

- Our project conference was held at NARI, Lae in late November – it was a wonderful opportunity to share our lessons with others and to use the time together to identify and analyse the impacts to date. The conference was attended by our Family Farm Team lead trainers and village community educators with representatives from Bougainville, Eastern Highlands, Jiwaka, New Ireland, and the Western Highlands. Agencies included NARI, Fresh Produce Development Agency, Baptist Union, Bougainville Women’s Federation, CARE PNG, Oxfam, Pacific Women Shaping Pacific Development, Pacific Adventist University and the University of Technology.
- Our other final activity was to trial two new delivery models for the Family Farm Team training:
 - **A one-day model**—Working as a family team to plan your farm business. This model has been designed to be used by agricultural supply businesses to help local farmers work towards becoming and equitable and effective small family business. Special thanks to Islands Agri-business (Kavieng) for offering their venue free of charge for this pilot. We will now create a workshop guide for this model
 - **Fishing communities’ model**—this trial was to assess if/how the FFT model could be adapted for coastal communities where fishing is the main income source and where there is little land available for gardens. Nusa Lik, a small island in the Kavieng harbour, was selected as a trial site due to the interest of Nitty Simard, of the ACIAR project, FIS/2014/060 Developing pearl industry-based livelihoods in the western Pacific. This project has developed jewellery making training for local families who have fishing as their only other income source.
- We were able to successfully adapt the activities of Module 1 and 2 and Module 3 and 4 will be conducted in early 2019. From the pilot we will now be able to provide new activities in Module 1 and 2 for communities that do not have the more common mixed farming options
- I would like to advise that as our project is now wrapping up, I will be the only on-going contact Barbara.pamphilon@canberra.edu.au, phone +61 (0)409 023 536
- However, we are thrilled to see that our work will continue in many ways through our wonderful PNG partners. Please feel free to contact them:
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 - Bougainville - Judith Oliver jkoliver2014@gmail.com
 - New Ireland - Lucy Siki Aiya lucysiki.aiya@gmail.com
- I would like to thank the UC staff who contributed so much to the project especially Katja Mikhailovich and Kym Simoncini who have been on both FFT projects and Sanna Harri, Kila Raka, Jo Caffery, Deborah Hill and Pauline Gwatarisa who each contributed significantly to the current project.
- Wishing all our colleagues and friends a blessed Christmas and a rewarding 2019

Factory and sales update

- This year we have demonstrated that supply of nuts is not an issue with 207 tonnes of nut in pulp (NIP) sold to the factory. We have also demonstrated that demand is strong with the 4th repeat order from Port Moresby markets. New challenges have emerged in the developing galip nut industry and the limitations are now the capacity of the factory to process stock. Previously the limits to production were cracking and purchasing enough product. This season has demonstrated that supply is not a problem, nor is the demand with repeat orders coming from all markets and the staff unable to keep up with demand.

- Orders are still strong from the consumer testing work and the NARI staff have struggled to keep up with orders from Port Moresby and Kokopo, with product out of stock in some retail outlets.
- The new mechanical cracker is currently being tested and modified to meet HACCP certification. Trials have achieved a cracking rate of approximately 100kgs per hour with about 50% whole kernel production. There are still issues to resolve and we are in the process of commissioning and installing new components.
- An influx of nut in shell (NIS) this season (around 100 tonne) has left a back log of unprocessed NIS that needs to be dealt with before next season NIS intake begins.
- Kim Jones worked with Dalsie Hannet to undertake a quality test for the current NIS batches to assess which batches need to be prioritised for fast processing. The results indicate that some batches are at a moisture content above 12%. They will be transferred to the NIS drier as soon as there is space available. The other batches are all about 10%-11% and will require a short drying before cracking.
- There is approximately 60 tonnes of NIS in storage as at 14 Dec 2018 which should yield about 6 tonnes of kernel.



Figure 1: The new crew working with Equanut, the private sector partner using mechanical cracker to crack nut in shells.

Photo: Dr Shahla Hosseini Bai



Figure 2: NARI staff hand cracking to fill orders.

Photo: Kim Jones

Compost project progress

- A TADEP compost project in conjunction with the galip project is researching compost methods to use galip factory waste and helping to build capacity. Two compost piles were established in September while undertaking a workshop at NARI. Dr Shahla Hosseini Bai (USC), and Mathew Poineau (NARI) explained the process of composting and the benefit of using compost in their gardens and farms to UNRE students undertaking their industry placement with Mathew. Two types of compost 1) with biochar and 2) without biochar had been established. Surprisingly, only the compost that contained biochar was ready to be used. The pile that did not contain biochar was thoroughly mixed with water added to facilitate the composting process.



Figure 3

Photos: Dr Shahla Hossenai Bai



Figure 4

- Compost pile from home and garden rubbish including galip testa and pulp (left in Figure 3) and compost with biochar (right in Figure 3) established in September 2018 (Figure 3), compost with biochar was ready to be used in December 2018 (Figure 4).



Figure 5: Mathew and Shahla are discussing the importance of soil fertility and adding compost to soil with UNRE students who are undertaking their industry experience with NARI under Mathew's supervision.
Photo supplied by: Dr Shahla Hosseini Bai

Bougainville Cocoa

HORT/2014/094

- Two project officers, Elizabeth Pisiai and Inia Bunsu (UNRE) attended the International Vegetable Training Course (IVTC) Vegetable Production Training program in Thailand in November. They will be involved in aspects of the project aimed at income diversification and improved nutrition.
- A Collaborative Research Grant proposal linking the Bougainville cocoa project with the Family Farm Teams project to educate villagers about improved nutrition was submitted in September. The purpose of the pilot study is to gain a deeper understanding of the food and nutrition security situation of Cocoa farming households and assess the impact of a nutrition and vegetable garden training model on the diets of cocoa farming families.
- Steven and Elizabeth Saveke, winners of the Best in Show at the recent Bougainville Chocolate Festival, will participate in the "Taste and Tell" event at Ratio in Melbourne on 13 February 2019.
- The shipment of goats collected from the Highlands have arrived in Kieta and are now thriving.
- Grant Vinning participated in a review of the 2018 Chocolate Festival and planning for the 2019 Festival. Farmers particularly valued the field day aspects of the 2018 Festival that showcased cocoa farming, soil management, fermentation, food crops and the competition.
- We were pleased that the Secretary of ABG-DPIMR, Thomas Betitis, has returned to duty after a period of leave for medical treatment, and wish him a return to full health.

PNG Cocoa

HORT/2014/096

Madang

- Our coordinators in Madang, Bofeng Mebali and Aitul Weoh, have overseen the establishment of budwood gardens at 17 Cocoa Model Farmer Trainer sites and these nurseries have completed their first round of budding and dispersing clones to their associated farmers. Interference in dispersal of clones from the Stewart Research Centre at Murnass, now controlled by KIK, has slowed down the development of budwood gardens at the 7 other sites. Trevor drew up a list of all 22 sites and the progress made at each site. It became evident that the supply of commercial budding tape has been a real problem. Godfried Savi attended an initial meeting and offered the support of provincial DAL.
- Excellent mature budwood gardens were seen at Mabonob (run by Gertrude Naig, daughter of the landowner, with the support of the CMFT) and Rempi, both combined with food crops during their development. These groups will be able to sell budwood sticks at K1 each and clones at K3.50 once they have been registered by the Cocoa Board and their own needs have been met.
- Phil, Trevor, Aitul and Bofeng, along with Godfried Savi and Simon Sakipa (Head of DAL Bogia), visited CMFT sites in the Bogia district on the border with East Sepik on 13-14 November. Developing budwood gardens were seen at Karkum (where a few clones had been cut down following a dispute) and Iku, and good nurseries at Amiten (Ismael and Jacinta) and Suaru (Albert). The big nursery previously seen at Iku (CMFT

Alex) has been emptied following the distribution of clones to farmers, and some good block developments with clones and food crops were seen. Farmers meetings were held at Iku and Suaru.

- At a meeting with Wesley Kilang, the regional manager of the Cocoa Board in Madang, he declared his desire to use many of our CMFT budwood gardens and nurseries as commercial suppliers of budwood and clones for PPAP and other farmers.
- On a visit to Korona Village (Steven and Margaret Topoti), healthy young goats were observed eating leaves of kaukau, banana and tapioca in their enclosure. Several of the farmers at this site have started their own nurseries and the original shade cloth has been divided between them. The bush-materials nursery at Dumpu was visited; seedlings are ready for budding with budwood brought from elsewhere. The budwood garden at Danaru has many gaps because of a poor result from bare-rooted transplanting of clones from Murnass in May. Bofeng is organising field budding of seedlings to complete the garden. The nursery is excellent with many clones completed and distributed; the farmers were carefully unwinding tape from buds, apparently to reuse it. A farmers meeting was held at Balama where the group has established an excellent budwood garden and nursery. They have planted pigeon pea introduced by Trevor and within 2 months it has grown to about 2 metres tall and is contributing to the shade of cocoa in the garden. Fifty clones have been distributed to each farmer in the group after the first round of budding. Tamane now have a mature complete budwood garden and have established a branch nursery on the main road east of Madang town. Our CMFT at Tamane, Kokurei Omarup, will be employed as a trainer by the Cocoa Board. He has also established eight satellite groups. The group has sold 1000 budwood sticks from the district budwood garden (10 clones) near the village. The mature budwood garden and commercial nursery of Ruben Luluk established at Erima under the World Vision cocoa project was visited. He is selling budwood sticks and clones in polybags, mainly to PPAP.
- Trevor, Bofeng and Phil departed from Rempi Dada Village for the boat trip to KarKar Island on 20 November and stayed overnight in the guest house of Paul and Barbara Goodyear. They visited the nurseries and developing budwood gardens at Krumlang (Julita and Ulan Philly) and Kaviak (Lynda and Lap Levis), and the mature, complete budwood garden at the Miak DAL station where kalava plants contribute to the shade, along with coconuts and Gliricidia. Paul and his senior manager, John Lang, think the so-called CPB tolerant clones have little tolerance or resistance, and that some of the old Trinitario clones are better. Paul has been doing a lot of niche marketing to New Zealand, Australia, Japan, UK and Germany. A farmers meeting was held at Krumlang, with about 20 men and 10 women attending. The PNG Buk Bilong Kakao Fama was distributed to people from both Krumlang and Kaviak. It was evident that the few remaining plantations on KarKar set an excellent example of good management practices, and Paul Goodyear's plantation, Kukul, has a weekly community day when staff assist and advise local village farmers.
- Trevor and Phil visited Ron Neville at Elliven cocoa buying company to discuss collaboration and the accuracy of official production figures for PNG.

East Sepik

- A Farmers' Field Day was held on 29 November at Yekimbole Village led by Thompson Fafungian and CMFTs Nola and Chris Sasingian. Scott Rambanare, the CMFT from Bararat Village, assisted on the day. About 300 farmers attended, including many other CMFTs, including Francis Whan from Banak, Xavier Manijembi from Kwaiari, Caleb Yali from Gavo, Angorum, Samuel Huingian from Hampeli, Jonathan Poema from Passam, and Sperian Kapia from Saporu-Kausimbi. Michael Kombo, the President of Numbo LLG, opened the gathering and cut the ribbon on the solar dryers. Farmers were shown through the three solar dryers at the site and their advantages over kiln dryers were discussed - relatively low cost of construction, reduced demand for firewood, reduced labour for cutting firewood and manning kilns, slower drying which lowers acid content, elimination of smoke tainting. Raju Ramalingam, Manager of Outspan in East Sepik, attended and discussed the possibility of collaborating to further develop dryers. The day was mostly devoted to practical demonstrations including soil fertility and composting (led by Kanika Singh and Chris Fidelis from the ACIAR Soil Fertility Project SMCN/2014/048), use of edible pigeon pea as an initial shade for cocoa (led by Trevor Clarke), goat husbandry (led by John Worowan, DAL, who brought two goats from Niumindogum), nursery management and budding and development of a budwood garden (led by Nola and Chris), and block rejuvenation (led by Scott). The presence of fire ants was demonstrated and their effectiveness in controlling Cocoa Pod Borer was discussed. The method of making neat rolls of 'Gladwrap' for use as budding tape from the larger commercial rolls, developed by budders at Hawain nursery, was demonstrated. Gina Koczberski showed a video of the method she had made at Hawain. Pigeon pea is growing well at Yekimbole and flowering. The CMFT at Niumindogum, Leah Kowi, successfully completed her diploma studies at UNRE supported by the project, and may receive a scholarship to continue her studies for a degree next year.

- The budwood garden at Yekimbole is complete, fully mature (3m high) and awaiting registration by the Cocoa Board. The garden at Saparu-Kausimbi has been registered.
- During the visit from 22 Nov to 3 Dec by Trevor and Phil to East Sepik with George Curry and Gina Koczberski, visits were made to the Model Farm established by John Meth at Yarakos on the road west of Wewak, to the Hawain Training Centre and nursery where they were shown a new way of preparing rolls of Gladwrap for budding (Gina made a video showing the method), to the new Solomons solar dryer of Kerobim Songai at Rainimbo near Hawain, to the nursery of Francis Whan who lent his cocoa production records (for the last 18 years) to George for copying and analysis (e.g. of the impact of CPB – production dropped from 40-50 bags cocoa p.a to 1 bag), to a new site in the Governor’s program near the West Sepik border (Jacob Kisau Bigiglen). Lynda Mugubuo’s budwood garden at Mague has not grown well since John Meth did field budding in June and clones will be bought from Francis Whan to complete the garden. Three new nursery sites for the Governor’s project, at Suanum, Sir and Simon Bla on the East Coast, were visited with John Meth and good progress observed in the establishment of budwood gardens. The latter group is a ‘self-starter’ having planted a budwood garden and built a substantial nursery and meeting house before being included in the governor’s program. The ACIAR program is now linked in with the governor’s program, for which the provincial government has committed K1.0 million, with John Meth coordinating both programs.
- On a visit to the Gavo CMFT site (Caleb Yali), Angoram District, old rubber plantings were observed. Trees were being tapped and cuplump rubber produced for sale to a Malaysian company active in the area. Rubber trees are a potential shade for cocoa and Caleb considered there are fewer pest and disease problems under rubber. The farmers consider that rubber gives ‘quick money’ and requires little maintenance as shade.
- Kanika Singh and Chris Fidelis arrived in Wewak on 27 November and the team travelled to Bararat (Scott and Maureen Rambanare) where many women from the farmers’ group were filling polybags with sieved fertile soil collected from bush fowl nests. The complete budwood garden and an outstanding example of block rehabilitation were observed. The block has been pruned back heavily and two chupons on each tree have been budded. A single tree with many VSD infections has been observed in the block repeatedly over the last two years, but most trees show few signs of infection, indicating that the resistance in the trees is generally high enough to control the disease. Scott and Maureen have developed 23 sub-groups, each of which has four pruning gangs cutting back cocoa trees.
- Trevor and Phil visited the budwood garden on grassland at Burui with Chris Toli and Angela Gossiba, and found the cocoa and Gliricidia stunted. The problem may be that the water table is close to the surface and it was suggested that many trees should be planted on such grassland sites to make them amenable for cocoa. The adjacent village is well treed and is very suitable for cocoa. Oil palm, coconuts, betel nut, paw paw, eucalypts and acacias could be grown at the site. George and Gina reported the occurrence of a very old galip nut tree in the village they stayed in on the plain, and it is evident that galip nut could be grown there. Then the team visited the mature budwood garden at Blamda where there is dispute over the ownership of the garden. A meeting attended by 70 farmers was held to air some of the problems.
- On 2 December, accompanied by John Meth, Trevor and Phil visited the CMFT site of Jonathan Poema at Paliama, and saw the mature budwood garden, main nursery and an associated Cocoa Board nursery, as well as observing Jonathan leading a team of farmers marking out their blocks for planting.

Highlands

- John Konam and the new acting head of DPI, Simbu Province, Chris Mondo, travelled into Karimui for the first time after the disturbance that had forced the evacuation of all government and ACIAR staff. In the interim, John Thomas has been stationed at Bena Bena to support the development of cocoa in Eastern Highlands Province. The CMFTs in Karimui are constructing Solomon-style solar dryers, except for Norman Mondo, who is building a conventional kiln dryer.
- The Karimui ‘2018 Environment, Agriculture and Cultural Show’ highlighted the ACIAR Cocoa work with half of the 2nd day being devoted to showcasing the work. Chocolate samples made in Brisbane from cocoa beans supplied by Karimui cocoa farmers were on show and brought pride to the farmers. A competition was held for the best beans and pods. Due to the impact of the project, especially increased dry beans sales (flown out with support of a Cocoa Board freight subsidy), the Board has just announced a 2nd phase of freight subsidy that will double the amount committed to K100,000 for another 12 months. Sales records from the Simbu Provincial Government indicate increased production and increased sales proceeds

returning to Karimui. After being airlifted to Goroka, Karimui cocoa beans have been transported by road to Madang for sale.



Figure 6: Connecting cocoa farmers to the chocolate, Job Korasu beans turned into chocolate by Cravve chocolate on display in Karimui Show.

Photo: John Konam



Figure 7: CMFT Dominic Wani manning the ACIAR, Cocoa Board and DPI stall at the Karimui Show.

Photo: John Konam

New Ireland

- John Joseph has been able to travel in the province to visit CMFTs using the second-hand vehicle provided by the project, although lack of a budget for fuel from the REDS section of the Cocoa Board has been a limiting factor. The previous CCI vehicles were taken over by KIK and are now unavailable for cocoa work. John spent two weeks in Lae attending a training program for Cocoa Board officers and then met up with Trevor and Phil in Kokopo to discuss the program for their upcoming visit and ongoing difficulties with management of the ACIAR and New Ireland Provincial Government cocoa programs. From 5 to 13 December, Trevor and Phil travelled with John Joseph to visit CMFT sites in Panameko, Manggai, Luapul, Langenia, Karu, Katedan, Burau, Komolobou, Lemeris and Bo and saw mostly complete, mature budwood gardens averaging about 2 metres high and able to provide ample budwood. Most have raised thousands of SG2 seedlings for distribution to the VEWs and farmers in the New Ireland Provincial Government Cocoa Project and are awaiting distribution and payment of approx. K1 per seedling that has been disrupted by the handover from CCI to the REDS section of the Cocoa Board and the NIPG. This has now been sorted out and the seedlings should be distributed and paid for soon. If this distribution is successful it will provide a tangible link between the ACIAR and NIPG projects.
- Phil and John met with Kula to discuss future collaboration between Kula's work with coconuts and our cocoa project sites. They also met with Bolomes Arawes, the RDO for Tikana LLG, in her tiny office in the LLG office building at Kopkop. Bolomes is supervising 5 CMFTs and 14 functioning VEWs. John and Gideon Bogosia, Director of NI Provincial DAL, are working to involve as many provincial, district and LLG Rural Development Officers as possible in supervision of CMFTs and VEWs. Trevor, Phil and John had a long meeting with consultants Matt Kanua and Ben Mullen who are developing cocoa activity for the MPs for Kavieng and Namatanai Districts.

East New Britain

- Trevor and Phil visited the old CCI building at Tavilo and had discussions with Peter Epaina and Peter Bapiwai. Peter Epaina still has not been offered a position by the Cocoa Board under the new REDS structure. He has survived this year with no salary and our project is supporting him to be involved with Peter Bapiwai and John Konam in introducing and testing cocoa in highland provinces such as Jiwaka, Eastern Highlands, Western Highlands and Southern Highlands. Discussions were held with Hosea Turbarat at UNRE about ongoing training for CMFTs and support for the establishment of a goat centre at Laraibina in New Ireland.



Figure 6: CMFTs Nola and Chris Sasingian in their solar cocoa dryer at Yekimbole.



Figure 7: LLG President Michael Kombo opening the solar dryers at Yekimbole Village with CMFT Nola Sasingian and Trevor Clarke.

- Mike Hughes visited Highlands Regional Centre, Aiyura and project sites in EHP, Jiwaka and WHP from 25 Nov – 7 Dec, to review sites and discuss future plans.
- NARI is preparing for final herbaceous indexing and virus testing of popular WHP commercial varieties, Korowest and Rachael. Assuming plants retain virus free status, multiplication will occur, and varieties should be available to 'klin sid' growers by March.
- NARI team member Winnie Maso has been accepted for a John Allwright Fellowship and will be studying at UQ, Gatton. During her absence Wilfred Wau will be managing the Aiyura tissue culture facility.
- Farmer screenhouses are being well managed with vines being cut and insect pests being controlled. The few screenhouses that have longer vines are waiting on planting rains. Many growers have made 4-5 cuts of their 'klin sid' vine, with each cutting producing +1,000 vines. Those that have harvested their 1st cut plantings have been impressed saying that as well as additional yield, the skin colour and taste of the kaukau is very much improved, factors which have been noted by their customers.
- Trial to assess efficacy of new detection methods and alternate sampling strategies for SPLCV commenced in Australia.
- Analysis of next gen sequencing data for RNA viruses completed summary being developed.
- Two publications from project work have been accepted for publication: Commercial sweet potato production in the highlands of Papua New Guinea (in *Acta Horticulturae*), and Local value chain interventions: a systematic review (in the *Journal of Agribusiness in Developing and Emerging Economies*)
- A very successful Organizational Strengthening Training (OST) attended by 21 female and 9 male participants was conducted for the SWOFFA group in Jiwaka Province, 19-23 November 2018. Of note was the active participation by Provincial Government representatives who are keen to promote the training program through LLG and Provincial Government channels.
- The portfolio approach to assessment and accreditation for the PNG National Standard for Community Development Workers, developed by Chris Gard and the ANUE team to underpin the community capacity building component in the project, has been endorsed/approved by the full National Apprenticeship and Trade Testing Board (NATTB). This is a significant development as it will allow formal recognition for trainers engaged in capacity building program and ensure ongoing capacity in training after the project completion.
- ACIAR RPM Irene Kernot will visit the project TEAM sites and conduct the mid-term project review in the week of the 11th February 2019.
- Matt Kanua and Mike Bourke did a 10-day trip to parts of Western Highlands, Jiwaka and Eastern Highlands in October-November to meet with screenhouse owners and review training needs. Useful information on growers' perceptions of the clean seed, and assessments of performance of commercial crops, were collected. In general, planting material had performed well, and high yields were obtained, but in some locations performance of the material had declined after several cropping cycles.