|  |  |
| --- | --- |
| ACIAR_inline PC | |
|  | Annual report |
| project | Developing the Cocoa Value Chain in Bougainville |
| project number | HORT/2014/094 |
| period of report | 2020-2021 |
| date due | 14 July 2021 |
| date submitted | 1 August 2021 |
| prepared by | David Guest, James Butubu Merrilyn Walton, Jessica Hall |
| co-authors/ contributors/ collaborators | Grant Vinning  Joe Yabom, PNGCCIL,  Josephine-Saul Maora  Phillip Simmons  Borgia Sinato  Francis Hurahura  Elizabeth Pisiai  Silas Paisi- South Bougainville FEO  Bruno Batari- Central Bougainville FEO  Julie Rereve- North Bougainville FEO |
| approved by |  |

Contents

[1 Progress summary 3](#_Toc42694824)

[2 Achievements against project activities and outputs/milestones 4](#_Toc42694825)

[2.1 Achievements to date 4](#_Toc42694826)

[2.2 Summary of achievements to date (for ACIAR website) 4](#_Toc42694827)

[3 Impacts 5](#_Toc42694828)

[3.1 Scientific impacts 5](#_Toc42694829)

[3.2 Capacity impacts 5](#_Toc42694830)

[3.3 Community impacts 5](#_Toc42694831)

[3.4 Communication and dissemination activities 5](#_Toc42694832)

[4 Training activities 6](#_Toc42694833)

[5 Intellectual property 7](#_Toc42694834)

[6 Variations to future activities 8](#_Toc42694835)

[7 Variations to personnel 9](#_Toc42694836)

[8 Problems and opportunities 10](#_Toc42694837)

[9 Budget 11](#_Toc42694838)

[10 Appendices 12](#_Toc42694839)

# Progress summary

Our focus this year has been to support the Village Extension Workers (VEWs) and their Village Resource Centres (VRCs). We continue to roll out Family Farm Teams (FFT) training and support the upskilling of our team. While disruptive in many ways, the COVID pandemic presented an opportunity to transfer responsibility to team members in country, a critical component for sustainability of project impacts. We are tremendously proud of the achievements of James Butubu and his team in Bougainville, supported by Josephine Saul-Maora, the PNG Cocoa Board and the University of Natural Resources and Environment.

This has been a challenging year for the project with the pandemic, the referendum, elections and severe weather in Bougainville. The Australian team has not been able to travel since February 2020, and our Bougainville team members faced a number of lockdowns.

A number of lessons have been learned during this time, in particular the need to remain flexible with activities and understand the added mobility and human resource constraints the members in Bougainville face as a result of these uncertain times. Key activities and outputs for the year are outlined below in the summary with further details provided in subsequent sections of the report.

**Planning, coordination and dissemination activities**

* Regular online team meetings and phone calls, weekly WhatsApp meetings and ACIAR and TADEP project reports compiled.
* Interview by the NBC Bougainville for DPI on the progress of the CRG nutrition project by the Health and DPI officers.
* We were asked by CARE International to train villagers on diversified cocoa farming under their program
* The **Bougainville Reader** was developed as a platform for sharing observations, reflections, reports and stories from those working in Bougainville to improve the livelihoods of cocoa farmers.
* Over 40 Cocoa marketing newsletters were prepared and circulated.
* The project [Facebook](https://www.facebook.com/groups/623998121765260) group has grown to 550 members.
* Facebook group promotes nursery business and advertise nurseries that were ready for sales.
* Several presentations were given on the project by the team at various online conferences and events.
* Involvement in a series of online meetings with cocoa researchers and the RPM to develop priorities for future Pacific cocoa research.
* Involvement in the Whitelum review of TADEP.

**Activities to support improving the productivity, profitability and sustainability of cocoa farming**

* Monitoring VRCs established by VEW’s, including cocoa bud wood gardens, nurseries and vegetable cultivation. Most bud wood gardens have matured and some are now being used for hybrid clone propagation. Seventeen of the gardens inspected met CB requirements and are now certified to operate commercially in distributing clones and bud woods to other farmers.
* Demonstrations on the concept of cocoa diversification and cocoa based farming systems with “half canopy pruning” rehabilitation were conducted in Kubu. In March 2020 the first half canopy was removed, and 2-3 cycles of crops planted. In November 2020 the remaining second half canopy was removed and planted with Taro varieties while the first removed canopy had rejuvenated and pod production has commenced.
* 10 UNRE students participated in Industrial training with the DPI. The students were engaged with the project for six weeks and were exposed to various activities such as cocoa extension and R&D work.
* Mobile app development company NGNY Ngakkan Nyaagu has been engaged to support the development of a custom mobile application for smallholder farmers in Bougainville. Content for the application has now been compiled. Tania Paul, leader of ASEM/2012/084 has agreed to incorporate traditional vegetables information and recipes. The App is planned to be rolled out in September 2021.
* During the internal workshop and stakeholder consultation held in Buka and Arawa the Bougainville project team contributed significantly to the establishment of ABG-BACRA (Bougainville Agricultural Commodities Regulatory Authority) by sharing their experiences, knowledge and skills in Cocoa technology transfer and training.
* Demo blocks were established in VRCs to use as training sites for IPDM training as well as food crops, livestock, composting and soil nutrition activities. Tools were also distributed to the VEWs to maintain the blocks after trainings were conducted. Project staff conduct regular visits to encourage farmers to maintain their cocoa blocks.
* Maintenance and upkeep of the South Bougainville Hub station was carried out. With a few minor changes the budwood garden will be ready for certification.The clone observation plot is well maintained. During a Ministerial visit, the GoPNG Agriculture Minister, Hon John Simon and the member for South Bougainville observed the block and were impressed. It was their first time to see such research innovations in Bougainville. The Nursery has been revived and recently cleaned and stocked with new soil filled poly bags. We are trialing out nursery marketing strategies to identify ways to have the nurseries run sustainably. Cocoa rootstocks in the nursery were recently budded for sale in three months’ time.

**Activities to raise awareness of the opportunities for improved nutrition and health to contribute to agricultural productivity and livelihoods**

* Family Farm Teams training was conducted by accredited trainers Josephine Saul Maora and Robert Taula who mentored DPI staff Bradley Tiva and Julie Revere. Training has been completed in the 9 CRG (**Project number: C001486)** villages and is now being run in all 33 VAs. FFT training in the North is complete and South and Central Bougainville will be completed in August and October 2021.
* Vegetable cultivation and diversification work has continued in each of the regions. Information booklets for IPDM and Vegetable production have been distributed in Tok Pisin to VEWs and farmers. Field visits have been conducted to encourage farmers to diversify their farms with introduced and local vegetables in terms of food security and also another source of income.
* Eight different species of taro were harvested from the Buin DPI vegetable garden and 3 different species of kaukau are to be harvested in the coming months, including the more nutritious purple and orange varieties.
* Seeds and materials were distributed for vegetable nursery and cultivation to the VEW’s and their farmers.

**Innovation and enterprise development**

* Extensive work has been conducted on the establishment and monitoring of the Village Resource Centres (VRCs) over the past year. Apart from setting up the VRCs as model farms for farmers in the Ward Assemblies (WAs) and other communities, some of the Village Extension Workers (VEWs) and farmers have taken the initiative to build training shelters. These shelters are to support model farmers to conduct training, have VA meetings and cater for other community gatherings/event. Some VEWs have also been invited to extend their work into other VAs. Farmers have received training on IPDM, crop diversification, bud grafting, nursery management and vegetable nursery. A number of nurseries and compost huts have also been established.
* Cocoa Board officer Joe Yabom visited all VEWs with the assistance from the hub coordinators in all regions. During the visit he supplied 1,000 poly bags, Bud wood garden labels and chicken fencing wires for poultry production and sales as well as for chicken manure production for composting some farmers erected their chicken houses and are looking after chickens now to collect the manure for composting.
* The health of the goat population has improved following diagnosis of worm infestations and poor nutrition, and administration of appropriate supplements and therapeutic drugs. Two kids were recently born with another 2 on the way in Konga which will bring the goat population in Konga to 10. Goats continue to attract a lot of interest and a high demand for breeding goats, Michael Pearson’s census indicates Bougainville has 47 goats. There is also a high demand for goat manure to use as organic fertiliser in food crop gardens. Goat Manure and Cocoa pod husk training was also been conducted in the VAs.
* A number of VEWs now professionally consult to neighbouring villages
* Sales and trade of food cops increased farm family incomes and empowers women as income earners and entrepreneurs.

**Value chain strengthening activities**

* Schools were visited by PNG Cocoa Board and ABG Department of Education for implementation of the Cocoa Curriculum in the 36 selected schools. 40 teachers from primary, secondary and technical schools participated in the in-service curriculum training at Tunuru Catholic mission.
* Mini chocolate Laboratory construction in Kieta (Toniva), Central Bougainville is in progress and will be completed by end of July 2021. Equipment for bean roasting, winnowing and deshelling, grinding and others will be commissioned for testing bean quality and some training on cocoa quality including processing of cocoa products will be conducted. It will also assist DPI/BACRA operation in terms of quality testing for export samples, compliance monitoring as well as certification of cocoa exports from Bougainville. Launching of the Mini-lab is scheduled for September 2021.
* For the first time, Bougainville has been able to enter cocoa beans in its own name into the worldwide Cocoa of Excellence for 2021.  This is a program led by the Alliance of Bioversity International based in Rome that is part of the international organisation of agricultural research institutions (CGIARs).  The acceptance of beans from Bougainville recognised that in late 2019 Bougainville overwhelmingly voted to become fully independent from Papua New Guinea.  The project provided guidelines and support for the submitting of samples, and advice and contacts within the Alliance of Bioversity International. Judging in past Bougainville Chocolate Festival competitions followed the blind panel methodology used in the Cocoa of Excellence competition to ensure that the samples submitted were selected on a truly objective basis
* David Guest and Grant Vinning maintained contact with a network of Australian chocolate makers, all potential importers of cocoa beans. The biggest constraint to imports from Bougainville remains the cost of transporting small quantities of beans. We have established an active network of chocolate makers who are discussing warehousing options in Australia. This would enable single bulk shipments into Australia, safe warehousing, and distribution of smaller amounts of beans within Australia.
* An analysis of local chocolate making costs was conducted by James Butubu and Grant Vinning
* Plans to conduct training in food safety for cocoa bean processing in the chocolate lab. There will be a training conducted as soon as the Bougainville Cocoa regulation (which has a section on food safety) is passed by the Bougainville House of Representative by October/ November 2021.
* Meetings were held with skilled local bakers in Bougainville to discuss engaging them to train farmers/VEWs on how to bake cocoa based cookies, cakes and confectioneries.
* Observations on producing best flavored beans and chocolate with proper fermentation days and two drying options were initiated in Kubu using beans harvested from rehabilitated clones. Data collected were fermentation temperature, drying days on solar dryers and direct sun drying. This will continue for more data collection**.**
* The project adopted a two-tiered quality testing regime for the three regional hubs so that they could assess moisture and bean count, two vital criteria in the marketing of cocoa beans. Long probe thermometers, roasting and grinding equipment is being provided to the hubs for training to improve fermenting and drying practices. The central laboratory at Buka will have butter fat testing equipment and the means for calibrating moisture readings of the regional equipment.

# Achievements against project activities and outputs/milestones

## Achievements to date

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Activity | Outputs/  milestones | Completion date | Comments |
| 1.1 | ABG, District, CoE and village consultations | Coordinated plans for development at each level, with priorities | Ongoing | ABG member for Stitalato Constituency and ABG Presidental candidate Honourable Fedelis Semoso visited Kubu, North regional hub to visit the facilities and observe activities. They were pleased to see the old cocoa clones were rehabilitated and pledged support for the project activities with funding for cocoa work in his constituency and Bougainville in general as it is a main cash crop and income earner for farmer and government.  The clones Observation Plot is well looked after in terms of weed control and general maintenance of the block. During a Ministerial visit, the PNG Agriculture Minister, Hon John Simon and the member for South Bougainville were taken to the clones Observation Plot at the South Bougainville Hub station and were impressed as it was their first time to see such innovations in terms of research in Bougainville.  We consulted with the AROB Education Department to roll out the Schools Cocoa Curriculum. |
| 1.2 | Baseline information collection and analysis | Monitoring livelihoods  Work with TADEP to develop M&E | Completed | Baseline data was collected in 2017. A report on the survey results was provided to the ABG Government in 2018. 2 Journal articles have been published in *One Health.* The results were also used to inform the CRG pilot study. |
| 1.3 | Selection of participating villages | 33 Village Assemblies selected across Bougainville-11 in each region. Selection process assisted by advice from ABG Ministry of Community Governance. | Completed | 33 villages selected 11 in each region (North, South, Central). |
| 1.4 | Training of DPI Senior Facilitators, District Officers and selected VEWs | Train 12 Senior DPI Facilitators (at MCA) then 52 District Officers and 33 village -level specialists in cocoa, food crops, livestock and health | Completed | * 1 x CCI officer trained at MARS Indonesia including a UNRE staff funded under CCIs allocation. * 33 VEWs, 3 Hub coordinators and 3 CCI Project staff and 1 UNRE officer with some DPI officers trained on Sustainable Livelihood, IPDM, Clones, BWG and Nursery set up as well as two business modules- small enterprises and record keeping and decision making. * Health and DPIMR staff upskilled in nutrition and vegetable garden cultivation as part of CRG |
| 1.5 | Establish village budwood gardens and nurseries | Establish 33 village budwood gardens and nurseries in 33 VAs | Completed | This activity has been achieved but infilling due to deaths to plants is ongoing.   * Out of the First Lot of 400 plantings had a high mortality rate that we lost about 2/3s of the block due to continuous raining during field budding time. * A total of 1000 rootstocks were budded to get the best 400 out of the 1000 for field planting. * Most bud wood gardens have now matured and some VEWs have harvested for clone seedlings production. * VRC bud wood garden inspection and certification was carried out by PNG Cocoa officers Joe Yabom and Benjamin Siloi from the Plant Breeding Section in June 2021. Out of the inspected gardens, 17 met the requirements and they are now certified for registration which means they can operate commercially in distributing clones and bud woods to other farmers. * Work to conserve and utilise some important cocoa clones from Kubu station, North Bougainville was initiated when the Government recently announced the takeover of Kubu land for construction of offices and residential houses. We also went to the site of the former PNGCCRI Duncan station and collected some of the Parental materials (KA2-106, KEE 12, KEE 42, KEE 47 and KA2-101) for establishing a SG2 Seed Garden for Bougainville. Others that were not found will be identified and collected in July/August and hopefully do the establishment by November/ December. DPI/BACRA will take ownership of the operation and/management of the seed garden when established. * Buin DPI, nursery and budwood garden supporting clonal propagation and tree rehabilitation. Fifty farmers have each been supplied with 200 seedlings. Pod pilfering is a problem. * VEWs were given shade clothes for nursery construction at their Village Resource Centers * See Appendix 3 for numbers of nurseries established * An evaluation was conducted in Buin DPI budwood and assessment *ex situ* was conducted to assess precocious attributes, response of IPDM inputs and yield components was initiated at Buin DPI Budwood and IPDM block. |
| 1.6 | Evaluate soils and compost and fertiliser requirements | Sample soils and establish composting trials linked to resource centres | Completed | * Soil sampling was completed with 8 samples each from each region and waiting response from soil labs to compare quotes before sending. It is highly unlikely that PNG labs will be utilised due to high costs involved as well as takes a long time before results a received as experienced by the SMCN project so a better option would be to send them to India. * Composting facilities were already built at CB-Tavilo. Composts of Goat Manure and Chicken Manure were prepared and are in the compost shed at Buin DPI Station. Composting facilities already built in north (Singh VA) and central (Manetai VA) and south (Mamaro VA) Composting training using cocoa pod husks conducted. * The utilization of goat manure as compost or direct application to crops looks promising as shown by growth parameters such as leaf size (Length x Width (cm) and weight (g) of Chinese cabbages in our small trials in Kubu, North. A more advanced trial was designed and initiated involving more treatments and replications. * Composting demonstrations were provided as part of the vegetable cultivation and nutrition sessions for the CRG. * See Appendix 3 for compost establishment and training numbers. * Schools were visited in June by PNG Cocoa Board and ABG Department of Education for the implementation of the teaching of Cocoa Curriculum in 36 schools selected. 40 teachers from primary, secondary and technical schools participated in the in-service curriculum training at Tunuru Catholic mission. |
| 1.7 | Establish IPDM demonstration plots | Establish 33 IPDM demonstration plots | Completed | * 33 plots established * Demo block establishment was done through selection of ideal blocks to use as training sites for IPDM/CPBM trainings as well as soil nutrition activities. All the blocks were selected, tools were also distributed to the VEWs to maintain the blocks after trainings were conducted. However, commitment of each farmer to his/her block is the determining factor of the status of each demo plot. Officers from the HQ and the project staff also pay visits to make sure the farmers are encouraged to maintain their cocoa blocks. |
| 1.8 | Establish mobile support networks | Develop, test and commission mobile and web-based apps for extension and health;  Provide smart phones / tablets to village specialists | Ongoing | * CommCare was used for livelihood and health surveys using 7” tablets. * For the CRG pilot project baseline data on diets and vegetable cultivation was captured from 10 villages using the Commcare application on Lenovo Tablets. CommCare will also be used for the monthly monitoring and 12-month evaluation. * Mobile app development company NGNY Ngakkan Nyaagu has been engaged to support the development of a custom mobile application for smallholder farmers in Bougainville. The app will be introduced by the ABG President and Minister for Agriculture. Content for the application has been compiled on how to diagnose and manage issues around cocoa management, food crops, soils, livestock, water and sanitation, human nutrition, maternal and child health. As well as provide modules on Family Farm Teams, Cocoa Board Cocoa Curriculum, daily cocoa bean prices and links to relevant sites such as the Cocoa Board Cocoa Extension Manual and PestNet. Information and recipes using traditional vegetables from the project ASEM/2012/084 will be included. The App is planned to be rolled out in September 2021. |
| 1.9 | Farmer training | Training established in 33 village assemblies.  Communication and outreach (radio, social media, Bougainville Bulletin, Newsletter etc) | Ongoing | * Please see Appendix 3 for numbers of trainings conducted. * Project officers followed up trainings that were done in theprevious reporting period, to make sure that training received on Composting, Nursery establishment, budding, tipping, formation pruning and cocoa rehabilitation as well as other management practices were properly implemented.   Plans for further training were disturbed by the COVID 19 lockdown   * DPI introduced weekly (Thursday and   Tuesday) **Radio Didiman** program with NBC Bougainville for Agriculture news, activity updates and information.   * A DPI blog spot (<https://dpimr.blogspot.com/>​) as well as the Bougainville Bulletin ([http://www.abg.gov.pg/…/re…/bougainville-bulletin-edition-14](http://www.abg.gov.pg/index.php/news/read/bougainville-bulletin-edition-14?fbclid=IwAR0aPYtpSNbGYOyIz0laH9iNtDmqUVdQHYFRcTBLeUTV9gBefUPtVZqZ3m4)) are used to upload market reports and other articles on cocoa and the chocolate festival. * A moderated Project Facebook page was established and is very active. Membership continues to grow and is now at 550 members * Arrangement was made for an interview by the NBC Bougainville for DPI to update the public on the progress of the CRG project by the Health and DPI officers |

PC = partner country, A = Australia

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Activity | Outputs/  milestones | Completion date | Comments |
| 2.1 | Establish the extent to which health and disease impacts on farming activities | Apply for Ethics approval from the relevant institutions.  Establish base line data about the health of cocoa farming families  Review the WHO health status survey tool for low resource countries  Design tool for recording days lost work to sickness or illness  Design mixed methods study to measure both health status, farming activities and days lost to illness.  Develop qualitative and quantitative and tools for collecting data  ( surveys, semi-structured interview schedules, number counting, activity counting) | Completed | * Results of community health and measures linked to farming activities including days lost to illness. * Results have been provided to the ARoB Government and stakeholders. * Report has provided the evidence for the Department of Health’s strategy to reduce stunting in children. * Three papers have been published and another is under review. * Food diaries have been captured from the 9 CRG villages and are currently being analysed. * Monitoring and support work in CRG villages is ongoing until December 2022. |
| 2.2 | Establish Community Advisory Committees | In each participating village, the Committees will coordinate and oversee the project.  Membership to include local leader to chair the meetings and women, youth, cocoa farmers, project team | completed | Results of survey provided to stakeholder meetings in each of the 3 regions. |
| 2.3 | ABG, district CoE and village-level consultations | 1. Identify main health concerns for the community  2. Understand how the initial health needs of the community are currently met  3. Develop support applications for basic mobile phones  4. Work with DoH to develop a Cocoa Farming Health Framework (CFHF) | Ongoing | A cocoa farming health framework has been developed and expanded with a curriculum developed for health and agriculture volunteers at the village level.  VEWs will receive training on nutrition water and sanitation later in 2021. |
| 2.4 | Link health information to roll out of satellite farmer training | Link DoH health programs to the roll out of satellite farmer training centres | Ongoing | The Collaborative Research Grant pilot project provides information on nutrition, water and sanitation and hygiene and vegetable cultivation to a sample of 10 villages. The project supports households over 12 months to adopt new techniques to improve health, nutrition and farming outcomes. An evaluation will be conducted at the end to establish how effective the program has been.   * Information sessions on Nutrition and vegetable cultivation completed in 10 villages selected to be part of CRG. * Family Farm Teams provided to all 9 villages. * One village has been excluded from the study for safety reasons. * Food diaries collected for all villages and currently being analysed. * CRG extended until December 2021. * Family Farm Teams training was conducted by accredited trainers Josephine Saul Maora and Robert Taula with assistance from DPI staff Bradley Tiva and Julie Revere. Traiining has been completed in 9 villages (CRG **Project number: C001486)** and is now being run in all 33 VAs. The original trainings were held at Tohatsie Ward (Halia) , Ben Matie (Hahon) and Kovanis (Tinputz) for North. Later it was conducted in two sites in Central (Kasowaro-Manetai and Kaprosipa-Wakunai) before going to 4 sites in South (Mamaro, Koogu & Kikimogu in Buin) and Mosiho in –Bana in September/October 2020. FFT training in the North is complete and South and Central Bougainville will be completed September/October 2021.Villages have applied their knowledge and skills acquired during the vegetable gardening and nutrition information sessions to grow new food crops such as cabbage. * Vegetable cultivation and diversification work has continued in each of the regions. Information booklets for IPDM and Vegetable production have been distributed in Tok Pisin to VEWs and farmers, and the mobile app being developed will include information on food crops, soil fertility, children’s health and nutrition. * Field visits have been conducted to encourage farmers to diversify their farms with introduced and local vegetables in terms of food security and also another source of income. * Farmers have reported increased food crop production with surpluses sold at local markets. The COVID lockdowns meant young people returned to their villages and boosted the labour supply, and that local markets became more active as travel to towns was restricted. * Eight different species of taro were harvested from the Buin DPI vegetable garden and 3 different species of Kaukau are to be harvested in the coming months, including the more nutritious purple and orange varieties. * After a series of delays seeds and materials were distributed for vegetable nursery and cultivation to the VEW’s and their farmers. |

PC = partner country, A = Australia

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Activity | Outputs/  milestones | Completion date | Comments |
| 3.1 | Support the establishment of DPI Regional research hubs in Bougainville | Selected facilitators trained at the Mars Cocoa Academy, so DPI has a network of well-supported research hubs staffed by trained scientists and technicians | Dec -2021 | * The South Hub station is fully established with a 10,000-capacity nursery, a budwood garden, a new clone block and a shed built to store tools and chemical and at the same time used as a compost house. We call it a combo shed. We also have a full-time officer managing the station. * Maintenance and upkeep of the South Bougainville Hub station was carried out. With a few changes the budwood garden will be ready for certification. The clones Observation Plot is well looked after in terms of weed control and general maintenance of the block. During a Ministerial visit, the PNG Agriculture Minister, Hon John Simon and the member for south Bougainville were taken to that block and were impressed as it was their first time to see such innovations in terms of research in Bougainville. The Nursery is been revived after been used by the Cocoa Board’s Nursery Project and abandoned. It has been recently cleaned and stocked with new soil filled poly bags. We are to venture into trialling out nursery marketing strategies as it is a norm that the life of cocoa nurseries depends on the life of the projects that they are engaged with but to run them independently has failed so we are trying to identify ways to have the nurseries run sustainably. Cocoa rootstocks in the nursery were recently budded for sale three months’ time. The shed that was built to accommodate all the project tools, materials and chemicals was broken into by thieves and they got away with all the cocoa pruning tools. The shed was then repaired and is in use again for storage. * DPI does not yet have a hub station in Central, although negotiations with landowners continue with the hope of re-establishing the Duncan Research Centre. One of our hard working VEWs (George Tonai) has set up a Solar dryer, budwood garden and nursery, IPDM demo plot and compost hut on a farmer’s block. We purchased a bicycle to help him reach out to his other farmers due to the remoteness of their blocks. * We built a shed at Arawa to store tools, materials and chemicals. * North also is facing similar situation so another hardworking VEW (Benjamin) at Siing was chosen and had the budwood garden established, nursery established, Demo block and the compost hut as well. However, for safety reasons this village can longer be visited. Therefore, Martin’s block at Malasang is given that attention now, with the compost hut established, nursery, IPDM block, budwood garden and a combination dryer. |
| 3.2 | Establish Village Resource Centres linking CCI, UNRE, AVRDC with DPI and DoH | Network of 33 Village Resource Centres | Ongoing | * See Appendix 3 for further details on VRCs * VEW Coordinator Borgia Sinato visited made to the VEWs in Jan/Feb 2020 to discuss how they are to work with their communities and Hub-Coordinators to plan and support the VRCs. Not all VRCs have buildings, but 6/11 in Central, 7/11 in the South and 5/11 in the North have community-built structures that function as broad community resource centres that include cocoa farmer training. * Issues and factors hindering progress of VRC construction were discussed and recommendations put forward to address them accordingly. One of the main challenges raised was that the VRCs are not getting enough support from their community government and ward steering committees. The project has since had regular meetings and monitoring visits with the VRCs to strengthen this working relationship. * Apart from setting up the VRCs as model farms for farmers in the Ward Assemblies (WAs) and other communities, some of the Village Extension Workers (VEWs) and farmers have taken the initiative to build training shelters. These shelters are to support model farmers to conduct training, have WA meetings and cater for other community gatherings/event. Some VEWs have also extended their work into other WAs. Farmers have received training on IPDM, crop diversification, bud grafting, nursery management and vegetable nursery. A number of nurseries and compost huts have also been established. * Cocoa Board officer Joe Yabom visited all VEWs with the assistance from the hub coordinators in all regions. During the visit he supplied 1000 polly bags, Bud wood garden labels and chicken fencing wires for poultry production and sales as well as for chicken manure production for composting some farmers erected their chicken houses and are looking after chickens now to collect the manure for composting. |
| 3.3 | Develop supplementary food crop and livestock enterprises | Recommendations for cocoa crop rotations that include food and supplementary crops |  | * The utilization of goat manure as compost or direct application to crops looks promising as shown by growth parameters such as leaf size (Length x Width (cm) and weight (g) of chinese cabbages and other food crops in our small trials in Kubu, North (See below). A more advanced trial was designed and initiated involving more treatments and replications. * Manure will be distributed to VEWs or put on sale for interested farmers. * Cocoa Board officer Joe Yabom visited all VEWs with the assistance from the hub coordinators in all regions. During the visit he supplied chicken fencing wires for poultry production and sales as well as for chicken manure production for composting some farmers erected their chicken houses and are looking after chickens now to collect the manure for composting. * The health of the goat population has improved following diagnosis of worm infestations and poor nutrition, and administration of appropriate supplements and therapeutic drugs. Two kids were recently born with another 2 on the way in Konga which will bring the goat population in Konga to 10. Goats continue to attract a lot of interest and a high demand for breeding goats, Michael Pearson’s census indicates Bougainville has 47 goats. There is also a high demand for goat manure to use as organic fertiliser in food crop gardens. Goat Manure and Cocoa pod husk training was also been conducted in the VAs. * Vegetables and rice seeds were distributed to VEWs to implement and show case the techniques of cocoa-vegetable/Food crop stripe cropping and for income diversification. * Information booklets for IPDM and Vegetable production have also been distributed in Tok Pisin to VEWs and farmers. * Vegetable cultivation and diversification work has continued in each of the regions. Elizabeth Pisiai (Southern Hub Manager) and Inia Bunsa (UNRE) participated in an AVRDC training course and continue to apply what they learned. VEW’s conducted field visits and monitoring to promote vegetable cultivation in their VA’s and diversify their farms with introduced and local vegetables to strengthen food security and also to provide another source of income. * Eight different species of taro were harvested from the Buin DPI vegetable garden and 3 different species of Kaukau are to be harvested in the coming months, including the more nutritious purple and orange varieties. * From Kikimogu Ward –Buin the FFT model has spread to Lonnako Ward whereAll families (approximately 30 households) are now working together to grow cocoa and have FAITH garden with diverse vegetables for consumption and sales. They supply Buin Secondary school with almost k1500-K1700 worth of vegetable every Sundays. * Mamaro VA with 3,000 inhabitants has established a cocoa and food crop nursery, food gardens, a waste composting facility, goats, ducks, poultry and an aquaculture setup farming Telapia under the leadership of model farmer Joe Taro. Good income is being made, especially from cabbages. * Work continued on documenting and training better handling practices of fruit and vegetables in transit and at the market place to that growers achieve higher prices and consumers get a higher quality produce. |
| 3.4 | Support economic development through enterprise development | Village communities establish diverse enterprises based around cocoa farming– nurseries, fermentation and drying, marketing, compost, block sanitation… | 7/2016-12/2021 | * Training Programs are now run by the VEWs and supported by the DEOs. * Budders who were trained through this project are now contracted to do budding in other commercial nurseries. Some are also hired to help do rehabilitation in other cocoa   farmers blocks.   * VEWs Benjamin Tatou, Martin Masen (with Malasang Womens) and Chris Poto (Chocolate festival Best of show winner) in North Bougainville were assisted with funds for their IPA registration of their farm businesses; BENJAY Business Group and POTO INTER FARM Business Group respectively. Enterprise activities will include Cocoa Nursery and seedling sales, Cocoa wet bean buying, fermentation and drying, Bud wood garden, Poultry and vegetables. All the other VEWs will be encouraged and assisted to do the similarly as and when required depending on their progress. * VEWs are establishing small businesses advising farmers in VAs in addition to project sites. * Village youths are forming pruning gangs that rehabilitate cocoa blocks for an income. * We supported cocoa farmer Ishmael Toroama to develop small-scale cocoa processing for local markets. He is now President of the Bougainville Government. |
| 3.5 | Monitor farming systems | Regular surveys |  | * Data collection on crop growth performance under cocoa rehabilitation is continuing. Additional factor on nutrition is also being observed with Goat manure, Cocoa pod husk and NPK. * Trial demos on Cocoa based farming system (stripe cropping) with rice, Taro konkong, Kaukau (sweet potato) and various vegetables continued in Kubu. 55 Varieties of Taro were all tested and suckers distributed to Kunua, atolls and Buin DPI as germplasm under the linked ARSF project |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Activity | Outputs/  milestones | Due date of output/ milestone | Applications of outputs |
| 4.1 | Improve quality through better postharvest handling, fermentation and drying | Establish and evaluate cocoa drying and fermenting equipment  Guidelines for cocoa fermentation and drying  Communities adapt, build and maintain new fermenteries and dryers  Cocoa quality monitoring becomes routine | 1/2017-12/2021 | * 2X Combinations Dryers built already but there is one more to go for the South. * Most VRCs have solar driers. * Continuous training and awareness done by Julie of North Bougainville as she makes chocolates and farmers take their own samples over for testing to see if they are producing quality cocoa. * Silas is also working in partnership with the Field Services of Cocoa Board to carry out awareness and inspect cocoa fermentaries and carry out activities under the Cocoa Boards Nursery Project which is in collaboration with the South Bougainville Cocoa Project. * The ABG through DPI have now shown interest and are willing to fund build a bigger laboratory for commodity quality testing & monitoring and post-harvest processing R&D initially with cocoa/chocolate and others to follow on later. There has been a submission (proposal) made by ABG to source funding and we are fortunate to get Australia Government support through Bougainville Partnership to fund the complete building with all office equipment worth K2 Million . Construction began in May –June and expected completion is in November 2021. * Experiments investigating the impact of fermentation length and drying method on bean flavour and chocolate quality were initiated at Kubu. The goal is to identify optimum fermentation and drying recommendations for farmers using solar dryers. We found changes in fermentation temperature and differences in moisture and flavour profiles using a range of drying days on solar dryers or direct sun drying. Data collection and analysis is continuing. The information captured from these experiments will help farmers to adopt the appropriate drying techniques to improve cocoa quality and taste. * The project adopted a two-tiered quality testing regime for the three regional hubs so that they could assess local moisture and bean count, two vital criteria in the selling of cocoa beans. Roasters and grinders will be provided to the hubs as training equipment to reinforce the impact of poor fermenting and drying practices. The plan is for the central laboratory at Buka to have butter fat testing equipment and the means for calibrating moisture readings of the regional equipment. Long probe temperature probes were sourced because of their role in researching and training in fermentation * The use of NIR technology was explored for its role in moisture and butterfat content detection. It was considered too expensive to be employed locally but the option was left to ABG-DPI to decide if funding is available and this can be pursued.Though expensive, ABG DPI/BACRA now had bought a SpectraStar™ 1400 XT chocolate or cocoa products analyser and will be testing cocoa butter fat, power butter fat and moistures using this non-destructive and no use of chemicals NIR technology. It has been fully calibrated to analyser the specified attributes. The provision of egg incubators was also researched. It became clear that this is not viable until electricity can be guaranteed. * IPDM/CPBM techniques taught to the farmers as well as composting techniques and Post Harvest Technique are having an impact on the production levels and quality of cocoa being produced. |
| 4.2 | Develop cocoa value chains and market access | Key constraints analysis  Market opportunities identified | 7/2016-12/2021 | * We compile the only market reports for Bougainville cocoa farmers. Over 40 Cocoa Market Reports have now been produced and circulated. * Laboratory equipped with a fryer for roasting and grinder for making chocolate powder. * We initiated data collection on power consumption in roasting and nib grinding to assess the possibility of small-scale chocolate making and other cocoa based products * Training in establishing the costs of producing value-added cocoa products was commenced. * Activities continued at the mini chocolate laboratory. Farmers dry bean samples were assessed for quality attributes and small chocolate samples made for farmers to taste the end product. * Efforts to increase the capacity of the Laboratory were stalled because of the availability of equipment from international suppliers. * Mini chocolate Laboratory construction in Kieta (Toniva), Central Bougainville is 70% complete and looks certain to be fully completed by end of July. Equipment for bean roasting, winnowing and deshelling, grinding and others will be commissioned for testing bean quality and some training on cocoa quality including processing of cocoa products will be conducted. It will also assist DPI/BACRA operation in terms of quality testing for export samples, compliance monitoring as well as certification of cocoa exports from Bougainville. Launching of the Mini-lab is scheduled for September 2021. * Grant Vinning developed a series of papers examining the international trade of Papua New Guinea cocoa beans based on the import data from select countries. * For the first time, Bougainville has been able to enter cocoa beans in its own name into the worldwide Cocoa of Excellence for 2021. * David Guest visited Loving Earth; a Melbourne based chocolate company to discuss potential supplies of beans from Bougainville as there is a good match with their requirements. The biggest constraint remains the cost of transporting small shipments of beans. * An analysis of local chocolate making costs was conducted by James Butubu and Grant Vinning * Plans to conduct training in food safety for cocoa bean processing in the chocolate lab. * Meetings were held with skilled local bakers to discuss engaging them to train farmers/VEWs on how to bake cocoa based cookies, cakes and confectioneries * DPIMR are currently working on designs for packaging for locally produced chocolate. . With the Enactment of Commodity Regulation ACT 2020 by the   Bougainville House of Representative (parliament) it allows the establishment of Bougainville Agriculture Regulatory Authority (BACRA). One functional division will be R&D into local downstream processing and packaging of Commodities to finished products. Therefore, BACRA under DPI will be looking into processing of Cocoa into chocolates and other products as well with technical advice and expertise from other organisations such as Bougainville Partnership (CSF) and ACIAR as well as Chocolate makers in Australia.   * There was a continuation of the activity of extending information regarding the formation of world cocoa prices into the more distant cocoa growing regions. - Covid-19 has resulted in requests to provide information to a large number of individuals and organisations. |
| 4.3 | Extension, education and capacity building | DPI Officers trained in cocoa management  VEWs established and supported in 33 participating villages | 7/2017- 12/2021 | * DPI officers together with VEWs were already trained in 2017 but continue to learn new technologies through collaborative efforts with the project staff and the DPI officers. * Supported 1 X UNRE officer and 1 X southern hub coordinator to attend Vegetable Cultivation training at the AVDRC-WVC in Thailand. These officers supported DPIMR staff to provide the vegetable cultivation training initially to 10 CRG villages and eventually to all VRCs. * VEW training in each region was conducted in February 2021 by project staff and Department of Health staff supported by the FFT trainers. The curriculum included information on water and sanitation (pit toilets)/nutrition/vegetable gardens. The training was delivered providing the underpinning knowledge and theory as well as demonstrating how to provide the information to farming households and villages. * 10 UNRE students participated in Industrial training with the DPI. The students were engaged with the project for six weeks and were exposed to various activities such as cocoa extension and R&D work. |
| 4.4 | Link resource centres with schools/technical colleges to facilitate technology/skills training and transfer | IPDM plots located near schools/colleges | 7/2016-12/2021 | * Discussions were held with CB and DPI to plan the roll out of the CB Cocoa curriculum. * Mr. Anton Varvaliu who is the CB schools curriculum ran an inception workshop for teachers from the selected schools during the term 3 holidays. * An opportunity to support VEW involvement in building school gardens was followed up with Food Plant Solutions who have designed packages for schools in the Sepik, Solomon Islands and Vietnam. * The Cocoa Farmer’s mobile app will be accessible to schools to support the CB curriculum. |
| Cocoa management, food crops, livestock, business and health included in, and enriches, curriculum |  | * Schools were visited in June by PNG Cocoa Board and ABG Department of Education for the implementation of the teaching of Cocoa Curriculum in 36 schools selected. 40 teachers from primary, secondary and technical schools participated in the in-service curriculum training at Tunuru Catholic mission. * Students from the University of Natural Resources and Environment and from the Highlands Agricultural College (3X Northern Hub- Shantiel, Sylvester and Rosilda, 3 X Southern Hub) participated in the industrial training program. Their training covered cocoa technologies including grafting, nursery practices and management, rehabilitation techniques, pollination, farmer trainings, and vegetable production. Students were also involved in conducting small projects and data collections. |
| 4.5 | Chocolate Festivals and field days | Annual events including chocolate judging, farming and health training | 7/2016-12/2021 | * The Bougainville Cocoa Festival was cancelled in 2020 because of the COVID lockdowns. * The 2021 Festival will be replaced by a series of Field Days in each region. These will be designed to promote the achievements of the VRCs and VEWs and to enable farmers to exchange and share information and knowledge. Award-winning farmers, Health Department representatives and other stakeholders will be invited to present. We will use these to celebrate the opening of the DPI Chocolate Lab in Kieta, and introductions to the Cocoa Farmer’s mobile app. * An assessment of bean quality, progression on cocoa quality improvement and capacity building across each of the Bougainville chocolate festivals has shown a steady improvement across the project lifespan. * World food day celebrations were held in Tinputz Government station and a Mini-FFT and Fresh produce Training/ field day held in Namatoa Ward in Tinputz. |

## Summary of achievements to date (for ACIAR website)

* Village Resource Centres have been established and 33 Village Assemblies have benefitted from training programs on cocoa, vegetables, livestock, composting, children’s health and nutrition awareness, with several extra villages also requesting assistance.
* 17 of the 33 village budwood gardens established are now certified by PNG Cocoa Board for commercial operations.
* Family Farm Teams training is being rolled out across Bougainville and aligns very well with the Bougainville Government’s independence-ready programs.
* 21 Schools will roll out the CB Cocoa curriculum to support education, sustainability and economic development in farming communities.
* Entrepreneurship, particularly amongst women and youth is emerging in food crop production and sales, service provision and downstream processing of cocoa.
* Project officers continue to participate and contribute to ABG DPI Food security policy and Cocoa industry regulation through the Bougainville Agricultural Commodities Regulatory Authority (BACRA).
* Following the success of the Bougainville Chocolate Festival competitions in earlier years, entries from Bougainville were accepted into the Cocoa of Excellence competition in Paris for the first time.
* Stakeholders have been engaged through media and the TADEP+ bi-monthly updates, project Facebook page, journal articles and market newsletters.
* The Cocoa Farmer’s mobile app will support community development, improved health and nutrition, gender equity, education in addition to cocoa farming.
* The no cost extension will enable us to complete many activities that were delayed due Covid -19, and the opportunity to include additional activities such as the FFT and Cocoa Farmer’s app.

**Project Stories**

If your project has a significant impact story or standout achievement that could potentially be shared by the ACIAR Outreach Team, please provide further information via question prompts at the link. [Project Stories](https://www.cognitoforms.com/ACIAR1/ProjectStories)*.*

See Appendix 4- Case studies

# Impacts

## Scientific impacts

* Experiments investigating the impact of fermentation time and drying method on bean flavour and chocolate quality were initiated at Kubu. The goal is to identify optimum fermentation and drying recommendations for farmers using solar dryers. We found changes in fermentation temperature and differences in moisture and flavor profiles using a range of drying days on solar dryers or direct sun drying. Data collection and analysis is continuing.
* The use of NIR technology was explored for its role in moisture and butterfat content detection. It was considered too expensive to be employed locally but the option was left to ABG-DPI to decide if funding is available and this can be pursued. Though expensive, ABG DPI/BACRA now had bought a SpectraStar™ 1400 XT chocolate or cocoa products analyser and will be testing cocoa butter fat, power butter fat and moistures using this non-destructive and no use of chemicals NIR technology. It has been fully calibrated to analyser the specified attributes.The provision of egg incubators was also researched. It became clear that this is not viable until electricity can be guaranteed**.**
* IPDM techniques taught to the farmers as well as composting techniques and Post Harvest handling techniques are having an impact on the production levels and quality of cocoa being produced.

## Capacity impacts

* The project team in Bougainville have done a phenomenal job keeping the fieldwork and activities moving ahead, with ongoing support from the Australian based members. We are so fortunate to have such a wonderfully dedicated team.
* Apart from setting up the VRCs as model farms for farmers in the Ward Assemblies (WAs, formerly known as Village Assemblies) and other communities, some of the Village Extension Workers (VEWs) and farmers have taken the initiative to build training shelters. These shelters are to support model farmers to conduct training, have WA meetings and cater for other community gatherings/event. In Central 5 training shelters have been completed, 4 in North and 2 in South Bougainville.
* The VEW for Hahon Nembaka Ward, Edward Gaoram, has extended his work to 3 other WAs, 17 farmers came from Anatoba, Savon and Pomat wards. Edward has registered his group of farmers with Investment Promotion Authority and is planning to get a loan from the National Development Bank in Buka through the SMEs scheme. He is also working with surrounding farming families (approximately 200 farmers) to model the FFT in their farmers in Hahon. Edward is demonstrating Chicken farming, 3 hectare Cocoa farming, vegetables farming.
* Tony Tamura the VEW for Tomasi Ward has also extended his work to two other wards, Keabosi and Siato.
* Lead farmer Raymond Naeasi has formed a group of 50 farmers trained in IPDM under the project to promote cocoa production. His group is supported by fundraising to purchase farm tools, nursery and planting materials, crop diversification, bud grafting, nursery management and vegetable cultivation. They have established their own main nursery and several village nurseries and have requested for two sac clothes and 10,000 poly bags to extend their work further.
* In Kunua (Tomasi ward)– FFT model has Spread to Siato ward, with approximately 60 families working and cocoa, food crops and vegetable farming.
* From Kikimogu Ward –Buin the FFT model has spread to Lonnako Ward whereAll families (approximately 30 households) are now working together to grow cocoa and have FAITH garden with diverse vegetables for consumption and sales. They supply Buin Secondary school with almost k1500-K1700 worth of vegetable every Sundays.
* Chris Kamanau the VEW for Mosina , south Bougainville also registered his group of farmers with IPA and have now been funded and supported by the Community Support Facility (DFAT) to expand their cocoa activities.
* Communities that are outside the project selected VAs are in need of assistance too and are coming in to seek for assistance. Project staff now are seen as extension officers which signifies that our staff are well qualified and respected in terms of cocoa extension work through this project.

## Community impacts

### Economic impacts

* Those farmers applying the technologies taught during the trainings are seeing results in terms of increased yields of cocoa trees that translates to higher incomes. In addition to that, cocoa nursery business and hired labour has seen an improved livelihood which can be assessed as having an economic impact upon the farmers.
* This year, cocoa production has increased significantly as witnessed at Buin. The sheds belonging to the 3 main cocoa buyers were overflowing with cocoa bags which caused the buyers to close their sheds frequently and after shipment reopen for more cocoa business. Production figures are yet to be collected from the exporters.
* The chocolate mini lab continues to assist farmers to assess their bean quality from all regions. Among the farmers is Michael Dmax from Bana, South Bougainville who is sending bean samples to a USA buyer, ABG Member for KOPI Constituency and Minister for Technical Services (Dr. Kim) and others have liaised with USA buyers and collected samples for testing. They wanted the results of assessment as well as cocoa variety information quickly to include them with the shipment of their samples. Selection into the final 50 entrants of the Cocoa of Excellence competition will increase awareness of Bougainville cocoa amongst international buyers.
* All project officers and selected VEWs from North, Central and South have participated constructively to the ABG (BACRA) draft cocoa regulation sharing their experiences, knowledge and skills in Cocoa technologies transfer and trainings during the DPI internal works and stakeholder consultation held in Buka and Arawa. Many of the inputs and/or contributions were taken from the lessons and experiences learnt during the implementation of the project.
* A number of the farmers who have been trained by the project have been able to use these skills to find employment in other cocoa nurseries as budders. It is encouraging to see cocoa farmers carrying tools and knapsack sprayers when traveling along the highway as well as well looked after blocks with high bearing cocoa trees. This is an indication that they are practicing what they were taught.
* Some youths in the communities are now forming service-provision groups and are hired by cocoa farmers to prune cocoa blocks to earn some income. We support these youths with advice and training at the regional hub stations.
* We have demonstrated how vegetable cultivation provides health & nutritional requirements and income from our cocoa vegetable stripping cropping demo plot in Kubu.
* Vegetable production and sales by some farmers especially women are proving to be a viable diversification alternative with cocoa as seen from the initial high local market demand in Buka, Arawa and Buin towns.
* The utilization of goat manure as compost or direct application to crops is giving promising results and goat manure is in high demand.
* VEWs are leading their farmers by example. Their rehabilitated blocks show that trees come into bearing again, budwood gardens and nursery are also commercialised. This indicates that the economic status of these farmers has improved.

### Social impacts

* Since the initial nutrition and vegetable cultivation information sessions were conducted as part of the CRG, we have recorded self-reported changes being implemented within the communities to improve their health, nutrition and vegetable cultivation practices. Such changes have included adding gates on kitchens to keep animals out, improving preparation and storage of food, improving how drinking water is collected and stored, adding more variety into diets and building compost bins. These small but important changes could lead to improvements in health and nutrition and the overall productivity of these cocoa farming communities.
* The addition of the FFT into village trainings also added another dimension of families working together as a team in planning and implementing of household and farming activities. The FFT approach covers issues of gender and culture within families. In doing so it fosters more effective, sustainable and gender-equitable farming and households activities.
* The project is empowering women in three ways:
  + First, the project FB page is an active forum for women to share ideas, such as about vegetable production, project events & activities. It is clear that women working in the project are emerging as positive role models for empowerment.
  + Second, enhanced food crop productivity, as evidenced by improved local sales, indicates households are allocating greater resources towards vegetable production, traditionally a women's domain. This indicates greater bargaining power on the part of women within the household.
  + Finally, involvement of women in new enterprise activity in chocolate production indicates a new willingness by women to seek out non-traditional entrepreneurial roles.

### Environmental impacts

* Under planting and cocoa rehabilitation training also gave our farmers a better option to boost production from their old senile cocoa trees whereas in the past they were used to clearing forests to plant new cocoa plantations which lead to devastation of the flora and fauna. Therefore, most of our farmers now used old and existing blocks to under plant and rehabilitate to get more production rather than cutting down new forest to plant cocoa.
* Additional incentive for Rehabilitation of old (over 20 years) old cocoa trees. We are encouraged by the observation so far on half (50%) canopy rehabilitation pruning and stripe cropping over a temporary period. Food security and nutrition can be all addressed together with cocoa farming simultaneously with this technique however more data is needed. For the old Cocoa trees, there has being noticeable effect on the remaining 50% of the branches/ canopy in terms of increased flowering and pod production.
* Goat and chicken manure is being used for the preparation of composted fertilisers that improve soil health instead of using inorganic fertilizers which are not widely available in remote villages and might have adverse effects when excessively used.
* Following the CRG information session on water, sanitation and hygiene a number of communities have been putting in place measures to improve drinking water quality.

## Communication and dissemination activities

* Regular online team meetings and weekly WhatsApp calls were held, and ACIAR and TADEP project reports compiled throughout the year.
* Project Facebook page [Bougainville Cocoa & Health Project](https://www.facebook.com/groups/623998121765260/) has grown to 550 members. The group is used to disseminate project updates and relevant materials to a wider audience, and to facilitate sharing and exchanges of successes and failures. It has proved to be a more accessible platform for those living in Bougainville and PNG.
* The **Bougainville Reader** was developed as a platform for sharing observations, reflections, reports and stories from those working in Bougainville to improve the livelihoods of cocoa farmers. The reader includes two suites of writings. One is the notes and extended comments that have been compiled as part of the usual project’s activities. These will be lost when the project closes. The other is to provide a platform for project officers to test their research and writing skills. Officers have been encouraged to provide notes on subjects as diverse as grinding experiments in the Laboratory, pruning research, and rainfall patterns.
* Cocoa marketing newsletters were distributed by Grant Vinning. The reports have focused on factors that result in prices being what they are. In this way some form of forecasting is presented. Greater emphasis has been placed on factors affecting demand. Effort has also been made to identify someone within the DPI who could take over the production of the Reports. There were over 40 newsletters between July 2020 and June 2021. The newsletters are evolving into a two-way communication loop between producers and chocolate makers in Australia, New Zealand, and United Kingdom. One of the major outcomes of the flow of information is that despite Covid, the uptake of cocoa has been strong. This has been an important outcome as it has given growers confidence that as long as they produce a good product there is a market for their product.
* Arrangement was made for an interview by the NBC Bougainville for DPI to update the public on the progress on monitoring of CRG project by the Health and DPI officers
* Paper titled ' Factors influencing undernutrition among children <5yrs from cocoa-growing communities in Bougainville' was published in the journal BMJ Global Health.
* Paper on technology adoption, productivity gains and poverty alleviation with smallholder cocoa farmers in Bougainville is currently under review.
* Prof Merrilyn Walton & Prof David guest presented at the Marie Bashir Institute 8th Annual Colloquium on 7th-8th October 2020.
* Jessica Hall presented at the Marie Bashir Institute Early Career Researcher One Health One-Day Conference on 2nd December 2020.
* Jessica Hall presented at the Sydney Global Child Health Network (SGCHN) Virtual Research Fora on 26th November 2020.
* Jessica Hall presented at the Global Health and Nutrition Research Collaboration meeting on 15th December 2020.
* FAO and DPI held a Bougainville Food Security Stakeholder Consultation Workshop in Buka on 12 February 2021. This is the first consultative meeting in Buka among others. Project staff presented evidence of the incidence and causes of malnutrition based on our 2017 cocoa farmers survey and outlined the research activities we are undertaking to address food security.
* Online meetings of INCOCOA cocoa research community will be held in place of the ISCR, originally scheduled in Montpellier in September 2021 but now deferred. While it remains unlikely that project staff will be able to travel to this meeting, David Guest is on the organising committee of the INCOCOA meeting which has the theme “Innovations to support market development and promote sustainability to improve farmer’s incomes”.

# Training activities

* CARE International approached the project for additional training on composting and soil management for their farmer groups, and we were delighted to be able to partner with them to deliver this. CARE receives funding from DFAT, separate to the TADEP program. The workshop was targeted at Training of Trainers (ToT) at Wakunai, Central region in February. This means this techniques will now be implemented to wider non-project farmers in Bougainville thus the spread and benefit of this technology.
* Food safety training for cocoa bean processing in the chocolate lab is being developed.
* 10 UNRE students participated in Industrial training with the DPI. The students were engaged with the project for six weeks and were exposed to various activities such as cocoa extension and R&D work. They are also given different topics or projects to work on such as Cocoa fermentation and grafting techniques.
* Capacity building in family farm training occurred with staff from the DPI.
* Family Farm Teams (FFT) training has now been conducted in all 9 villages of the CRG. Regional training and roll-out of the FFT is planned for all 33 VAs in 2021 as part of the main project. . The original trainings were held at Tohatsie Ward (Halia) , Ben Matie (Hahon) and Kovanis (Tinputz) for North. Later it was conducted in two sites in Central (Kasowaro-Manetai and Kaprosipa-Wakunai) before going to 4 sites in South (Mamaro, Koogu & Kikimogu in Buin) and Mosiho in –Bana in September/october 2020. FFT training in the North is complete and South and Central Bougainville will be completed September/October 2021.Villages have already applied their knowledge and skills acquired during the vegetable gardening and nutrition information sessions to grow new food crops such as cabbage.

# Intellectual property

Nothing to Report

# Variations to future activities

* A 12 month, no-cost project extension was approved to enable the project to try and make up for lost time due to the COVID-19 pandemic, so the new end date for this project is now December 2022. Funds withheld by ACIAR in 2020 will be used to support completion of the project.
* An initiative to build chicken houses emerged when our VEWs were facing difficulties in accessing chicken manure. Chicken wire was distributed to them to help them accumulate chicken manure for their composting activities.
* Assessment of the 18 clones to the Bougainville micro climatic zones also surfaced when some of the clones were seen to not performing well. Some of the budwood gardens will be selected to carry out this activity.

# Variations to personnel

Iranious Simon has replaced VEW Alex Bialik in the Sorom WA. Alex has stepped down due to other work commitments in the community to allow his farmer to take the job. The community, chiefs and WA member were happy to select him to replace Alex.

Associate Professor Phillip Simmons joined the team to support economic analyses of the costs and benefits of project activities. Phil has substantial experience with IFPRI.

Project Officer Jess Hall returned from maternity leave in July 2021.

# Problems and opportunities

**Problems/ Opportunities**

It has generally been assumed that the COVID-19 pandemic would cause food insecurity in urban and rural communities on Pacific Islands like Bougainville. It was feared that disrupted supply chains and labour mobility will cause significant shocks to households. It was also feared that returning migrant labour might swamp local food systems. Global uncertainty would drive down commodity prices, farm incomes and drive-up living costs.

However, we are hearing and will continue to monitor reports that the local response to the pandemic has had a positive effect on food security for cocoa farmers in Bougainville. Cocoa farmers in Bougainville now appear to be producing more cocoa and more food crops than before the pandemic. The first part of the explanation is that the rapid lockdown of the island of Bougainville in 2020 helped contain the virus.

Secondly, we know that labour is a significant constraint to improving crop production. While the predicted return of people from urban centres has increased the local demand for food, we think this relatively young, well educated and healthy workforce has introduced new skills and innovations that increase local food supplies and decrease the reliance on imported foods.

The influx of labour has also helped commodity crop production like cocoa, in defiance of the anticipated slump in markets. Commodity crops provide cash income in rural villages that is essential for local transport, medical care, school fees, clothing and food. Spending this cash stimulates town and Provincial economies.

In many ways the local response to COVID-19 pandemic has demonstrated a resilience not seen in the globalised economy.

We think the Covid-19 pandemic supports our proposition that improved education and health services support more productive, healthier and more food secure communities.

Two main problems that hindered progress last year were the C19 lockdowns, then when the lockdowns were lifted Bougainville went into election fever. Both VEWs and officers were busy either been campaigners, scrutineers, polling officials or just providing security. This affected the progress of the project activities, however, few VEWs took that as an opportunity to stay home and work the land.

The C19 lockdowns also gave the opportunity for cocoa farmers to look seriously into maintaining their cocoa blocks as those who had well maintained cocoa blocks had a good time selling the cocoa dry bean bags while the by-standers who depended on the open Market produce of vegetables, fish and betelnuts found it very difficult to make ends meet as the main markets were closed. It was encouraging to see farmers either rehabilitating their blocks or clearing new land to plant cocoa.

Further, the Covid experience has shown that whilst demand for cocoa remained strong, overall profitability depends on factors outside the purview of the project. These are essentially costs associated with logistics such as storage, transport, and various statutory charges. The project needs to engage with those organisations whose terms of reference more properly address these issues.

There is a tremendous but as yet unexploited opportunity for ACIAR to continue supporting cocoa farming families in the Pacific. Extensive discussions were held in 2020 between ACIAR and researchers to identify priorities and opportunities for future research for development projects, and a clear pathway forward developed.

# Budget

Enter text

# Appendices

Appendix 1: Annual Project Report Appendix One Publications list (See link on ACIAR website - Microsoft Excel document)

Appendix 2: Project Media coverage

Appendix 3: Summary on Village Resource Centres

Appendix 4: Case Studies