

ACIAR–DFAT PNG Economic Development Program and Bougainville Agriculture Program

Transformative Agriculture
and Enterprise Development Program

Annual Report

1 July 2017 – 30 June 2018



Australian Government

**Australian Centre for
International Agricultural Research**



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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 2017 to 30 June 2018.

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
Family Farm Teams		July 2015	July 2018	Dec			
Galip nut		September 2015	December 2018		January 2019		December 2021
Bougainville Cocoa		February 2016					December 2021
PNG Cocoa		March 2016				February 2021	
Sweetpotato		February 2016					December 2021

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 will conclude at the end of 2018. A Mid-Term Review of the program was undertaken this year, and those projects with shorter timeframes communicated a desire to continue to contribute to the program, albeit not as part of the 'formal' program.

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 approximately 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 52).



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

The monitoring and evaluation 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 16). The program elements describe the extent to which TADEP delivers value beyond the sum of the component projects, and are summarised as follows:

- Communications
 - 12 comprehensive Monthly Updates sent to +130 recipients detailing progress of the component projects and more broadly of the program
 - Numerous stakeholders meeting held in Canberra and various locations across PNG with funding agencies, project teams, partner organisations
 - Stories communicating the impact of the projects featured in print media, online blogs and articles, social media
 - Continuation and review of the Closer User Group telecommunications tool
 - Collation of content for a soon-to-be launched website www.tadep-png.com
 - Hosted a TADEP Tour of the New Guinea Islands region to invite key stakeholders to see on-the-ground impacts of the projects and program
 - Creation of a series of videos communicating stories of impact that align with five over-arching program objectives
- Collaboration
 - Fostered partnerships within and beyond the program to continue identifying potential collaborations and maximising the impact of TADEP

- Launched the first round of the Collaborative Research Grants with three successful applications approved
- Hosted the 2018 Annual Meeting and Mid-Term Review in Kavieng, New Ireland
- Capacity building
 - Several qualitative evidence that demonstrate instances of project team staff benefiting from additional capacity and leadership roles
 - Key partner organisations for the program such NARI, FPDA and Oxfam receiving and delivering training as part of institutional capacity building.

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 areas for greater 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. 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.

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

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 the 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:

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

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 will achieve economic benefits, especially increased employment and incomes in rural areas, and enhanced rural–urban supply chains. It works in the sectors of greatest benefit to rural communities, and has a particular focus on the empowerment of women, and commodities that can be brought to market.

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

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.

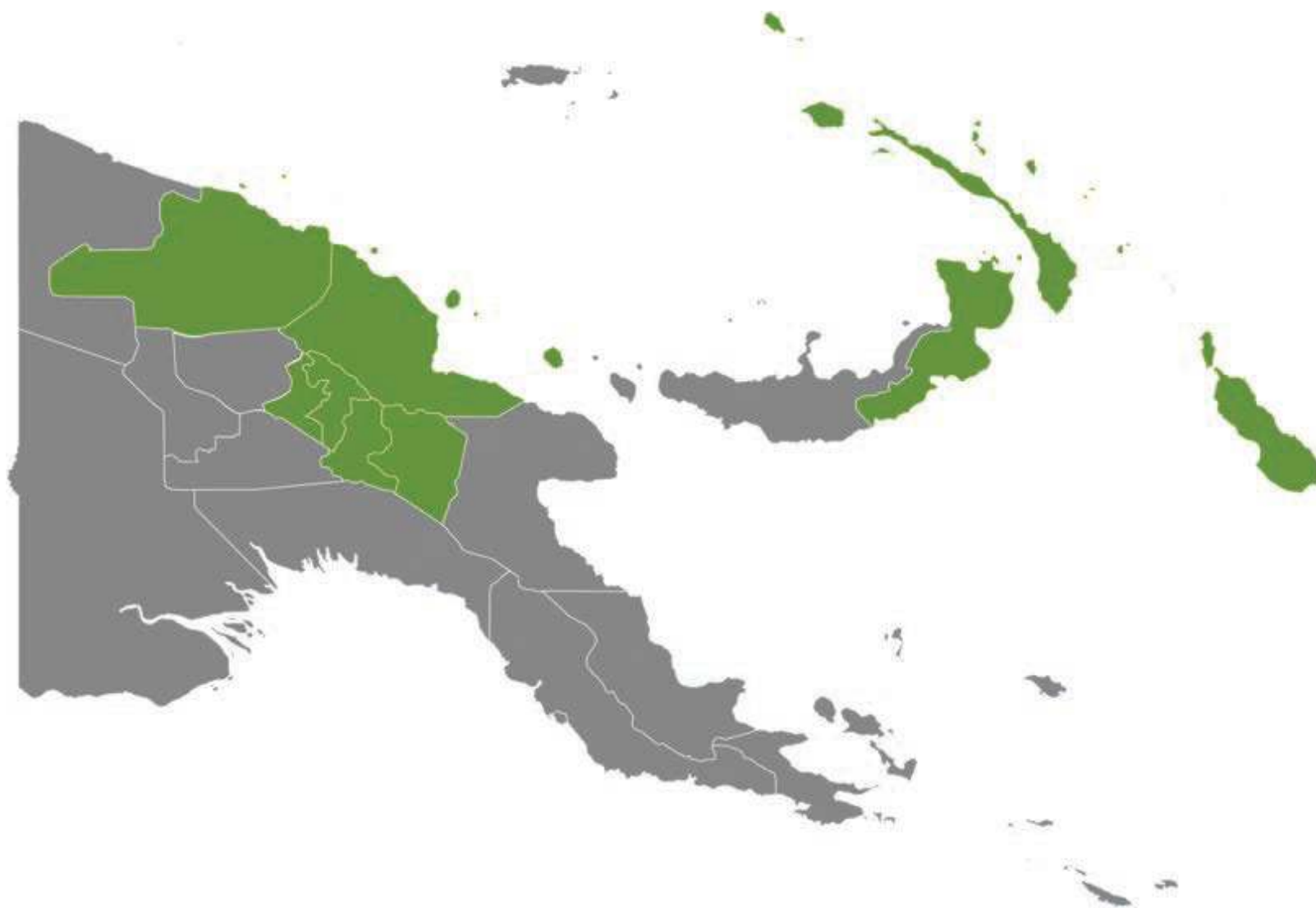


Figure 3: TADEP areas of focus in Papua New Guinea and the Autonomous Region of Bougainville. (Source: FreeVectorMaps.com)

3. Program principles

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, as well as across other TADEP projects.

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.

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 (2017)

To build on the existing relationships and progress already made by the PNG Cocoa project in New Ireland, the Family Farms Teams project was able to value add 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

³ ACIAR Gender Equity Policy and Strategy 2017-2021 (2017)



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 52) 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.



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 more than 12 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.

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 (10F 13M) and Family Farm Teams (12F 6M) 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.



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 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.



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 market opportunities identified in Kokopo and Port Moresby. 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.

A Galip Club has been formed of SMEs to provide additional processing and marketing training and mentorship, enabling the farmers and farming families to become more financial sustainable. There are 20 SMEs in the club, of which three are led by women and one SME of women seeking to establish a galip nut bakery.



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.

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 Sweetpotato project also has a similarly domestic market focus for its products. Since mapping the supply chain of sweetpotato to its major markets, significant improvements have been made in product quality and logistics to respond to the market needs. The project is at an earlier stage of product development, where the improved pathogen-tested varieties of sweetpotato are being multiplied for broader distribution. 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.



Similarly, 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 that, once fully operational, will likely become self-sustaining SMEs. 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. Yekimbole Village in East Sepik has also setup successful businesses buying wet beans from other farmers to process in cooperative fermentaries and solar driers, which they are then selling to the international cocoa buyer and exporter, Outspan.

The Bougainville Cocoa project has also adopted a similar approach, and both cocoa projects endeavour to facilitate a partnership with the World Bank Productive Partnerships in Agriculture Project (PPAP). 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. 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. The project has had great success in facilitating 15 cocoa buyers from Australia, Indonesia, France, England and the USA, but as a key tenet to private sector development, is still facing restrictive regulations that are inhibiting further direct export oriented market opportunities.

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 52).

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 communications assists with the identification and facilitation of coordinated and collaborative activities.

Monthly Updates

Each month, progress reports are collated by the Program Coordinator and circulated to a database of +130 recipients including TADEP project team members, relevant DFAT and ACIAR contacts, project and program stakeholders, inter-related ACIAR or other projects and other interested parties. Whilst these Monthly Updates provide a valuable snapshot into the progress of each of the TADEP projects, they also encourage the sharing of context-specific approaches, ideas or lessons learnt that exemplify the collaborative aims of the overall program.

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

As of September 2017, the Monthly Updates were transferred into an online newsletter platform, MailChimp, which provides branded templates to customise content and improve readership. The format of the Monthly 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 TADEP Monthly Update has an open rate of 42.1% compared to 24.5% for government and 17.0% for agriculture and food services.

The Monthly 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.

Stakeholder meetings

In this reporting period, the TADEP Program Coordinator travelled three times 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. A review has since been conducted to assess whether the CUG will continue as part of the program.

Website

A website for TADEP has been commissioned and content continues to be generated before finalisation and launching. The website will provide context for the program, updates and reports from the component project and the program, communicate the impact of the program against the program goals and share resources relating to multidisciplinary research programs.

The web address is www.tadep-png.com

TADEP Tour

In September 2017, a 'TADEP Tour' concept was developed and facilitated to give those in the TADEP network the opportunity to experience the impact of the projects on the ground and value-add to the site visits the TADEP team will be doing on an annual basis. Any members of the TADEP network were welcome to join the tour, with participation being self-funded.

The first tour of the New Guinea Islands region was aligned with the Bougainville Chocolate Festival and was hosted over 10 days across the Autonomous Region of Bougainville, East New Britain and New Ireland. The program coordinator and program assistant travelled to numerous sites and met with key stakeholders, and were joined by ACIAR Country Office staff, DFAT representatives, partner agencies and project team members for components of the trip. The program team was also able to attend the Reference Group Meeting for the Bougainville Cocoa project along with ACIAR Regional Manager, Florence Rahiria, during ARoB component of the tour. During the tour through Bougainville, the tour also visited research sites relating to the ACIAR cocoa soils project SMCN/2014/048⁴ in Manetai, which has been collaborating with the two TADEP cocoa projects.

Over the ten days the program team met with representatives from NARI Kerevat, University of Sunshine Coast, ABG DPI, ABG Department of Health, Paradise Foods, University of Sydney, UNRE, CCI Kerevat, CCI New Ireland, New Ireland DPI project consultants and many project team members. The opportunity to gain insight into how the projects are progressing on the ground, meet with many of the key people integral to the success of each project and witnessing the impact of the program in the lives of so many was a very valuable to those that participated.

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.

⁴ Optimising soil management and health in Papua New Guinea integrated cocoa farming systems.

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 overarching 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 will feature on the TADEP website, be showcased on multiple media platforms and will be available 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 Monthly 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.

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.

The following is a list of the successful applications with the goal correlating to the collaborative activity:

- Enhancing the roles of women and families in cocoa production

Goal: To build the confidence and skills of women and families to enable the development of equitable family cocoa production and sales enterprises.

Projects involved: Family Farm Teams, PNG Cocoa, Bougainville Cocoa

Partners: Cocoa Board, DPI (NIP, ARoB, East Sepik and Madang)

- Organic wastes or wasted opportunities?

Goal: Aims to reduce soil nutrient depletion and increase the use of low cost and low technology soil supplements in PNG.

Projects involved: Family Farm Teams, Galip Nut, SMCN/2014/048⁵

Partners: USC, UC, USyd, NARI, UNRE

- Sharing income generating ideas for women market sellers across provinces:

Goal: Facilitate a sharing environment where women can experience new products and ideas that can be sourced for their gardens and excess harvest, providing further market engagement and value adding opportunities, alleviating gender inequality through economic empowerment.

Projects involved: Family Farm Teams, Galip Nut

Partners: USC, UC, NARI, UNRE, ENBWYiA

There were considerable delays in the review of the application and administration of the contracts once they were approved. This has impacted the initial scheduling of the proposed activities. Progress has been and full reports will be circulated upon completion

Annual Meeting

The 2018 TADEP Annual Meeting was held in Kavieng, New Ireland on Tuesday 19 and Wednesday 20 June and welcomed 49 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, two ACIAR Research Program Managers as well as Peter Horne and Maree Livermore from the ACIAR Country Programs team, two of our DFAT

⁵ Optimising soil management and health in Papua New Guinea integrated cocoa farming systems.

colleagues from Port Moresby and Canberra, representatives from the New Ireland Provincial Government and entrepreneurs from the galip nut industry.

To help set the context of the program, there were brief overviews of the ACIAR Ten-Year Strategy 2018-2027 and how the new direction is translating into the PNG country program. An overview of TADEP was also delivered, highlighting the timelines of the five component projects relative to the overall program timeline. This incited much discussion about the perceived value of the program and how the projects might consider collaborating in the future, regardless of being a 'formal' component of TADEP.

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. The following list is a summary of common areas of need in capacity building:

- Enterprise development
 - Commercialisation, product to market
 - Showcase 'rainbow foods' in recipes, nutrition, Maria Book, etc
- Engagement of post-graduate students
- 'Telling our story' and communications tools (newsletter, website, video, etc)
- Tablet/mobile for training, baseline, info disseminations

Day one concluded with a relaxed program dinner at the Kavieng Village Resort, allowing for more informal discussion and networking.

The first session on the second day showcased the *stories of impact* videos, relative to the five principal TADEP objectives. The over-arching *Why TADEP?* video and two thematic videos of *gender equity and women's empowerment* and *individual and institutional capacity building* were broadcast. The process for identifying, capturing, transcribing, translating and creating the videos was shared to enable attendees to understand the process and rationale behind each of the videos. Each of the projects was asked to review the current TADEP communications strategy and these videos as a key component of conveying the impact of the program.

An overview of the three successful Collaborative Research Grant applications was delivered with each of the projects asked to provide feedback on the initiative itself and to generate potential ideas for future collaborative research activities. This was followed by an overview of the program performance framework to ensure that projects were able to understand how they are each contributing to the program goal and objectives.

Each of the projects was asked to nominate a project team member to contribute to two separate, interactive question and answer panels. Each panellist shared their practical applications and insights into the respective topics, which aligned with the program guiding principles, demonstrating how each project is already contributing to the success of the program. The two topics were:

- Gender in research: it's more than just counting women
- Engaging and managing expectations in private sector development

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

- UNRE's research collaborative in PNG
- *Do no harm* research campaign
- An overview of the IFC Global Agribusiness Conference

The day concluded with an overview of significant dates and deadlines in the coming six months, followed by a workshop exploring partnerships within and beyond the program. This workshop was facilitated by Emily Flowers and Dr Kulala Mulung, as the external reviewers for the program Mid-Term Review.

The Mid-Term Review was intentionally scheduled the day following the TADEP Annual Meeting to offer each of the five projects the opportunity to contribute face-to-face to the review process. A program of staggered group interviews were facilitated, factoring in any cross-cultural considerations. Each of the program activity feedback sessions in the Annual Meeting also contributed to the Mid-Term Review.

Two optional field tours were conducted in the morning and the afternoon to correspond to the Mid-Term Review interview sessions. The optional tours visited sites relating to the PNG Cocoa and Family Farm Teams projects, showcasing CMFT budwood gardens and communities that had undertaken the FFT training modules.

In concluding the 2018 TADEP Annual Meeting, it was proposed that the 2019 event be hosted in Goroka or Aiyura on 18 and 19 June, to be confirmed by January 2019.

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.⁶

Individual capacity building

In 2018, the Galip factory has employed three young women from the local area, one of whom is a graduate of the 2016 Youth Work Experience Program. Helen Ronnie worked with the project as a participant and displayed a real ability to assist in the factory. She has since made several applications seeking employment and was successful in gaining a position assisting Dalsie Hannel with data entry and processing of galip nut. Helen is a young single mother with two children who grew up in the area and is passionate about working for the project. A part time woman employee is working with the CommCare project.

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 New Ireland.

Institutional capacity building

In conjunction with the filming for the *stories of impact*, each project was offered a communications workshop covering a series of topics. The training was offered to either the project team itself or a key partner agency. Examples of the training options included:

⁶ ACIAR Capacity Building Policy (2018)

- Introduction to photography - Learning and practising the top tips involved in how to take better photos with any device.
- Participatory filmmaking - work with Conor in pre-production, during filming and interviewing and also be involved in the scripting and post-production process.
- How to identify a good story - Stories are everywhere, but how can we find a good one and know the best way to communicate it.

The Galip Nut project opted to host two days training with a broad range of participants from the NARI Kerevat Research Station. In addition to the topics above, participants requested training in how to create short videos which they planned to use to demonstrate galip nut processing and value-adding techniques. Similarly, the Sweetpotato project opted to host a one day workshop for various staff from FPDA, covering the topics mentioned above.

Government officer, Simaima Kapi, has been working with NARI in Kerevat to build training capacity in health and hygiene for galip nut processing and value adding which lead to the opportunity to modify and develop a culturally relevant training module for health and hygiene. Simaima has delivered this training module a number of times in 2017 and 2018.

A key program activity for the 2016/17 reporting period was the Mobile Acquired Data (MAD) Small Research Activity rolled out across the program, aptly named MAD4TADEP. Training and support was offered to each component project to adopt CommCare as an online survey tool as well as targeted training with NARI to certify five staff as CommCare app builders. One of the certified staff member, Jeromy Kavi, continues to offer CommCare support to TADEP and other projects.

Other examples of institutional capacity building include the brokered training as part of the Family Farm Teams project which has been delivered by various parent agencies and other ACIAR projects including Nationwide Microbank, the Galip Nut project, ASEM/2012/084⁷ Traditional vegetables project and Integrated Agriculture Training Program (IATP). After the Mid-Term Review of the Family Farm Teams project, a fifth objective was added to explore the capacity development of PNG agricultural focused agencies in gender inclusive and gender sensitive extension delivery. This objective involved the training of trainers (ToT) from the Fresh Produce Development Agency (FPDA) and Oxfam staff in the FFT modules. This was completed in October and November 2017. Additionally, Barbara Pamphilon and Lalen Simeon were funded by Pacific Women Shaping Pacific Development (Pacific Women) to conduct a ToT with Pacific Women partner agencies.

⁷ Promoting traditional vegetable production and consumption for improved livelihoods in Papua New Guinea and northern Australia

5. Project Updates



ASEM/2014/095 Family Farm Teams

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

Background

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

A previous ACIAR project ASEM/2010/052⁸ demonstrated that a whole of family approach to farmer learning has enabled farming families to work in a more equitable and effective way to improve their livelihoods. The family farm teams (FFT) approach integrates family farm teams modules, banking and saving training and agricultural planning techniques with the training of peer village community educators (VCEs). This project now seeks to understand the effectiveness of the approach at scale and across a broader range of commodities and geographies.



⁸ Examining women's business acumen in Papua New Guinea: Working with women smallholders in horticulture

Progress summary

Islands Hub

The major focus this year was the Islands Hub scale-out. The partners, locations and staff in the Islands Hub are:

- **Autonomous Region of Bougainville** - Bougainville Women's Federation (BWF), Halia constituency. Staff members: Ian Viore (Project officer, full-time), Sherdrick Nana (Logistics officer, part-time)
- **New Ireland** - Department of Primary Industries (NI DPI), Tikana Local Level Government (LLG) Ward 7 (Manggai/Lossuk/Livitua) and Ward 11 (Luaupul), linking to the Cocoa Model Farmer Trainers from TADEP PNG Cocoa project. Staff members: Milton Temeni (Project officer, full-time, until October 2017), Stella Itam (Admin officer, part-time to October 2017, then Project Officer until June 2018, FFT training officers, casual Lucy Siki Aiya, Robert Taula, March 2018 to present)

Family Farm Teams and VCE activities

On each of the four major field trips, the program has addressed three major project objectives:

- Leadership workshop incorporating research data collection (objective 1)
- VCE workshop on adult learning and facilitation skills incorporating research data collection (objective 3)
- VCE FFT module training incorporating research data collection (objective 4)

As an adjunct to the FFT module training, specific leadership training was conducted for women in New Ireland and for both women and men in Bougainville. This training used a strengths-based approach that began with the identification of personal strengths, skills and networks, then built from that to skill development in program management and evaluation.

Training	Date	Bougainville		New Ireland	
		F	M	F	M
Module 1: Working as a family farm team for family goals	June 2017	27	28	60	42
Module 2: Planning your family farm as a family team	August 2017	33	20	36	28
Module 3: Feeding your family farm team	February 2018	28	15	42	36
Module 4: Communicating and decision-making as a family farm team	April 2018	30	16	44	30
Leadership training 1	August 2017	26	N/A	8	N/A
Leadership training 2	November 2017	9	21	20	N/A
Leadership training 3	February 2018	21	16	46	N/A
Leadership training 4	April 2018	16	13	36	N/A

Figure 4: Summary of Family Farm Teams project training in Islands Hub.

Brokered training activities

To address objective 2, brokered training has been delivered by various parent agencies and other ACIAR projects:

- Nationwide Microbank
- FST/2014/099 Galip Nut project
- ASEM/2012/0849 Traditional vegetables project
- Integrated Agriculture Training Program (IATP)

Training	Date	Bougainville		New Ireland	
		F	M	F	M
Budgeting, banking and saving	July 2017	46	34	-	-
Budgeting, banking and saving	October 2017	-	-	26	34
Galip use & food crop value adding	November 2017	21	32	-	-
Traditional vegetables	February 2018	21	32	-	-
Poultry training	June/July 2018	35	25	-	-
Village commercial piggery	June/July 2018	35	24	-	-
Vegetable production	June/July 2018	36	17	-	-
Soil management	June/July 2018	35	15	-	-

Figure 5: Summary of Family Farm Teams brokered training in Islands Hub.

Family Farm Teams organisational capacity building

Following the project Mid Term Review, a new objective was added to the project - *Objective 5: To explore the capacity development of PNG agricultural focused agencies in gender inclusive and gender sensitive extension delivery*. This objective involved the training of trainers (ToT) from the Fresh Produce Development Agency (FPDA) and Oxfam staff in the FFT modules. This was completed in October and November 2017.

Barbara Pamphilon and Lalen Simeon were funded by Pacific Women Shaping Pacific Development (Pacific Women) to conduct a ToT with Pacific Women partner agencies. This was conducted in November 2017.

One further training will be completed with the HORT/2014/094 Bougainville Cocoa project in October 2018.

⁹ Promoting traditional vegetable production and consumption for improved livelihoods in Papua New Guinea and northern Australia

Training	Date	FPDA		Oxfam		Pacific Woman	
		F	M	F	M	F	M
ToT	October 2017	5	15	-	-	-	-
ToT	November 2017	-	-	17	23	-	-
ToT	November 2017	-	-	-	-	21	6

Figure 6: Summary of Family Farm Teams ‘training of trainers’ with partner agencies.

Other activities

A number of other research for development activities have been completed:

- Family Farm Teams ripple effect mapping - UC and CARE (research completed, report available by end of October 2018)
- Baiyer valley, Western Highlands extension project - UC, Baptist Union and UniTech (research completed, report available by end of October 2018)
- Community-based Family Farm Teams extension workers project - UC, Voice for Change and UniTech (research completed, report available by end of October 2018)
- Teacher professional learning materials - UC and Pacific Adventist University (PAU) (materials completed, was disseminated on SD cards in July and will be evaluated in November 2018)
- Business literacy training for farmers with low literacy - UC, PAU and Pacific Women (piloting completed, manual piloted and completed, final production in progress via Pacific Women)
- Two UniTech Masters students in-depth research projects are close to completion
- Elizabeth Owa Innovations adopted by women and their impact on their family livelihoods in selected villages in the highlands of Papua New Guinea (to be submitted December 2018)
- William Nano Performance and impact evaluation of peer education learning in animal production for women in selected rural areas in the Highlands of Papua New Guinea (to be submitted in 2019)



Achievements against project objectives:

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

As outlined in the training and capacity building sections above, a number of workshops and training has been delivered in leadership development and Training of Trainers. Depending on the location, A broad spread of women and men of differing roles and ages participated, including community government, young women leaders and Village Community Educators.

Bougainville

At the request of Bougainville Women's Federation, after the first workshop, the group was extended to include males. This was because of the recent Bougainville government policy to have mandatory equal numbers of females and males on all committees, from the ward level to the provincial level. The two groups have worked well together; however, the final workshop was conducted with separate gender groups to gain gender specific data. Three women VCEs have been elected as Community Government members and one invited to a steering committee.

New Ireland

The first two workshops were successfully run with a mix of female VCE leaders and government staff. However, due to a staff mistake, all female VCEs were invited to the first two workshops of 2018. This required a significant adjustment of the program; however, the women were appreciative of the opportunity to gain leadership skills. The final evaluation was conducted with 18 women VCE leaders, correctly selected by the new staff member.

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

The Integrated Agriculture Training Program (IATP) is a community outreach extension program delivered by the University of Natural Resources and Environment in Vudal, East New Britain. IATP has been a critical partner in delivering brokered training for the Family Farm Teams project, in addition to Nationwide Microbank and ACIAR projects, ASEM/2012/084¹⁰ Traditional Vegetable and FST/2014/099 Galip Nut; the latter forming part of TADEP.

¹⁰ Promoting traditional vegetable production and consumption for improved livelihoods in Papua New Guinea and northern Australia

Bougainville

The IATP agricultural training has been highly appreciated by the VCEs, with good representation from women and men across the four brokered workshops. The negotiations with DPI for cocoa training have been very slow however following connections made via TADEP, there has been greater responsiveness from DPI. Goodman Fielder poultry training is also under negotiation.

New Ireland

The IATP training was completed in July 2018 and the galip and food crop value-adding training will be conducted in November 2018. The latter will be conducted in collaboration with the Our Lady of the Sacred Heart international school senior students.

Teacher professional development modules

Teacher resources have been developed as part of a professional development package with Joros Sawi from Pacific Adventist University, based on NARI and ACIAR publications. These resources are being made available on SD cards so that teachers can access resources from their own mobile phones. The evaluation of the SD cards will be done in New Ireland and East New Britain in late 2018. The fourth Maria book, *Maria's Family Farm Team*, is in the production phase.



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

Following the Highlands Hub evaluation, the training for VCEs in adult learning facilitation has been redesigned to include general training for all VCEs and advanced training for VCE leaders and other selected VCEs. This has enabled greater depth to be gained in both the FFT training and the training to be peer educators.

An intensive 4.5-day model of delivery was trialled in Namatanai, a remote area of New Ireland. This trial indicated that a three-day intensive would be sufficient and could be run well by advanced VCEs. This model will now be further developed in collaboration with the TADEP HORT/2014/096 PNG Cocoa project.

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

The focus of this year has been on the FFT module training for VCEs, as summarised in the training section above. A review workshop of the FFT for VCEs was added as an additional activity to the project schedule after the project Mid-Term Review. This activity proved to be a useful way for the VCEs to review their knowledge and application of the FFT in their families and communities as well as providing focused evaluation data.

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

This new objective has provided important data on the capacity building of organisational staff from Oxfam and FPDA. The FPDA trainees were all paid staff whilst the Oxfam trainees were community-based organisations farmer leaders. The gender imbalance in the trainees from FPDA reflected the low number of female staff in the organisation. In contrast, Oxfam has a policy when working with community-based organisations that equal gender representation is expected. Valuable gender awareness data was gained from both groups. Further ToTs are planned for Bougainville and New Ireland for later in 2018.

Upcoming

The Family Farm Teams project was due to conclude in December 2018 but has been granted a no-cost extension to March 2019 to take into consideration delays caused in early 2017. The following milestones are scheduled to be achieved before the project conclusion:

- Capacity development and futures report (objective 5)
- Business literacy manual (objective 2)
- Teacher professional development modules and report (objective 2)
- Final conference and project review
- Islands Hub Report 1: Building the capacity of rural farmers as peer educators and leaders (objectives 1 and 3)
- Islands Hub Report 2: Developing farming families through training and development activities (objectives 2 and 4)
- Islands Hub learning resource compilation (objective 3)
- Islands Hub VCE manual (objective 3)



FST/2014/099 Galip Nut

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

Background

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

Progress summary

The project achieved some major milestones in the 2017/2018 period including:

- Almost tripling of the supply of nuts sold by smallholder farmers. Our research indicated that it would be more cost effective to purchase the nuts at the factory gate for 1.50 kina than sourcing from growers for 1 kina. This new buying model massively increased supply and encouraged local entrepreneurs, including a women's group East New Britain Women and Youth in Agriculture to hire trucks and buy from their local district and deliver to the factory.
- A fourfold increase in galip processing capacity at the pilot factory. A high throughput factory cracking and processing line was installed to increase galip processing capacity of the factory from 250kg of nut-in-shell (NIS) per day, to about 1 tonne/day, a fourfold increase. A new de-pulper was developed by NARI staffed using a modified juicing machine. De-pulping time for 3 tonnes of fruit in pulp decreased from full day by 5-8 people to 1 hour by 3 people.
- A range of new products were developed and launched in East New Britain May 4th, 2018. Three main products with new packaging were developed for formal markets in East New Britain and Port Moresby including natural, roasted and peeled products. The estimated prices for final product include: 170 kina/kg for peeled, 150 kina/kg for roasted and 140 kina/kg for natural product at the package sizes of 60 g, 100 g and 1000 g. The second product launch has been scheduled for Port Moresby in Mid-July 2018.
- Two private sector players have partnered with the project team. These are the Canarium Nut Co who is partnering with the project team to process canarium in East New Britain, and CPL who has agreed to act as a distributor for the project team for market testing trials.

Achievements against project objectives

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

Most activities relating to objective 1 were completed in the first year and have since helped inform the Canarium industry roadmap, training needs and industry development. The draft the priority research training and extension report presented in 2017 Annual Report identified the following needs:

- Small scale entrepreneurs need to improve processing, packaging and labelling.
- Small scale entrepreneurs need training to build economically viable cracker built locally (potential for a local business in manufacturing crackers) and training in this specific cracker (potential for smallholder processors)
- Small scale entrepreneurs need training to build economically viable solar drier built locally (potential for a local manufacturer of solar drier business) and training in this specific solar drier (potential for smallholder processors)
- Female smallholders continue to emphasise training for younger generations and request marketing options for produce from their gardens.

These needs are being met through a series of extension workshops were developed and implemented based on feedback and requests received from small-scale entrepreneurs as follows:

- Galip sellers mentoring workshop for food safety, financial literacy, crackers, solar drier construction, supply chain and value-adding – 2 female farmers selling their product in the market.
- Value adding, business opportunities around the galip industry and financial literacy workshop – 7 galip seller women in the Rabaul markets.
- Galip awareness and factory tour – 35 participants.
- Buka Value Adding Expo – 55 participants.
- Galip Club training for food safety, financial literacy, crackers, solar drier construction, supply chain and value-adding – 20 participants.
- Galip Club training for value-adding training for galip (baking workshop) – 5 participants.

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

Methods for small-scale processing were researched and reported in 2016 and 2017. From this, a series of training programs were undertaken in East New Britain and Bougainville, which demonstrated food preservation hygiene, drying and value adding of galip for small scale processors, 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. The Galip Club and East New Britain Women have received on-going mentorship for galip processing, value adding, food hygiene, income diversification and plant maintenance in the farm. A factory tour was also organised to increase awareness and business encouragement of smallholder farmers.

A food safety booklet for female entrepreneurs in the market has been previously produced with further resources being added in 2017/2018, including:

- A health and hygiene leaflet in Tok Pisin
- Value adding and baking training
- Food drying techniques, snap test, financial literacy
- Preparing recipes in Tok Pisin

Further to the training that was delivered in 2015 and 2016, more specific training in galip growing and processing, value adding and business mentoring were delivered in 2017 and 2018. The training package were modified based on the locally available infrastructure to ensure maximum participation and relevance. The focus of training has changed to microenterprises as these are more active in PNG galip value adding than SMEs.

The annual review of the project was conducted in June 2017 to evaluate the success of the first, second and third processing season interventions including commercial factory research and public private partnerships. Since the review, the factory has increased capacity and purchased 65 tonnes of nut-in-pulp during the last season, which has generated PGK65,000 in income to farmers.



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

The project team has greatly upscaled factory production from less than 1 tonne of raw material (nut in pulp) since the start of the project in 2014 to 65 tonnes of nut in pulp purchased and processed in 2017. Repeat demand for the products is strong and production is not currently meeting demand.

Year	Nut in pulp purchased (PGK1 - PGK1.50 per kg)	Number of farmers selling	Farm gate value
2014	Small volumes (<1000 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	659 farmers (many others not captured in data app) 544 selling at factory gate, 115 on farms	PGK65,000 at farm gate

Figure 7: Galip nut production and processing volume, farmer sources and value.

The project has developed and refined methods for processing canarium and the factory has produced a range of product options for the Port Moresby market. Product specifications and food safety have been developed and shelf life experiments have been conducted. Nutritional information, packaging, labelling and a project website have been developed and designed. The official launch for these products was in May 2018 in East New Britain and July 2018 in Port Moresby. The final products distributed include:

- 60g roasted
- 60g peeled
- 100g natural
- 100g roasted
- 100g peeled
- 1kg natural (food service)

The mechanical cracker was tested and reported on in the 2017 Annual Report. Subsequent trials show that it still needs further adjusting but should be able to produce 50% whole kernels. A post cracking separator has been purchased and installed. Drying system, cold storage and oven have almost tripled the factory capacity at NARI in Kerevat.

The financial analysis also included in the previous Annual Report identified purchasing nut in pulp and de-pulping as the most expensive components of the current factory, along with reliable electricity. Staff are purchasing galip at the factory reducing purchasing costs and increasing income to farmers. Staff at NARI have also developed a better method for testa removal using a modified Noni juicing machine, resulting in increased processing capacity.

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

A literature review and documents detailing a roadmap for the emerging Canarium industry and enhancing private partnerships were reported in 2016 and 2017 Annual Reports, respectively. The project has since realised its ultimate goal of creating public-private partnerships and in its final year, has facilitated two public-private partnerships. The project team and NARI are working closely with The Canarium Nut Co, a New Zealand based investor, co-funded by MFAT NZ. 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.

At a smaller but equally as important scale, galip awareness days and training programs continue to raise awareness of the industry and opportunities for farmers to supply nuts to the factory. Awareness raising is largely administered at the factory gate or when purchasing direct from farmers. Value-adding and marketing training has been conducted through the Galip Club.

A young woman from the Women and Youth in Agriculture Co-Operative Society who received work experience at the NARI factory last year has been employed full time at the NARI factory since. This story of impact is captured in the TADEP videos which will be made publicly available soon.

The capacity of NARI staff has been increased in a number of key areas including processing equipment use, hygiene and maintenance, technology, food technology, health and hygiene, experimental design, plant and soil experiments and marketing. The project also facilitated CommCare training to be delivered not only to the galip project team but also to 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.

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 material to be used at point of sale as well as a website is being developed and delivered at the product launch events

Upcoming

The Galip Nut project was due to conclude in June 2018 but has been granted a no-cost extension to December 2018 to take into consideration unavoidable delays early in the project.

Since the two product launches in East New Britain and Port Moresby, demand has exceeded supply. In addition to the product needed for retailing, the project needs to produce and supply large volumes of the products for market research for the remainder of 2018. New equipment needs to be tested and adjusted, and commission a further large scale nut drier.

Discussions have commenced with two private sector partners to run the factory and to distribute the products during the galip nut season (July-November) for market testing in Port Moresby and East New Britain for the remainder of 2018. Other activities such as producing guides for processors and finalising information packages for private industry also need to be finalised.



HORT/2014/094 Bougainville Cocoa

Developing the cocoa value chain in Bougainville

Background

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

Achievements against project objectives:

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

The foundation formed by the initial consultations with the Autonomous Bougainville and District level governments, Council of Elders (CoE) and broader village communities has been integral to the success of the project. Given the geographical spread and multi-level collaboration, it has been critical to engage key stakeholders frequently via annual reference meetings, partnerships with governments, CCI and UNRE, the Project Manager and Hub Coordinators in each of the three regions (North, Central and South) and Village Extension Workers (VEWs).

Following the selection and training of the 11 VEWs for each of the three regions (33 total) farmer training, in conjunction with CCI and UNRE, has been delivered in participating Village Assemblies:

Training	South	Central	North	Total
Budding	9	0	5	14/33
IPDM	7	0	8	15/33
Nursery management	9	0	8	17/33
Lining and planting	6	7	12	25/33

Figure 8: Summary of Bougainville Cocoa village extension worker (VEW) training.



The adoption rate by cocoa farmers on cocoa technologies taught to them is obvious by them practicing the technologies in their cocoa blocks with IPDM practices and cocoa nursery set up as well as nursery management practices. After more training is conducted farmers will now be well equipped with practical information that will help them in managing their own cocoa blocks.

As the project field implementation is gaining momentum the selected groups are also taking shape as VEWs are continuing to train and work with their selected and interested farmers. Village budwood gardens are at various rates of establishment across the three regions, correlating to the 33 participating Village Assemblies. Villages nurseries will be established when the budwood gardens provide sufficient materials. Similarly, 33 integrated pest and disease management (IPDM) plots are being identified and advice given accordingly to bring them up to a demo plot standard.

Activity	South	Central	North	Total
Budwood gardens	6	7	11	24/33
IPDM plots	8	1	1	10/33

Figure 9: Summary of progress for Bougainville Cocoa project village demonstration sites.

In partnership with ACIAR SMCN/2014/048¹¹ Soils project, sites were previously selected to evaluate soils, and compost and fertiliser requirements. Composting facilities have been built at Tavilo in East New Britain. Composts of goat manure and chicken manure were done and are in the compost shed at Buin DPI Station. Composting facilities built in North (Singh VA) and Central (Manetai VA) and composting training using cocoa pod husks conducted.

As implementation has begun to shift into the VAs, farmers who have previously been reluctant to conduct pruning and other management activities have now understood the importance of keeping their cocoa trees in shape, and are now applying the best practices in their cocoa blocks.

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

A baseline survey of 6,275 men, women and children across the three regions of Bougainville (Southern 2,255, Central 923 and Northern 3,097) has been completed. This survey seeks to understand the extent to which health and disease impacts on farming activities, namely cocoa. There was extensive consultation with the villages prior to the surveys and aggregated data has now been reported back to the respective villages and other key stakeholders, such as the Autonomous Bougainville Government (ABG) and Village Assemblies. A framework of survey questions to understand productivity losses due to health determinants has been completed. A program to identify the multiple facts underpinning lost productivity is currently in progress. The follow-up

¹¹ Optimising soil management and health in Papua New Guinea integrated cocoa farming systems.

meetings and survey data feedback sessions has added further contextual and qualitative data to the survey results.

The existing network of Village Assembly Committees will be broadened with the establishment of three additional Committees to align with the Village Resource Centres. These committees, along with the Council of Elders and the ABG, are critical contact points in ensuring the survey feedback can be utilised at all levels of leadership and decision making to help understand the current limitations and opportunities for agricultural productivity in Bougainville. The presentation of survey results to the ABG Department of Health and Village Assembly Committees has catalysed a revision of the Health Strategy, which has been refocussed on prevention with a new Preventative Health Policy developed.



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 are to be established. As previously reported, the Buin DPI Station is been supported by CCI with a Combo shed, 10,000 seedling capacity nursery, budwood garden, cocoa germplasm plot and a labourer to man the station with the help of the CCI Field Extension Officer. The Southern Hub has been relocated to Siwai (Konga DPI station).

Key farmers were identified in the Central and North and budwood gardens, compost huts, demo plots and a solar dryer were established at both sites, whilst sites for the regional research hubs are determined. A potential site for the northern research hub has been identified but is still in a forest state. This area will need to be cleared by the DPI before CCI moves in. Negotiations have also commenced to reopen Duncan Research Station as a DPI research hub.

Several of the 33 Village Resource Centres are already linked to Village Extension Worker awareness and training programs. These Village Resource Centres will link research institutes including CCI, UNRE and Asian Vegetable Research and Development Centre (AVRDC) with ABG departments, such as Department of Primary Industries and Department of Health.

As part of the development of supplementary food crop and livestock enterprises, UNRE has continued to deliver associated training, which has been supported by provision of a variety of vegetable seeds and soil testing kits. Vegetable and food crop demo plots have been established at Kubu Research Station in the Northern Hub, showcasing strip cropping with cocoa. Also connected to this Northern Hub, is a site that has been confirmed in Tinputz (Michael Pearson Goat Farm) for goat holding and breeding. A goat/cocoa demo has been established at Mamaro, Buin in South Bougainville, with a correlating site constructed at Konga DPI Station for goat holding and breeding for the Southern Hub. Goat breeding stock have been collected from the Highlands and are now at UNRE in East New Britain, awaiting transport to Bougainville. A complementary goat management training manual has also been written and produced at UNRE.

Enterprise development is a core component of the project and of TADEP more broadly. The project seeks to encourage village communities to establish diverse enterprises based on the cocoa value chain. Of the 33 Village Extension Workers (VEWs), 70% now own cocoa budwood gardens. Out of the 18 permanent nurseries set up, 16 of these nurseries are affiliated to the Productive Partnerships in Agriculture Project (PPAP) and are delivering clones to farmers. One farmer that learnt basic skills on nursery set up and bud grafting during the 2017 Chocolate Festival has set up his own nursery and is supplying PPAP farmers. The project aims to have all our nurseries affiliated to PPAP, including the Buin DPI permanent nursery, to ensure sustainability beyond the life of the project.

As reported previously, three cocoa marketing businesses have been established. A DPI sanctioned marketing company was also formed and is awaiting the Internal Revenue Commission Tax Identification Number (TIN) before commencing operations. Attempts to export small quantities of beans to specialist buyers in Australia and Europe continue to be hindered by licencing requirements. A new PNG Cocoa Act that allows small exports is waiting for enactment.

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

A key element of improving cocoa quality is to improve postharvest handling, fermentation and drying processes. As previously reported, the current standards and regulations relating to cocoa drying and fermenting have been audited. Numerous training programs on cocoa quality and marketing continue to be delivered by Grant Vinning and Kenny Francis, with solar driers under various stages of construction at the Research Hubs. A solar dryer has been built at Manetai in Central Bougainville and are waiting for the ABG DPIs to fund another two for the South and North. The Northern Hub has a solar dryer constructed with recycled black silo plastic donated by an Australian wheat farmer and awaits to be trialled with fermented beans.

To embed routine cocoa quality monitoring, testing equipment has been purchased, including probes and balances to measure temperature, pH and moisture, among others. Samples have been collected by our postharvest team for cocoa quality assessment from the Manetai solar dryer.

Further to the quality and productivity gains made through improved postharvest handling, fermentation drying, the project also seeks to improve market access and develop cocoa value chains. Marketing training has been delivered by Grant Vinning, building upon the market research trips to Singapore and Malaysia in 2017. Requirements and options for exporting cocoa have been

identified, and in conjunction with an Australian market analysis, trial shipments have been freighted to select chocolate makers.

Hub Coordinators and Village Extension Workers have received Training of Trainers (ToT) and are now ready to on-deliver this training to their respective farmers. This ToT training was collaboratively delivered by Kenny Francis, Anton Varvaliu, Anton Kamuso (CCI), the UNRE team, Grant Vinning and Andrew Sale. Additional sensory evaluation and quality assessment training was also delivered to Julie Rereve at Tavilo in East New Britain, with support from PHAMA. Julie will join the judges at the 2018 Bougainville Chocolate Festival.

As a holistic centre for learning, the Village Resource Centres will be linked to particular schools to implement teaching of the cocoa curriculum. Schools have been identified in the Southern region and negotiations have led to Hananan Primary School being linked to model farmer, Cletus, for cocoa and vegetable production trainings in the North. The Malassang Women's Resource Centre (Bougainville Women's Federation) in North is also now linked to a local Village Extension Worker with an established budwood garden, cocoa nursery and vegetable nursery, where additional vegetable production and cocoa technology trainings will also be conducted.

The second annual Bougainville Chocolate Festival was held in Arawa in September 2017. The main highlights of the event included big bean competition and judging, where the guest Australian judges awarded 6 gold medals, using globally-renowned criteria. These notable awards then led to trial shipments of Bougainvillean cocoa to select Australian chocolate makers.

In a similar showcasing, the project collaboratively hosted World Food Day in Tinputz in November 2017, which promoted the cocoa hot drink made from ground cocoa as a healthy alternative to high sugar-content drinks. Once chocolate processing machines are readily available, more exhibitions are planned in the future such as World Food Day and local school and farmer group field days.



Upcoming

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

- 2018 Chocolate Festival in Hutjena, Buka in the North. The event is being refocused as a DP Field Day to build capacity of the department and ensure sustainability of the event. Planned competitions include big bean, big pod, chocolate, children's quiz, sensory evaluation and fermentation science seminar, vegetable and livestock production demos, and more.
- Establish Village Resource Centres, village nurseries, fermentaries, diversificationn.
- Work with Department of Health to address health issues.
- Improve stakeholder linkages.



HORT/2014/096 PNG Cocoa

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

Background

Cocoa production in East Sepik, Madang and New Ireland provinces, along with other provinces, was greatly reduced by the incursion of cocoa pod borer (CPB) from Indonesia in 2006, accelerating malaise in cocoa production in PNG linked to poor performance of hybrid seedlings and production lost by Phytophthora Pod Rot (Black Pod). Cocoa is grown in PNG overwhelmingly by smallholders, and the incursion of caused them to lose interest in the crop. Research and development work at the PNG Cocoa and Coconut Institute (CCI), Tavilo, East New Britain Province over the last two decades, partly sponsored by ACIAR, have produced a set of 18 new 'hybrid clones', selected from the best of the hybrid seedlings, and methods of integrated pest and disease management (IPDM) that were shown to be effective in greatly reducing damage by CPB and Black Pod. Using these new clones and the new management methods it was shown that production could be increased from the current average of about 200 to over 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.



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

Each of the four target provinces have had various numbers of CMFTs undertake training. The training has mainly focussed on budwood garden and nursery establishment, and in budding. Complementary to the training, 1ha model farms are at various stages of development. Although most nominated CMFTs were men, all spouses attended the training sessions and we now have mainly husband/wife teams. The New Ireland component commenced six months prior to the other regions so has progressed more than the others.

Each CMFT is linked to a farmer group consisting of 25 farmers which, through the Training of Trainers model mentioned above, seeks to establish CMFTs as self-supporting advisors in their respective villages. By building their capacity through training, hands on experience of managing their 1ha model farms and necessary cocoa planting materials, the CMFTs are able to relay their skills and products, in the form of training and selling propagated clones for example, to other farmers in their group. All CMFTs in New Ireland have established budwood gardens and two are already functioning as commercial nurseries, evidencing that CMFTs can become self-supporting suppliers of cocoa clones. The cocoa model farmer-trainer model has also encouraged greater community collaboration where whole families and formally employed community members are dedicating time to support the CMFT.

Location	Date	CMFT	Farmers
New Ireland			
New Ireland	November 2016	28	-
New Ireland	October 2017	84	-
Total		102	0
East Sepik			
Wewak	April 2017	22	-
Hawain	September 2017	10	-
Niumindogum	November 2017	13	-
Separu-Kausimbi	November 2017	4	150
Total		49	150
Madang			
Madang	May 2017	20	-
Erima, Madang	January 2018	10	-
Korona, Madang	March 2018	6	-
Total		36	0
Chimbu			
Karamui	August 2017	7	-
Total		7	0

Figure 10: Summary of Cocoa Model Farmer-Trainer (CMFT) training in four select PNG provinces.

There is a boom in kiln drier construction and rehabilitation. Farmers are interested in building new solar driers and Trevor Clarke is developing a design and construction kit for distribution. The CMFT group at Yekimbole in East Sepik has established a thriving wet bean buying, fermenting and drying business based on Solomon-style solar dryers. Outspan, one of the two major cocoa bean buyers in PNG, is buying beans from Yekimbole and supporting CMFT business, proving the effectiveness of the solar dryers. Cheaper solar driers have been established in Tavilo and Tokiala (East New Britain) for testing and in Panamecho Village (New Ireland) and Yekimbole Village (East Sepik) for testing and commercial use, with the intention that these form the basis for additional village-based businesses.



The PNG CCI Extension Manual and Farmer's *Handbook* were delivered by the project leader as final copy to PPAP for publishing in July 2016. A Tok Pisin edition of the *Farmer's Handbook* was translated by Alfred Nongkas and Trevor Clarke, and the final design of the English edition was reviewed, amended and readied for publication in July 2017. The *Extension Manual* was checked and amended for final publication in July-August 2017. Final copies of the *Extension Manual* (English) and the *Farmer's Handbook* (English and Tok Pisin) were completed in December 2017, with books published in Fiji and delivered to PNG in June 2018.

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

Budwood gardens of the 18 latest-release hybrid clones from CCI and nurseries and trained budders to propagate clones are being established by all CMFTs in the coastal provinces, and in West Sepik as a spontaneous extension of the project. Building on the research being undertaken in the three coastal provinces, further study is being undertaken to understand the production and physiology in the Highlands. Best bet types from the CCI trial at Karimui in Chimbu and the 18 hybrid clones via quarantine from Tavilo in East New Britain have also been introduced into Karimui. Additionally, the 18 hybrid clones have been established in Jimi Valley in Jiwaka. Further test plantings are planned for Southern and Western Highlands provinces. It is intended that each of the trial sites will have correlating budwood gardens and nurseries to allow further propagation, testing and dissemination of successful clones, relative to geographical location.

The project is collaborating with the ACIAR SMCN/2014/048¹² Soils project to improve soil fertility through the recycling of farm waste and the use of soil amendments. Various field tests have commenced comparing two forms of composting demonstrations using organic waste in either compost heaps or trenches against inorganic NPK fertilisers. The trenching method of in-situ composting of waste organic matter is being tested in field trials at Wingei and Panamecho. Tests are also being conducted by the Agronomy Section of CCI at Tavilo in East New Britain.

Occurrence of pests and diseases will be observed in all budwood gardens but so far these have not been a problem. There is evidence that biocontrol of cocoa pod borer (CPB) is occurring given the decline in incidence and damage observed during 2017. There is anecdotal evidence that fire ants, which have spread from the Solomon Islands to most cocoa growing areas in PNG, are contributing to biocontrol of CPB.

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. A cheaper solar drier based on comparable research undertaken in the Solomon Islands has been constructed and tested at Tavilo and Tokiala in East New Britain, Yekimbole in East Sepik and Panamecho and the CCI Station Kopkop in New Ireland. The solar driers have been working well in sunny conditions but have been limited during periods of extended wet weather. The solar drier in Panamecho has been retrofitted to an existing wood-fired kiln drier which, in part, overcomes this issue. Other modifications being tested include incorporation of a solar-powered fan system with assistance from Agmark and drying techniques that limit the layer of beans being dried at any one time. The successes the Yekimbole trial site has experienced with ongoing cocoa sales to Outspan has demonstrated that these customised solar driers can be effective, both in terms of quality and cost.

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

¹² Optimising soil management and health in Papua New Guinea integrated cocoa farming systems.

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 trees are also being promoted as an alternative shade tree and progress has been made in establishing trees in East Sepik.

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. Goat enclosures have been built at Korona in Madang and Niumindogum in East Sepik and goats are being introduced. The agronomy section at CCI has established a goat facility at Tavilo in East New Britain to test and promote the use of goats with cocoa farming.

Upcoming

- Assess uptake and success of integration of cocoa, food crops, livestock and high-value trees and the involvement of family labour in the cocoa farming systems
- Shipment and distribution of goats from within and among four provinces
- Goat training (husbandry practices) to be conducted in four provinces once draft Goat Training Module is finalised



HORT/2014/097 Sweetpotato

Supporting commercial sweetpotato production and marketing in the PNG highlands

Background

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

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

Achievements against project objectives:

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

The socio-economic review of sweetpotato production and marketing systems undertaken in January 2016 identified several factors impacting the expansion of the industry and mapped various value chain opportunities. Four target communities from within the broader Technology Evaluation and Marketing (TEAM) locations were selected from this research and participatory workshops were held to collate local knowledge and insights. This regional specific knowledge has been embedded into a series of community development training (CDT), which has been facilitated for the duration of the project. After prioritising the opportunities, supermarkets in Port Moresby were identified as a key market for commercial farmers managing propagations facilities, and trials of these value chains have since commenced. The first trial shipment of high quality kaukau from EHP to supermarkets in Port Moresby was completed, with novel packaging and supermarket display strategies used to maintain quality during transport and maximise prices at the retail point of sale.



‘Best bet’ production techniques based on outputs of HORT/2014/083¹³ and SMCN/2012/105¹⁴ and knowledge from NARI and FPDA staff have informed trials at 30 commercial grower sites in Asaro. A number of management strategies are still under investigation in the partner projects so a suite of strategies are available for growers.

A survey to gather data on production elements in the four TEAM locations, and demand and marketing for sweetpotato in Port Moresby, Lae and the Highlands, has been completed using CommCare in November 2017 and results have been compiled. The surveys also captured data on ideal training interventions to address barriers to chain functionality to inform the CDT, and ultimately build value chain capacity.

Linkages to markets have been examined now that larger volumes of kaukau from ‘clean kaukau’ crops have become available. The first trial shipment of produce from Asaro farmers to two supermarket groups in Port Moresby was conducted to assess market acceptance. Kaukau was graded and packed in boxes rather than traditional 100kg bags to reduce damage, and were displayed as individually wrapped roots for sale at an elevated price on the supermarket shelf. Value chain research is now focussing on identification of strategies to support expansion in supply to these and other high value markets.

Objective 2: To build capacity of sweetpotato value chain players

A series of village extensions workers (VEWs) are linked to Farmer Field/Business Schools in each of the TEAM locations to support training of respective networks of growers in the technical aspects of commercial sweetpotato production. The initial cohort of VEWs were trained in June 2016 and a review has since been undertaken by FPDA, with new VEWs inducted in 2018. Staff from FPDA, NARI and PNG ANU have also travelled to Australia in November 2011 to gain a greater understanding of clean seed utilisation, proving to be a very useful opportunity for peer-to-peer learning and garnered significant media coverage. A similar trip is planned for late 2018 for a select group of PNG growers, namely the propagation facility owners. Once that trip has occurred, a reciprocal group of Australian growers will travel to PNG.

The community development training (CDT) developed by Chris Gard and the ANUE team was planned and carried out by Bennie Atigini and Debbie Kapal 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

¹³ Developing improved crop protection options in support of intensification of sweetpotato production in Papua New Guinea

¹⁴ Sustaining soil fertility in support of intensification of sweetpotato cropping systems

by themselves and documented in their 'Community Development Plan'. The training program has been designed to meet the Community Development Worker (CDW) standards set by the National Apprenticeships and Trade Testing Board (NATTB). Project partner FPDA staff are completing the training so that they can issue accreditation for extension workers in-house, keep the evidence (observation checklist by in-house assessor, copies of work-plans, reports, etc.), and then later submit it to NATTB for their accreditation.



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

Multiplication and distribution of clean planting material is proceeding, with four propagation facilities established in Asaro (EHP), three in Minj (Jiwaka), four in Hagen Central (WHP), two in Mul (WHP) and one in Nebylier (WHP). The varieties *Gimani*, *Wanmun*, *Beauregard* and *Wahgi Besta* are being multiplied and distributed. During the reporting period, approximately 7,000 clean vines were established in the propagation facilities, generating over 5,000 first cut and 3,000 second cut vines for crop planting. Over 1,500 vines were distributed to other farmers to demonstrate the potential of the clean planting material. The important commercial varieties *Korowest* and *Rachel* have been introduced into the tissue culture collection at NARI Aiyura and will be available for commercial use later in 2018.

Technical training was held for the 14 commercial propagation facility owners and partners at NARI Aiyura station and at FPDA offices in Goroka. A technical training visit by PNG partners to Australia was conducted in 2017 to study production systems and receive training in pathogen tested propagation systems.

A series of trials have been established to understand the optimal nutritional protocols for PT multiplication in both protected structures (igloos) and in-field beds. Commercial propagation facility seedbeds have been established using a soil/sand/chicken manure mix and protocols have been put in place for monitoring sweetpotato vine production rates. Additional trials to examine cutting type and spacing effects on multiplication rates in the propagation beds have commenced, in conjunction with 'on row vs mound' and 'single vs double' vine planting in field production.

The relationship between the sweetpotato industries in PNG and Australia is critical in this project, given the geographical proximity and correlating biosecurity risks. Improvements to diagnostic capacity and infrastructure in PNG has assisted with testing and indexing viruses from around the Tambul PT multiplication centre. Materials from all Australian production regions have also been collected for a comparative virus indexing, collectively leading to the development of improved virus diagnostic procedures in PNG and Australia.



Upcoming

A promotion and awareness campaign of the benefits of new sweetpotato technologies will be launched in late 2018, with timing corresponding to commissioning of larger propagation facilities able to supply greater volumes of clean seed. A sweetpotato fair has been deferred until 2019 with the broader availability of clean planting material and the development of more high value markets.

6. 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 11: 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 1). This is generally limited to the footprint of the project (the area bounded by the green circle) plus the managed relationships with ‘next users’. For research projects, ‘next users’ might typically include government extension services, NGOs, private sector, and a small group of end users.

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

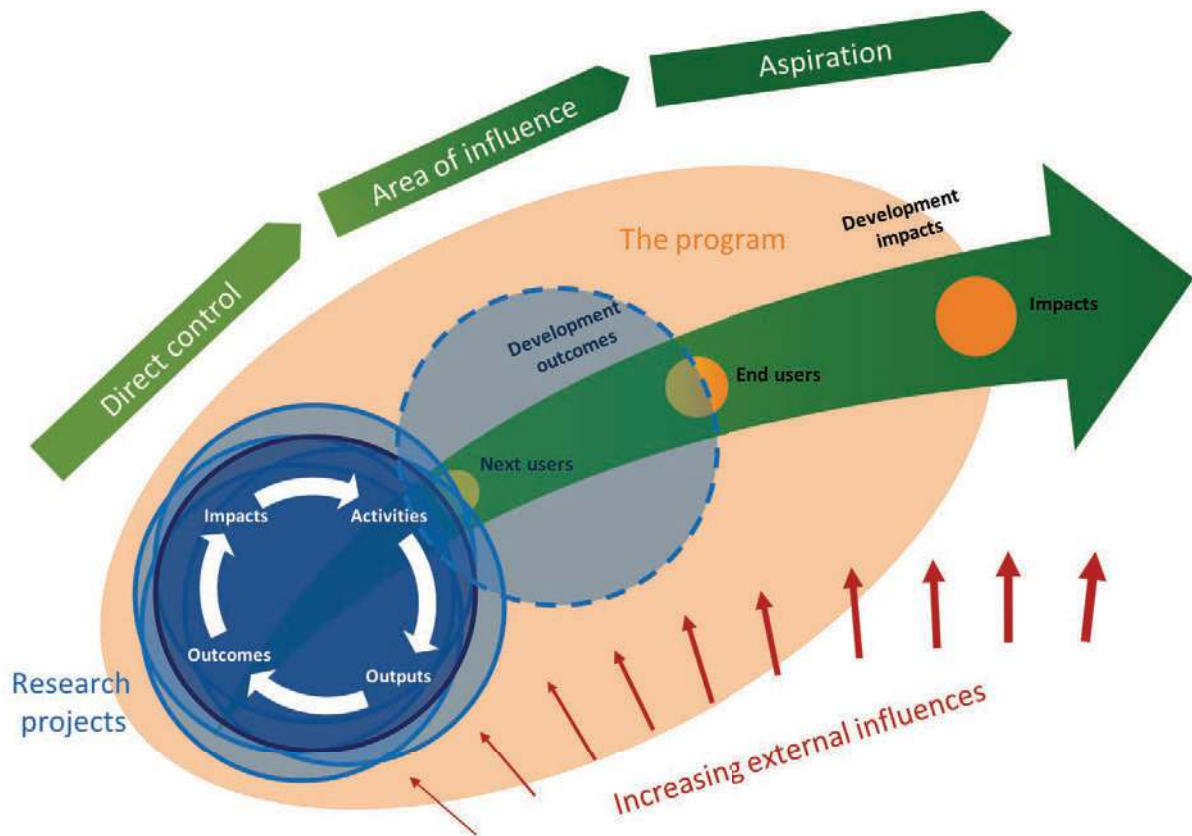


Figure 12: Impact pathway for research projects and TADEP.

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

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



Figure 13: 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:

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

Figure 14: 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 What will success look like?	Verifiable Indicators	
		When considering how each Project has contributed to a VI, specify both the scale (quantity) and nature (narrative) of the impact	Evidence
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.	Number and size of agribusiness SMEs, micro-enterprises and companies (current, new and potential)	(G) 3 women selling galip in the market. (G) 1 woman making galip bread. (G) 20 SMEs in the Galip Club. (G) 12 individual mentoring opportunities anticipated. (B) 15 buyers of cocoa from Australia, Indonesia, France, England and USA. (B) Dealing with three locally developed trading companies. (B) Dealt with at least four growers cooperatives. (P) 75 Cocoa Model Farmer Trainers (CMFTs) who have set up budwood gardens and associated nurseries are likely to become successful small enterprises selling clones and budwood; some (e.g. Yekimbole Village, East Sepik) have also set up successful businesses buying wet beans from other farmers and running fermentaries and solar dryers. (S) 14 clean seed multipliers in the form of commercial farmers and traders.
		Number of partnerships and engagements with agribusiness SMEs, micro-enterprises and companies (current, new and potential)	(G) The project has created two public private partnerships in its final year. The project team and NARI are working closely with The Canarium nut Co, a NZ based investor, co-funded by MFAT NZ. 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.

			<p>(P) The CMFT group at Yekimbole is working with the cocoa buyer/exporter, Outspan.</p>
		<p>Number of men and women farmers and workers engaged with agribusiness SMEs, micro-enterprises companies and formal markets (current, new and potential)</p>	<p>(F) FPDA has made a commitment to working with the eight women leaders on the establishment of further model farms for bulb onion in EHP. 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. BU is working on a funded extension to further develop the Kwinkya Women's Resource Centre as a regional demonstration farm in WHP.</p> <p>(G) 381 farmers, SMEs and micro-enterprises have received formal training through different workshops undertaken 2015-2017.</p> <p>(G) 659 farmers recorded selling galip (many others not captured in data app) - 544 selling at factory gate and 115 on farms.</p> <p>(G) In the Galip factory, the number of female staff has increased from one in 2015, two in 2016 and six in 2017.</p> <p>(G) In 2018, the factory has employed three young women from the local area, one of whom is a graduate of the 2016 Youth Work Experience Program. Helen Ronnie worked with the project as a participant and displayed a real ability to assist in the factory. She has since made several applications seeking employment and was successful in gaining a position assisting Dalsie Hannel with data entry and processing of galip nut. Helen is a young single mother with two children who grew up in the area and is passionate about working for the project. A part time woman employee is working with the CommCare project.</p> <p>(G) Government officer, Simaima Kapi, has been working with NARI to build training capacity in health and hygiene which lead to the opportunity to modify and develop a culturally relevant training module for health and hygiene. Simaima has delivered this training module a number of</p>

			<p>times in 2017 and 2018.</p> <p>(B) Engaged with thousands of farmers across three regions of Bougainville (40% F 60% M)</p> <p>(P) About 25 farmers are engaged with each CMFT, contributing to building the nursery businesses.</p> <p>(S) Each of the 14 clean seed multipliers has a network of farmers that liaise with and purchase from these new commercial businesses.</p>
	Evidence of positive private sector engagement outputs, outcomes and impacts for men and women farmers and workers		<p>(F) FPDA staff (EHP), Voice for Change (Jiwaka) and Baptist Union (WHP) trained in Family Farm Teams activities. FPDA has made a commitment to working with the eight women leaders on the establishment of further model farms for bulb onion. 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. BU is working on a funded extension to further develop the Kwinkya Women's Resource Centre as a regional demonstration farm.</p> <p>(B) Formation of numerous companies.</p> <p>(P) The engagement with Outspan in East Sepik is positive, and it is hoped that this can be scaled and/or replicated in other areas.</p> <p>(S) A series of smaller screen houses have been scaled out to include 14 additional commercial propagation facilities to facilitate wider dissemination of clean seed materials to farmers.</p>
	Number of smallholder farmers that have transformed from subsistence or opportunistic farming to small-medium enterprises (SMEs) and the nature of the transformation		<p>(F) "Module 2: Planning your family farm as a family team" delivered to VCEs in Eastern Highlands (34F 3 M), Jiwaka (20F 15M), Western Highlands (42F 8M), ARoB (33F 20M) and New Ireland (36F 28M).</p> <p>(F) VCEs delivered "Module 2: Planning your family farm as a family team" to farmers in Eastern Highlands (272F</p>

			<p>211M), Jiwaka (88F 62M) and Western Highlands (213F 50M).</p> <p>(G) There are 20 SMEs that form part of the Galip Club, three SMEs led by women in the market and one SME of women establishing a Galip Nut bakery.</p> <p>(P) Each of the 25 CMFTs has a group of approximately 75 farmers each. Therefore, we anticipate 1,875 farmers to benefit from the transformation of planting material and methods linked to CMFTs.</p>
		<p>Potential number of beneficiaries (men and women) that can reasonably be expected to benefit from developing partnerships between the private sector, schools, institutions and training providers and the nature of the impact</p>	<p>(B) Beneficiaries are all of Bougainville. Partnership with government departments (health agriculture, local government, economic department, media and communications) along with 33 village assemblies and engagement with 12,450 household members.</p> <p>(P) With the 25 CMFTs having 75 farmers each, and each farmer having an average household of five family members, it is anticipated that 9,375 individuals will benefit from the project partnerships.</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.	Actual increase in agricultural productivity of target livelihood systems resulting from Project interventions and the nature of the impact		<p>(F) Women and men have undertaken bulb onion training due to heavy product demand.</p> <p>(F) Modules 1 and 2 have encouraged families to work and plan as family farm team.</p> <p>(B) As evidenced by the overall outcomes of the project itself.</p> <p>(S) The multi-site soils trial has demonstrated an average yield increase of 30%.</p>
		Actual increase in quality of agricultural produce of target livelihood systems resulting from Project interventions and the nature of the impact		<p>(B) The Bougainville Chocolate Festival competitions and judging has demonstrated that there has been an increase in overall quality of cocoa beans produced.</p> <p>(S) Through the establishment of the 14 clean seed propagation facilities, more than 10,000 clean seed vines have been distributed.</p>
		Actual increase in agricultural value of target livelihood systems resulting from Project interventions and the nature of the impact		<p>(G) The farm gate value of the purchased nut in pulp has increased from <1t for research trials in 2014, 11t (PGK10,669) in 2015, 25t (PGK26,349) in 2016 to 65t (PGK65,000) in 2017.</p> <p>(B) Market fluctuations impact the perceived or real value of cocoa, but supply of and demand for quality cocoa beans from Bougainville could be considered a proxy indicator for increased value.</p>
		Actual number of target beneficiaries that adopted and maintained new technology and systems and the nature of the impact		<p>(F) “Module 1: Working as a family farm team for family goals” delivered to VCEs in Eastern Highlands (34F 3M), Jiwaka (20F 15M), Western Highlands (42F 8M), ARoB (27F 28M) and New Ireland (60F 42M).</p> <p>(F) VCEs delivered “Module 1: Working as a family farm team for family goals” to farmers in Eastern Highlands (272F 211M), Jiwaka (88F 62M) and Western Highlands (213F 50M).</p> <p>(G) Number of smallholder farmers selling nut has increased from negligible in 2014, 243 in 2015, 647 in 2016 to 659 in 2017 with many others not captured by data collection app.</p>

			<p>(B) The 33 VEWs and respective farmer groups have adopted technologies in cocoa production and processing.</p> <p>(S) The farmers linked to each of the 14 propagation facilities have been benefited from the adoption of new cleansed technology and propagation systems.</p>
		<p>Potential increased agricultural production and quality of target livelihoods systems and the value of this increase to rural livelihoods that can reasonably be expected within five and ten years after completion of this Program and the nature of the impact</p>	<p>(B) Completed livelihood survey and identified health and nutrition characteristics as well as farming information. ABG Department of Health aware of information and assists in policy development with a focus on prevention. data available for policy development.</p> <p>(B) Research on cocoa to get markets going but still premature to give final position.</p> <p>(P) We expect an increase in average cocoa yields per ha per year from 200kg or less, to an average of 1000kg; we expect a reduction in the smoke contamination of cocoa as a result of increased use of solar drying.</p>
		<p>Potential number of target beneficiaries that adopted and maintained new technology and systems and the nature of the impact</p>	<p>(B) Beyond the VEWs and farmer groups, the impact of the new technologies and systems adopted has rippled throughout the supply chain and within extended communities.</p> <p>(P) With the 25 CMFTs having 75 farmers each, and each farmer having an average household of five family members, it is anticipated that 9,375 individuals will benefit from the adoption of new technology and systems.</p>

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.	Actual number of activities targeted at farmers to increase their capacity to access markets and the nature of the impact	<p>(F) Training delivered to VCEs in the Highlands Hub include Modules 1, 2 and 4.</p> <p>(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.</p> <p>(G) A solar drying training workshop was developed by the project team and delivered in 2015. It was attended by 22 women and youth from the East New Britain Women and Youth in Agriculture association.</p> <p>(G) Smallholders and small-scale entrepreneurs have undertaken solar drying training (37).</p> <p>(G) Several hundred people exposed to nut cracking demonstrations.</p> <p>(G) Smallholders and small-scale entrepreneurs undertook a galip factory tour looking at all aspects of the supply chain handling (25F, 9 youth).</p> <p>(G) Smallholder and small-scale entrepreneurs have undertaken training to improve packaging (50F).</p> <p>(G) Smallholder and small-scale entrepreneurs have undertaken health and safety training, which was conducted by a local trainer and translated in local language (50F)</p> <p>(G) A workshop was held for female entrepreneurs in Kokopo in November 2016 (14 women from the market, 2 farmers and 2 overseas volunteers participated)</p> <p>(G) An introductory workshop to Food Drying, Food Safety and Capacity Building was held in Kerevat Sept 2016 and attended by 25 women from Kokopo and Rabaul markets.</p> <p>(G) Market development strategy workshop held by Theo Simos with NARI staff in March 2017.</p> <p>(B) Over 12,450 individuals have been interviewed as part of household surveys.</p>

			<p>(P) Cocoa has immediate market access through up to seven competing buyers; the project aims to encourage farmers to produce high quality cocoa that satisfies existing markets, mainly through control of CPB and use of solar dryers backed up by kiln dryers.</p> <p>(S) Community development training (CDT) has been undertaken in four communities, with approximately 20 farmers attending each workshop. These workshops have enabled participating farmers to strengthen the community resolve for addressing technical problems identified by themselves.</p> <p>(S) The 14 farmers linked to the new propagation facilities have also increased their capacity to access markets by understanding the PT technology and undertaking training in aphid/pest management.</p>
		Actual number of activities targeted at value chain partners and institutions to increase their capacity to support access to markets and the nature of the impact	<p>(B) Over 6,000 interviews, multiple trainings and workshops, market information disseminated widely via newsletter, development of website.</p> <p>(P) Work on testing and promoting solar dryers is linked to the main cocoa buying/exporting companies, Agmark and Outspan. This will reduce smoke tainting of cocoa that has been a problem with PNG cocoa to date.</p> <p>(S) Staff from FPDA, NARI and PNG ANU have travelled to Australia to gain a greater understanding of clean seed utilisation, proving to be a very useful opportunity for peer-to-peer learning.</p>
		Actual number of activities targeted at developing opportunities for improved post-harvest handling, processing and marketing and the nature of the impact	<p>(G) Galip sellers mentoring workshop for food safety, financial literacy, crackers, solar drier construction, supply chain and value-adding (2F).</p> <p>(G) Value adding, business opportunities around the galip industry and financial literacy workshop (7F).</p> <p>(G) Galip awareness and factory tour (35)</p> <p>(G) Buka Value Adding Expo (55)</p>

			<p>(G) Galip Club training for food safety, financial literacy, crackers, solar drier construction, supply chain and value-adding (20)</p> <p>(G) Galip Club training for value-adding for galip (5)</p> <p>(P) Promotion, testing and development of improved, cheap solar dryers, and promotion of small-scale fermenting methods.</p> <p>(S) Agreements with supermarkets in Lae and Port Moresby have been negotiated to trial products grown from clean seed planting material.</p>
		Actual number of new markets identified and the nature of the impact	<p>(B) At least four new markets identified.</p> <p>(P) Cocoa has several competing buyers in a well-established market chain.</p>
		Actual number of new markets developed and the nature of the impact	<p>(G) New retail partnerships with Tropicana in Kokopo and CPL in Port Moresby.</p> <p>(B) New markets are ready to be developed but are limited by in-country licensing and regulation.</p> <p>(P) Progressive grower groups may develop niche markets as their production of high quality cocoa beans increases; groups at Yekimbole and Poro are considering new niche markets.</p>
		Potential increased number of farmers and potential increased capacity of farmers to access markets and the nature of the impact	<p>(B) More than 6,237 people.</p> <p>(P) There is currently no restriction on market access for cocoa farmers; maintaining high quality fermentation and drying will ensure that cocoa is saleable through the approx. Seven existing cocoa buying/exporting companies.</p>
		Potential number of beneficiaries (men and women) that can reasonably be expected to benefit from improved post-harvest handling, processing and marketing within five and ten years after completion of this Program and the nature of the impact	<p>(B) More than 6,237 people</p> <p>(P) With the 25 CMFTs having 75 farmers each, and each farmer having an average household of five family members, it is anticipated that 9,375 individuals will benefit from improved post-harvest handling, processing and marketing. The impact is expected to be much greater due to project extensions funded by national and provincial governments.</p>

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.	Actual number of activities specifically targeted towards women's decision making capacity, leadership and representation , actual number of women and men actively participating and the nature of the impact	<p>(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.</p> <p>(G) Workshops to improve productivity, value-adding and market access have been delivered to 381 farmers, SMEs and micro-enterprises plus factory demonstrations to several hundred people, a large majority of whom are women.</p> <p>(B) 2,500 women involved with household surveys.</p> <p>(B) A portion of the training delivered by the project has been targeted at women.</p> <p>(B) Fairly even split between representation of women and men.</p> <p>(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.</p>
		Actual number of activities specifically targeted towards women's economic opportunities , actual number of women and men actively participating and the nature of the impact	<p>(F) Aside from the four Family Farm Teams training modules, financial literacy training has been delivered by Nationwide Microbank in ARoB (46F 34M) and New Ireland (26F 34M).</p> <p>(G) More than 12 formal workshops have been delivered to training participants in productivity, value-adding and market access.</p> <p>(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).</p>

		Actual number of activities specifically targeted towards improving women's skills and access to information , actual number of women and men actively participating and the nature of the impact	<p>(F) VCEs have been identified and trained in Eastern Highlands (34F), Jiwaka (20F), Western Highlands (42F), ARoB (27F) and New Ireland (60F).</p> <p>(F) Twenty women leaders were selected for leadership training in Eastern Highlands (6F), Jiwaka (7F), Western Highlands (7F), ARoB (26F) and New Ireland (46F).</p> <p>(G) More than 12 formal workshops have been delivered to training participants in productivity, value-adding and market access.</p> <p>(P) Growing cocoa as a small tree and with more intensive management facilitates, and even requires, the involvement of women and youth.</p> <p>(S) The Community Development Training (CDT) was conducted in four communities, focusing on family involvement and decision making.</p>
		Actual number of women and men actively involved as members of research teams and the nature of the impact	<p>(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).</p> <p>(G) More than 12 formal activities and many informal training undertaken by NARI staff.</p> <p>(B) More than 50 women involved in the project team, including the trained interviewers and hub managers.</p> <p>(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.</p> <p>(S) 10 women, 13 men.</p>
		Potential increased number of women in leadership and representative roles and the nature of the impact of both women and men actively participating	<p>(P) At all our training sessions, Josephine Saul-Maora has been important in demonstrating and promoting the role of women in cocoa growing.</p>
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from increased economic opportunities for women and the nature of the impact of both women and men actively participating	<p>(B) More than 12,450 individuals.</p> <p>(P) We expect that all our 25 CMFTs x 75 farmers = 1,875 farms linked to our initial CMFT system will benefit farming families.</p>

		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from improved skills and access to information for women and the nature of the impact of both women and men actively participating	<p>(B) More than 12,450 individuals.</p> <p>(P) All of the 1,875 farming families involved with the project will benefit from improved methods of growing cocoa, and from the higher yields expected from the new varieties of cocoa.</p>
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from being actively involved as members of research teams and the nature of the impact	<p>(B) More than 50 individuals.</p> <p>(P) We don't have research teams but rather 'extension teams'. We started with 75 of these (each with 25 farmers) but this number has grown as extension groups have formed (e.g. an extra 110 in New Ireland, 40 in East Sepik, 22 in Karamui, 6 in Madang).</p>

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.	Actual number of activities targeted towards building the capacity of farmers, SMEs and micro-enterprises , the number of beneficiaries (men and women) and the nature of the impact	<p>(F) Family Farm Teams training modules delivered to VCEs in Eastern Highlands (34F 3M), Jiwaka (20F 15M), Western Highlands (42F 8M), ARoB (33F 28M) and New Ireland (60F 42M).</p> <p>(F) VCEs delivered Family Farm Teams training modules to farmers in Eastern Highlands (272F 211M), Jiwaka (88F 62M), Western Highlands (213F 50M), Module 1 and 2 ARoB (96F 68M) and New Ireland (180F 180M).</p> <p>(G) More than 12 formal workshops have been delivered to training participants in productivity, value-adding and market access.</p> <p>(G) Workshops to improve productivity, value-adding and market access have been delivered to 381 farmers, SMEs and micro-enterprises plus factory demonstrations to several hundred people, a large majority of whom are women.</p> <p>(P) The fundamental premise of the project is to build the capacity of the 25 CMFTs, who impart knowledge and skills to their respective groups of 75 farmers.</p> <p>(S) Technical training was held for the 14 commercial propagation facility owners and partners at NARI Aiyura station and at FPDA offices in Goroka.</p>
		Actual number of activities targeted towards building the RD&E capacity of institutions , the number of beneficiaries (men and women) and the nature of the impact	<p>(F) Adult learning training delivered in conjunction with Family Farm Teams training to Eastern Highlands (1 FPDA staff), Jiwaka (2 Baptist Union staff) and Western Highlands (1 Voice for Change staff).</p> <p>(F) NARI Field Officer in the CommCare application, farm observations and M&E.</p> <p>(F) NARI Training Officer in the FFT and peer education training processes.</p> <p>(F) Senior cocoa scientist trained in the FFT and peer education training processes.</p> <p>(F) CARE/UC project officer in ripple effect mapping, introductory discourse analysis</p>

			<p>and impact investigation.</p> <p>(F) Two UniTech Masters students in gender focused and participatory research methods.</p> <p>(G) More than 12 formal activities and many informal training undertaken by NARI staff. (B) Seven ABG Departments</p> <p>(B) One NGO; Bougainville Women's Federation (BWF)</p> <p>(B) Relevant, partial data shared with Care in Bougainville.</p> <p>(B) Partnership with PHAMA.</p> <p>(P) All our activities linked to the current 75 CMFTs are linked back to the REDS section of the PNG Cocoa Board, and to Provincial Government Departments of Agriculture and Livestock who will benefit from the activities.</p> <p>(S) A technical training visit by PNG partners to Australia was conducted in 2017 to study production systems and receive training in pathogen tested propagation systems.</p> <p>(S) PNG partner institutions have also benefited from training in CommCare and for sensor technology in the screenhouses.</p>
		Actual number of Project participants (men and women) whose knowledge, attitudes, skills and aspirations (KASA) have specifically benefited through involvement in Project team and the nature of the impact	<p>(G) Factory manager (1F), processing line (3F 10M), social sciences (1F), agribusiness and market development (2M) and agronomy (1M).</p> <p>(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> <p>(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.</p> <p>(S) Seven FPDA and NARI staff (Raywin, Winnie, Myla, Johnny, Joe, Lonica, Chris).</p>
		Actual number of short-term training events and post-graduate training opportunities , the	<p>(F) Two postgraduate students at UniTech.</p>

		<p>number of beneficiaries (men and women) and the nature of the impact</p>	<p>(F) Family Farm Teams training delivered to FPDA (5F 15M), Oxfam (17F 23M) and Pacific Women agencies (21F 6M).</p> <p>(G) More than 12 formal workshops have been delivered to training participants in productivity, value-adding and market access.</p> <p>(B) 71 training workshops (budding, IPDM/CPBM, nursery management, lining and planting) across three regions of Bougainville (31 South, 7 Central, 33 North)</p> <p>(B) 33 individuals trained to undertake household surveys.</p> <p>(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.</p> <p>(S) A technical training visit by PNG partners to Australia was conducted in 2017 to study production systems and receive training in pathogen tested propagation systems.</p> <p>(S) PT training and aphid management.</p>
		<p>Actual number of activities undertaken in geographically and socio-economically diverse locations and the nature of the impact</p>	<p>(F) Family Farm Teams and Leadership training along with IATP and Nationwide Microbank training activities have been delivered in Eastern Highlands, Jiwaka, Western Highlands, AROB and New Ireland.</p> <p>(G) Most of the training activities were undertaken in East New Britain. One workshop was held in Bougainville for 553 SMEs. Solar drying training was undertaken in very remote villages (Tinanagalip and Vunamarita) for smallholders and small scale entrepreneurs.</p> <p>(B) Numerous activities in each of the three regions of Bougainville, reaching in excess of 12,450 individuals.</p> <p>(P) Training sessions for CMFTs are held in diverse locations (e.g. one in each of Madang, Usino and Rai Coast Districts of Madang Province; one in each of Hawain Training Centre, Niumindogum Village, Saparu-Kausimbi Village, East Sepik Province; several at Kopkop Research Centre, Kavieng, New Ireland Province; on-going training</p>

			of CMFTs in Karamui by three staff permanently based there).
		Potential number of beneficiaries (men and women) including the farmers themselves who can reasonably be expected to benefit from increased capacity of farmers within five and ten years after completion of this Program and the nature of the impact	(P) 9,375 members of farming families involved in the project.
		Potential number of beneficiaries (men and women) including the institutions themselves who can reasonably be expected to benefit from increased RD&E capacity of institutions within five and ten years after completion of this Program and the nature of the impact	(P) Staff of the various provincial government DPIs and the Cocoa Board will have an increased capacity in practices and models for scaling out cocoa technologies and systems.
		Potential number of beneficiaries (men and women) whose knowledge, attitudes, skills and aspirations (KASA) can reasonably be expected to benefit from involvement in Project team and the nature of the impact	
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from short-term training events and post-graduate training opportunities and the nature of the impact	(P) Three post-graduate projects are planned. (P) The project has paid the fees for one woman CMFT (Leah Kowi) to return to UNRE to finish her B.Ag.Sc. degree.
		Potential number of beneficiaries (men and women) who can reasonably be expected to benefit from activities undertaken in geographically and socio-economically diverse locations and the nature of the impact	(P) The diverse locations and spread of the CMFT sites in the coastal provinces were deliberate to demonstrate application and relevance. As such, the 9,374 members of the farming families involved in the project, reflect geographically and socio-economically diverse locations.

Glossary

ABG	Autonomous Bougainville Government
ACIAR	Australian Centre for International Agricultural Research
ARB	Autonomous Region of Bougainville
BU	Baptist Union
CBO	community-based organisation
CCI	Cocoa Coconut Institute
CDW	Community Development Worker
CPB	cocoa pod borer
CMFT	Cocoa Model Farmer-Trainers
CUG	Closed User Group
DAL	Department of Agriculture and Livestock
DFAT	Department of Foreign Affairs and Trade
DPI	Department of Primary Industries
FFT	Family Farm Teams
FPDA	Fresh Produce Development Agency
IFAD	International Fund for Agricultural Development
LAMP	Loop-Mediated Isothermal Amplification
MAD	Mobile Acquired Data
MDG	Millennium Development Goal
MFAT	New Zealand Ministry of Foreign Affairs and Trade
MTDP2	Medium Term Development Plan 2
M&E	Monitoring and Evaluation
NARI	National Agricultural Research Institute
NATTB	National Apprenticeships and Trade Testing Board
PAU	Pacific Adventist University
PMV	pubic motor vehicle
PPAP	Productive Partnerships in Agriculture Project
PSD	private sector development
PT	pathogen tested
R4D	research for development
SME	small medium enterprises
SRA	Small Research Activity
TADEP	Transformative Agriculture and Enterprise Development Program
TEAM	Technology Evaluation and Marketing
ToT	Training of Trainers
UNRE	University of Natural Resources and Environment
VCE	village community educators
VEW	village extension worker
VRC	Village Resource Centre