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

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prepared by Barbara Pamphilon and Katja Mikhailovich

*co-authors/
contributors/
collaborators* Barbara Chambers, Kiteni Kurika, Elizabeth Ling, Norah Omot, Lalen Simeon, Kym Simoncini, Fredah Wantum

approved by Dr Jayne Curnow

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1.1 List of acronyms

ABCD: asset-based community development

AI: appreciative inquiry

AISC: Australian Institute for Sustainable Communities

CP: Central Province

ENB: East New Britain province

EPSP: Economic and Public Sector Program (Coffey International)

FPDA: Fresh Produce Development Agency

IATP: Integrated Agricultural Training Program, University of Natural Resources and Environment

NARI: National Agricultural Research Institute

PAU: Pacific Adventist University

PNG: Papua New Guinea

PLGP: Provincial and Local-level Governments Program (Coffey International)

PPAP: Productive Partnerships in Agriculture Project

SPSS: Statistical Package for the Social Sciences

UC: University of Canberra

VCE: village community educator

WH: Western Highlands province

2 Executive summary

Women smallholders are the key to PNG family livelihoods; they produce essential subsistence crops whilst undertaking valued social roles such as family care. When women smallholders in PNG market their produce, it is for family benefit, such as to pay school fees. However, PNG farming families need to move from subsistence practices to more business-oriented practices in order to engage in the modern agricultural economy and to develop more sustainable family livelihoods. Given their importance as agricultural producers and cornerstones of family livelihoods, this project explored ways to support the development of women smallholders in PNG.

The project was conducted in three locations, selected to reflect PNG's cultural, geographic and agricultural diversity: the highlands (Western Highlands province), the islands (East New Britain province) and the lowlands (Central Province).

Through participatory action research, appreciative inquiry (AI) and asset-based community development (ABCD), the project developed a series of experiential learning activities for farmers with low literacy. The resultant Family Teams program is a gender-inclusive approach that encourages male and female family heads to work together as a family team and to collaboratively plan the further development of their agricultural and family activities. The three modules are: 1) Working as a family team for family goals; 2) Planning your family farm as a family team; and 3) Communicating and decision-making as a family team. The Family Teams program was complemented by brokered training in the areas of sustainable livelihoods, business and financial literacy, and agricultural production development relevant to each area.

A number of farmers were trained as village community educators (VCEs). The VCEs were encouraged to use the Family Teams learning in their own family and then further disseminate the training to other families through farmer-to-farmer peer education and/or with groups through their affiliations, such as churches. These VCEs have become important role models in their own communities.

The processes developed in this project have resulted in strong community engagement and uptake of training by women and their families. The Family Teams approach has proven to be a culturally appropriate way to support the empowerment of women and begin the development of more gender-equitable family practices. Participant families now see their farms as small family businesses, and most have changed to a more planned approach to farming. Incomes are increasing and families are now able to plan and save for further farm development and for their future.

The techniques are now at a point where they can be further developed across wider areas of PNG and with other agricultural commodities. There are some areas that now merit specific attention:

- Examining ways to build the capacity of women as agricultural leaders
- Further development of the peer education model of agricultural extension
- Understanding how the Family Teams approach could further benefit women and girls
- Exploring ways to build the capacity of key government and non-government agricultural and community organisations to adopt family-based gender inclusive activities as core practices
- Trialling ways to further support the learning of farmers with low/no literacy
- Exploring if and how a family teams approach to farm development is relevant to other areas of the Pacific and beyond.

3 Background

PNG women smallholders as agricultural producers

Women smallholders are key to the food security of PNG. It is largely the women who grow the food for PNG, whilst men work on commodity crops of coffee, cocoa, oil palm and coconut (Bourke & Harwood, 2009; Peter, 2012). Women contribute considerably to diverse, local, informal economic activities (Gibson-Graham & Roelvink, 2011). However, women's inputs to agricultural production and their roles as economic agents are not always recognised, as women's family care and household roles are overly privileged (Manchón & Macleod, 2010).

A wide range of factors have constrained women in taking a more productive role in agriculture. These include poor access to resources such as land, water, machinery, seeds and fertiliser; lack of financial skills and access to banks and credit; land pressure due to population growth; poorly developed infrastructure and transport systems; educational disadvantages due to low literacy, and limited access to formal training programs and extension services (Australian Centre for International Agricultural Research, 2014; Bourke & Harwood, 2009). These factors are further exacerbated by gender issues.

3.1 Gender challenges for PNG women smallholders

PNG women smallholders face significant gender challenges. PNG ranks 157 out of 187 countries on the Gender Inequality Index (United Nations Development Programme, 2015). Unequal gender roles and the gendered division of labour in both agricultural and family roles are strongly entrenched. Gender-based violence is endemic; however, national statistics have not been collected since 1992, when the PNG Law Reform Commission (1992) found that two-thirds of families experience domestic violence. Human Rights Watch (2015) reports a range of data that indicates family violence continues to be a major issue for women and girls. Other than directly influencing the physical and psychological wellbeing of women, violence undermines confidence, inhibits women's ability to move freely in the community, and impacts on their levels of participation and choice in agriculture activities and other aspects of daily life (Chang, Be'soer, Wali, Anjan, & Ramita, 2010; Potek, 2009). Women are further impacted by high levels of crime, low levels of school completion, high maternal and child morbidity and mortality, and a growing prevalence of HIV/AIDS (Anderson, 2010; Asian Development Bank, 2012; Lakhani & Willman, 2014; Lewis, Maruia, & Walker, 2008; McCalman, Tsey, Kitau, & McGinty, 2011). Despite these many constraints, PNG women smallholders continue to make major contributions to family livelihoods.

3.2 PNG women and family livelihoods

PNG women smallholders make significant contributions to family livelihoods through their labour and because they typically use their income for family benefit. Household income studies in developing countries show that on average 75% of income earned by women goes to support the family, whilst the return of men's income to the family is much lower at 25% (Garap, 2004; Macintyre, 2000; World Bank, 2001).

Even though PNG women produce many of the agricultural products, men may still control the resultant income (Cahn & Liu, 2008). This means that men are often in control of considerably higher incomes, whilst women gain comparatively small incomes from the sale of surplus food. Although the informal exchange economy continues to co-exist beside the cash economy, women generally hold low

bargaining power concerning the distribution of household income. Women's access to income from production can also be a major area of intra-household conflict (Koczberski, 2007).

Over 80% of PNG's poor are rural-based subsistence smallholder farmers (Asian Development Bank, 2012). Women smallholders' contributions to family livelihoods must be acknowledged as an essential platform for poverty reduction. Camara concluded that, given that women use their incomes to pay for education, health and family obligations, 'women's access to financial services, agricultural extension, education, health care and human rights are, therefore, key to assuring food security for all' (Camara, 2011, p.141).

3.2.1 PNG women small holders and agricultural extension

Until recently, the education of PNG farmers through agricultural extension has typically focused on technology transfer and on training for the development of cash crops (Sitapai, 2011). As women smallholders primarily grow subsistence crops, most women have not seen training on cash crops as relevant.

Cahn and Liu (2008, p.135) note that a number of factors have created an 'invisible barrier' for women in accessing training. Culturally, PNG women may not be permitted to attend training run by men. Further, PNG women smallholders do not find it easy to attend training, even if their husbands permit them to do so. Most extension is held in a central town rather than a local village, which makes it difficult for women to attend because of the time taken away from their family responsibilities, the cost of travelling and that it can be unsafe to travel (Cahn & Liu, 2008).

A further significant barrier is the low literacy and numeracy of PNG women. Adult literacy rates are self-reported as 65.6% (male) and 62.8% (female) (CIA, 2015). However, in rural areas such as the Western Highlands province (WH), women's literacy rates have been cited to be as low as 19.4% (UNDP, 2010). Low literacy impacts on women's confidence to engage in training and limits the number of women with the foundational skills to become trainers.

It is telling that there is a paucity of literature that examines the impact and relevance of agricultural extension for women smallholders in PNG. This silence indicates that the gender dimensions of farming and farming knowledge are not yet acknowledged as core components of effective agricultural extension.

3.2.2 Supporting the development of women smallholders

PNG farming families need to move from subsistence practices to more business-oriented practices in order to engage in the modern agricultural economy and to move towards sustainable family livelihoods. Given the importance of women smallholders as agricultural producers and cornerstones of family livelihoods, it is essential to explore ways to support their development.

It is important to develop methods of agricultural extension that are suitable for the majority of women smallholders, particularly those who have low literacy and limited education. It is crucial to understand the cultural, family, gender and regional factors that impact on the development of these essential food producers of PNG. At a time when traditional cultural and gender roles are in transition, there is an opportunity to explore and enhance activities that develop women smallholders' economic success.

4 Objectives

Overall Aim: to improve the uptake and impact of training and small business development of women smallholder vegetable producers in Central Province, East New Britain and the Western Highlands of PNG.

Objective 1: To understand women vegetable producers' context, business knowledge and practice in each region in order to develop and facilitate ways to improve their overall skills

- Analysis of existing knowledge on regional vegetable producers' practices and national/regional issues e.g. cash crop c/f subsistence issues
- Research skills capacity building for local research teams
- Design and pilot vegetable practices survey, business practices survey, family profiles and village ethnography
- Collaborative design and capacity building of local partners in survey and ethnography practices
- Implementation of baseline study in each village
- Regional analysis of training and learning issues and opportunities (availability/skills of local partners/trainers, women's literacy, delivery styles)
- Design of locally relevant vegetable business training/community education modules
- Training of trainers
- Delivery and evaluation of a range of training/community education types in vegetable business practices using a local capacity building/mentoring process
- Capacity building for trainers in monitoring and evaluation
- Monitoring and evaluation of training types
- In-depth Village Case Studies
- Production of learning handbooks and identification of learning interventions suitable for the continuum of women's skill levels and needs

Objective 2: To identify financial issues and opportunities in order to trial a range of ways to improve the finance practices of women vegetable producers

- Literature review on women's financial practices, barriers and enablers in PNG and other relevant countries
- Key informant interviews
- Baseline vegetable financial business practices analysis
- Village workshops exploring perceptions of local financial providers, barriers and enablers and other non-market forms of practice
- Analysis of micro-finance and other financial business development opportunities
- Partner engagement, design, implementation, monitoring and evaluation of trials of a range of financial development activities
- Evaluation of social, economic, gender, cultural and other factors impacting women's response to financial development activities

5 Methodology

5.1 Study locations

Three locations were selected to reflect the diversity of culture, geography and agriculture across PNG: the highlands — Western Highlands province (WH), the islands — East New Britain province (ENB) and the lowlands — Central Province (CP). In consultation with partner agencies, two villages were selected in each area. All villages depended primarily on agriculture for their livelihoods; were less than two hours from a regional market; and had basic infrastructure, including a primary school, aid posts, trade stores and churches.

The villages were:

- WH: Kumbareta and Kwinkya (Mul-Baiyer district)
- ENB: Tinganagalip and Vunapalading 1 (Gazelle district), and
- CP: Hisiu and Tubersereia (Kairuku-Hiri district).

At the time of the study, the Mul-Baiyer district had a recent history of tribal warfare, high food crop and coffee productivity, poor market access due to poor roads, and low levels of education and literacy. The Gazelle district had more stable communities, moderate food crop production, low cocoa production due to the cocoa pod borer, good access to local markets, and higher levels of education and literacy. The Kairuku-Hiri district had stable communities, with fishing and paid employment as main income sources, moderate food crop production, access to the major Port Moresby markets, and a range of education and literacy levels. These differing characteristics and issues of the three areas enabled a wider understanding of barriers and enablers in relation to women's agricultural and business practices.

Partner agencies were selected based on their previous work with women and families and/or agricultural expertise. Leaders for each area were appointed by the partner agency: these leaders in turn appointed village leaders (see Acknowledgments).

Partner agencies were:

- Mul-Baiyer district: Baptist Union
- Gazelle district: National Agricultural Research Institute (NARI) and the East New Britain Women and Youth in Agriculture Cooperative Society, and
- Kairuku-Hiri district: Pacific Adventist University (PAU) and the Fresh Produce Development Agency (FPDA).

5.2 Research methodology

Participatory action research (McNiff, 2013) formed the overarching methodological framework. The project methodology and methods were approved by the University of Canberra (UC) Human Research Ethics Committee (approval number 12-188) and PAU.

PNG partners made significant contributions to the design and implementation of data collection tools and contributed to analysis through workshops and consultations and in written formats.

The study was initially influenced by the methodology of a precursor ACIAR project,

(SMCN/2008/008) *Increasing vegetable production in Central Province, Papua New Guinea to supply Port Moresby markets*, which used the Organic Research and Collaborative Development model. This collaborative, participatory approach involves utilising contextualised local knowledge balanced with the non-contextualised knowledge of external researchers (Spriggs & Chambers, 2011).

The final model integrated the Freirean principles of co-constructed learning (Freire, 1970) with the principles of asset-based community development (ABCD), (Green & Haines, 2012; Kretzmann & McKnight, 1993) and the process of appreciative inquiry (AI) (Cooperrider, Whitney, & Stavros, 2003). These approaches share an 'empowerment' philosophy. ABCD understands local communities and community members as resilient and resourceful, and aims to collaboratively identify and build on the assets in a community. AI directs the research and development attention towards 'what works' and 'what strengths can be built on' rather than focusing on deficits and needs. Whilst strengths-based approaches have been used to assess gender outcomes, there is a growing movement to develop strengths-based methods to address (not just assess) gender equality (Willet, 2013). This is particularly important in PNG, where violence against women has been documented as a response to women's changing roles. The Freirean philosophy focuses attention on the dialectical exchange between outsider and insider knowledge, and privileges local knowledge and knowers.

These approaches emphasise collaborative and participatory processes in both research and development activities. They inspired the development of culturally sensitive research practices, with a focus on working with community and individual strengths, and fostered the participatory research processes.

5.3 Research methods

The study's qualitative and quantitative methods are described below in Table 1.

Although they are presented as discrete phases, as the stages and activities were conducted within the framework of sequential action research cycles (plan, act, observe, reflect) each phase interacted and informed the others. This enabled the team to adapt to new information or developments from the knowledge gained through each process. It enabled an agile approach to the development of new ways of working with women smallholders and their families.

Formative evaluation data was collected across the life of the project, with the formal mid-term review conducted in September 2013. A summative final evaluation was conducted in 2016. Process monitoring enabled timely decision-making and adaptive management during the project.

The range of data collection methods are described in Table 1.

Table 1: Information sources and data collection methods

Information source	Data collection
Publications <ul style="list-style-type: none"> • Academic Search Complete • national and international agencies • ACIAR 	Literature review Grey literature and internet Project reports and monographs
National research institutes <ul style="list-style-type: none"> • National Statistics Office • National Agricultural Research Institute • National Research Institute 	Secondary data: national, regional and district statistics Agricultural data PNG context data Village context data
Partner agencies <ul style="list-style-type: none"> • Baptist Union • Pacific Adventist University • National Agricultural Research Institute 	Primary data: field work, staff interviews, mid-term review workshop, final conference Secondary data: activity and progress reports
Training providers <ul style="list-style-type: none"> • Fresh Produce Development Agency • Nationwide MicroBank • National Agricultural Research Institute • Integrated Agricultural Training Program • Bank South Pacific 	Primary data: staff interviews, mid-term review workshop, final conference workshop analysis, end-line evaluation workshops Secondary data: training evaluation reports
Government and non-government agencies <ul style="list-style-type: none"> • World Bank Productive Partnerships in Agriculture Project • PNG Department of Agriculture and Livestock • CARE International • UN Women • Coffey International • East New Britain Women and Youth in Agriculture Cooperative Society 	Primary data: key informant interviews Secondary data: grey literature and internet
Financial institutions <ul style="list-style-type: none"> • UN Pacific Financial Inclusion Programme • Microfinance Expansion Project • National Development Bank Women in Business Unit • Westpac • Nationwide MicroBank 	Primary data: key informant interviews Secondary data: grey literature and internet
Local-level government <ul style="list-style-type: none"> • PNG Department of Primary Industry officers 	Primary data: key informant interviews
Community participants <ul style="list-style-type: none"> • community leaders • farmer groups • women smallholders • farm families (male and female and youth) 	Primary data: key informant interviews, group interviews, surveys, focus groups, participatory group work, community meetings, individual interviews, short-term ex-post group interviews Visual methods: photography, mapping, drawing Narrative story methods
Village and field environment	Farm observations, market walks, community observation walks, participatory community asset mapping, village history group interview

5.4 Baseline study (2013)

Initial information about the broad characteristics of each village and region was gathered from partner organisations, local key informants and available literature. The mixed method baseline study then utilised participatory community workshops and a small-scale livelihood survey with women smallholders. The baseline study also involved training local women as co-researchers/facilitators.

These activities enabled an understanding of the social, economic and agricultural practices and family and gender contexts of study sites.

5.4.1 Training local women as co-researchers/facilitators

To develop collaborative community links and recruit participants, a project leader for each village was recruited. The village leader, in consultation with the partner agency leader, then led the selection and mobilisation of local men and women who were willing and able to become co-researchers and village community educators (VCEs). The appointment of a small number of village leaders provided an opportunity to support the capacity development of local women, who contributed essential local contextual knowledge to the baseline and later studies. The backgrounds of the local leaders and their teams included community development, community health, teaching, agricultural extension and unpaid community leaders.

The initial training of the local community research teams covered the administration of the baseline survey and ethical protocols, and enabled out-of-country researchers to seek advice on local socio-cultural and language issues associated with the survey. An essential part of the collaboration was to tailor the terms used in each village baseline survey in light of the appropriate local terms (Tok Ples).

Gender relationships were carefully considered. PNG has highly defined gender roles. Even in the area of the study where there is a matrilineal tradition (ENB), men are the head of the household and maintain a dominant role in decision-making. Whilst this research focused on working with women, local research partners advised that it was not appropriate to engage women in the study without the consent of the male community leaders, and in some cases the husbands. Hence, in every community the baseline study began with an open public meeting in which the research team outlined to the community leaders, in the presence of both men and women from the community, the research aims, the proposed activities and the rights of participants. All senior male community leaders (cultural leaders of clans/tribes and government leaders from local level government) endorsed the project and gave consent for village members to participate in the study. As the project progressed, the importance of including men in all aspects of the training became apparent. Consequently, a gender-inclusive approach was adopted across the project.

5.4.2 Baseline livelihood survey

The baseline livelihood survey (Appendix 1) was conducted in all six villages. The survey collected household data from the most senior woman in a household who was responsible for growing and selling produce. Data on age, family composition, housing, agricultural activities, household division of labour, training experiences and needs, business and financial practices, income, health, education and literacy was collected as well as information on the women's aspirations for themselves and their families. The survey design was developed by both PNG research team members and out-of-country researchers, and was informed by other livelihood surveys (CARE, 2002, 2004; Chambers & Conway, 1991; FAO, 2011; Lindenberg, 2002; Spriggs, 2012). Data was analysed using Excel and SPSS.

Recruitment was open to all who wished to participate and who were able to travel to

a central village location (non-probability convenience sample). Triangulation of the survey data with the group work and qualitative data was used to address the sampling limitations.

The survey was administered by local research teams. Participating women had the choice to conduct the survey in English, Tok Pisin or Tok Ples (local language). The majority chose their Tok Ples. In hindsight, the household data collection could have been strengthened through the participation of both male and female heads of household. However, at the baseline point the project was focusing on women only.

Whilst the survey provided good contextual information about the agricultural practices and the activities of women farmers, the data on income is weak. Subsistence farmers who sell opportunistically do not keep records. As they typically spend what they earn, except for the few who are in paid work, income from different sources is not known. This weakness was further exacerbated by the low literacy and numeracy of the majority of survey participants. However, income data was corroborated by the community workshop data. Despite this limitation, the baseline results of mean incomes across the three areas were consistent with national patterns.

5.4.3 Participatory baseline community workshops

These workshops were designed to gather initial data on agricultural, economic, financial and family livelihoods, and gender issues. Each day-long workshop was held in an accessible local community facility (e.g. a church hall). The local project leaders invited a cross-section of the community (men, women and older youth).

A range of qualitative participatory social analysis techniques were incorporated into these workshops (see Box 1). The activities were designed to enable the participants to surface their own knowledge and analyse it together, in order to begin an awareness of where families might consider changing practices, as well as to share their insights with the outside researchers.

Box 1: Participatory baseline community workshops activities

- Overview, ethics and photo permission
- Icebreaker—a fun activity to surface assumptions about and commonalities between the four outside researchers (two from PNG, two from Australia) and community members
- Community asset mapping—small groups drew their village area on large paper noting the natural, built and community assets
- Climate calendar—charted the wet and dry seasons, hot and cooler seasons and other climate factors
- Family and community calendar—noted the time taken from agriculture for cultural and religious events
- Food crops—listed all food crops grown, noting the major crops, those grown mainly for cash and those with specific harvest seasons
- A Day in the Life of a Farmer—participants divided into 4 groups: older men, older women, young men and young women. Each group recorded in writing their typical day in hour blocks, then drew up a typical day of the opposite gender. This activity raised awareness of the work done by men and women in the family and brought to the fore any differences in perceptions about the work of the opposite gender.

- Where does our community earn kina? Documented how income was generated at home and away from home. This was then analysed by gender.
- Talking Tables/Talking Papers—participants divided into 4 groups: older men, older women, young men and young women. Groups moved across four table topics: 'What do women spend money on?', 'What do men spend money on?', 'What are the positives and negatives of wantok-giving?' and 'Why don't people use banks?' The activity provided participants an opportunity to see the collective responses of the community to these questions, whilst maintaining anonymity.
- Future hopes for the community—participants used sticky notes to list their hopes for the future of their community, and
- Workshop feedback—evaluative discussion.

5.4.4 Leaders workshop

Leaders workshops were conducted with community leaders (predominantly male) to identify the history, context, strengths and vulnerabilities of the communities from the leaders' perspectives. The workshops used the Ten Seeds technique (Jayakaran, 2002) as well as the more standard group interview techniques.

Table 2: Baseline community study numbers by region and gender

Region	Community leaders male	Community leaders female	Community members male	Community members female	Baseline survey female	Total
ENB	10	5	27	73	81	196
WH	9	8	15	68	155	255
CP	8	14	50	50	93	215
Total	27	27	92	191	329	666

As part of the ABCD process, information from the survey and the community workshops was provided back to communities and their leaders at the end of the first year in the form of summary village reports. These were validated through community feedback workshops.

Overall, the baseline study provided a sound basis for the development activities to improve the business skills of women smallholders and their families.

5.5 Development activity trials (2013–2015)

This phase focused on the development and trial of a range of activities to, firstly, improve women food crop producers' business knowledge and skills, and, secondly, identify and develop their financial skills and opportunities. This involved six methods:

1. community learning plan
2. capacity development of VCEs
3. development and trial of the Family Teams approach
4. brokered training trial, and
5. development and trial of learning resources for women farmers with low literacy.

5.5.1 Community learning plan

As part of the ABCD and AI orientation of the project, a community learning plan process was undertaken in all communities. The aim of this extended training needs analysis was to ensure that community leaders and members had the opportunity to identify their learning needs together in an open workshop process; importantly, they also then had the opportunity to identify the existing strengths and assets in their community as well as their existing or past connections with relevant trainers or expertise. Whilst communities identified a broad range of issues and needs, researchers were explicit about the limits of the scope of the project and the types of training that could be offered. In this way, community expectations were managed.

This data was integrated with the baseline study data to identify priority needs for training that could be provided through the project development activities trial or by local providers (brokered training).

5.5.2 Village community educators capacity development

A total of 194 people (115 women, 79 men) were trained as peer educators, known in the project as VCEs. Although there were male and female VCEs, at least 60% of all VCE team members were women, to ensure women's knowledge was carefully integrated.

Local partner agencies selected the teams of VCEs. The teams in WH and ENB were fully involved across the life of the project. However, in CP engagement after the first training session was problematic. This was due to issues in village selection, leader availability and commitment, and community divisions.

The VCEs were all smallholder farmers who agreed to train as peer educators and to work with the research team to trial and evaluate what came to be known as the Family Teams program. The VCEs were encouraged to use the Family Teams learning for their own family and then further disseminate the training to other smallholder families through farmer-to-farmer peer education and/or through their affiliations, such as churches.

VCEs were not required to be literate, as the learning activities were either experientially based or adapted with the use of symbols. However, to support the further development of the VCEs' literacy, learning materials and workbooks were provided in plain English, and there was room in the workbooks for VCEs to make notes in the language of their choice. Despite this, low literacy was a significant challenge for some VCEs.

The VCEs were sequentially introduced to the theory and practice of facilitating adult learning, how to plan and run a training program, facilitation skills, and basic evaluation and reporting (see Pamphilon, 2017, in press, *The 'Not a Manual' manual*). The Family Teams modules then became the vehicle for applying this learning.

VCEs who completed all three modules and participated in the delivery of the learning to other farmers were awarded a UC Certificate of Completion. Those who were not able to complete or deliver all three modules were awarded a Certificate of Participation.

An advanced workshop for leading VCEs (18 women, 7 men) was held in late 2016. The aim of the workshop was to further develop the training skills of the VCEs, introduce new activities that had been developed in 2016 and begin the development of a national VCE network.

5.5.3 Family Teams approach development and trial

The Family Teams program was trialled and developed with the six village communities through a series of workshops. The workshops were held in local venues to ensure that women did not have to leave their families and farms for extended periods of time. As many participants had low literacy, the program used visual activities, small group work, role-plays and discussion (see Mikhailovich, Pamphilon, & Chambers, 2015). The length of each module depended on literacy levels and group size, and ranged from a half-day to a full day.

The aim of the Family Teams program is to provide one male and one female head of a household with a series of workshops that encourage them to work together as a family team and to collaboratively plan the further development of their agricultural and family activities. Participants can also include other family members, such as extended family and youth, or other family types, such as women-headed households or polygamous families (see Pamphilon & Mikhailovich, 2016.)

The three modules developed in the project were:

1. Working as a family team for family goals
2. Planning your family farm as a family team, and
3. Communicating and decision-making as a family team (see Pamphilon, Mikhailovich, & Gwatorisa, 2017, in press, *The PNG Family Teams Manual*).

Table 3 shows the total number of male and female VCEs trained during the project and the number of project village farmers who received training from those VCEs. Additional training for Coffey International's Economic and Public Sector Program (EPSP) and Provincial and Local-level Governments Program (PLGP) was conducted in five areas: Nuku district, Sandaun province; Mul-Baiyer, WH; Nawaeb district, Morobe province; Sohe district, Oro province; and Talasea district, West New Britain province.

Table 3: Total numbers of farmers trained

Training type	Male	Female	Total
VCEs trained in Family Teams modules	79	115	194
Project farmers trained by VCEs	455	510	965
PLGP farmers trained	82	191	273
Total farmers who received training	616	816	1432

5.5.4 Brokered training trial

A model of brokered training (Kirkpatrick, 2013) to provide agricultural and financial literacy training for smallholder farmers was trialled. A total of 352 people (235 women, 117 men) participated.

An early component of the project identified private sector and industry partners who could provide quality, affordable and culturally appropriate training to the project communities. This data was used, alongside the data from the community learning plan, to identify preferred providers. The inclusion of PNG organisations to conduct appropriate training contributed to the sustainability of the project and connected communities to the assets in their own regions. Relationships were developed with each agency in order to share mutual learning and evaluation, rather than simply purchasing the services of these agencies.

As the brokered training was linked to community learning plans, a range of agencies were engaged:

- for financial literacy, banking and saving: Nationwide MicroBank (3), Bank South Pacific (1)
- for food crop production: NARI (1), FPDA (1)
- for sustainable livelihoods: Integrated Agricultural Training Program, University of Natural Resources and Environment (2), and
- for recordkeeping and bookkeeping: Integrated Agricultural Training Program, University of Natural Resources and Environment (2).

5.5.5 Development and trial of learning resources for women farmers with low literacy

A lack of literacy is recognised as one of the factors that limits PNG women's participation in agricultural extension and training (Cahn and Liu, 2008). Low levels of education, literacy and numeracy were reported in all areas in the baseline study, with approximately 46% of women having attended primary school and 22% secondary school. Therefore, the project prioritised the development of visual and experiential learning processes and materials (see Mikhailovich, Pamphilon, & Chambers, 2015). These approaches were key facets of the participatory workshops, Family Teams training, data collection and evaluation, and they were a central part of the adult learning process.

The major learning resource developed was the Maria books—a series of picture books with agricultural messages to be used by both adults and children. The concept of a family team, in which farm and family work and decisions are shared between men and women, is a core feature of the books. The family team in the series is a mother, father, grandmother, two primary school-aged children and a baby. Maria, the young girl, was chosen as the central character to present an active role for women and girls. The key messages of the books are evidence-based and drawn from the research findings.

Two draft Maria books were prepared (one on marketing and one on budgeting and saving). These were trialled in the Mul-Baiyer and Gazelle villages. A participatory learning and development approach was used to ensure that the families benefited from the activity whilst they made contextual assessments of the books. Both Maria books were read to the groups, who then worked in smaller gender-specific subgroups to critique the content and the illustrations. Overall, 30 mothers, nine grandmothers, six fathers and four grandfathers participated in the development workshops. The changes recommended by the workshop participants were significant. It was clear that there needed to be two place-based versions of the marketing book, as local practices were different; therefore, three Maria books were produced (Pamphilon & Simoncini, 2014a, 2014b, 2014c)

To maximise the impact of the Maria books, workshops with VCEs and teachers were held prior to dissemination of the books into the four pilot communities. The VCE workshops involved modelling how to read the books with children and particularly focused on how illiterate mothers could use the books with their children. The teachers workshop focused on ways to use the books across all primary grades and subjects beyond reading—for example, maths, environment, 'making a living' and social studies.

Once this training had been completed, the books were distributed to five primary schools (grades 3–8) and one elementary school (K–2). These schools were asked to use the Maria books in the classroom for approximately four weeks and then send one book home to every family in the school (see Simoncini, Pamphilon & Mikhailovich, 2016).

Given the strong community, school and agency responses to the Maria books, further Maria books were planned. The first of these, *Maria's family raises chickens*, was developed in 2016 as a response to project data showing that PNG families had low protein intakes and that women need to develop diverse income streams that are compatible with their family responsibilities. Because of the technical nature of this book, it was written in collaboration with NARI (Simoncini & Pamphilon, 2016).

5.6 Ethnographic study (2014)

Focus groups with follow-up in-depth interviews in Tok Pisin were conducted in ENB and WH with 38 women who were beginning to improve their agriculture and those who were still struggling. The aim was to explore the contextual issues that may have impacted on their ability to take up new agricultural practices. Questions included: Can you describe life in general in your village? As far back as you can remember were there any stories told to you by your mother or grandmother about life in the village.? Can you describe the lifestyle, practices, experiences and anything about the village in general today? How do you see yourself in the community? Do you have any enough money and everything else to live on? Describe the important values and ideas you have gained from this research project? What are some of the problems and issues that affected your plans and dreams?

Lessons from this data were used to further inform the Family Teams modules and clarify further areas to be followed up in the end-line study.

5.7 End-line study (2015)

A full end-line study was conducted in the WH and ENB sites (including group interviews, participatory workshops, surveys, key informant interviews, leader interviews and impact stories). Due to the modified model of the VCE and Family Teams program in CP, a modified end-line study was conducted in the Kairuku-Hiri district (including group interviews, leader interviews, and impact stories).

The evaluation model for the learning outcomes was the Kirkpatrick (2006) model, which includes:

- reaction—were the participants pleased with the program? (Measures the learning activities and process)
- learning—what knowledge, skills and understandings did participants gain? (Measures short-term learning)
- behaviour—what changes in behaviour resulted? (Measures the application of the learning and outcome), and
- results—did the changes in behaviour positively affect the family/community? (Measures the long-term aim and impact).

5.7.1 Participatory farmer workshops

Community workshops were conducted with the VCEs and farmers who had received training. Local project leaders attended the workshop activities to provide feedback and contribute to the analysis of the results.

Group interviews with men and women's groups explored men's responses to the project and the Family Teams approach. Questions asked included:

- How did men respond to the first phase of the project that had a women's focus?
- What has been men's response to the whole project (positive and negative)?

- How did men respond to the Family Teams philosophy?
- Are there changes and new ways of decision-making by men in the family?
- What about men who have not changed? Can you tell us why that might be?

The *Talking Tables* process was used in gender-specific groups to assess responses to the content of the Family Teams program:

- What were the key messages of the Family Teams program?
- What was the most useful content?

It was also used to assess the impact:

- How have men changed?
- How have women changed?
- How have youth changed?

A *sticky note* activity examined how participants understood their roles as VCEs. The post-it notes were sorted with the group, and a summary of the key factors and their relationships to adult learning theory was developed.

The *evaluation wheel* method (Appendix 2) was used to measure the knowledge outcomes from the Family Team program and brokered training. Each person rated their current knowledge (from 0 to 5) in the key learning areas (setting goals, farm planning, marketing, budgeting, saving, banking, communication and working as a family team).

5.7.2 End-line surveys

The end-line surveys were administered by the area and village leaders.

The first survey used relevant questions from the baseline survey and sought further information on the project's impact on women and their families. Data was analysed at the aggregate level by village and area, using Excel and SPSS. Forty-three women completed the survey (23 in ENB, 20 in WH). Only 26 women had participated in the baseline survey and the end-line survey. To counter the small survey numbers, data was triangulated with other evaluation data collected in participatory workshops and interviews.

A second survey was conducted with 104 VCEs and farmers (101 women, 79 men), to examine the impact of training provided by VCEs to farmer families. VCEs chose five farming couples they had trained and completed a short survey with the man and woman separately. The VCEs were asked to fill in one survey for their own family. The survey had a retrospective self-assessment design that used a six-point scale to respond to a series of statements about behaviours, knowledge and attitudes before and after the training. The survey also asked about income improvement and how money had been used.

5.7.3 Interviews

Three types of interviews were used:

- *impact stories* with VCEs who participated in the training, to explore observed changes resulting from the project. VCEs were asked to think about the changes they had seen in their own and others' families and to select the story that was the most significant for them. The PNG term for this was 'testimonies of change'. In one region, participants were broken into small groups to tell that story in either

Tok Pisin or English. In the other region, the stories were collected on request in a one-to-one process.

- *training reflections* with highly active VCEs and VCE leaders in each village. VCEs were invited to share their reflections on the training processes they used and key learning areas.
- *leaders experiences* with area leaders. Leaders shared their insights on the benefits and challenges of the project approach, logistical issues, observed changes within families and personal impacts on their leadership capacity. They also suggested areas for improvement in future projects.

5.7.4 Maria books evaluation

Focus groups were conducted with the VCEs (18 women, 14 men) from the four communities that had developed and trialled the Maria books. The activity explored how the books had been used, the major messages recalled and any challenges in their use.

Initial interviews with teachers, held six months after the Maria book training, revealed that all but one school had kept the books at the school rather than distribute them to the local families as requested. After a further explanation of the research aim and funding expectations, all principals agreed to disseminate the books to families.

Six months later, follow-up in-depth interviews were conducted with teachers from seven primary schools and one elementary school that had used the books. The interviews were conducted by Dr Lalen Simeon to ensure that any sensitive issues could be explored. The interview focused on how schools used the books and their impact in the classroom and on local families who had been received the books via their children. Reasons for the limited distribution were explored.

5.8 Post-project evaluations (2016)

Four post-project evaluations were conducted in 2016 after the end-line evaluation.

5.8.1 Conference evaluation

An end-of-project conference was held in July 2016. One session was designed to gain further feedback on the key learnings and challenges of the project from partner agencies, brokered training partners and key project leaders across three regions. This group stakeholder analysis was used to map the perceived outcomes of the project, identify major key lessons and consider ways to ensure sustainability and wider uptake.

5.8.2 Family Teams group interviews

Dr Ray Bartell (independent consultant) conducted gender-specific focus groups in Tok Pisin with VCEs and trained farmers in each of the villages in the Mul-Baiyer and Gazelle districts in mid-2016. The groups were conducted in Tok Pisin in order to surface the issues that were of importance to both males and females, to reveal the positive and negative aspects of the program and to assess what worked and what did not work. The evaluation focused on the impact of the Family Teams training on families and probed into shared workloads in family roles and farm activities, shared decision-making, communication in the family, violence in the family and food security.

5.8.3 Leader interviews

Dr Lalen Simeon (PAU) conducted in-depth interviews with the women area project leaders six months after the project end to identify positive and negative impacts of the project on families, men and women in the areas of agricultural development, family relationships, family finances, VCE training and farmer learning. In addition, the leaders were asked about improvements needed in the project and any impacts on their own skills, knowledge and leadership capacity development. Barbara Pamphilon conducted an interview with Dr Simeon to explore the same data areas.

5.8.4 Video interviews

In late 2016, Dr Jo Caffery (UC) conducted video interviews with the 19 (13 women, 6 men) leading VCEs who attended the advanced training. VCEs explained the training activities that they enjoyed delivering and those they believed had the most impact on farming families. The interviews will be used on the project website.

5.8.5 Evaluation summary

Table 4 summarises the overall participation numbers by gender in each of the evaluation activities.

Table 4: Data collection methods and participants by gender

Data collection methods	Women	Men	Total
End-line surveys	43	n/a	43
Farmer surveys	101	84	185
Farmer workshops	34	13	47
Interviews	32	15	47
VCE workshops	35	15	50
Maria books VCE workshops	18	14	32
Maria books teacher interviews	10	7	17
Post-project family team group interviews	32	22	54
Post-project VCE video interviews	13	6	19

At the project conclusion, a total of 1,432 smallholder farmers had been involved in the activities. Of these, 194 (115 women, 79 men) were VCEs and a further 1,238 (701 women, 537 men) were farmers who had received the Family Teams training through peer education from the VCEs. Further farming families and schoolchildren were impacted through the Maria books; however, exact numbers were not available.

The age range of farmers was 17 to 70, with a median age of 43 years. The majority of women were married (81%). The number of children ranged from one to 14, and the average number of children was 3.4.

Further assessment of the impact and uptake of the project methodology will be assessed in the follow-up project ASEM/2014/095 *Improving opportunities for economic development for women smallholders in rural Papua New Guinea*.

6 Achievements against activities and outputs/milestones

Objective 1: To understand women vegetable producers' context, business knowledge and practice in each region in order to develop and facilitate ways to improve their overall skills

No.	Activity	Outputs/milestones	Completion date	Comments
1.1	Literature reviews: PNG ethnographies, geographies, vegetable growing, women's learning, women and business	Literature review report	August 2012	The purpose of this first activity was to identify the range and types of literature available as a foundation for informing and/or refining subsequent activities. However, after the first briefing and scoping visit to PNG, it was apparent that the pressing need was to review the literature on family livelihood definitions and measurement (to inform the first community baseline study), and women and learning (to develop a framework for the training needs analysis).
1.2	PNG partner engagement and briefings	Report on village selection and partner issues and strengths	August 2012 September 2012	In consultation with the partner agencies, two villages were selected in Western Highlands (Kwinkya & Kumbareta), two in East New Britain (Tinganagalip & Vunapalading) and one in Central Province (Tubuseriea & Hisiu).
1.3	Research skills building for pilot team	Research skills developed for survey implementation	March 2013	Due to the time line to gain ethics approval and the competing time lines of SMCN/2008/008, the baseline study was conducted in March 2013.
1.4	Design and pilot vegetable business practices survey	Baseline survey designed in consultation with PAU and NARI	March 2013	Due to competing time lines of SMCN/2008/008, the baseline study and the related research skills building were conducted in March and May 2013.
1.5	Pilot training of trainers and mentored delivery of women's workshop 1	Both men and women were trained as VCEs in CP pilot	June 2013	To complement the activities of SMCN/2008/008, the training and first women's workshops were held in May 2013 in line with the other two regions' activities.
1.6	Research skills building	Capacity-building report	March 2013	The research skills training focused on administering the baseline survey with women smallholders.
1.7	Vegetable business practices survey and village workshop 1 Training needs analysis	Baseline study completed in all 6 villages Training needs analysis community workshops informed 1.9	March 2013 November 2013	Ethics approval was granted by the UC and PAU human research ethics committees (December 2012). The baseline study consisted of community leaders workshops, community members workshops, and individual livelihood surveys.

1.8	Key informant interviews	Key informant interviews were conducted across the full first year	April 2012 September 2012 February 2013	These informed the baseline study and the design of the first gender awareness workshops.
1.9	Design of vegetable business training models	Training framework re-designed	May 2013	The data from 1.1, 1.2, 1.7 and 1.8 strongly indicated that when working with PNG village women it is essential to begin with a gender-inclusive workshop that ensures men are engaged and supportive. The decision was made to focus on this Family Teams training first.
1.10	Training of trainers, plus mentored delivery of Type 1 training in regions	Report: The Training Stage 1	April 2014	In each of the 6 focus communities, teams of local community educators (VCEs) were trained in the basic skills of community-based training. Building on the data from the baseline study, the key informant interviews and literature on women and development, the first major training activity was designed by the UC team and locally modified following feedback from the community educators. The training used a community workshop approach and focused on engaging whole families rather than women only. The workshop topic was 'Working as a family team for family goals' and as such not only addressed gender equity but also identified agricultural, financial and general family goals.
1.11	Follow-up Type 1 training in villages	Peer education at a village level	April to October 2013	Under the guidance of the regional team leaders, VCEs delivered Module 1 to groups and to their families.
1.12	Evaluation of Type 1 training	Report: The Training Stage 1	April to October 2013	Evaluation was conducted with the regional leadership teams to identify further relevant modules.
1.13	Design of research tools for Village Study 2	Journal article, Mikhailovich, Pamphilon & Chambers (2015)	November 2013 2015	Given the need to further engage young women, participatory visual methods were designed and piloted with youth in the Western Highlands and East New Britain. Family farm mapping was designed for use with family teams as well as youth.
1.14	Village Study ethnography skills building for teams			Due to the unavailability of the PNG ethnographer, this activity was not conducted.
1.15	Village Studies 2 (Nov 2013)	Report: The focus communities: their context, challenges and opportunities	May 2014	The village studies report drew on the baseline study data (survey and group work), the range of community workshops, local key informant interviews, and field observations.

1.16	Trainer training, implementation and evaluation of Type 3 training	Module 2: Planning your family farm as a family team was trialled in all three regions Module 3: Communication and decision-making as a family team was trialled in ENB and WH	March 2014 Nov 2014	Given the resonance of the Family Teams philosophy, two more modules were designed for delivery in 2014. VCEs were trained in the module and then rolled this out in their own villages.
1.17	Village case studies	Journal article, Mikhailovich, Pamphilon, Chambers, Simeon & Zapata (2016)	January 2016	This activity was adapted to use a number of participatory methods to gain wider data across a period of time rather than as a one-off village study.
1.18	Follow-up training	Maria books 1 & 2, Pamphilon, Simoncini, & Veal (2014a, 2014b) Maria book 3, Simoncini, Pamphilon, & Veal (2016)	September 2014 July 2016	Following analysis of the early data, the focus of the training moved to women with low literacy. The Maria books (including their design, pilot and evaluation) were trialled as an innovative strategy to reach this target group.
1.19	Trainer training, implementation and evaluation of Type 4 training	Brokered training Food crop production (NARI) Container gardening (FPDA)	June 2015	Due to the diversity of regional training needs, the decision was made to offer the Family Teams modules to all communities and to trial a brokerage model to engage locally valued PNG training bodies. In ENB, the PPAP project concurrently offered training in the two villages.
1.20	Village case studies	Impact stories on website Stories to be used as learning materials	December 2015	Stories were drawn from in-depth interviews in Tok Pisin with women who were successful farmers and women who were struggling to provide data for 'learning stories' as well as to inform further development of the Family Teams modules.
1.22	Follow-up training	Master class for leading VCEs	November 2016	VCEs were selected for this training based on their commitment and skills as trainers. This also enabled the start of a PNG network of Family Teams VCEs.
1.23	Final village study	External evaluation of the Family Teams approach and the Maria books	July 2016	This was conducted by an external evaluator using gender-specific group interviews with men and women VCEs and farmers. A second evaluator conducted in-depth interviews with schools that had received the Maria books.
1.24	Regional trainers and village stakeholder workshops	End-line study	March 2016	The end-line study involved individual livelihood surveys, farmer surveys, VCE and farmer workshops, impact studies and key informant interviews.

1.25	Production of learning handbook	<i>The 'Not A Manual' manual: A process and resources for the development of farmers as peer educators</i> <i>The PNG Family Teams manual</i>	October 2016 December 2016	Given the possible different audiences for the Family Teams and the VCE training process, 2 manuals were produced,
1.26	Futures and Dissemination conference	Conference outcomes report	July 2016	The conference 'Building PNG by Building Farming Families' enabled further evaluation of the project and informed wider stakeholders about the project.
1.27	Summative analysis and lessons learned	Final report	February 2017	

Objective 2: To understand the financial practices and issues for families in order to develop ways to improve the business finance practices of women vegetable producers

No.	Activity	Outputs/milestones	Completion date	Comments
2.1	Financial contextual analysis: literature review, key informant interviews	Report: <i>Financial literacy and women smallholders: the PNG context and challenges</i>	May 2013	This report used the baseline study data and literature and program reviews as the basis for designing brokered training and identifying partners.
2.2	Analysis of women's financial practices data			
2.3	Identification of financial business practice development partners			
2.4	Training of trainers and mentored delivery of financial literacy training (Type 2)	Brokered training provided Budgeting, banking and saving (Nationwide MicroBank, Bank South Pacific) Sustainable livelihoods (IATP) Recordkeeping and bookkeeping (IATP) Budgeting (FPDA)	July 2014 to May 2015	The brokered training was supplemented by sections of the Family Teams modules that integrated key financial literacy messages (family financial goals, family financial plans linked to farm plans).
2.5	Follow-up of financial literacy training	Regional leaders monitoring	July 2014 to May 2015	Regional leaders supported the VCEs in peer education activities to encourage budgeting, saving and where possible banking.

2.6	Design of financial development trials by region	Small seed loan trial (WH) Recordkeeping and bookkeeping supplies trial (ENB)	July 2014 to July 2015	Given the findings from the baseline study showed very low financial literacy and no banking practices, this activity was reduced to 2 small trials to support the most committed VCEs. One trial provided seed funds for increasing income (poultry and sewing). The other trial provided shared calculators, record books and document folders to support more efficient recordkeeping.
2.7	AISC conference	Website http://pngwomen.estem-uc.edu.au/	March 2014, ongoing	Due to the need to focus on PNG-based research and training activities, this conference was combined with the Futures and Dissemination conference (1.26) to include a wider audience and strategically link to ASEM 2014/095. In order to ensure early dissemination of information, a dedicated website was developed.
2.8	Trials of financial development activities	Maria book 2, Pamphilon, Simoncini & Veal (2014c)	November 2015	Given the low levels of literacy and financial skills, a Maria book was designed to reach this financially vulnerable group.
2.9	Review of financial development activities	End-line study	December 2015	Brokered trainers provided evaluative reports, including the number of bank accounts that had been opened and the number of transaction activities. The end-line study incorporated financial development questions in the individual livelihood surveys, farmer surveys, VCE and farmer workshops, impact studies and key informant interviews.
2.10	Trials of improved/new financial development activities	Nationwide MicroBank mobile banking agents Kumbareta & Kwinkya	June 2015 ongoing	Given the low levels of banking, 4 VCEs were trained as bank agents and have been providing mobile phone banking to their communities.
2.11	Summative analysis of micro-finance trials	Final report	February 2017	

7 Key results and discussion

The aim of the project was to develop training approaches that would improve the agricultural and business skills of women smallholder food crop producers in CP, ENB and WH of PNG. The overall goal of the training was to support the development of equitable and effective agricultural family livelihoods. Across the life of the project, data was collected on the contextual enablers and barriers faced by women farmers in the three regions. These informed the content and process of the training. This section first presents the context of the women farmers, using a Community Capitals Framework analysis. It then outlines the training model and the Family Teams approach that was developed as part of the project.

7.1 The context of the women farmers: a community capitals analysis

The following sections use Community Capitals Framework to present the community assets, barriers and enablers that impacted on the women smallholders and their families, and outlines how the project enabled women and their families to address a number of these challenges.

The Community Capitals Framework (Emery & Flora, 2006) evolved from the Sustainable Livelihoods Approach (Scoones, 1998) to consider factors beyond the individual and the family. A wider understanding of community capitals (natural, built, financial, cultural, political, human, social) enables assets to be identified, connected and leveraged. Whilst social capital is the process that makes things happen, each of the other capitals must be understood and addressed in order to support sustainable development (Gutierrez-Montes, Emery, & Fernandez-Baca, 2009).

The material tangible community capitals are presented first (natural, built, financial), followed by the less tangible human capitals (cultural, social, human, political). For further information on the definition of community capitals, see Emery and Flora (2006).

7.1.1 Natural capital

Agricultural assets

The three districts involved in the project have differing natural agricultural assets. The Mul-Baiyer district (WH) is located in a wide valley, has highly fertile soil and good access to water, and produces a wide range of quality food crops and coffee. The Gazelle district (ENB) has fertile soil, good access to water and accessible land. However, when the study started the communities were mainly producing food crops as they were gradually recovering from the impact of the cocoa pod borer (*Conopomorpha cramerella*). Their livelihoods had been significantly reduced and families were struggling to meet basic costs such as school fees (Curry, Lummani, & Omoru, 2008). In the Kairuku-Hiri district (CP), the two communities were on the coast and were involved in fishing as well as food crop production. Their food gardens were away from the village areas in the more arable hills adjacent to the coastal flats.

All areas were increasingly being affected by climate change, most notably with periods of drought. Women farmers reported that they could no longer be sure of harvest times and were beginning to plant crops at very different times to the traditional practices of their parents. The uncertainty of crop production and the variable harvests were a stress on family time management, and family income was even more insecure. The project's family farm planning and production planning activities gave families tools that helped men and women to make plans to adapt to climate variability, enhancing their sense of competency and coping.

Land assets

Most women were working on customary family land that had been cultivated across many generations. Traditional practices of moving gardens and resting land continued to be used. Ownership, rather than leasing land, was the norm; land was an asset to the families. However, both men and women reported a range of pressures with regard to land.

I tell my children that we do not have enough land. I tell them to share and work together... When I see others in the village (brothers) fighting for land, I try my best to train my children to share. (F, ENBP)

This included land acquisitions and leases for oil palm (ENB) and land disputes over ownership and user rights (WH and CP).

Many families had some uncultivated land that could be further developed; however, arable accessible land was becoming difficult to access in all three areas, as families needed to divide their farming land with each new generation.

Land is very important to us in the highlands. But it is getting smaller in size because a man is expected to provide everything for his family, therefore he has to divide up the land into equal sizes to his wives (two or more) and his sons will divide up their pieces of land to their wives if they have more than one wife. The land is becoming a problem because families need to build their houses and make vegetable gardens or coffee plantations. (F WHP)

In a number of cases, this meant that families accessed or leased land some distance from their family home, adding a considerable travel burden to women, who typically did the majority of the crop management. The family farm plan activity made this issue visible to both men and women in the family. A number of families reported changing the farm plot arrangements for improved efficiency—for example, the location of intensive management crops.

7.1.2 Built capital

Roads

All three areas had access to roads to major towns, and their markets and were served by local bus. The state of the roads hampered women's access to markets and compromised their safety. The WH communities experienced the most difficulties in market access, as the nearest market at Mount Hagen was over two hours away by bus, and women had to pay for their own fare plus the cost of any produce. Women and men reported high levels of concern about safety and violence on the road to Mount Hagen and in Mount Hagen itself. Although the roads were better in the other two areas, women still reported concerns about travelling beyond the local area. Although this is a structural barrier, following the training a number of men did recognise the value of accompanying the women to market, with some ENB men reporting that, although they were called a 'man woman' for this practice, they would continue to do so to support their family marketing plan.

Housing

Housing varied considerably across the three areas. The WH communities had the largest proportion of traditional houses built of natural materials, whilst those in more developed areas of ENB and CP had a higher proportion of semi-permanent or permanent housing. A major goal of families in all three areas was to use any increased income to improve their housing. Whilst this is an important family goal, improved quality of housing can also reduce women's daily burden and contribute to improved health. For example, in WH and ENB, a number of families had built and fitted out cook houses and/or added water tanks. The type of house improvements achieved depended on the initial level of family poverty,

ranging from a family in Kwinkya who now proudly had mattresses for all family members to full permanent houses.

Health services

Some level of health services was available in all three areas. Whilst the Gazelle (ENB) and Mul-Baiyer (WH) districts had accessible hospitals, women in CP only had health centres and aid posts. The cost of health care was a concern for women and was a saving goal for women in all three areas.

Health was significant issue for women. In the baseline survey 25% of women reported that they or a close family member had been ill for more than a week in the past three months. Managing their own health, and that of family members, is an ongoing challenge for many women farmers. At the end of the project, women and men reported that they had either enough savings or regular income to cover potential health costs. This was a saving goal for most families.

Education services

All three communities had easy access to elementary and primary schools, although in the Mul-Baiyer district (WH) schooling had been regularly disrupted by tribal fighting until 2008. Only the Gazelle district (ENB) had a nearby high school. As a result the education and literacy levels of women were low. Approximately 47% of women had attended primary school and 22% secondary school. From self-reports, 43% of women were able to read Tok Pisin very well, and 13% were not able to read at all; 35% reported being able to write Tok Pisin very well, and 22% were not able to write at all.

As discussed, low literacy provided a number of challenges for women. However, as minimal education and low literacy is a common factor for many women farmers in PNG, this was the reason the project chose to focus on this large and important cohort of women.

Few of the women had access to formal adult learning experiences, especially in agricultural extension. Only 14% of women who completed the baseline survey across all regions had received any agricultural extension training. The main adult learning resources available to the women farmers comprised training courses provided by the church. This included skills development such as sewing or people skills, such as Sunday school and/or church leadership. A small number of women from Tubuseria (Kairuku-Hiri district, CP) had been engaged in training associated with one other ACIAR project (SMCN/2008/008) and had been involved in an early pilot of the Nationwide MicroBank financial literacy training.

Despite the lack of access to training, women readily identified a wide range of education needs in agriculture (crop production, plant nursery, irrigation, pest control, post-harvest management, livestock care), income generation (marketing, sewing, aquaculture) and business skills (bookkeeping, finances). A major aspiration of women across all three areas was to become literate. This was one stimulus for integrating literacy development within the agricultural development strategies, especially through the Maria books.

7.1.3 Financial capital

Budgeting and saving

At baseline, most women farmers and their families were using financial practices that were opportunistic rather than planned. A typical comment heard across all areas was 'PNG is a spending culture not a saving culture'. Women explained that when they earned money from excess crops they spent it immediately on family needs. Larger incomes (in the thousands of kina) from coffee (WH), cocoa (ENB) and prawns (CP) were rarely saved but typically used within three months. However, women reported that they did save

money (88% in CP, 79% in WH, 92% in ENB), mostly for immediate needs such as school fees and larger household items.

Although many women in the baseline survey reported that they planned with a budget (76% in CP, 74% in ENB, 50% in WH), there was little evidence to suggest this was written or that it occurred with any regularity. Men and women budgeted differently; men budgeted seasonally for cash crop income and women weekly or monthly around food crop incomes. Families did not typically keep records of agricultural inputs or expenditure. At project end, families reported that having a budget and savings plan had enabled them to become more financially secure and to build their family farm.

For me, it was not easy to budget my money. I struggle every day and I survive with my children on what I earn on a daily basis. To budget my money is easy but I don't know, I could not do it. I needed to do it but it is hard...some of us practiced what we learnt at the workshop and are now doing well (F ENB).

Some men reported reducing their spending on drinking and gambling once they saw the outcome of investing this money in their farming activities.

Banking

The rural areas of PNG have minimal access to banking services. Most banks are located in towns, and mobile phone banking is a recent innovation. Most women reported saving at home, with only about a third using banks (37% in CP, 30% in WH, 29% in ENB). Families had a range of reasons for not using banks: lack of accessibility, difficulties with literacy and numeracy, lack of trust in bank processes, and issues around safety in travelling to town banks. At the end of the project, most families had opened bank accounts, primarily with the micro-finance banks such as Nationwide MicroBank, which have low fees.

After the ACIAR training I felt so good and confident—I wanted to do something for myself so I opened up my first bank account with Nationwide MicroBank. (F, WH)

The use of banks for regular saving will be the next step for families who want to move on to taking out loans for their farm activities.

Gift and exchange

Gift and exchange practices remain an important part of the informal economy, particularly in women's lives. Women reported sharing excess crops, exchanging labour through activities such as child care or for land preparation, and supporting or being supported by wantok for major items such as school fees. Women reported that, as their agricultural production increased, they felt empowered by being able to 'give' when needed rather than only 'when possible'. This raised their standing in their wantok group and in their community.

Income generation

Diversified income streams through both formal and informal means assist low-income smallholder farmers to improve their livelihoods and resilience. At baseline, women contributed to family income through a range of minor activities inside and outside the home—growing and selling vegetables, making bilums (string bags), sewing, cooking food to sell, floriculture. They used this income to support the family. Women had few available avenues for paid work, as the only local jobs, such as nursing and teaching, required formal qualifications. The Kairuku-Hiri district (CP) was an exception as, due to its proximity to Port Moresby, there was some possibility of wider paid work. At the end of the project a number of women had begun to diversify their sources of income through small entrepreneurial activities, such as catering or selling chickens, ducks and pigs.

At baseline, men reported larger incomes from cash crops and, for some, selling wood or working as occasional labourers. They controlled family income, although many women reported strategies for secreting money to support the family.

If I earn more than the daily total I always save K50 in my BSP [Bank of South Pacific] account without his knowledge. I opened my BSP account 3 years ago and I save money secretly in this account. I also hide money in my secret corner in the house. (F ENB)

Men openly reported 'stealing' from their wife's purse. Many families reported that men used money for alcohol, gambling and recreation, whilst women used it for family and church. In families that had taken up a Family Teams approach, men and women reported that they had now shared plans for income generation and for the use of the money. This had led to greater family and farm success and great pride.

At baseline, the majority of women across all areas sold produce only when a surplus was available or when cash was needed, for example, for school fees. In the latter, this meant that there were many women at the market and consequently prices dropped. Few women had a planned approach to crop production. As frequency of selling at markets was identified as an important contributor to income, a focus on a planned approach to production was identified as a priority.

I used to be ashamed to go to the roadside market to sell, now I am happy to do that. I have a garden plan. (F WH)

At end-line, families reported that using an annual seasonal production planning calendar linked to family financial goals had increased their production and enabled them to sell across the whole year to ensure they had regular income and income for large costs such as school fees.

At baseline, all communities had identified access to main markets as a major barrier, although for varying reasons (distance, safety, transport, cost, time). Most women relied on small roadside or local markets as the main point of sale. Women and girls undertook the majority of the food crop marketing, with men usually selling the cash crops to middle men. At the project end, a number of families had identified specific crops that were in demand at the main markets. Men and women worked together to grow, sell and market these and gained large incomes for specific purposes (for example, families in WH selling watermelons began chicken farming; ENB families selling corn began a piggery). However, although the majority of families had adopted regular marketing for regular income, there continue to be significant challenges, especially in CP and WH where women reported that they often had to discard surplus produce at the end of the market day. At end-line most reported that they needed to know how to reach new markets and/or engage with wholesalers.

As families begin to generate income and develop budgets, it is then possible to identify financial goals and farm plans to meet these goals. This move from an ad hoc, opportunistic approach to a planned approach to the sale and marketing of produce for income is an essential step for the development of a family business approach to farming.

Cultural capital

The wantok¹ system

The wantok system was both an enabler and a barrier in all three areas. As an enabler, it did provide a safety net for families, with all communities reporting that 'no-one lives in

¹ Wantok is a term used across Melanesia to express patterns of relationships and networks that link people in families and regional localities. It has been described as a socio-economic and political network, a set of

poverty' as food and resources are always shared. Giving money to wantok provided a form of insurance policy for families, because they could then go to those family members for money at a later time as needed. Some wantok were seen as 'good investments' and many as a 'black hole' where reciprocity would not occur. Wantok did provide emotional and physical support at times of death and serious illness.

Although there was evidence that some families were developing strategies to manage wantok-giving (only carrying a certain amount of kina, setting limits on the amount given per week), both men and women reported that the constant drain on family finances and the cultural obligation to take time to support wantok in times of need were major barriers for farming families. Naming wantok obligations as a budget item and as an item in time management were taken up as empowering concepts.

Patrilineal, matrilineal and patriarchal traditions

Patrilineal and matrilineal land systems of inheritance can have a significant influence on what women can and cannot do, which in turn impacts upon family livelihoods. The ENB areas are matrilineal, and the CP and WH sites patrilineal. Whilst in principle in matrilineal societies women own the land and are able to make decisions about the land, in ENB women reported that their fathers, brothers and husband still made the major decisions about the use of land and family assets. In all regions, families reported that men were identified as the head of the household, retaining patriarchal family status.

Within a patriarchal system of power relations where men hold authority over women and children, practices such as 'bride price' can relegate women as 'bought assets'. Having paid for the women as assets, some men see this as giving them the right to control and direct a woman's daily life. This was manifested in some men's abusive control of women in both farm and family practices. In CP, some women reported that their mother-in-law also controlled their daily lives in an abusive way.

Through the project concept and activities that supported working as a family team, a number of men recognised the benefit of having a male and female family head who could plan, problem-solve and lead the family together towards their shared goals. The discourse of a family team provided language for women to negotiate more equitable roles in family and farm life. This approach is essentially gender-inclusive, recognising that both men and women need to change to build more effective and equitable farming families.

7.1.4 Social capital

Christianity

Following colonisation by missionary nations, PNG has overwhelmingly become a Christian country. Christian principles inform the identities of most PNG people, although in varying ways across the country (Anderson, 2012). Christian work and family ethics were core to the beliefs and practices of the women in all three areas. This gave them guidance and comfort in their daily lives. Many of the women were active in their church and had developed a number of community and family skills through this engagement.

Christianity was an important enabler for women. It provided a discourse that valued their roles and the importance of peaceful, productive families. Men who became actively engaged in the project often had strong church backgrounds. They reported that the Family Teams philosophy was congruent with their Christian principles. Men and women agreed that working as a caring and equal family team put these principles into action.

relationships (or obligations) between individuals characterised by common language, kinship group, geographical area of origin, social associations or religious groups (Nanua, 2011).

Social networks

Although most of the waking hours of women were spent in house and farm activities, women in all three areas reported that time at the markets (as either buyers or sellers) was a valuable time for connection with other women. Some men referred to this time as 'gossip' time; however, for the women, this time had deeper impact, whether it be through sharing stories of their lives or, more instrumentally, looking at the pricing, quality and range of others' produce.

7.1.5 Human capital

Distribution of labour

Men and women's roles in agricultural production have undergone significant change as PNG systems of production and greater engagement with the cash economy have increased. At baseline, men and women consistently reported that they typically worked in separate spheres within the household and farm. Their different roles in agriculture and family life were understood as 'natural' and 'complementary'. At the end of the project, many men and women had moved to shared planning at the start of each day, which they reported had led to greater trust in each other and negotiated and/or shared roles.

When women and men examined their daily work in the baseline workshops, there was consensus that women worked longer hours in a typical day than men, taking into account farming, housework and care responsibilities.

Mothers work harder in the gardens these days than most men. Of course there are men who work in the garden, but overall, more women do gardening work. Men depend on cash crops such as coffee, they get rich overnight, stop working to enjoy themselves when they receive their money but most women do not stop working, they work hard every day of the year. (F WH)

In the baseline surveys, women attributed ground preparation as the main agricultural contribution of men, but they also reported a range of tasks that were completed together, such as seed propagation, planting and harvesting (see Table 5).

Table 5: Women's account of agricultural labour contributions by gender and % (baseline)²

Task	Female	Male	Female with other family members	Male and female together
Buys seed	49	9.4	10	22
Seed propagation	56	8.3	7.9	20
Ground preparation	19	18	18	36
Planting	35	3	19	40
Pest control	46	13	12	20
Harvesting	48	0.3	22	25
Post-harvest	43	4	26	30

The majority of household and caring work was conducted by women; however, some men and women reported working together in these tasks (see Table 6). The responsibility for household roles placed significant demands on women's time and constrained their capacity for increasing their agricultural productivity and other livelihood activities.

² The total baseline sample was 329 women across six villages. 'Other' categories included mother, father, son, daughter and other adults. These accounted for the remaining smaller proportions. Numbers are percent.

Table 6: Women's account of family labour contributions by gender and % (baseline)

Task	Female	Male	Female with other family members	Male & female together
Gathers wood	24	16	33	18
Collects water	38	0.6	42.5	12.4
Cares for children	51	0.3	13	29
Cares for elderly	51	1	15	26
Does the cooking	52	0.3	32	12
Washes up/gets drinks	53	0.4	28	10

At the end of the project, women and men reported that adopting a Family Teams approach to their farming and family had enabled greater sharing of roles and changed workloads for men and women. Families also reported engaging their youth in more farm activities, which had spread the workload and encouraged youth to see themselves as part of the farm future. Men and women explained that planning the weekly tasks together as a family was more efficient and led to greater production.

The challenge is your timing... get the timing right and discipline yourself and have your daily priorities set... is it your farm that feeds you or your wantoks... dance to the music that you play—that's the secret of it... it is all about the management—that's what's important to me. (M ENB)

Roles that men had become increasingly involved in included crop maintenance, post-harvest management and marketing. Some men reported that they now saw the value of helping with family roles, such as cooking and childcare. As men changed their engagement with the family, women reported wider community impact.

Now a good change has come to our ways of doing things: people are busy to look after their gardens, families, hospitals and schools; men have given up their drinking beer, they have stopped beating their wives, sitting idle, and playing cards (F WH).

A number of the women found that their days were now more interesting and rewarding.

Now I want to work instead of sitting around; I time my day in 2-hour blocks and it is really enjoyable. (F ENB)

A number of women reported that their relationship with their husband was more peaceful and that there was a wider benefit for their young people.

In the past I used to get upset and angry with my husband because he never bothered helping me in my flower garden or plant our vegetables in the garden. But today he is happily helping me with my projects and he even planted his own vegetable garden. That has been good for the whole family because it has supported us for a few years and our children have realised their father's contribution to our family (F ENB).

Agricultural labour

The women and families were in transition from semi-subsistence farming practices to more planned and income-oriented ways of farming. However, in all areas women had little knowledge of basic agricultural challenges such as pest management, soil enrichment, enhanced production techniques or marketing. Due to their lack of access to agricultural extension, the women recognised the areas in which they needed guidance, but had not considered ways to gain this knowledge. Only 14% of women who completed the baseline survey across all regions had received any agricultural extension training. At the end of the project women were able to identify very targeted agricultural learning

needs which included sourcing new markets, understanding supply chains, managing credit and loans, and accessing wider ways to increase family income.

Despite the lack of training prior to the project, the women did experiment through 'trial and error' and observing their neighbours' practices. The WH women described this as being 'photocopy people' and in ENB 'copycat' or 'cut-and-paste' people. At the end-line, women reported that seeing the project's farming family 'role models' in their own community was one of the most effective ways to improve their knowledge and practices.

We will not give up, when things go wrong. Life may seem hard but we will continue to work. This ACIAR project is helping us to see how we can improve our practices and lives. Not everyone will change their practices but at least some can do it and they will be the example for others to follow. (F ENB)

At baseline, most of the WH families used the traditional form of mixed cropping/planting in which a range of crops were sequentially planted in the same plot to ensure a regular harvest for consumption. Most could not afford to purchase fertiliser. Although some families were able to produce excess, this semi-subsistence practice did not enable specific care of plant varieties or produce a harvest that was large enough for sale. At end-line, farmers reported the change to single crop plots as one of the most significant learnings. Many non-project farmers had also adopted the practice.

NARI taught us new gardening techniques, and we liked the idea and I will definitely try it out. One of the lady participants has tried this new technique by planting only peanut on a bed and informed us that the yield was really high. We are all excited and most ladies are doing that now. (F WH).

In ENB, cocoa plots had been the major agricultural income earner until the cocoa pod borer created problems. Food crops received little attention, as families had been able to harvest cocoa when money was needed (cocoa was known as 'the bank'). Women reported that when they had to increase food crop production after the cocoa pod borer problems began, they struggled with the labour intensity in comparison to that involved with cocoa. In the first year of the project, the Productive Partnerships in Agriculture Project (PPAP)³ cocoa redevelopment project was introduced in the ENB sites. This has enabled families to gain technical knowledge and cocoa clones, and, importantly, to apply the Family Teams approach to their new agricultural practices. This will present an opportunity for longer term comparison with villages that received PPAP training but had not been introduced to the Family Teams approach.

Food security

Although the wantok system ensures that no-one actually starves, food security was an issue in a number of areas. In the baseline study many people reported that they mostly have enough food, but a considerable proportion reported that they only sometimes had enough food (55% in CP, 34% in ENB %, 4% in WH).

It became apparent that nutritional security was also an issue for farming families. For those in CP and ENB who had easier access to store-bought food, women reported depending on white rice and flour as the meal staple rather than the traditional and healthier staple of sweet potato or taro. When farming incomes were adequate, tinned meat and fish provided a valuable protein supplement. Through workshops that introduced Dame Carol Kidu's concept of FAITH gardens (Food Always In The Home), women readily took up the need to plan to grow a range of food for family food and

³ <http://www.worldbank.org/en/results/2014/12/02/papua-new-guinea-productive-partnerships-in-agriculture-project>

nutritional security. Further education on family nutrition and food security was identified as a need across all areas.

7.1.6 Political capital

At the baseline, women's engagement in community organisations was limited to conventional roles through the church (for example, women's fellowship and prayer groups, youth groups and Sunday school) and in addition, in ENB, the East New Britain Women and Youth in Agriculture Cooperative Society. A small number of women did engage through school committees, and opportunities existed for women with higher levels of education to contribute to government, non-government and provincial church organisations.

Through the project, women were able to take up and develop leadership roles within the project that built capacity, skills and knowledge that was recognised as valuable by both farming communities and the local organisations within which they worked in a paid or voluntary capacity. Women talked about how the skills they had developed through the project had increased their status in their families and within the broader community. A number became recognised for their leadership capacity through leading teams of VCEs.

Women project leaders in WH were recognised as community agricultural leaders through the ceremonial gifting of pigs. For these women, local-level government committees could be a further avenue for political engagement. However, most women did not aspire to this level of civic engagement, partly because of their commitment to their family and farming community and partly due to their low education levels. Even men who were supportive of their wife's engagement in church or school work saw these organisations as the main avenues for their further contributions.

7.1.7 Capitals analysis conclusion

As rural PNG is increasingly moving towards a cash economy, particular through commodity crops such as coffee or cocoa, the role of women as food producers for family consumption and for income has become increasingly important. In all three areas, women faced many similar challenges as smallholder farmers. Equally, the women across all three areas drew on many assets and showed strength, resilience and commitment to their families and farms.

The contextual analysis showed that, although women carried a greater burden of work, sustainable livelihoods of agricultural families are dependent upon the contributions of all family members. From the start of the project, there was evidence of changing beliefs and practices in relation to gender roles and women's positions within the family. There was growing recognition of the potential of women's economic contribution to the family. As PNG continues to undergo economic, agricultural and social change, the gendered identities of men and women in PNG are in transition. Many have begun to explore new ways of being and working together in families and in their roles as men and women within the community and family.

From this contextual base the Family Teams approach was developed as a process to support farming families to work towards a more equitable and effective distribution of agricultural and household work and to increase the role of women as decision-makers within the family.

7.2 A training model to develop equitable and effective agricultural family livelihoods

The model was developed over a two-year period using participatory action research cycles. Experiential and place-based processes and activities were trialled and further developed in the three project sites. The four features of the model are:

- a peer education approach to agricultural extension
- three Family Teams modules
- education resources for learners with low literacy, and
- a complementary brokered training program.

7.2.1 Peer education

To date, PNG farmer education has typically relied on a top-down 'train the trainer' (ToT) approach, where trainers are given technical information that they then disseminate to other farmers. In this model, trainers are provided with manuals and training materials to deliver a set package of information to farmers. In contrast, this project focused on participatory agricultural extension and moved beyond knowledge transfer to collaborative problem-solving. This approach links the outside scientists with local farmers who collaboratively share their different knowledges in order to develop the best solutions to local problems (Pamphilon, 2016).

A peer education approach was core to the process. Selected men and women farmers were invited to participate in the Family Teams program as VCEs. The process was:

- VCEs were introduced to the theory and practice of facilitating adult learning. This was based on the experiential learning cycle and the knowledge, skills and attitude development components of training courses.
- VCEs then participated in each of the Family Teams modules (facilitated by the UC team). The VCEs adapted the activities to integrate their own knowledge and to suit their local community.
- VCEs first used the Family Teams activities in their own family, then rolled out the training to other smallholder families through farmer-to-farmer or group peer education.
- VCEs were offered the first places in the brokered training program (see below). In this way, the VCEs' families become the first beneficiaries of the collaborative training and became role models in their communities.

The ways in which the VCEs conducted the rollout training varied. Those with low literacy typically extended the learning to family members or neighbours only, whilst those with higher levels of education and literacy ran the modules in church settings for larger numbers.

I have made awareness to other women and have been sharing my life and experiences with them and I believe others will catch this vision and do what I am doing for my family. (F WHP)

For many VCEs the peer education approach suited the practicalities and demands of their own lives as farmers. All VCEs had limited time to formally train others, but they could all extend their learning to those around them.

My family is doing well in practising all the valuable lessons we got from the training and in return we are influencing others to follow what we are doing. I see a lot of changes in families in our community right here. (F ENB)

Some VCEs attempted to replicate as closely as possible the training they had received. Other VCEs shared only specific activities or ideas they felt were most important. Whilst there was inconsistency among villages or VCEs in what was disseminated, the advantage was that the information that was considered most important was selected by VCEs. To ensure greater consistency, the Family Teams manual now designates activities as core or optional.

The VCEs were given a set of handouts at the completion of training that they could use as an aide-mémoire for the peer education process. These were not 'how to' guides on conducting the training; rather, they were a guide to the key components of training, each related to the Family Teams modules. Because literacy levels are low, these are now translated into Tok Pisin, which should improve comprehension levels and skill development. These handouts have now been further developed into a manual for use in other agricultural extension settings (Pamphilon, 2017, in press, *The 'Not a Manual' manual*).

VCEs reported satisfaction in learning how to share knowledge and skills with others, gaining confidence in public speaking, learning how to lead groups and developing skills as educators. These led to improved self-esteem. As community educators, women increased their status and respect in their own family and their community. Overall the process encouraged the VCEs to become a 'community of practice' which, for many, will enable them to continue their development through peer and action learning, rather than becoming over-reliant on external material, guidance and direction. Most importantly, their facilitation skills remain in the community now the project has concluded.

Given that the peer education model has been initially effective, further research and development is needed—for example, more direct observation of group training; monitoring and farm observations with selected trained farmers; and refresher workshops on each module. One growing concern is the trend in PNG to demand payment for training. In many African settings, this trend has been reversed by promoting the training as only available to dedicated farmers who show their commitment by paying to attend. This ensures that early adopters are identified and supported, and they then become the community role models. Culturally appropriate responses to this issue in PNG now needs further exploration.

7.2.2 The Family Teams modules

The Family Teams program was designed to enable farming families to explore issues of gender and culture within families, seeking to encourage more effective, sustainable and gender-equitable farming and business practices. The modules were trialled with VCEs and their families and sequentially improved (see Pamphilon & Mikhailovich, 2016).

A key process for the module development was that the UC facilitators always used Australian farming and family examples for each learning activity. They then engaged the VCEs in comparing, contrasting and analysing the same activity based on their own PNG farming experiences. From this, the VCEs then designed the activity with PNG content—for example, gender labour pie charts, family farm plans, seasonal production and marketing calendars and role-plays (dramas). This enhanced the resonance of the activity when it was presented to local farmers.

This empowerment approach places the PNG participants' knowledge of their own farming and families as central. By using Australian examples, the participants see gender dynamics that are common the world over. They can then think through these dynamics as they are played out in PNG families. This allowed the PNG VCEs to teach the UC team about family and farming issues, hence enriching the research findings and affirming the VCEs as experts in their own lives.

Although participant evaluations were important to ascertain what was seen as the most important components, local project leaders were the key development partners. These leaders worked as co-facilitators in the VCE workshops, recommending adaptations and adding local content wherever relevant. Their supportive critique was particularly important in the gender sensitive areas, such as males' excessive spending on themselves and family violence, and in culturally sensitive areas, such as the management of wantok obligations.

Education resources for learners with low literacy

Low literacy rates had been identified as a factor that marginalises women from agricultural extension activities in PNG (Cahn & Liu, 2008). This became a driving factor that prompted the use of participatory visual approaches in training and research. The project operated on the assumption that a range of visual materials designed for low literacy groups would enhance our ability to engage and include those with low literacy in research and development activities.

This led to the development of three place-based, dual-language picture books with agricultural messages for women farmers and their families. The purpose of the books was to disseminate better agricultural and livelihood practices. The VCEs reported changes in family practices related to marketing, budgeting and saving that reflected messages in the books. The books helped the VCEs who had received livelihood and agricultural training to recall and implement the training in addition to sharing their knowledge. Farmers with low literacy were able to understand the messages through the illustrations.

The Maria books are very good because some people never went to school and they can't read but they can see the pictures. Those who can read still like the books because of the pictures. In the past we used pictures, illustrations, do dramas, body language to teach ideas to the community. That's the way of pidgin. (M WH)

Such place-based picture books are a powerful medium for low literacy women farmers and their families to learn about shared farm and family roles. They reinforce positive messages from the Family Teams training and livelihood and agricultural practices.

Women spoke about how the books had changed their thinking.

It helps us revolutionise or change our thinking pattern. Previously we spend carelessly or do not use our time wisely. (F ENB)

More importantly, the VCEs reported that the books had brought about changes in their behaviour.

Our families have used the Maria books by planning how to sell our garden produce and how to manage their income. We had discussions with our families on the importance of money use. (F ENB)

The VCEs further reported that families were growing and marketing more, trying new ventures such as raising chickens and pigs and sewing to increase their incomes, and saving some of their earnings. Similarly, they recounted new family practices that were suggested in the books—for example, pricing their produce and saving for a family goal. The books assisted the VCEs in disseminating the training they had received.

The book reminds us of the training. It speaks louder... It brings more vision for the future because you can see it. At times we forget about what we learnt from the training but the book is with us and reminds us. (F WH)

The VCEs reported how they used the books to share their knowledge with family, neighbours, church members and other members of the community.

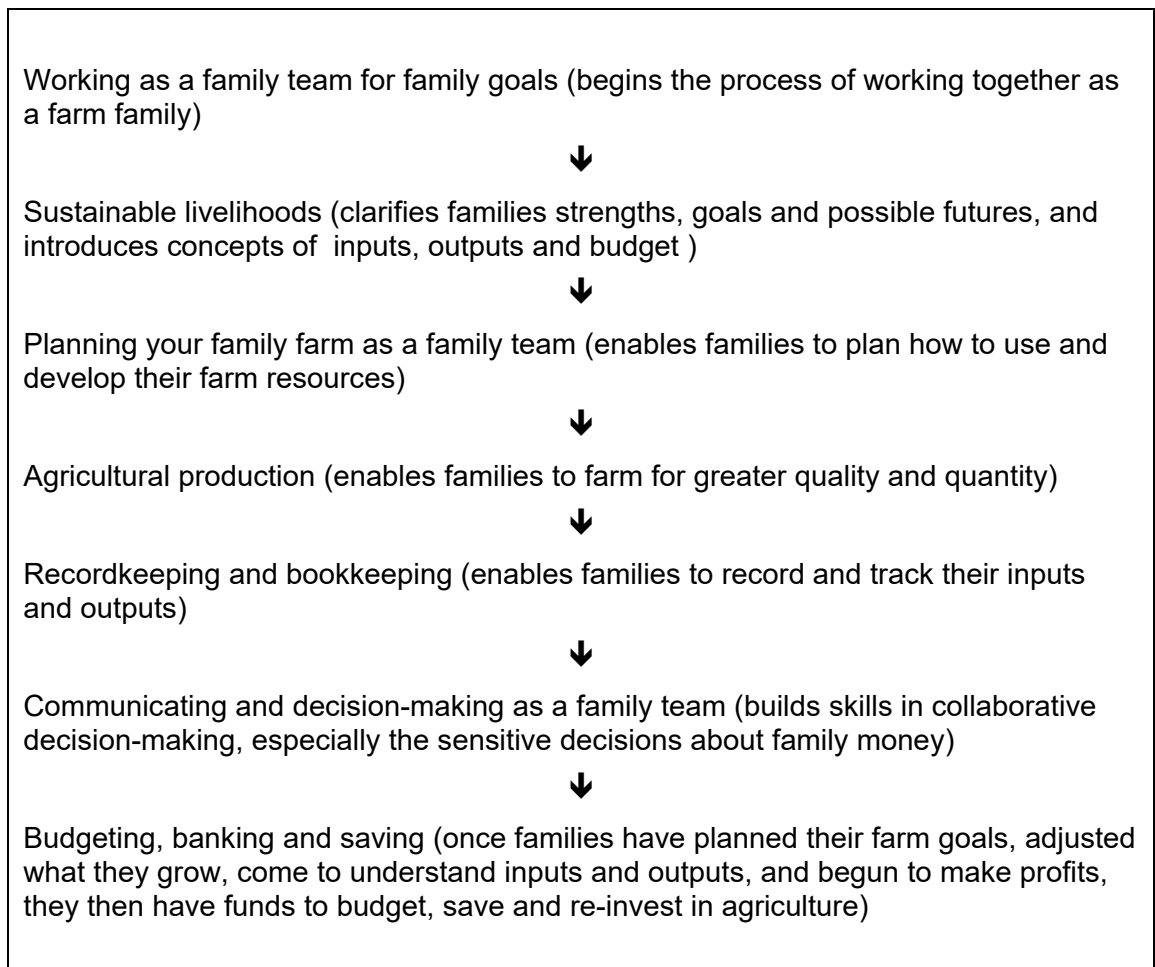
Brokered training

The project's brokered training model brought PNG training agencies to the farmers' own communities. This had accessibility benefits, particularly for women. The training focused on four areas that were essential components of more business-oriented farming:

- agricultural production
- budgeting, banking and saving
- sustainable livelihoods, and
- recordkeeping and bookkeeping.

Training was delivered to the communities to fit around the Family Teams modules and the availability of the training agencies. However, it is now clear that there is an order of delivery that provides the best scaffolding for the learning.

Box 2: Most effective order of delivery for training




7.3 Conclusion

The PNG women smallholders involved in this project were highly committed to improving their family livelihoods through better farming and business practices. They were proud of their traditional farming skills but unaware of their many strengths. Most women accepted the division of labour, family violence and gender inequities as 'natural'. As their lives were focused on the private, domestic sphere, with the exception of the church, they had little knowledge of, and access to, resources outside their family and wantok.

This project explored how to work in a gender-inclusive and empowering way to support these women and their families as together build their livelihoods and agricultural futures.

The findings of the study confirmed the following project logic.



If women, men and youth are supported to look at their roles, strengths and division of family and farm labour, then they will become aware of and able to address the inequalities and inefficiencies.

If a family team identify their family goals together, then all members will understand how their agricultural activities can contribute to these goals.

If family teams are introduced to the concept that their agricultural activities can be a small family farm business, then this will lead to changes in their attitudes, farming and family practices.

If a family farm is planned together by the members of the family team as a small business, then all members of the family can contribute and benefit.

If family teams take a planned approach to production and marketing and use new farming practices that complement their traditional knowledge and skills, then they will be able increase their income.

If family teams use their increased income to re-invest in their family farm business, then they will generate a regular income and be able to meet their agreed family goals.

If family teams meet their short-term family goals through budgeting and savings from improved agricultural practices, then they will have the skills and attitudes to meet longer term goals and become financially resilient.

If women, men and youth change their family and farm practices to work as a family team, then the family will be more equitable, stronger and successful.

8 Impacts

The project achieved many positive impacts for women and their families with outcomes that have the potential to inform agricultural research internationally. This section provides a brief overview of these achievements as well as the anticipated impacts in five years.

8.1 Scientific impacts – now and in 5 years

8.1.1 Family Teams approach to farming

Agricultural and NGO organisations have expressed direct interest in the Family Teams project approach. These organisations have requested training so they can apply the model across the agricultural programs that they deliver within PNG and beyond. Agriculture—International Fund for Agricultural Development, NARI and FPDA; NGOs — CARE, Oxfam and World Vision. Negotiations to conduct the Family Teams training are in progress.

Barbara Pamphilon was invited to attend the first international Forum on Empowerment through Household Methodologies: A Practitioners' Forum held by IFAD, Oxfam and Hivos (IFAD, Rome, 27–30 July 2016) to explore methodological synergies .

In 2016, three of the PNG team leaders (Fredah Wantum, Baptist Union; Kiteni Kurika and Elisabeth Ling, NARI) were subcontracted by Coffey International's Economic and Public Sector Program (EPSP) and Provincial and Local-level Governments Program (PLGP) projects resulting in a reach of 273 farmers: 191 women, 82 men. These organisations will apply the Family Teams model to their future agricultural local development programs.

Five years

It is expected that, once key agencies are trained, wider adoption will occur. Other countries in the Pacific (Fiji, Solomon Islands) have shown interest in adopting the approach, which suggests that regional adoption/adaptation is possible. It will be important to engage PNG provincial departments of primary industry / agriculture and livestock in supporting the wider rollout.

8.1.2 Maria books

A major impact of the project has been from the Maria books published by ACIAR. The Maria books are place-based agricultural learning resources, with content founded on research evidence specific to the region. As such, they have been highly valued by development organisations and schools. Save the Children and Buk Bilong Pikinini purchased 570 copies for use in PNG.

The following agencies have requested support from the project to develop their own research-informed place-based books: University of the South Pacific's education department (Fiji); Chief of Education, Pacific Island Countries, UNICEF (Fiji); Pacific Community (SPC); and the Tonga Institute of Education.

Five years

The development of research-informed place-based picture books for farming families with low literacy is a scientific innovation that has received significant attention. It is a form of agricultural extension that, by starting in primary school and the home, may prove to be an internationally relevant approach to facilitating a lifelong approach to agricultural learning. PNG philanthropic funding for further dissemination are currently being explored.

8.2 Capacity impacts – now and in 5 years

Capacity-building impacts occurred at four levels: farming families, VCEs, local leaders and professional staff development. It is anticipated that as individuals continue to apply their new knowledge and skills, they will consolidate their learning, which will lead to wider impacts over a five-year period.

8.2.1 Farming families capacity-building impacts

The Family Teams training, financial literacy, banking and saving education, and introduction to agricultural planning techniques have enabled participants to begin to improve their agricultural and family business practices. It has also enabled a more gender-equitable approach to farming. The impacts should further develop over the next five years as families continue to move towards farming as a small family business.

Improved farm business acumen

Through the project many women and men began to adopt a more business-like approach to farming. Both women and men reported that seeing their agricultural activities as a family farm business was a significant and empowering shift.

I am no longer worried about what we will eat and what will happen in the future because we are working hard to build a small business for our children and grandchildren to enjoy in the future (F ENB)

This is a crucial step for semi-subsistence farmers that should lead to increasing agricultural and economic impacts across the next five years.

Agricultural practices

The focus of the agricultural training was to help farming families move from semi-subsistence farming to planned production for greater quality and quantity. The majority of farmers involved in the training adopted this approach. Table 7 shows that a high proportion of men and women farmers reported that they had changed their farming approach after training. Much of this change related to a move from a shifting, mixed cropping approach towards a more intensive integrated farming approach that included increasing knowledge of soil, crop, water and pest management.

Table 7: The training changed my ways of farming (by %, gender and region)

	East New Britain		Western Highlands	
	M	F	M	F
Very much	55	58	41	56
Quite a lot	24	24	21	28
A little	3	6	10	10
Not much/Hardly/not at all	0	0	0	0
No answer	18	12	28	6

Note: All tables in this section report data from the farmer survey (ENB n= 31 women and 33 men , WH n= 71 women and 52 men). Key: BT = before training; AT = after training; Diff = differential (green shading). M = male; F = female.

Business practices

Farm goals—In this project, the development of farm goals were identified as an indicator of change in business practice. At baseline the concept of setting agricultural goals was an unfamiliar concept to almost all project participants. As seen in Table 8, the percentage of men and women who reported their family 'always' having farm goals after training

changed considerably. In ENB the differential increase was 34 % for men in 43% for women. In WH there was an increase of 23% for men and 37% for women. Families who 'never' have farm goals decreased (9% for men and 15% for women in ENB and 11% for both men and women in WH).

Table 8: Families with farm goals before and after training (by %, gender and region)

	East New Britain						Western Highlands					
	M BT	M AT	Dif f	F BT	F AT	Dif f	M BT	M AT	Dif f	F BT	F AT	Dif f
Always	12	46	34	6	49	43	9	32	23	14	51	37
Never	9	0	-9	15	0	15	11	0	11	11	0	11
No answer	18	18		12	12		28	28		0	0	

In the VCE end-line survey (n= 43, 23 ENB, 20 WH), 90% of women reported developing farm goals and of these 50% reported having achieved their goals which included planting new crop varieties, using crop rotation, increasing the size of their cash crop, raising chickens and pigs, making new gardens, composting and using manure to improve soil.

Planned crop production—The second indicator of change was that families were planning what they grow for sale. At the commencement of the project women reported selling mostly 'when money was needed' and only a few planned in advance to ensure that the sale of produce would provide funds when needed. Selling was best described as opportunistic.

After the training the percentage of men and women who reported their family 'always' plans what to grow for sale increased: 34% for men and 49% for women in ENB and; 21% for men and 29% for women in WH. The percentage of respondents reporting that their family 'never' plans what to grow decreased: 9% men and 12% for women in ENB and 8 men and 24 % women in WH.

Table 9: Families who plan what to grow for sale before and after training (by %, gender and region)

	East New Britain						Western Highlands					
	M BT	M AT	Dif f	F BT	F AT	Dif f	M BT	M AT	Dif f	F BT	F AT	Dif f
Always	18	52	34	12	61	49	14	35	21	13	42	29
Never	9	0	-9	12	0	-12	8	0	-8	24	0	-24
No answer	18	18		12	12		28	28		0	0	

In both Table 8 and 9 there is a variation between the responses of men and women, with men showing slightly lower percentage increases in their approach to farm planning and goal setting. However, as women do the majority of labour for food crops, the process of shared planning may enable women to negotiate more equitable and effective seasonal practices and marketing plans for the family.

Overall there are strong indicators that the capacity building activities have enabled farming families to begin to develop a more business-like approach to their farming activities.

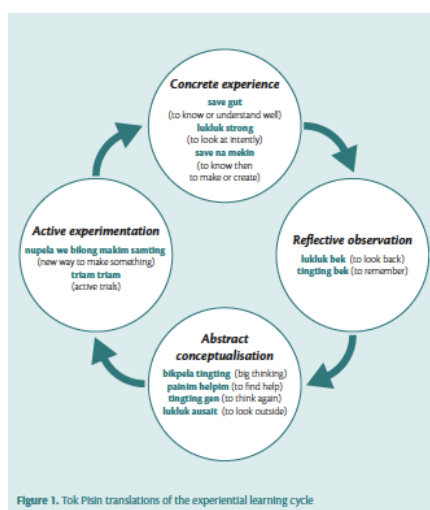
8.2.2 VCEs capacity-building impacts

Peer education—A strong indicator of the capacity of the trained VCEs was their ability to train/share their knowledge with other farmers. The VCE peer education reached 1,432 farmers (816 women, 616 men).

Whilst some VCEs were only confident to work as support trainers, equally a number stood out as advanced trainers and were invited to a Master Class to further their development (WH, 8 women, 3 men; ENB, 8 women, 5 men). These VCEs now form a beginning nucleus of a national network of Family Farm Team community educators.

Understanding of adult learning—An indicator of the VCEs' theoretical understanding of adult learning was the ability of the VCE groups to apply Tok Pisin words to the experiential learning cycle. This activity was done at the end of the first training module and reviewed in the final evaluation.

Figure 1: Tok Pisin translations of the experiential learning cycle



As can be seen in Table 10, in the groupwork in ENB and WH, VCEs of both areas agreed on the key characteristics of an effective peer educator. The box shows the Kwinkya VCEs summary of the key peer learning strategies. This directly aligned with the academic literature on this topic.

Table 10: Summaries of VCE key characteristics and activities

VCE characteristics in rank order
Role model
Communicates well
Has a good attitude/mindset
Plans their training
Shows commitment
Understands training theory and processes
Builds good relationships
Uses drama (role-play)

- **Drama**—because they will see and learn easy because [it is] good to remember
- **Pictures**—because [it is] easy to remember, see and follow, picture makes ideas clear
- **Story**—about others because [it] keeps in [your] mind
- **Demonstration**—NARI garden, because [it] helps to remember, [people] hear and ask 'Why not me?'

Summary

- Activities people see and do [they] remember
- Too much talking and people forget!

8.2.3 Local leaders capacity-building impacts

The following achievements of the project's leaders highlight the success of the capacity development activities. All project leaders developed skills in leading VCE groups, and monitoring, evaluating and reporting on training. Although written reporting continues to be a challenge, verbal reporting was of a higher standard.

- Fredah Wantum was awarded the John Dillon Memorial Fellowship (2015). She was invited and funded to present at the Australian Women in Agriculture national conference in 2016. Fredah is standing for parliament in Telefomin in 2017.
- Four VCE women leaders were selected to be trained as Nationwide MicroBank agents: Kay Simon, Lessie Pyare, Susan Trapu and Lyn Jacob (WH).
- Kiteni Kurika, Lalen Simeon, Elisabeth Medline Ling and Fredah Wantum have been invited to be on the Pacific Women Shaping Pacific Development monitoring and evaluation register.

8.2.4 Professional staff development.

Research processes—Two-way capacity building was an important facet of the project for both PNG and Australian team members.

- The collaborative development of the ethics process and of culturally appropriate research tools (PNG, Norah Omot, Lalen Simeon; UC, Katja Mikhailovich, Barbara Pamphilon).
- The participatory research process development, including monitoring and evaluation (PNG, Lalen Simeon, Fredah Wantum, Kiteni Kurika, Elisabeth Ling; UC, Katja Mikhailovich, Barbara Pamphilon).
- Data analysis (PNG, Lalen Simeon; UC, Katja Mikhailovich, Barbara Pamphilon).

Lalen Simeon spent two weeks in Canberra to further develop ethnographic research skills. She is now teaching these skills to other PAU staff and students. She was mentored as a co-author of two publications (Mikhailovich, Pamphilon, Chambers, Simeon, & Zapata, 2016; Pamphilon, Mikhailovich, Simeon, & Chambers, 2013). These publications were a significant component of Dr Simeon's 2016 promotion to Associate Professor.

Visual and art-based research methods were introduced to PAU, Baptist Union and NARI staff, and to local community leaders. Staff have reported the relevance of these methods at a community level.

Video production — Lalen Simeon (in collaboration with Kiteni Kurika and Elisabeth Ling, NARI) led the design, scripting and production of three PNG-produced digital videos that focus on the key messages of the Family Teams program. The quality and content of these videos illustrate the uptake and ownership of the project's key messages from a PNG perspective (see publication list for links).

Maria books — Teachers (96 women, 9 men) and VCEs (29 women, 14 men) were trained in the use of the Maria books in schools and with farming families with low literacy. This enabled the books to have greater impact than if they had been simply given out. The evaluation revealed that the teachers so valued the books they were not willing to send them home. The VCEs reported that the books made a significant difference to the uptake of the key agricultural messages. Changes based on the books were reported in all sites (see Simoncini, Pamphilon, & Mikhailovich, 2016). As a result of this work, Kym Simoncini was invited to run a two-day workshop in 2015 for 100 upgrading teachers at PAU.

8.3 Community impacts – now and in 5 years

There is evidence of emerging community impacts from the project, which would be expected to continue to build over the next five years

8.3.1 Introduction of community banking services

As a result of the training on banking and saving, bank agents have been set up by Nationwide MicroBank in Kumbareta, Kwinkya (WH) and Hisiu (CP). These were the first community-based banking services in each of these areas, making banking more accessible for women. Over the next five years, it is expected that this will enable women to develop saving skills and, for some, to move to loans to develop their farm businesses.

8.3.2 Demonstration farms

In Kwinkya (WH) there are now small demonstration plots at the Women's Resource Centre, which can be accessed by the wider community. In collaboration with the PPAP project, in Vunapalading (ENB) the VCEs are sharing their knowledge of cocoa nursery design with the wider community through demonstration nurseries.

8.3.3 Increased number of local markets

As the women increased their marketing frequency, the number of informal roadside markets across the week increased. This enables women to sell close to their home and provides a more frequent supply of fresh vegetables to the community.

In our village women's business group has been formed, which has brought a big change into our village. Before women used to plant the crop only for their own families but now grow and sell it at the market (F WH).

There are now informal markets at local schools in ENB and WH. In both settings, women are becoming more entrepreneurial by selling cooked and fresh food. This is a step forward for communities that were semi-subsistence opportunistic marketers.

8.3.4 Community-based peer educators

The VCEs provide a potentially valuable resource for the community, as many now have the confidence to deliver training to their peers. Some have already increased their activities in their church programs. Others are looking for funding to further their rollout of the Family Teams program to neighbouring communities.

8.4 Economic impacts

8.4.1 Improved family livelihoods

Families have generated more income and assets as they have taken on a more business-like approach to their agricultural activities. This is a crucial step for semi-subsistence farmers which should lead to increasing agricultural and economic impacts across the next five years. The following indicators of assets and income changes are proxy indicators for improved family livelihoods within the project.

Increased crop production and sales— Increased food production was reported by women VCEs at end-line (45% ENB and 95% in WH). In addition, 46% of women across both regions reported selling more often after the training. Prior to the training, most families sold at the same place and went to the market only when they needed money. In WH, women began to sell at the roadside as well as going to the weekly market. In ENB, women planned when to sell at the local market and when it was worthwhile to travel to the major market. Table 11 indicates that the training had an impact on selling practice.

Table 11: The training has changed how I sell (by %, gender and region)

	East New Britain		Western Highlands	
	Men	Women	Men	Women
Very much	43	40	41	51
Quite a lot	27	30	17	24
A little	9	15	7	20
Not much	3	3	7	0
Hardly/not at all	0	0	0	0
No answer	18	12	28	5

New income sources— Diversified income sources are important for family resilience and increasing income. In WH, families have diversified into new crops such as watermelon, pineapple, cabbage and new varieties of sweet potato. They reported that food crops provides them with a more regular income across the year in comparison to the once-a-year income from coffee. This in turn enabled them to have funds to re-invest in agriculture, and to budget and save. Many have begun to develop new income sources.

To help me change my life, I will plant garden food and sell, (starting with water melon and pineapple... I will start sewing Meri blouses and will try to get my friends to sell them for me or maybe sell the clothes at my house instead of sitting at the market. If I have to make another nursery, I will use capsicum seeds for nursery ... Carrot is easy because you can plant it directly in the soil and that is what I will be planting as well.
(F WH)

In ENB, families were heavily involved in cocoa regeneration but now see food crops as an essential adjunct for income security. Families in all regions were diversifying into livestock (pigs, chickens and ducks). Some women had begun entrepreneurial activities such as selling cooked food, catering and floriculture. A number of women's aspirations have changed.

I am dreaming of the day we will sell our produce to a hotel or a company to save us spending a lot of time sitting at the market. At the moment it takes a lot of effort and time to travel to the market on PMV then sit there all day and if everything is sold then I am lucky but if most stuff is not sold then I have to return the next day (F ENB).

Increased family income— Due to the very low financial literacy and absence of record-keeping in all areas, the base-line data on income was not reliable. Therefore quantitative data on income changes cannot be reported. However, through interviews, workshop activities and surveys, male and female farmers and VCEs reported that they had increased their income primarily from improved farming and selling practices. The following comment illustrates how having access to your own money can be empowering for a woman.

In the past I never carried money with me in my handbag but today, I always have some money in my handbag which makes me feel good...I am happy with my life and the money I get each day. When I manage to sell everything I prepare, I always feel so good and I can't stop working (F ENB).

In the end-line VCE survey 95% of women indicated that the training had helped to increase their income. This was attributed to learning to save and budget, diversifying income, working together as a family team and learning more about managing crops and selling.

Income for daily living costs— Through the farmer survey, a number of families reported they are now able to pay for their daily living costs from their farm income. As can be seen in Table 12, the percentage of families who now 'always' have enough money to pay for daily living costs had increased (ENB– men 31%, women 34%: WH– men 17%, women 20%), whilst those who 'never' have enough had decreased in both regions. The percentage increase in the WH was smaller than in ENB, possibly attributable to less opportunities for diverse income streams in WH.

Table 12: Ability to earn enough money from farming to pay for daily living costs (by %, gender and region)

	East New Britain						Western Highlands					
	M BT	M AT	Dif f	F BT	F AT	Dif f	M BT	M AT	Dif f	F BT	F AT	Dif f
Always	9	40	31	12	46	34	8	25	17	14	34	20
Never	3	0	-3	9	0	-9	14	0	-14	6	0	-6
No answer	18	21		12	12		31	30		0	0	

Income for major family items— The ability to purchase major family items indicates the capacity not just to earn more money but also to budget and save.

The percentage of families that report that they now have enough money to buy major items increased by 24% for men and 43% for women in ENB and by 13% for men and 16% for women in WH (Table 13).

Table 13: Families who save enough money for major family items (by %, gender and region)

	East New Britain						Western Highlands					
	M BT	M AT	Diff	F BT	F AT	Diff	M BT	M AT	Diff	F BT	F AT	Diff
Always	9	33	24	6	49	43	7	20	13	16	32	16
Never	6	0	-6	9	0	-9	9	0	-9	8	0	-8
No answer	15	15		12	12		28	28		0	0	

Major items included permanent houses, cook-houses, agricultural equipment and supplies, home furnishings and school fees.

We can now earn good money by selling products at the market which then has enabled us to build permanent houses with water tanks and other facilities I (M WH).

Respondents reported that their status in the community was enhanced when others saw the success of their improved agriculture and financial management.

Commitment to budgeting and saving—At the completion of the project, the majority of training participants reported that they were now budgeting and saving effectively.

All families in Kwinkya are improving their ways of living, because we have learnt to draw up our budgets. We do earn money but we always used it and gave it away freely to family members or friends. In 10 to 20 years time our lives will change for the better, we will have money in the bank because we have learnt new farming ideas and family life values. We are changing slowly now and the change is obvious. (M WH)

Table 14 shows that a high proportion of men and women farmers trained by VCEs reported that the training had changed their practices in budgeting and saving (49% men

and women in ENB and 41% of men and 49% of women in WH). However, not all of the savings were necessarily at a bank.

Table 14: The training has changed my budgeting and saving (by %, gender and region)

	East New Britain		Western Highlands	
	Men	Women	Men	Women
Very much	49	49	41	48
Quite a lot	21	33	14	21
A little	9	3	13	21
Not much	0	3	4	4
Hardly at all	3	0	0	0
Not at all	0	0	0	0
No answer	18	12	28	6

Although almost all women who completed the financial literacy and banking training opened bank accounts, it will be important to monitor if and how these accounts are used.

Ninety five per cent of the women who completed the end-line survey reported that they had set financial goals such as opening savings accounts for family members, saving for emergencies or saving for a generator. Of these 32% had achieved these goals and a further 30% reported partially achieving their goals.

8.4.2 Family futures

One of the most meaningful indicators for the future wellbeing of agricultural families is a positive sense of the future. As can be seen in Table 15, a high proportion of men and women now have new hopes for their families future. Women had a higher response rate to this question than men possibly indicating their positive response to the project.

Table 15: The training gave me new hope for my family future (by %, gender and region)

	East New Britain		Western Highlands	
	Men	Women	Men	Women
Very much	52	67	54	69
Quite a lot	33	21	15	11
A little	0	0	0	13
Not much	0	0	3	1
Hardly/not at all	0	0	0	0
No answer	15	12	28	6

In articulating these hopes many focused on providing education for their children, improving their housing, building their business, purchasing a vehicle or sewing machine, becoming a role model and changing their village for better. Participants positive sense of the future was overwhelmingly heard throughout the evaluation interviews.

I never held or earned K600 [before] in my life, I believe my future will be bright; I will be somebody in the future within my community. I want people to look up to me. I will have money in my savings. I cannot stop and will not stop working and planning things for my family. I am interested in other things, chicken, etc. I am starting with garden and will move on to other things when I have enough money. Right now I do not have enough money but I have seen that it is easy to get money

and I am thankful for all the trainings that were conducted, it has changed my life.(F ENB).

I no longer sit around and do nothing as I use to do before. I do not just waste money, I plan and do things ...the importance of gardening we never realised before is now very important to us. After the different trainings I attended, I come home shared the ideas and we are now making more gardens and happily planning our family lives together. My children, have realised our work and are interested to join and they comment that their father and I are very good friends (F WH).

8.5 Social impacts

8.5.1 Gender equity

Division of labour— this is a strong indicator of gender equity. A range of evidence showed that at the end of the project men and women were working together more often and in different ways that involved the whole family, especially children and youth, in agricultural and income earning activities.

Some men have begun to contribute to domestic labour

I can see a great difference in the responsibilities. Now, like men are looking after babies and men now can cook in the villages. Now ladies are coming back and telling me that they can see some changes in their family. Like behaviours, man's behaviours. Women are slowly trying to talk to them: 'you're not going to gamble or [play] cards, like wasting time, telling stories', Behaviours need to be slowly changed (F WH).

However, although many families that adopted a family team approach reported that women were now more respected in the family, women in both areas noted that such change can be slow.

There were stages when the men did not fully understand what was going on, what the program was all about. As the program progressed on, a lot of them saw that there was a change in lifestyle, from the [VCE] team that we have and the life view of the people. So people, men are beginning to feel happy as the burden is being shared among the women and men (F ENB).

Table 16 shows results from the farmer survey in which a high percentage of farmers reported that the workload for men and women after training was similar (49% men and 52% women in ENB; 32% men, 54% women in WH). The difference between male and female responses in ENB is minimal whereas fewer men in the WH perceived that the workloads were similar.

Table 16: Workloads of women before and after training (by %, gender and region)

	Before training Women have a greater workload than men				After training Men and women have similar workloads			
	East New Britain		Western Highlands		East New Britain		Western Highlands	
	M	F	M	F	M	F	M	F
Always	18	31	34	56	49	52	32	54
No answer	15		34	6	15	12	30	

Family decision-making —women's involvement in financial decisions indicates a move towards more equitable family gender dynamics. This has the potential for women to gain more access to productive assets which are then typically used for farm and family needs.

Table 17 shows that men and women who reported that decisions about money are 'always' shared by men and women has increased (ENB men 34%, women 43%; WH men 11%, women 31%).

Table 17: Shared family money decisions before and after training (by %, gender and region)

	East New Britain						Western Highlands					
	M BT	M AT	Diff	F BT	F AT	Diff	M BT	M AT	Diff	F BT	F AT	Diff
Always	15	49	34	9	52	43	21	32	11	16	47	31
Never	12	3	-9	25	0	-25	10	0	-10	28	0	-28
No answer	15	15		12	12		29	28		1	1	

8.5.2 Working as a family team

The major underpinning message of the project was that, for success in farming and family life, all family members need to work together as a family team.

In the past our family never talked together. My husband never discussed plans or worked with me, I did things on my own. After the training, my family sits together and discusses our goals, my husband and the children work with me and we always plan together. My husband and I work together as best friends and I am so happy. (F WH)

A high proportion of men and women reported that they now worked as a family team: an increase of 31% for men and 40% for women in ENB and 21% for men and 36% for women in WH (Table 18). Families reported that as they achieved family goals, the family was strengthened and they became even more committed to work as a family team.

Table 18: Families working as a family team before and after training (by %, gender and region)

	East New Britain						Western Highlands					
	M BT	M AT	Diff	F BT	F AT	Diff	M BT	M AT	Diff	F BT	F AT	Diff
Always	15	46	31	15	55	40	23	44	21	13	49	36
Never	15	0	-15	12	0	-12	6	0	-6	6	0	-6
Total	15	15		12	12		28	28		0	0	

8.6 Environmental impacts

Leaders reported that farmers are now more aware of the safe use of chemicals and the place of plant-derived pesticides. Given the land pressures in all areas, there is a greater awareness of natural asset management of the existing land.

8.7 Communication and dissemination activities

Communication with multiple stakeholders has been ongoing across the life of the project. This has led to wider awareness of the project and enabled the development of mutually beneficial links to PNG agencies and other ACIAR projects (see Appendix 3 details).

- Project website
- Project Facebook page
- Project videos (5)
- Project conference
- Conference presentations (7)
- Major stakeholders (8)

- ACIAR projects (9)

9 Conclusions and recommendations

9.1 Conclusions

9.1.1 Capacity building for women farmers and their families

This project demonstrated the need for two parallel processes to support women and their families in their transition from semi-subsistence farming to equitable and effective business-oriented farming: family building and farm building. Although there is considerable knowledge and skill development in both, the change begins as soon as families re-orient their attitudes/mindsets. Capacity development of farming families can be enhanced through the education and development activities that present the following key principles to farmers themselves and to support agencies working with them.

Farm building: from gardens/plots to a family farm business

- The sum of all agricultural activities makes a farm.
- Farms are the major income generators for a rural family.
- Some diversification of income activities ensures greater resilience.
- All members of a farming family can and should equitably contribute to the income generation activities and benefit from them.
- Youth will see a farming future if they have meaningful roles and rewards in their family farm business.
- Agricultural activities need to be analysed then collaboratively planned to create a future farm plan.
- A family farm plan should be developed by all members of a family to ensure shared contributions and the maximisation of skills and strengths. This is the first step towards a family farm business.
- Training will help families move from mixed to individual crop production in order to produce the volume and quality required by the market.
- Annual seasonal production and marketing plans for selected crops will enable a family farm to produce income across the whole year, as well as generate savings for large items.
- A budget and savings plan enables families to re-invest in agriculture for greater returns, as well as proactively manage cultural and community obligations.

Family building: from separate spheres to family teams

- All family members have skills, talents and aspirations that together comprise the family's human resources, now and for the future.
- The male family head (husband, father, grandfather) will be a more effective family leader if he works with his female family head (wife, daughter, widow) to build a family team.
- Mapping and analysing family and farm roles and labour hours will make gender inequities visible.
- A strong family team is only possible when gender inequities are addressed. Both men and women need to change.
- Effective communication and shared decision-making in a family lead to the best possible goals and solutions to problems.
- A family team can collaboratively determine their family goals. The farm goals are the vehicles to meet these goals.
- Meeting short-term goals provides immediate reward to all family members.
- Meeting long-term goals provides the family with a sustainable future.
- Christian teachings support the importance of a loving and equal family team.
- Family teams become role models in their community and have increased status.

Technical training

To increase the effectiveness of family farm businesses, four areas of technical training are key. These four areas enable farming families to take the first steps from opportunistic farming to a small business. They are:

- understanding the principles and processes of sustainable livelihoods
- agricultural production and marketing—food crops and commodity crops
- budgeting, banking and saving, and
- recordkeeping and bookkeeping.

Peer education

The project demonstrated the importance of farmer-to-farmer learning, especially for women, who are typically not able to travel to major centres for training.

- VCEs are able to first educate their own family and wantok, then reach out to neighbours either one-to-one or through community organisations.
- VCEs know their community and environment and can integrate new technical knowledge with traditional practices.
- Applying the action learning cycle enables VCEs to be active adult learners who have the skills to problem-solve and adapt.
- VCEs and their families become community role models and have the potential to be key connections for future agricultural extension.
- Becoming a VCE increases the status of a woman in her family and community.
- Active VCEs can become a 'community of practice' and over time may encourage a 'learning community'.

9.2 Recommendations

The processes developed in this project have resulted in strong community engagement and uptake of training by women and their families. The Family Teams approach has proven to be a culturally appropriate way to support the empowerment of women and begin the development of more gender-equitable family practices. The techniques are now at a point where they can be trialled and further developed across diverse areas of PNG and with other types of agricultural commodities.

The research problem now needing investigation is: Are the approaches developed in ASEM/2010/052 likely to be effective across a broader range of commodities, geographies and cultures, and if so how might these approaches be improved, adapted and scaled out?

There are some areas that merit specific attention:

- examining ways to build the capacity of women as agricultural leaders
- investigating ways to connect communities to the private and government sectors
- examining how to further develop the peer education model of agricultural extension for long-term sustainability
- enriching the Family Teams approach to further benefit women and girls
- exploring ways to build the capacity of key government and non-government agricultural and community organisations to adopt family-based gender-inclusive activities as core practices
- trialling ways to further support the learning of farmers with low/no literacy, and
- exploring if and how a Family Teams approach to farm development is relevant for other areas of the Pacific and beyond.

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11 Appendixes

11.1 Appendix 1: Baseline survey

Content only, not formatted for field use

HOUSEHOLD SURVEY WOMEN SMALLHOLDERS IN PNG

Survey completed by [researcher name]

Date:

PART 1: IDENTIFICATION DETAILS

(to be separated from survey once ID number is allocated)

1. Name:	
2. Village	
3. Mobile number	

Project ID number

PART 2: PERSONAL AND HOUSEHOLD INFORMATION

2.1 Age in years	
2.2 Marital status	<input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Divorced/Separated <input type="checkbox"/> Widowed (when).....
2.3 Who is the primary breadwinner (main income earner) in the family?	<input type="checkbox"/> Husband <input type="checkbox"/> Self <input type="checkbox"/> Both husband and self <input type="checkbox"/> Father <input type="checkbox"/> Mother <input type="checkbox"/> Other, specify.....

2.4 How many people live in your household in the following age groups?

	Children under school age	Children of school age	Children who have finished school	Other adults (state age)	Total
Males					
Females					

2.5 How many children attend school?	In school In voc/college/uni Not in school
2.6 What are the reasons for children of school-age not attending school?	<input type="checkbox"/> Working in the garden/home <input type="checkbox"/> Cant' afford <input type="checkbox"/> Too far away <input type="checkbox"/> No transport <input type="checkbox"/> Refused to go <input type="checkbox"/> Pregnant

	<input type="checkbox"/> Other, specify.....
--	---

2.7 Who is mainly responsible for doing the following activities in your family?(self, husband, daughter, son, children, other)

Family Activity	Self	List other
Gathering firewood		
Collecting water		
Caring for children		
Caring for older people		
Washing clothes		
Cooking		
Washing up and making drinks for older adults		
Garden Activity	Self	List other
Buying (e.g. seeds, fertilisers, seedlings)		
Propagating seedlings		
Preparing ground before planting		
Planting		
Pest control		
Weeding		
Irrigating		
Harvesting		
Post-harvest activities (handling, storage, transport)		
Selling Activity	Self	List other
Selling to depot		
Selling to wholesaler		
Selling to supermarket or hotel		
Selling to a cooperative group		
Selling at roadside markets		
Selling at main market		
Exchanging food crops with family/friends		

2.8 Thinking about a typical day last week what **did YOU do** across the day? (prompts: housework, child care, elder care, income earning work done at home, garden work, paid work outside home, selling produce)

Morning	Afternoon	Evening
Get up at		Went to sleep at.....

2.9 Thinking about a typical day last week what did **YOUR Husband** do across the day

Morning	Afternoon	Evening
Get up at		Went to sleep at

2.10 Are you a member of any of the following groups?

Group type	Group name
Church group	
Agricultural group	
Savings group	
Other	

PART 3: FOOD CROP INFORMATION

3.1 How big is your garden?	In metres or acres: <div style="text-align: right;"> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td style="width: 40px; height: 20px;"></td><td style="width: 40px; height: 20px;"></td></tr> <tr><td style="width: 40px; height: 20px;"></td><td style="width: 40px; height: 20px;"></td></tr> </table> </div> OR Football field (colour in area)																											
3.2 How do you get to your garden?	Walk Canoe Truck																											
3.3 How long does this take?																												
3.4 How much of your garden is used for growing food for the family?	<input type="checkbox"/> ¼ <input type="checkbox"/> ½ <input type="checkbox"/> ¾ <input type="checkbox"/> All OR (colour in area) <div style="text-align: right;"> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td style="width: 40px; height: 20px;"></td><td style="width: 40px; height: 20px;"></td></tr> <tr><td style="width: 40px; height: 20px;"></td><td style="width: 40px; height: 20px;"></td></tr> </table> </div>																											
3.5 How much of your garden is used for growing produce to sell?	<input type="checkbox"/> ¼ <input type="checkbox"/> ½ <input type="checkbox"/> ¾ <input type="checkbox"/> All OR (colour in area) <div style="text-align: right;"> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td style="width: 40px; height: 20px;"></td><td style="width: 40px; height: 20px;"></td></tr> <tr><td style="width: 40px; height: 20px;"></td><td style="width: 40px; height: 20px;"></td></tr> </table> </div>																											
3.6 Do you leave any land fallow?	If yes, how much and for how long																											
3.7 Do you lease your land to someone else for food crops?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, how much do you get each week in Kina?																											
3.8 Do you lease land from someone else for growing food crops?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, how much do you pay each week in Kina?																											
3.9 What type of food crops do you grow?	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Food crop</th> <th style="width: 20%;">Mainly for home</th> <th style="width: 20%;">Mainly for sale</th> </tr> </thead> <tbody> <tr><td>1.</td><td></td><td></td></tr> <tr><td>2.</td><td></td><td></td></tr> <tr><td>3.</td><td></td><td></td></tr> <tr><td>4.</td><td></td><td></td></tr> <tr><td>5.</td><td></td><td></td></tr> <tr><td>6.</td><td></td><td></td></tr> <tr><td>7.</td><td></td><td></td></tr> <tr><td>8.</td><td></td><td></td></tr> </tbody> </table>	Food crop	Mainly for home	Mainly for sale	1.			2.			3.			4.			5.			6.			7.			8.		
Food crop	Mainly for home	Mainly for sale																										
1.																												
2.																												
3.																												
4.																												
5.																												
6.																												
7.																												
8.																												
3.10 Do you grow any cash crops? If yes, what																												
3.11 Where do you sell most of your produce? (1) Where do you sometimes sell your produce?(2,3,4)	Please rank <input type="checkbox"/> Roadside <input type="checkbox"/> Selling to people in my village <input type="checkbox"/> Exchanging food crops with family/friends <input type="checkbox"/> Local market <input type="checkbox"/> Main market <input type="checkbox"/> Selling to wholesaler <input type="checkbox"/> Selling to supermarket or hotel <input type="checkbox"/> Selling to a cooperative group <input type="checkbox"/> Other, specify																											

PART 4: INCOME AND EXPENDITURE

4.1 How much would you spend on the following garden costs in a month?	<table border="1"> <tr><td data-bbox="715 264 1078 300">Planting stock/seeds</td><td data-bbox="1078 264 1436 300"></td></tr> <tr><td data-bbox="715 300 1078 336">Fertiliser</td><td data-bbox="1078 300 1436 336"></td></tr> <tr><td data-bbox="715 336 1078 371">Chemicals</td><td data-bbox="1078 336 1436 371"></td></tr> <tr><td data-bbox="715 371 1078 407">Irrigation equipment</td><td data-bbox="1078 371 1436 407"></td></tr> <tr><td data-bbox="715 407 1078 443">Post harvest packaging</td><td data-bbox="1078 407 1436 443"></td></tr> <tr><td data-bbox="715 443 1078 479">Transport</td><td data-bbox="1078 443 1436 479"></td></tr> <tr><td data-bbox="715 479 1078 515">Other</td><td data-bbox="1078 479 1436 515"></td></tr> </table>	Planting stock/seeds		Fertiliser		Chemicals		Irrigation equipment		Post harvest packaging		Transport		Other	
Planting stock/seeds															
Fertiliser															
Chemicals															
Irrigation equipment															
Post harvest packaging															
Transport															
Other															
4.2 What garden tools have you bought in the last year and how much did each cost?															
4.3 What is your best weekly income from the sale of your food crops?	Amount in Kina.....														
4.4 What is your worst weekly income from the sale of your food crops?	Amount in Kina.....														
4.5 What is your usual weekly income from the sale of your food crops?	Amount in Kina.....														
4.6 What other sources of income do you have in your family?	<input type="checkbox"/> Outside employment (paid job/casual labor/ fishing/ forestry) <input type="checkbox"/> Inside house employment (meri dresses/ floriculture/ bilums) <input type="checkbox"/> Selling livestock <input type="checkbox"/> Selling betel nut <input type="checkbox"/> Selling cooked food <input type="checkbox"/> Selling building materials <input type="checkbox"/> Selling firewood <input type="checkbox"/> Other, specify														
4.7 Estimate your total family income for an average month from all sources of income	Amount in Kina..... <input type="checkbox"/> Don't know														
4.8 Last week, did you have any money left over after paying for all expenses?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, how much and what did you do with it?														
4.9 How would you describe your family?	<input type="checkbox"/> Saving Family <input type="checkbox"/> Spending Family <input type="checkbox"/> Other, specify														
4.10 Do you save money?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, <input type="checkbox"/> At a bank <input type="checkbox"/> Savings club <input type="checkbox"/> Keep at home <input type="checkbox"/> Other, specify														

4.11 How often in a month do you give gifts?		Often	Sometimes	Rarely
	Your own family/friends			
	To wantok			
	Other, specify			
4.12 Do you plan with a family budget?	<input type="checkbox"/> No <input type="checkbox"/> Yes If yes, how often do you budget: Yearly Monthly Weekly			
4.13 What are the 4 biggest expenses you have in your family? (e.g. school fees, garden equipment, medical expenses, food, transport, alcohol and cigarettes)	1. _____ 2. _____ 3. _____ 4. _____			
4.14 What other expenses do you sometimes have?				
4.15 If your child was sick today would you have enough money to buy medicine?	<input type="checkbox"/> Yes <input type="checkbox"/> No			

PART 5: SKILLS TRAINING

5.1 Have you had training for any of the following?	Training	Days	Organisers
	Growing crops		
	Soil Improvement		
	Irrigation		
	Pest control		
	Post harvest management		
	Marketing		
	Business		
	Finance		
	Other		
5.2 What was the best training and why?			
5.3 Have you faced any of the following problems in any of the training you have had?	<input type="checkbox"/> Understanding English <input type="checkbox"/> Long distance to travel <input type="checkbox"/> Men as trainers <input type="checkbox"/> No follow up		
5.4 Other problems with training?			
5.5 What kind of skills training would you like in the future? Mark the two you most need?			

PART 6: HEALTH AND EDUCATION

6.1 In the last year is there anyone in your family who has been ill for 3 months or more?	<input type="checkbox"/> No <input type="checkbox"/> Yes, If yes, how many people
--	--

6.2 In the last year have you been ill for 3 months or more?	<input type="checkbox"/> Yes <input type="checkbox"/> No
6.3 I have enough food to feed my family....	Always-----Mostly-----Sometimes-----Not often
6.4 Education Level achieved	<input type="checkbox"/> Elementary (Prep-grade 2) <input type="checkbox"/> Primary (grades 3-8) <input type="checkbox"/> Secondary (Grades 9-12) <input type="checkbox"/> Tertiary (college/ University) <input type="checkbox"/> Vocational <input type="checkbox"/> Other.....
6.5 Can you read?	In English <input type="checkbox"/> Not at all <input type="checkbox"/> A little <input type="checkbox"/> Quite well <input type="checkbox"/> Very well In Tok Pisin <input type="checkbox"/> Not at all <input type="checkbox"/> A little <input type="checkbox"/> Quite well <input type="checkbox"/> Very well
6.6 Can you write?	In English <input type="checkbox"/> Not at all <input type="checkbox"/> A little <input type="checkbox"/> Quite well <input type="checkbox"/> Very Well In Tok Pisin <input type="checkbox"/> Not at all <input type="checkbox"/> A little <input type="checkbox"/> Quite well <input type="checkbox"/> Very well
6.7 How confident are you giving change when you sell something?	<input type="checkbox"/> Not confident <input type="checkbox"/> A little confident <input type="checkbox"/> Very confident

PART 7: GENERAL INFORMATION

7.1 Do you have any future plans for growing and selling your food crops? Please list:	1. 2. 3.
7.2 Do you have any future plans for increasing your family income in other ways? Please list:	1. 2. 3.
7.3 What are your hopes for your family for the future?	In one years time..... In five years time.....
7.4 Is there anything else we should know about you or your family?	

Thank you very much for taking the time to fill in this survey.

11.2 Appendix 2: Evaluation wheel of knowledge

Man / woman

Did you participate in any of the following training? Please tick ✓

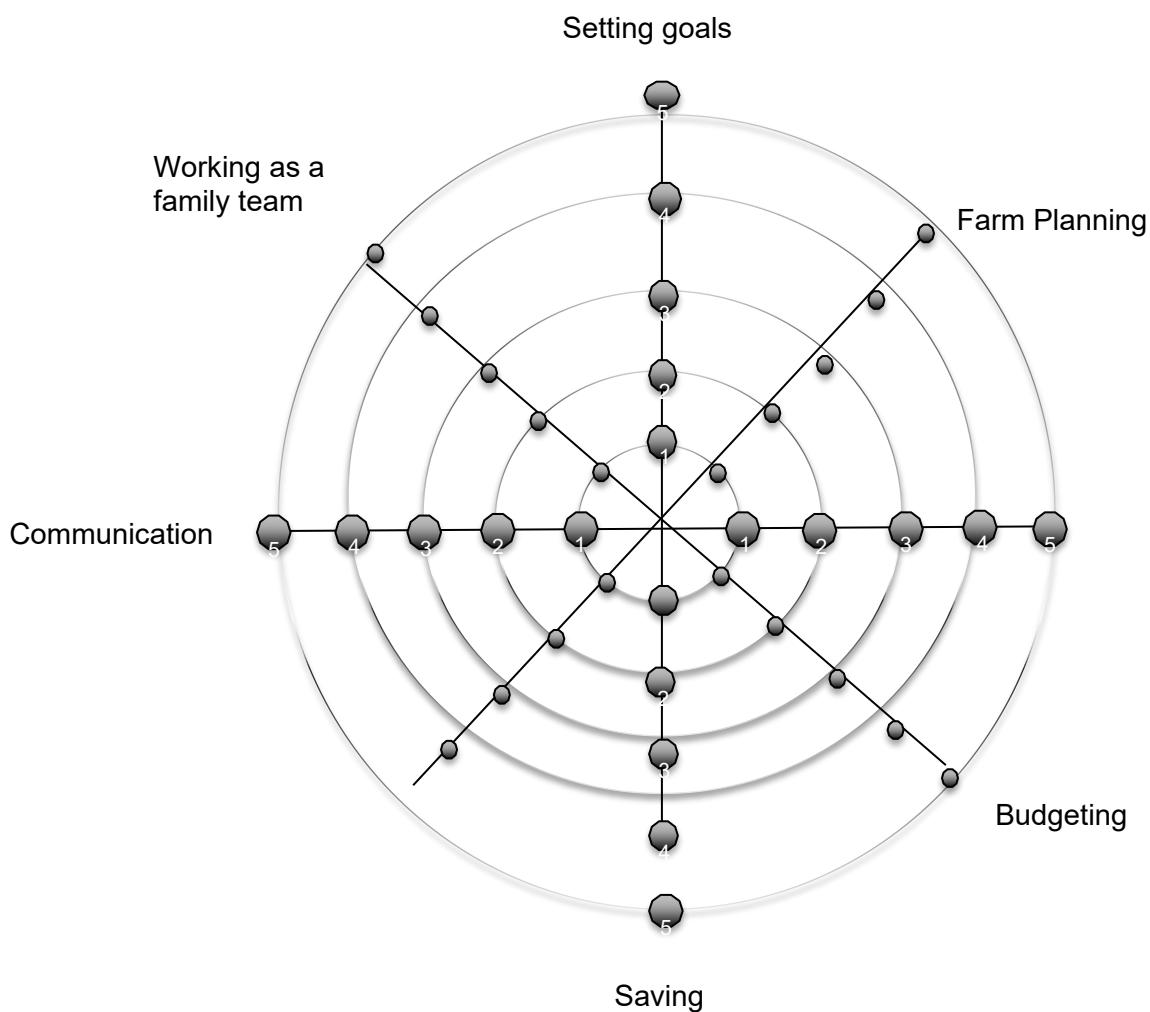
Training	Yes	No
Family Teams		
Banking and saving		
Sustainable livelihoods		
Record- and Bookkeeping		

How much have you learned about each of these topics through the training you have received?

Mark an X on the spot that matches your learning, starting from the middle.

Centre of wheel means no learning and each ring shows an increase in learning.

(1= a little learning, to the outer circle meaning a lot of learning =5).



11.3 Appendix 3: Communication and dissemination activities

Project website

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

Project Facebook page

<https://www.facebook.com/pngwomenfarmers/>

Project videos

The Family Team series (Tok Pisin, with English sub-titles)

Working as a team <https://www.youtube.com/watch?v=3RGQSfFkDxg>

Family communication https://www.youtube.com/watch?v=0oqwa_W5MWg

Saving as a family <https://www.youtube.com/watch?v=zsedoqpdCyo>

The ENB project song— Save a Kina a Day <https://vimeo.com/182946618>

PNG women smallholders—Family teams <https://vimeo.com/158563911>

Project conference

Building PNG by building PNG farming families, Pacific Adventist University, Port Moresby, July 14 -15, 2016

Conference presentations

Simeon, L —Providing appropriate training, tools and support to people in rural societies is the key to changing their livelihoods and standard of living *Pacific Islands University Research Network (PIURN) Second Conference*: National University of Samoa, Apia, 19-21 September, 2016

Wantum, F —The Family Teams project: Examining business acumen in PNG: Working with women smallholders in horticulture, *Australian Women in Agriculture conference 'Women shaping our future: Reflections from the Limestone Plains'*, Australian National University, Canberra, September 9 –11, 2016

Simoncini, K & Manson, E — Bringing together good teaching and agricultural learning in primary schools: A Case Study of a New Professional Development (PD) for PNG teachers. *Vaka Pasifiki Education Conference*, Solomon Islands National University, Honiara, Solomon Islands, 5 & 6 July, 2016

Pamphilon, B— Invited key note address: 'Weaving knowledges: The development of empowering intercultural learning spaces for smallholder farmers in Papua New Guinea' *Korean Association of Multicultural Education International Conference*, Seoul, Korea, May 2, 2015

Simeon, L. & Pamphilon B. —Creating an enabling environment for PNG women smallholders: lessons from three provinces, *Alfred Deakin Institute and Pacific Adventist University Symposium: 'PNG and the World'* September 15, 2014

Simeon, L, Kurika, K, Wantum, F & Pamphilon, B —Two-way learning: key gender lessons from participatory community workshops with smallholders in the Baiyer Valley and Kerevat areas of PNG, *Socioeconomic agricultural research in Papua New Guinea workshop* NARI Lae, June 5–6, 2013

Chambers, B, Pamphilon, B & Mikhailovich, K Enabling the co-construction of meaning: lessons from a PNG/ Australian research and development project , *Australian Council for International Development conference 'Participatory Development'*, Nov 2012

Stakeholder communication

Ongoing communication and exchange networks have been developed:

- CARE (Australia and PNG)
- Integrated Agriculture Training Program, University of Natural Resources and Environment, Vudal, ENB
- World Bank Productive Partnerships in Agriculture Project, ENB
- Fresh Produce Development Agency
- Nationwide Micro-bank gender unit
- Microfinance Expansion Project,
- ANU State, Society and Governance in Melanesia Program
- International Fund for Agricultural Development, gender unit

ACIAR projects

1. ASEM/2008/036 Improving livelihoods of smallholder families through increased productivity of coffee-based farming systems in the highlands of Papua New Guinea
2. ASEM/2014/008 Pilot - A business approach to product and market development for processed sweet potato products in Papua New Guinea
3. FIS/2009/057 Pearl industry development in the western Pacific
4. FST/2010/013 Developing markets and products for the Papua New Guinea canarium nut industry
5. ASEM/2012/072 Strengthening livelihoods for food security amongst cocoa and oil palm farming communities in Papua New Guinea
6. FST/2014/099 Enhancing private sector-led development of the canarium nut industry in PNG
7. HORT/2014/094 Strengthening rural communities through the re-introduction of profitable cocoa production Bougainville
8. HORT/2014/096 Supporting commercial sweet potato production and marketing in the PNG highlands
9. HORT/2014/096 Enterprise-driven transformation of family cocoa production in East Sepik, Madang, New Ireland and Chimbu Provinces of Papua New Guinea