the private sector at three different scales: smallholder and small-scale entrepreneurs, small and medium-sized enterprises, and large-scale processors.



Progress summary

There has been a large increase in the number of farmers selling and the farm gate value of the industry over the life of the project.

Year	Nut in pulp purchased (PGK1 - PGK1.50 per kg)	Number of farmers selling	Farm gate value
2014	Small volumes (<1,000 kg) for research trials	N/A	N/A
2015	11 tonnes nut in pulp	243 smallholder farmers	PGK10,669
2016	25 tonnes nut in pulp	647 smallholder farmers	PGK26,349
2017	65 tonnes in pulp	564 purchases recorded (many others not captured in data app) 447 selling at farm gate, 117 at factory door	PGK65,000 at farm gate
2018	207 tonnes in pulp	1,349 purchases recorded (many others not captured in data app) 44 selling at farm gate, 1,305 at factory door	PGK310,500 at farm gate

Figure 4: Galip nut production and processing volume, farmer sources and value.

With the increasing supply of galip nuts to the factory, a range of products have been developed and various markets tested in East New Britain and Port Moresby. Three main products were developed for formal markets in East New Britain and Port Moresby including natural, roasted and peeled products. The prices for final product include: PGK170/kg for peeled, PGK150/kg for roasted and PGK140/kg for natural product at the package sizes of 60g, 100g and 1kg.

There were two formal launch events in mid-2018 in East New Britain and Port Moresby. Repeat sales have been strong with the factory struggling to meet demand from Port Moresby markets. As of December 2018, over 1 tonne of processed nut product had been sold, mostly in Port Moresby markets.



The pilot factory at NARI Kerevat has been scaled up with cracking capacity of around 500kg per day. Research underpinning this expansion included depulping, drying, cracking, roasting, nut quality, food safety shelf life and nutritional analysis.

Two private sector players have partnered with the project team. These are the Equanut Co who is partnering with the project team to use the NARI Kerevat factory to process *canarium* in East New Britain, and CPL who has agreed to act as a distributor for the project team for the market testing trials and ongoing sales.

Achievements against project objectives

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

Most activities relating to this objective were completed in the first year and have since helped inform the Canarium industry roadmap, training needs and industry development. In addition to the initial surveys, the project can also infer to some extent the level of market participation at different stages of the project. On the supply side, inference can be drawn from changes in the volume of fruit purchased over time, the number of farmers participating in sales, the primary locations of farmer supply, changes in the quality of fruit offered for sale, and the emergence of arbitrage actors purchasing at the farm level and transporting and reselling at the factory gate. In 2018, CommCare data for fruit purchases indicated that 69% of purchases were from farmers who has sold to NARI previously. On the demand side, inference can be drawn from the initial availability and quality of different products at the retail level and the size and frequency of repeat purchases of finished product from the project for retail resale.

The results of ongoing market analysis are consistent with the characteristics of an emerging and sustainable market for a new product. At the project inception, farmers provided a very limited supply of fruit at PGK2/kg and the project team had to travel to the multiple villages to collect it. As outreach expanded, more farmers saw financial benefit in participation and purchases increased even as the purchase price was reduced to PGK1/kg at the farm gate. A dual price strategy introduced mid-way through the project (PGK1/kg picked up at the farm gate or PGK1.50/kg delivered to the factory gate) coincided with a large increase in factory gates sales and a generally higher quality of product presented as farmers developed greater awareness of the size and quality of fruit that would be accepted or rejected. In 2018, approximately 76.8 tonnes of fruit was purchased, 95% of which occurred at the factory gate. The recent emergence of villagers purchasing from farmers, consolidating, and then reselling at the factory gate is a positive indicator of the maturity of market participants.

On the demand side, the availability of a shelf-stable nut product was largely non-existent at the beginning of the project. Supply was highly decentralised, and the nut was only available through informal markets in a raw and non-value-added form. The establishment of the factory and the introduction of a higher end and shelf-stable nut product facilitated the participation of more traditional retailers into the market. Concurrently, the overall increase in consumer awareness of the nut enabled competitive and industrious entrepreneurs to process and sell packed nuts independently and capture a share of the emerging market.

In the final year of the project the supply of high-quality fruit by farmers has greatly increased, and the sales of shelf-stable nut products at premium prices has substantially expanded. This has attracted the attention of SMEs from related industries and recently led to a public-private partnership to further develop the product and market.

All indications are that the market will continue to evolve and mature as anticipated. Specifically, supply of fruit from farmers will continue to expand, primarily at the factory gate. It's likely that entrepreneurial participants will seek to undertake more local purchasing and value-adding through de-pulping and selling nut in shell or kernel to the factory rather than fruit. While there are quality

control issues that need to be addressed, the outcome would be enhanced livelihood benefits and expanded informal employment opportunities at remote locations. Ideally, this would increase remote technical capacity and lead to both greater overall supply to the factory, increased financial benefits to remote locations, and more competition in domestic markets.

Market analysis indicates that there is considerable repeat retail demand for the finished products coming off the factory production line (shelf-stable professionally packaged peeled, natural, and roasted whole kernel) at a premium price that provides a large profit margin on variable costs. This is a significant indicator of the viability of whole processed kernels in premium niche markets. Further, it provides the project team and private investors with confidence to develop new product lines that make greater use of mechanised production processes that have lower average costs to provide oil, meal and kernels to international markets at competitive prices with supply chain traceability and quality assurance.

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

Research for refinement of methods for small scale processing have been completed and included cracking technology, pulping, and processing methods. Three main areas were identified as readily transferable interventions;

- **Solar drier:** Solar driers have been built in three different provinces of PNG utilising the resources available locally to the area. Different models have been transported across East New Britain, New Ireland and Bougainville tied to the back of utes, in boats and on top of trucks. It has demonstrated the versatility and effectiveness of this simple design and how it can be easily modified to suit a situation.
- **Drying:** Whether using the solar drier or a range of other techniques the team has developed a range of drying options that can be utilised dependent on access to services. Simple procedures and tests have been developed to ensure that galip nuts are sufficiently dry for them to be stored, using electric dehydrators, a range of ovens and open fires and pans.
- **Value adding:** Throughout the project there have been many opportunities to trial galip based, value added products with ongoing work in the Galip Nut Company kitchen and with small scale entrepreneurs looking to develop new products. The team has worked through many recipes and formulas to provide stable recipes using local ingredients that produce a safe, healthy and desirable product.

In situ training on small scale processing has been provided throughout East New Britain and in New Ireland across a range of different settings from remote through to urban. In this reporting period, there have been two training sessions in New Ireland which included galip growing and processing, value adding and business mentoring;

- Kavieng in November 2018, 78 participants – as part of TADEP+ Collaborative Research Grant (refer to page 24).
- Djoul Island in January 2019, 70 participants.

Whilst the project had initially expected to be focusing training with small-medium enterprises, this shifted over the life of the project to microenterprises as they are more active in galip value adding. The Galip Club are a recently formed group of farmers and persons interested in participating in the development of a galip industry.



The group works across the Gazelle Peninsula in East New Britain and have a strong focus on local sustainability and ensuring all members have the opportunity to benefit from the industry. This can be from farmers whom are looking to sell their nuts, those interested in propagation and groups looking to value add to their products. The club organises regular training opportunities and allows communities to decide what is best for them. The project has supported the Galip Club with a range of training including food hygiene, food safety, value adding options, financial literacy, factory tours, farm visits, agricultural methodologies, biochar production and composting workshops, baking for profit workshops. Another Galip Club has also been established in Port Moresby.

Devine Management Services (DMS) is a local SME founded by Dorothy Luana which supplies galip nuts to retailers in Port Moresby. The project has provided advice on packaging, distribution, food safety requirements and marketing, and in turn Dorothy has acted as a role model and mentor for other aspiring microenterprises and as an industry ambassador.

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

The financial analysis for the 2018 season identified that the fruit purchase price remains the largest contributor to the final ex-factory cost of kernel. This component of the final cost has been substantially reduced from 2017 due to incentivising fruit delivery to the factory gate with a dual purchase price strategy, following financial analysis at the conclusion of that season. The outcome has been substantially greater purchase volumes, greater income benefits for farmers, and the avoided cost of staff travelling to farms to purchase the fruit. Staff at NARI also developed a better method for testa removal using a modified Noni juicing machine which increased processing capacity.

While the initial intention of the financial modelling was to develop micro- and macro-level financial models, undertake advanced DuPont Analysis etc., it became apparent that financial information that only related to the factory could not be extracted from whole of project costs at sufficient detail to produce accurate figures. Further, the project as a whole did not function like a traditional commercial operation with loans, shareholders, dividends, equity, assets, depreciation schedules etc. As a result, the financial analysis focused greater attention on producing a detailed and accurate gross-margin analysis concentrating on variable costs associated with the production process for various product lines which could be triangulated with the time and throughput figures collected in the logbooks.

A detailed final financial analysis is being prepared based on year sales and production figures, however, the preliminary findings of the financial and market analysis are positive. On the supply side, farmers are motivated to collect and sell at the prices offered for fruit. On the demand side, the



project is getting repeat orders from CPL in Port Moresby and private and retail purchasers in Kokopo, Kerevat, Lae and Rabaul at premium prices with reasonable gross profit margins. Looking forward, there is considerable scope to reduce costs as our production process matures and becomes more efficient and we develop new product lines that take advantage of the lower average costs of the mechanised production process and expand domestic and international sales.

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

The project has created two public private partnerships in its final year. The project team and NARI are working closely with Equanut, NZ based investor, co-funded by the New Zealand Ministry of Foreign Affairs and Trade (MFAT). They are negotiating to lease the NARI factory and operate it commercially half time and are working closely with the project team. CPL, a PNG based company, has partnered with the project team to act as a distributor for the product for the market testing phase in Port Moresby.

Since the installation and subsequent improvements of the processing line at the NARI Kerevat factory, there has been a significantly increased capacity to profitably purchase nuts from farmers and to efficiently process the nut-in-shell. Staff at NARI have been trained in using the equipment, plant hygiene and plant maintenance. Project staff have worked with NARI staff on a one-to-one basis to build their skills with use of technology, food technology, health and hygiene, experimental design, plant and soil experiments and marketing.

A processor information package that details equipment needs, throughput and cost structures is currently in draft form and will be finalised by the end of the project. The information is designed processors wishing to enter the industry. Other marketing and promotional materials to be used at point of sales are being developed and delivered at the product launch events.

A website has been developed to market and promote the new product range; www.galipnutco.net

7. 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.

Inputs	Activities	Outputs	Outcomes or impacts
<i>what resources go into a project</i>	<i>research activities the project implements</i>	<i>the direct product of those activities</i>	<i>the changes or benefits that result from the activities or outputs</i>
funding, staff, equipment	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

Figure 5: Typical elements of project monitoring and evaluation.

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 11). This is generally limited to the footprint of the project (the area bounded by the blue 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 introduced the TADEP Annual Meeting in May 2016 and reiterated as subsequent Annual Meetings. 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 impact.

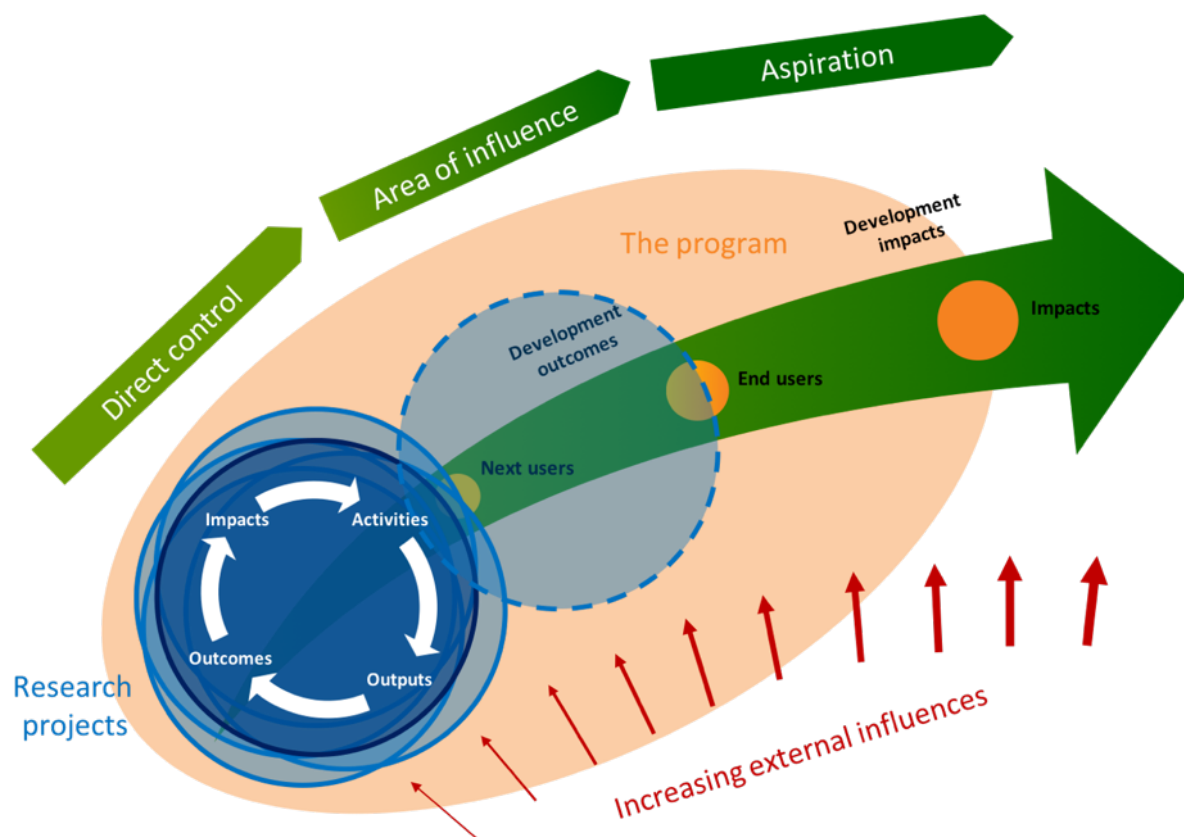


Figure 6: Impact pathway for research projects and TADEP.

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'.

As the program has progressed, the projects have shifted their focus from implementation of their respective research activities and outputs to research outcomes. As we come toward the end of the program, impacts will begin to emerge and by its conclusion, the evidence provided by the projects will be to demonstrate program level development impacts.

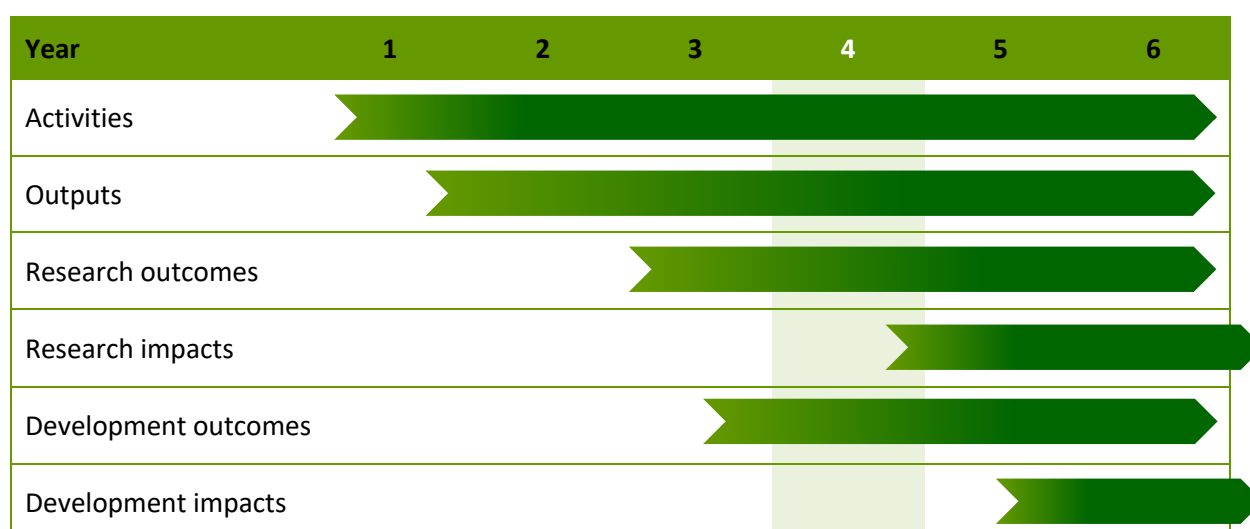


Figure 7: An example of anticipated timing of outcomes and impacts for a research for development (R4D) project or program.

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 and June 2018. 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:

- (B)** HORT/2014/094 Developing the Cocoa value chain in Bougainville (Bougainville Cocoa)
- (P)** 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)
- (S)** HORT/2014/097 Supporting commercial Sweetpotato production and marketing in the Papua New Guinea highlands (Sweetpotato)
- (F)** ASEM/2014/095 Improving opportunities for economic development for women smallholders in rural Papua New Guinea (Family Farm Teams)
- (G)** FST/2014/099 Enhancing private sector-led development of the Canarium industry in Papua New Guinea (Galip Nut)

Figure 8: Contributions to the Program Performance Framework.

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

Program objective	Vision of success	Verifiable indicators	Evidence
To stimulate and strengthen inclusive private sector-led development 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.	Partnerships brokered with private sector.	(B) Three international chocolate makers attended the 2018 Bougainville Chocolate Festival to act as judges in the chocolate competition. Sales of cocoa beans have resulted, albeit handicapped by logistics and licencing.
			(S) Growers now directly supplying supermarkets rather than open markets, reducing price variability that is noted by growers as a major issue for them.
			(G) The project team and NARI are working closely with Equanut, NZ based investor, co-funded by the New Zealand Ministry of Foreign Affairs and Trade (MFAT). They are negotiating to lease the NARI factory and operate it commercially half time and are working closely with the project team.
			(G) CPL, a PNG based company, has partnered with the project team to act as a distributor for the product for the market testing phase in Port Moresby.
		Partnerships brokered with Provincial Governments.	(P) The externally-funded Provincial Government cocoa projects in New Ireland and East Sepik are buying clones from the CMFTs originally set up in the ACIAR project and this is contributing to the viability of nurseries.
		Value-adding businesses developed.	(B) The project has assisted a smallholder farmer, Ishmael Toroama, from Tinputz to become a local drinking chocolate producer via basic processing equipment and training.
			(P) A CMFT in East Sepik is also now functioning as a commercial nursery, supplying cocoa seedlings to the

			World Bank managed Productive Partnership in Agriculture Project (PPAP).
			(P) The Yekimbole CMFT group have established a successful wet bean buying and fermentary business.
			(S) The sale of <i>klin kaukau</i> vines is a new business to PNG. As awareness of the benefits of use of clean planting material grows, demand for the vines has increased. One grower has reported sales exceeding PGK4,000 over a 4-month period.
		Women are actively engaged in family farms.	<p>(P) The aim was to recruit an equal number of men and women but in nearly all cases spouses attended the training with their partners and so CMFTs are nearly always husband/wife teams.</p> <p>(F) “Module 2: Planning your family farm as a family team” delivered to VCEs in Eastern Highlands (34 F, 3 M), Jiwaka (20 F, 15 M), Western Highlands (42 F, 8 M), ARoB (33 F, 20 M) and New Ireland (36 F, 28 M).</p> <p>(F) VCEs delivered “Module 2: Planning your family farm as a family team” to farmers in Eastern Highlands (272 F, 211 M), Jiwaka (88 F, 62 M) and Western Highlands (213 F, 50 M).</p>

Program objective	Vision of success	Verifiable Indicators	Evidence
To sustainably increase agricultural productivity, quality and value	The livelihoods of rural men and women are transformed through improvements in and adoption of production technologies in agriculture.	Increased agricultural productivity.	(B) 33 VEWs have received training and, to varying extents, have adopted cocoa management best practice techniques.
			(P) 75 CMFTs (25 per province) have received training and, to varying extents, have adopted cocoa management best practice techniques.
			(S) Data from trials conducted in farmers' fields and at NARI Aiyura research station. Yield increases of 10-30% from use of clean planting material.
			(G) Increase from 65 tonnes to 207 tonnes between 2017 and 2018 seasons.
		Increased quality of agricultural produce.	(B) Increasing number of cocoa farmers are improving processing techniques, as evidenced by the chocolate competition at the Bougainville Chocolate Festival.
		Increased agricultural value.	(B) Cocoa buyer in Arawa has introduced a premium price for cocoa farmers that supply cocoa that meet high quality standards.
			(S) Increased demand for clean sweetpotato in markets due to superior appearance and taste. Anecdotal evidence from growers is of higher yield, earlier crop maturity (shorter cropping duration), better product shape and superior product taste.
			(G) Increase from 117 total sales at factory door in 2017 season to 1,305 total sales in 2018, reflecting shift in sales method due to new pricing structure.
		Farming families are operating commercially.	(S) The 14 core farmers in the project have embraced the technology. Each of these farmers is actively promoting it in her/his community, with 1 farmer reporting that he has

			mobilised 100 other farmers in his region to adopt <i>klin kaukau</i> .
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Program objective	Vision of success	Verifiable Indicators	Evidence
To improve access to markets and strengthen value chains	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.	Increased capacity to access markets.	(B) Improved cocoa quality through training, VEW peer learning model and partnerships with international chocolate makers.
			(P) Improved cocoa quality through training, CMFT peer learning model and partnerships with cocoa exporters.
			(S) Community development training across four communities.
			(S) Grower study tour to Australia.
			(S) Supermarket trial and subsequent support for growers to maintain supply to the new markets.
			(G) The supply of high-quality fruit by farmers has greatly increased, and the sales of shelf-stable nut products at premium prices has substantially expanded.
		Improved post-harvest handling, processing and marketing.	(B) Education about quality cocoa attributes and correlating improvements to processing equipment needed.
			(B) Chocolate Festival raising awareness of Bougainville as source of fine flavour cocoa. Chocolate competition to increase farmers' knowledge of cocoa quality.
			(P) With the support of Agmark, models for more cost-effective solar dryers using rolls of plastic have been developed. The CMFT group at Yekimbole has built a successful business around these dryers, and similar dryers have also been built at in New Ireland, East Sepik and Madang.
			(S) Establishment of Facebook page to communicate with project partners and value chain.
			(F) Training delivered to VCEs in ARoB and New Ireland include all four Family Farm Team Modules plus IATP

			training (sustainable livelihoods, record and book keeping, poultry, piggery, soil management, vegetable production) and Nationwide Microbank training.
		New markets identified.	(B) Taste and Tell event brought together chocolate makers from across Australia to promote Bougainville fine flavour cocoa.
			(P) A CMFT in East Sepik is also now functioning as a commercial nursery, supplying cocoa seedlings to the World Bank managed Productive Partnership in Agriculture Project (PPAP).
			(P) The Yekimbole CMFT group have established a successful wet bean buying and fermentary business.
			(S) Supermarkets, catering companies and a potential export market to Micronesia.
			(G) Retail presence in East New Britain and Port Moresby.
		New markets developed.	(B) Direct relationships between cocoa farmers and chocolate makers in Australia.
			(S) Growers now supplying directly to Tininga and CPL supermarkets.
			(G) Repeat orders from CPL in Port Moresby and private and retail purchasers in Kokopo, Kerevat, Lae and Rabaul.

Program objective	Vision of success	Verifiable Indicators	Evidence
To promote gender equity and women's empowerment 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.	Activities specifically targeted towards women's decision-making capacity, leadership and representation	(B) A portion of the training delivered by the project has been targeted at women.
			(P) All training sessions include training to support the involvement of women in cocoa production. This training is led by Dr Josephine Saul-Maora who is working in collaboration with the Family Farm Teams project ASEM/2014/095.
			(S) Community development training (family focussed) across 4 communities – 10 modules delivered for each community.
			(F) Leadership training delivered in conjunction with Family Farm Teams training to Eastern Highlands (6F, 1 staff), Jiwaka (7F, 2 staff) and Western Highlands (7F, 1 staff). Each woman led a team of six VCEs who delivered the peer education activities in their own village.
		Activities specifically targeted towards women's economic opportunities	(P) Most of our CMFTs have developed as husband and wife teams, and some have been led by women, and one group is considered an all-woman group (supported by their husbands).
			(F) Aside from the four Family Farm Teams training modules, financial literacy training has been delivered by Nationwide Microbank in ARoB (46 F, 34 M) and New Ireland (26 F, 34 M).
			(G) Workshops to improve productivity, value-adding and market access have been delivered to 529 farmers, SMEs and micro-enterprises plus factory demonstrations to several hundred people, a large majority of whom are women.

		Activities specifically targeted towards improving women's skills and access to information	(P) Growing cocoa as a small tree and with more intensive management facilitates, and even requires, the involvement of women and youth.
			(S) Female project team member from NARI is undertaking a research higher degree in a project related area. Female project team member from NARI is undertaking a research higher degree in a project related area.
			(F) 266 farmers were trained as VCEs (165 F, 101 M). These VCEs trained 2,491 other farmers (1,622 F, 869 M).
			(F) 98 people (45 F, 53 M) from Fresh Produce Development Agency (FPDA), Oxfam, Pacific Women Shaping Pacific Development/Pacific Governance Facility funded agencies were trained as FFT trainers. At the time of the report, they had trained a further 1,271 farmers (592 F, 679 M).
			(G) Workshops to improve productivity, value-adding and market access have been delivered to farmers, SMEs and micro-enterprises plus factory demonstrations to several hundred people, a large majority of whom are women.
		Number of women and men actively involved as members of research teams	(B) More than 50 women involved in the project team, including the trained interviewers and hub managers.
			(P) Of our initial 75 CMFTs, about 65 involve both husband and wives. One unmarried CMFT is supported by his mother, who attends training sessions with him.
			(F) UniTech (2F 2M), PAU (2F 1M), NARI (2F 1M), Baptist Union (2F), Voice for Change (1F), FPDA (1F), New Ireland DPI (1F 2M) and CARE (1F).

Program objective	Vision of success	Verifiable Indicators	Evidence
To build individual and institutional capacity	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.	Activities targeted towards building the capacity of farmers, SMEs and micro-enterprises	(B) 33 VEWs have received training in nursery and budwood garden establishment, integrated pest and disease management (IPDM), cocoa pod borer (CPB) management, budding of clones, sustainable livelihoods and two business modules in small enterprises and record keeping and decision making.
			(P) 75 CMFTs have received training in nursery and budwood garden establishment, integrated pest and disease management (IPDM), budding of clones and sustainable livelihoods.
			(S) Community development training (CDT) has been delivered in Wimbika village (WHP), Gusam village (Jiwaka Province), Kasena village (EHP) and Matiyufa village (EHP).
			(F) 266 farmers were trained as VCEs (165 F, 101 M). These VCEs trained 2,491 other farmers (1,622 F, 869 M).
			(G) Workshops to improve productivity, value-adding and market access have been delivered to 529 farmers, SMEs and micro-enterprises plus factory demonstrations to several hundred people, a large majority of whom are women.
			(B) Cocoa Board and ABG DPI staff are engaged directly by the project and have received ongoing training and mentoring.
	Activities targeted towards building the RD&E capacity of institutions		(S) Training of NARI staff on virus diagnostics NARI and FPDA staff visit to Australia on study tour.
			(F) 98 people (45 F, 53 M) from Fresh Produce Development Agency (FPDA), Oxfam, Pacific Women Shaping Pacific Development/Pacific Governance Facility funded agencies were trained as FFT trainers. At the time

			of the report, they had trained a further 1,271 farmers (592 F, 679 M).
			(G) Increased capacity of NARI Kerevat staff.
		Project participants whose knowledge, attitudes, skills and aspirations have specifically benefited through involvement in Project team	(B) More than 12,450 household surveys have been conducted, providing individuals and policy makers key data and insights into the factors affecting cocoa production in Bougainville.
			(P) With each of the 25 CMFTs having groups of 75 farmers each, of which have an average of 5 family members, it is anticipated that 9,375 individuals will have benefited from the project.
			(S) Positive feedback from the 14 lead sweetpotato farmers about grower visit to Australia, and examples of practice change adopted in return to PNG as shared on project Facebook page.
			(G) Factory manager (1F), processing line (3F 10M), social sciences (1F), agribusiness and market development (2M) and agronomy (1M).
		Training events and post-graduate training opportunities	(B) Training workshops (budding, IPDM/CPBM, nursery management, lining and planting) across three regions of Bougainville.
			(B) 33 individuals trained to undertake household surveys.
			(P) Each of the 25 CMFTs have undertaken specific training, which will be imparted to the respective farmer groups. The training of farmers will be on-going via the permanent presence in villages of CMFTs.
			(S) Grower visit to Australia (14 farmers, 4 NARI/FPDA staff).
			(S) NARI staff member enrolling in research higher degree study in Australia.

			<p>(F) 266 farmers were trained as VCEs (165 F, 101 M). These VCEs trained 2,491 other farmers (1,622 F, 869 M).</p> <p>(F) 98 people (45 F, 53 M) from Fresh Produce Development Agency (FPDA), Oxfam, Pacific Women Shaping Pacific Development/Pacific Governance Facility funded agencies were trained as FFT trainers. At the time of the report, they had trained a further 1,271 farmers (592 F, 679 M).</p>
		Activities undertaken in geographically and socio-economically diverse locations	<p>(B) Village assembly were specifically chosen for their geographic diversity across the three regions of Bougainville.</p>
			<p>(P) CMFT sites are geographically diverse across the four provinces involved.</p>
			<p>(F) Family Farm Teams and Leadership training have been delivered in Eastern Highlands, Jiwaka, Western Highlands, AROB and New Ireland.</p>
			<p>(G) Training was extended to New Ireland and Bougainville in addition to the core training in East New Britain.</p>

Glossary

ABG	Autonomous Bougainville Government
ACIAR	Australian Centre for International Agricultural Research
ARoB	Autonomous Region of Bougainville
BP	Bougainville Partners
BU	Baptist Union
CBO	community-based organisation
CCI	Cocoa Coconut Institute
CDW	community development worker
CPB	cocoa pod borer
CMFT	Cocoa Model Farmer-Trainers
CRG	Collaborative Research Grant
CUG	Closed User Group (Digicel service)
DAL	Department of Agriculture and Livestock
DFAT	Department of Foreign Affairs and Trade
DPI	Department of Primary Industries
EHP	Eastern Highlands Province
FFT	Family Farm Teams
FPDA	Fresh Produce Development Agency
IFAD	International Fund for Agricultural Development
HEW	Health Extension Worker
LAMP	Loop-Mediated Isothermal Amplification
MAD	Mobile Acquired Data
MDG	Millennium Development Goal
MFAT	New Zealand Ministry of Foreign Affairs and Trade
MTDP III	Medium Term Development Plan III
M&E	Monitoring and Evaluation
NARI	National Agricultural Research Institute
NATTB	National Apprenticeships and Trade Testing Board
PD	professional development
PAU	Pacific Adventist University
PMV	pubic motor vehicle
PPAP	Productive Partnerships in Agriculture Project
PSD	private sector development
PT	pathogen tested
R4D	research for development
SD card	secure digital card
SME	small medium enterprises
SRA	Small Research Activity
TADEP	Transformative Agriculture and Enterprise Development Program
TADEP+	Transformative Agriculture and Enterprise Development Program including the formally concluded Family Farm Teams and Galip Nut projects
TEAM	Technology Evaluation and Marketing
ToT	Training of Trainers

UNRE	University of Natural Resources and Environment
VCE	village community educators
VEW	village extension worker
VRC	Village Resource Centre
WHP	Western Highlands Province

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