

End-line study continues

- Having completed the first part of our end-line study in late July (looking at our village community educator (VCE) leaders and the work of our VCEs as peer educators) we will be now be evaluating the impact and uptake of the Family Farm Teams work in our three sites in the Islands region (Halia, Bougainville and Tikana LLG, New Ireland)
- We are very pleased to welcome Rebecca Robinson to our team. Rebecca is a highly experienced researcher who has conducted some very valuable research in PNG. She has contributed to our end-line study design and will be conducting a number of activities in Tok Pisin
- The study team will be led by Katja Mikhailovich, with the support of our local project leaders (Ian Viore, Lucy Siki Aiya and Robert Taula). The study will take place in the first two weeks of September in all three sites.
- There will be a range of evaluation activities:
 - VCE survey and group work
 - Farmers trained by the VCEs survey and groupwork
 - In-depth interviews with female and male VCEs
 - Partner interviews

Helping teachers incorporate agriculture into primary school

- This component of our work is led by Dr Kym Simoncini from the University of Canberra. Kym has been working with PAU to develop professional development (PD) for teachers in order to build their capacity to incorporate agricultural messages and lessons in primary schools. Just over two thirds of PNG's primary aged children are enrolled in school, but half of these will drop out by Year 6. As more than 85% of the PNG population live in rural communities and the majority of these people are subsistence farmers, there is a very small window of schooling to prepare children for their future lives and engage them in formal education. Rural primary school teachers are well positioned to ensure that children are educated for their future as rural producers.
- Kym has completed the PD package which was been provided as an SD cards to be trialled with groups of teachers in New Ireland and East New Britain.
- The PD package contains five teaching videos:
 1. 21st century skills (including teaching strategies paddle pop sticks, manage mats, cone of experience, Bloom's taxonomy)
 2. Culturally relevant materials (including mirrors and windows)
 3. Authentic assessment and GRASPS tasks
 4. Feedback and peer and self-assessment
 5. Rubrics
- Other materials on the SD cards
 - Agricultural information sheets adapted from NARI materials
 - Livelihood videos produced by UniTech (making kaukau break, making soap, making peanut butter)
 - PDF versions of the Maria books
 - Copies of the Maria book posters
 - Written information that supplements the five modules.
- In collaboration with the Our Lady of the Sacred Heart School in Kavieng, 17 men and 19 teachers from the district attended a full day PD in late July.
- The SD cards were launched at Kokopo Primary School East New Britain by the Provincial Education Advisor Herbert Wangun. More than 40 people attended the launch (from 20 different schools and two teachers' colleges).
- The cards were launched in Port Moresby at Kioari Park Primary School, Pacific Adventist University by the Chairman and CEO of the PNG Science and Technology Council. Other guests included the Vice-chancellor, Director of Research and Education faculty from the university.
- The impact of the cards will be evaluated in 2019.

Market testing

- Sales of galip nut products in Port Moresby were very strong. Two supermarkets in Port Moresby and the Prouds Duty Free store at Jackson airport carried galip nut stock in late July in conjunction with the galip product launch in Port Moresby. Almost all stock sold out in two weeks; around 400kg of processed kernel worth about PGK50,000. The factory is now preparing their second order for CPL stores and needs to increase production.

Galip nut production at the factory

- The new packing machine was installed, calibrated and tested. Staff trained in operating and cleaning. The new machine has reduced the time it takes to pack final product by about 50%, which will free up staff for other processing duties. Product testing has shown that all of the kernel is food safe. The extremely low plate counts and mould counts show excellent hygiene practices. Nut buying at the factory has begun for the season and there are a number of research challenges on sizing nuts a need to educate farmers on appropriate size nuts. the team will also be working on more efficient buying and depulping systems at the factory gate.

Project impacts on livelihoods

- The project has created new income streams for many emerging entrepreneurs within the galip industry. There are reports of several people working as collection agents in the region. One story is of a young man who identified the potential of the industry during his UNRE student placement with the NARI Kerevat station last year. Since his graduation he has borrowed PGK200 to begin purchasing galip from local farmers at PGK1.00 per kilo and transporting to NARI to benefit from the PGK1.50 available to those selling at the factory door. He has developed a system where he is only purchasing on a Tuesday, since he was constantly bombarded with sales through the week, and then arranges transport for the bulk later in the week. He has developed his own system to avoid undersized nuts by suggesting to farmers that they bring galip to him if it is bigger than a betel nut.
- There is more positive news of small-scale entrepreneurship where the Women and Youth in Agriculture Josein co-operative has been value-adding to their galip products. One of the women has been baking up to 60 loaves of galip bread daily for her roadside market and continues to sell out. These volumes of galip bread are produced in a small wood fired oven in a bush kitchen.

Private sector engagement

- Our New Zealand private sector partners are now leasing the factory for a portion of the week and we have been working together to identify processes that this commercial team will be following during their time in the factory. This collaboration with a purely commercial team will provide us with many opportunities to improve our own efficiencies.



Figure 1 (left): New packing machine improves efficiency of packing final product.



Figure 2 (right): Nut-in-pulp (NIP) being delivered.

Bougainville Chocolate Festival

- Work associated with preparations for Bougainville Chocolate Festival continued at an increasing pace.
- Judges have been briefed – three internationals and one national. Small issues have yet to be finalised, eg: acquiring the latest version of the IICCT but the big issues – basically the judges' logistics, which have been handled in cooperation with Bougainville Partners.
- There was a small addition to the slide show on converting cocoa beans to chocolate but thanks to Peter Channells and Li Peng Munroe at Jasper+Myrtle and the very innovative Adriana Smidh at Bougainville's Department of Media and Communication, version #2 will be nominated for at least one Oscar.
- Over 130 samples were submitted for the chocolate competition.
- A pre-evaluation team reduced this number to 50 from which the chocolate will be made for the judges.

Chocolate making equipment at DPIMR, Buka

- The big news was the arrival of the project's chocolate making equipment.
- More thanks to Jasper+Myrtle who advised on and then assembled the necessary equipment and John Moxon from PPAP who provided funds to bring trainers from Kokopo to Bougainville. We are now in a position to make our own chocolate.
- The equipment is housed in a dedicated laboratory that will be used as a research and extension facility.
- We will now be able to make chocolate from cocoa that has been over- or under-fermented and smoke tainted. Eating chocolate made from poor quality cocoa will show the growers the result of poor practices.



Figures 3, 4 and 6 (clockwise from top): DPIMR Minister's launch of quality assessment and chocolate processing training.

Figure 5 (right): Bean quality assessment training at DPIMR conference room.

Conference presentation

- Results from the project were featured in the Invited Opening Plenary address given by David Guest to the 11th International Congress of Plant Pathology in Boston, USA.
- The talk "*The answer is chocolate: People focussed plant disease management*" highlighted our findings that agricultural development projects and improved delivery of health services to farming communities (the "One Health" approach) are interdependent.
- You can listen to the talk about 1h 03m into on https://youtu.be/MYyslKSYy_8

Other news

- The blog site of the daily ICCO prices has proved to be popular.
- Only the one market newsletter was compiled during the month – too much excitement associated with equipping the chocolate laboratory.
- Contact has been made with SPC in Fiji to see if we can link up with the Fiji based fermentation and drying survey data collection. The idea is that the survey will produce a country benchmark against which participants can then judge themselves. It will be interesting to then link the medal winners from the Chocolate Festival with industry practices.
- Follow updates on the Bougainville Chocolate Festival via Facebook: <https://www.facebook.com/bougainvillechocolatefestival/>

New Ireland Province

- John Joseph, assisted by Naison Laki especially for transport, visited as many CMFTs as possible to explain the change in coordination of the project in New Ireland.
- The project bought a second-hand Toyota Landcruiser in Kokopo and shipped it to Kavieng to help alleviate the transport problem faced by John.
- Negotiations continued between the Cocoa Board, the Kokonas Industri Korporasen (KIK) and the New Ireland Provincial Government on the allocation of resources at the Kopkop Research Centre.

Madang Province

- Bofeng Mebali visited CMFT sites in Bogia and Sumkar Districts, including sites at Amiten, Sualu, Bunu and Karkum Villages, despite the collapse of Banak bridge.
- During July and August CMFT sites at Balama, Tamane, Gohe/Mawan, Galeg, Kumisanger, Danaru, Dumpu, Ulingan, Bom and Patulu were also visited to continue completion of budwood gardens and training of budders.
- Farmers blocks have been established at Amiten (24 farmers blocks), Sualu (2), Danaru (5), Kumisanger (2) and Galeg (14).

The Highlands

- Peter Epaina prepared proposals to the Southern Highlands and Western Highlands Provincial Governments for trialling of hybrid seedling cocoa at selected sites in the provinces. The aim is to establish test plantings of SG2 hybrid seedlings and from these select the types best adapted to the sites. During the assessment of the seedlings, training in cocoa husbandry will be provided to staff of Provincial DALs and local farmers.

East Sepik Province

- Suri Taisa from the University of Natural Resources and Environment (UNRE) spent three weeks to get a group of goats (four female and one male) from the Livestock Research Centre at Erap to Lae in Morobe Province, and then across the Bismark Sea by ship to a new home at Niumindogum Village, East Sepik Province, via Wewak.
- He also had a meeting with Chris Pais, First Secretary of the Governor of East Sepik Province, and Kevin Hawan, Head of Provincial DAL Wewak, to discuss the sustainability of the Goat/Cocoa Integration Project after the ACIAR Project ceases at the end of 2020. UNRE was requested to continue providing technical advice to build capacity from the current project to more widespread developments proposed by the government. Proper instruments including MOUs and MOAs are to be developed and incorporated into the province's agricultural program to be presented to the governor in the near future.

- On Facebook, Suri commended the DAL team at Erap, headed by Ario Movis and staff including Sensik Solopi, Solomon Ralph Yambundimi, Nickson and other stockmen for all their time and effort. He also extended his appreciation to staff from ACIAR Wewak and lead farmers Leah Kowi and Edmund Huiwali and the neighbouring communities for their preparation and support. He also commended Roddy Amut and Lemau of IATP Kairak, UNRE, for the logistic arrangement and support.
- On 10 August Suri also met Allan Bird, the Governor of East Sepik Province, to discuss the importance of inclusion of universities like UNRE in his province's economic development priorities covering agriculture and other natural resource-based sectors. On the same day the Governor held a public meeting to commit PGK1.4m of provincial funds for mass distribution of budded cocoa seedlings for ESP cocoa farmers. UNRE, Cocoa Board and ACIAR staff were invited as guests of honour to not only witnessing the Cocoa Launching but also to be given extra support especially on sustainable outreach cocoa/livestock programs. John Meth, the ACIAR Coordinator in ESP will lead the cocoa developments in the province.
- Training will be delivered by Suri and John Worowan, Head of Livestock at the Provincial Government DAL, to ensure farmers apply good goat husbandry practices and to ensure that, through penning and tethering, goats do not damage cocoa or food crops. The target is to provide 1 to 2 goats for each family initially, and later to give further training for farmers who wish to have more goats in the long term.



Figures 7 and 8: The arrival of the young goats in Niumindogum Village, to be welcomed by people for Niumindogum and nearby villages.

- Two separated teams attended to groups of CMFTs to complete the establishment of budwood gardens. Team 1, led by Joel Hori (REDS) visited sites at Wosera Gawi, Ambunti Drekikier, and Nuku Districts. Bud grafters were engaged to bud root stock seedlings on site to establish the budwood. Team 2, led by Timothy Sam (REDS), visited sites in Angoram District to complete budwood gardens. Two CPB tolerant clones were distributed to one CMFT site.
- A visit is planned to Lumi conservation site (Tenkile Conservation Alliance) to assist their CMFT to establish a budwood garden of 20 x 18 CCI latest release clones to be provided from Hawain cocoa nursery.
- A Solomon-style solar cocoa dryer was completed at the CMFT site of Cherobim Songai, at Renembo/Hawain, and discussions have been held with other CMFTs to select a site for a third Solomon solar drier. The aim is to erect one per month for the next four months, giving a total of six for CMFTs in the Province.
- The pigeon pea seed arrived in Wewak from India ready for test planting on the Sepik grasslands.
- Trevor visited Wewak with David Yinil, Anton Varvaliu and Boto Guapu (CEO of the Cocoa Board) from 29 August to 2 September.

- Commercial sweetpotato varieties Koro West, Rachael and Kerot (Hagen) while still undergoing pathogen testing are nearing completion. They have all undergone two of three sets of grafting and will soon undergo the 3rd. Assuming these return negative reading these varieties will be available as clean seed for bulk up and release.
- Planning for 14 PNG sweetpotato farmers to visit Australia in October to study sweetpotato production and the use of clean seed is underway.
- To overcome a shortage of *Ipomoea setosa* seed, NARI has replanted their remaining seed stocks. These plants are now flowering and expected to seed well. Annual seed production will be incorporated into PT production planning.
- The effect of sweetpotato virus dual infections trial being conducted by NARI is progressing well. Sweetpotato Feathery Mottle virus, Sweetpotato virus G (common viruses in PNG) and dual infections are being studied.
- Virus diagnostics – 30 varieties (from Aiyura field germplasm collection) and samples from Jiwaka have been sent to Gatton for virus confirmation testing. Testing confirmed Sweetpotato Feathery Mottle virus, Sweetpotato Leaf Curl virus, Sweetpotato virus G and Sweetpotato Collusive virus were present.
- In Australia, DNA extracted from 9 varieties and RNA extracted from 12 varieties have been sent for next gen sequencing. Ground truthing of *quantitative polymerase chain reaction (qPCR) against existing pathogen detecting technologies is continuing, including use of LAMP assays against other pathogen detection technologies. Virus testing of samples from Cairns, Atherton Tablelands, Cooktown, Weipa and Torres Strait has been undertaken.
- The initial trial of high quality sweetpotato in Port Moresby supermarkets has been successful, and one of the clean seed growers involved in the project has now negotiated for supply of clean kaukau to RH supermarkets. An initial shipment of 300kg of the clean Gimani is scheduled for delivery to RH in the last week of August, with regular shipments scheduled to follow.
- ANUE and FPDA staff (Robert Lutelele, Mike Bourke, Johnny Wemin, Matt Kanua, Debbie Kapal and Benny Atigini) will conduct a planning meeting on 14 September. The training requirements of the 'igloo farmers', those receiving PT planting material and possibly those trading kaukau (who are sometimes also farmers) will be discussed to formulate a training program.
- Community development training activities continue to be rolled out across the major kaukau production regions. *Wanbel agreement* that guides both parties on the codes of conduct. A group in Wimbuka, Hagen Central have signed a *Wanbel agreement* and are looking forward to the trainings planned for to build capacity in their community.

* Quantitative polymerase chain reaction (qPCR) is a molecular biology technique used to detect, characterise and quantify nucleic acids and is used in this project to confirm whether certain viruses are present in samples.