



Final Evaluation of the FY13 Food for Progress Timor-Leste Agribusiness Development Project

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List of Abbreviations and Common Translations

CCT	Cooperativa Café Timor
ENSO	El Nino Southern Oscillation
FAO	Food and Agriculture Organization
GOTL	Government of Timor-Leste
ICCRI	Indonesian Cocoa and Coffee Research Institute
ILETRI	Indonesian Legume and Tuber Research Institute
MAF	Ministry of Agriculture and Fisheries
MOCAF	modified cassava flour
MTE	Midterm Evaluation
<i>município</i>	district (Timorese)
NCBA	National Cooperative Business Association
<i>posto (or posto administrativo)</i>	sub-district (Timorese)
PPKKI	<i>Pusat Penelitian Kopi dan Kakao Indonesia</i> (Indonesian Cocoa and Coffee Research Institute)
TLADP	Timor-Leste Agriculture Development Project
WHO	World Health Organization
USDA	US Department of Agriculture

Executive Summary

The Timor-Leste Agribusiness Development Project (TLADP) ran from October 2013 through March 2019 with USDA funding of just over \$9.2 million. It was implemented by the National Cooperative Business Association (NCBA) in partnership with Cooperative Café Timor (CCT) and the Ministry of Agriculture and Fisheries (MAF) in four districts. Farmers in one district (12 percent) have experience harvesting coffee commercially, but participants in the other three districts (88 percent) are primarily subsistence farmers with little-to-no exposure to commercial agriculture practices. Activities were organized around a) seedling production, b) farm production, c) crop supply chain development, and d) capacity building and training.

A network of 90 farmer nurseries were established which produced a) cloves, pepper and vanilla from local plant materials, and b) disease-resistant cocoa and high-yielding Robusta coffee from seeds developed at the Indonesian Cocoa & Coffee Research Institute (ICCRI). NCBA imported and distributed fresh stems of a new, high-starch variety (Ailuka I) of cassava developed through the Indonesian Legumes and Tuber Crops Research Institute (ILETRI), which were subsequently propagated using harvested stems. Nearly two million tree & vine seedlings were produced and distributed to participating farmers during the project along with over four million cassava cuttings. Only one nursery owner plans to continue producing seedlings commercially after the project ends. They report that individual farmers will not pay for high-quality seedlings when they believe that the government or a project will supply them for free. The one continuing nursery owner agrees with this and operates on a scale large enough that projects and the government already buy from him. However, farmer nursery owners agreed they would be happy and able to restart activities whenever asked.

12,368 farmers (70 percent male, 30 percent female) participated in the project which suffered from the country's worst-ever El Nino drought during its first two years. The final evaluation selected a random sample of farmers, measured their garden plots, counted all surviving seedlings and conducted a socio-economic survey. The results indicate that cassava farmers have prepared an estimated 796 hectares for cultivation (not all of which are being cultivated), and that between 59 and 71 percent of the tree crops had survived and were on their way to producing commercial yields.

The annual distribution of seedlings and varying growth rates of the trees means that initial harvests are expected to begin in 2019 with full, mature yields for all distributed seedlings occurring in 2029. A very conservative yield stream was projected (roughly half the Indonesian averages) to reflect Timor's poor soil conditions, uneven water availability and organic cultivation. Total production for the tree crops was projected out ten years that incorporated the annual seedling distribution numbers, estimated survival rates and yield timelines.

Yields from tree crops are summarized in Table 15 which indicates sustained, mature tree crop yields are expected to total about 2 million tons per year. NCBA developed likely price scenarios for each crop over the next ten years from which farmgate prices were estimated, and TLADP farmers are expected to receive about \$6.5 million annually in income from tree crops at mature yields. This averages out to about \$400 per tree farmer (in 2029), an increase of 180 percent over 2018 average income from crops. Organic certification needs to be completed as trees become ready to yield commercial harvests and is now under way, with the first 575 crops on 527 farms successfully certified in 2018. The timing of the yields means the remainder of the certification will be

completed after the project closes, but CCT has planned and budgeted for the remaining certifications to be completed in the following four years.

The scenario for cassava production was less clear. While Timorese farmers are experienced cultivators of cassava as a fall-back crop for “hungry seasons,” this is a new commercial venture for NCBA and CCT, and the market for cassava products is dynamic. The original design concept was for annual sales of cassava to bridge the 2-6 year period required for the trees to begin yielding. However, farmers had different ideas, with only 30 percent of farmers taking cassava cuttings also taking tree seedlings. The final evaluation survey found closer to 90 percent of cassava farmers in the sample only cultivated cassava, with no tree crops.

CCT has experimented with production schemes that were acceptable to farmers and which will ensure a sound basis for supply and settled on a combination of a section of own-cultivated land, a section of supported contract farmers, and cash purchase from individual farmers of both fresh tubers and dried, chipped cassava. During the project period, CCT purchased a modest \$150,000 of cassava from TLADP farmers while developing the supply chain and marketing aspects. They are now finalizing their first major buyer contract that will require an input of approximately 1,100 tons of tuber per year, with inquiries for additional monthly supply, and do not anticipate difficulties achieving this volume. Eastern Timor-Leste has vast uncultivated land suitable for cassava production, but the binding constraint for farmers is seasonal tractor services (provided by MAF) to open the land.

TLADP provided resources to help develop supply chains for all the products, particularly processing and warehouse facilities. One existing facility in Dili was renovated for clove processing, and three larger warehouses were built in various locations around the country. In the far east of the country, a multipurpose facility was built to handle wet tuber peeling and chipping for cassava, a cherry pulping mill for Robusta coffee, and drying tunnels and warehousing for all commodities purchased there. The facility in Comoro provides space for processing cocoa, pepper and vanilla, and international laboratory testing of vanilla drying and curing during the past two seasons indicates very positive results. Finally, a warehouse and annex built outside of Dili houses CCT’s investment in the cassava flour and starch production line.

All the supply chains were tested for one or more harvests and CCT is looking forward to commercial harvests starting in 2019. Based on yield projections of existing trees and processing conversion ratios, production of high-quality, traceable exports from the tree crops is expected to reach 1,000 metric tons by 2029 with a value of more than \$8 million annually. Petroleum is the largest export from Timor-Leste, with Arabica coffee number two at \$26 million (2017 data) per year. TLADP’s exports will provide a 30 percent boost for agricultural exports within ten years, all from new, diversified products.

CCT staff and all TLADP farmers received training & capacity building in land management, plant spacing, garden maintenance, product quality assurance and other aspects of successful commercial agriculture. TLADP extension workers were transitioned to CCT field staff and received extensive training in preparing for and managing organic certification, and have been working intensively with farmers on this. Buyers are very interested in this production – three containers of (non-organic) hand-picked, gourmet cloves were exported from farmers’ pre-existing clove trees, and samples from early cocoa yields were sent for flavor profiling. Production and exports should be sustainable based on yields from existing trees, and at the program close a bilateral donor was exploring supporting continued farmer nursery operations to expand plantings further. The cassava contract

being finalized is with the local Heineken brewery, and once they have confirmed health and sanitary conditions on the production line, additional buyers are expected to follow.

CCT has developed a staffing needs plan for mature yield production and processing volumes. They foresee adding 112 full time positions and 80 seasonal positions. Eighty-seven percent of the full-time jobs would be outside of the capital, Dili, where economic opportunities are very limited, and 38 percent of the part time jobs.

Considering the uncertain returns on cassava – likely to be positive, but unknown – the rate of return was calculated using the realized project grant amount against the most conservative projection possible – projected farmgate returns to farmers for tree crops only. Using the ten-year projections, the rate of return (IRR) was calculated at 13 percent – a strong investment – even if there is no return on cassava. A sensitivity analysis yielded 11 percent when projected revenues were reduced by twenty-five percent, and fell to a marginally-acceptable 7 percent only when projections were halved.

Experience with TLADP contains a number of good lessons for future design. **First**, the project timeframe was not well suited to the activities. All tree crops take time after planting to begin producing, and it is unrealistic to expect a project to develop nurseries, organize and train farmers to plant seedlings, and develop the supply chains and marketing structures within five years – before the trees begin yielding. A project like this one would ideally be implemented in two phases: 1) nursery development, farmer organization and planting, followed by (assuming benchmarks achieved) 2) investments in the supply chain, processing several years of initial yield and marketing.

Second, farmer nurseries were very successful. With basic training and support, farmers are able to manage medium and large scale seedling development. Decentralized nurseries reduce delivery stress on seedlings, build local ownership, and put more money into farmers' pockets. They can also be quickly restarted on demand.

Third, think twice before adding an unknown crop or product to a project mix. NCBA and CCT both were familiar with spices, but neither had worked with cassava when it was introduced for income bridging. Moreover, cassava farmers didn't demonstrate a strong interest in tree crops and vice versa, meaning the farmers, the crops and the nature of the support work are very different. It increases risks for the project.

Finally, be ready to do some socio-cultural research when you begin to help subsistence farmers transition to commercial agriculture. Customary rules that have enabled them to survive without markets might present challenges for day-to-day farm management and long-term investment in land (i.e. trees). For example, rights to free-range cattle grazing present serious challenges and costs to farmers, and customary communal land rights could greatly complicate farmers' incentives to invest and manage crops in ways that are considered efficient.

Overview

Project Name	Timor-Leste Agribusiness Development Project
Agreement Number	FCC-472-2013-028-00
Donor	United States Department of Agriculture (USDA)
Project Duration	October 2013-March 2019
Funding	\$9,204,012.43
Implementing Organization	National Cooperative Business Association (NCBA) Cooperative League of the USA (CLUSA)
Partner Organization	Cooperativa Café Timor (CCT) and Timor-Leste Ministry of Agriculture and Fisheries (MAF)
Geographic Coverage	Aileu, Baucau, Lautem, Viqueque districts in Timor-Leste

NCBA CLUSA implemented a multi-crop farming program in East Timor known as the Timor-Leste Agribusiness Development Project (TLADP) with funding from the United States Department of Agriculture (USDA). TLADP began in October 2013 with an original anticipated project completion date of September 2017. Due to greater than expected resources from monetization activities, a project modification was approved by USDA in September 2017 with an expanded number of geographic areas and beneficiaries and a revised closing date of March 2019.

Project Objectives

Specific activity objectives contained in the project agreement include:

- **Increased agricultural productivity of tree and high value horticultural crops** through improved agricultural techniques and technologies, increased knowledge of the farmers, more availability of appropriate improved inputs, and further use of financing services.¹
- **Expanded trade of agricultural products by increasing the value of post-harvest products and access to markets** through improved quality, increased efficiency, farmer procurement systems setup, enabling processing methods and process facility infrastructure development and improved marketing and market linkages.

Project Components

The project was implemented through four major components:

- Seedling production.** Seedlings were produced both in CCT nurseries and in contracted small farmer nurseries. Owners of contracted nurseries were provided with seeds, polybags, and training from the project to raise seedlings to suitable maturity after which they were purchased by CCT for distribution to project farmers. For cassava, individual farmers multiplied cuttings for their own use and for sale back to the project for further distribution. The seedling production component continued for all project crops through the final distribution period in January-March 2019.
- Farm production.** The project targeted 10,000 farmers to be trained in improved farming and post-harvest handling techniques adequate to produce commercial crops for eventual cooperative processing and value-adding. Farmers were granted seedlings from the project and benefited from cooperative post-harvest systems, equipment, and facilities, supported by 22 trained, local agricultural extension officers. Commercial crop

¹ Financing activities were not developed under the project and were dropped from the amended agreement.

production focused on cassava, cloves, cocoa, Robusta coffee, black pepper and vanilla, with fruit and moringa used to enhance domestic food security and local market sales. A portion of project cassava was intended for home consumption and local markets sales, while the remaining surplus - when available - was sold to the cooperative for value-adding production including modified cassava flour (MOCAF) or animal feed. A cohort of farmers was selected to develop project demonstration farms (Demplots) for the local training of farmers in practical farming techniques. Organic farming methods for crops with viable international demand were promoted with the establishment of farmer groups linked to CCT ensuring eventual markets. NCBA CLUSA provided farmers training on organic certification for cloves, pepper, cocoa, vanilla and coffee to add value to crops as they begin to yield and attain critical volume mass.

- C. **Crop Supply Chain.** To build on the distribution of crop seedlings and establishment of 10,000 project farms, CCT and TLADP developed and expanded the cooperative's sustainable crop procurement systems with an expansion of efficient supply chain management, processing, handling, transportation, value adding, and storage capacities of the new target crops of cassava, cloves, cocoa, pepper and vanilla. Prior to the project's implementation, CCT had more than 20 years of experience processing and exporting Arabica and Robusta coffee, and this will expand with TLADP Robusta production. Seedlings were distributed yearly during 2014-2019, and planted trees take 2-6 years to being yielding depending on the type. Some TLADP tree crops are expected to start yielding initial volumes over the years 2019-2024, and all will reach mature yields by 2029. However, by the last year of the project all supply chains had been tested with the purchase and processing of harvests from pre-existing trees from TLADP farmers.² Under the project, TLADP built a cassava warehouse in Tibar; refurbished a clove processing area in an existing CCT building; constructed a multi-crop storage facility in Lautem and constructed a spice and cocoa storage processing and export facility in Dili. A cassava wet processing facility in Lautem was completed, and a Robusta coffee wet processing unit was procured and is ready for installation when the yield is sufficient. The project procured two four-wheel-drive trucks for seedling distribution and crop transport purchased by CCT during the last year of the project, and CCT will allocate the appropriate amount of their existing truck fleet as production increases. CCT purchased limited volumes of cassava, cocoa, cloves, pepper and vanilla from project farmers – a result of early distribution of seedlings and from pre-project trees. Processing and export of project cassava, cloves, and vanilla commenced through CCT's existing and enhanced supply and market chains. As domestic and export markets develop, farmers and project staff will receive timely feedback on market prices. Project extension staff are transitioning to farm certification and crop purchasing.
- D. **Capacity Building and Training.** Farmers, staff, and cooperative agribusiness received capacity building at all component levels of the project. Training was intended to underpin improvements in agricultural techniques, seedling and farm production, post-harvest handling, cooperative development and organic/ethical trade certification (for export market crops), efficient supply chain management and marketing.

² Yield and value projections for the final project evaluation were extended to 10 years after project closing because of the delayed production timeline.

Purpose and Scope of the Final Evaluation

The purpose of the Final Evaluation was to provide an independent assessment and analysis of the overall relevance, effectiveness, efficiency, impact, and sustainability of TLADP using the USDA's prescribed framework, and the degree to which TLADP has accomplished its objectives and results as outlined in the results framework. Further, NCBA identified five specific objectives in the TOR:

1. Assess the project's performance in meeting the End of Project Activity and Results targets.
2. Assess the impact of the project for beneficiaries, including monetary and selected socio-economic measures against the baseline and midterm evaluation results.
3. Assess the current and future value of sales and trade from the crops supported and the viability and quality of market connections.
4. Assess the sustainability of the project by reviewing the capacity of farmers and related agribusiness to continue to support the project's crop production and assess the potential through to their production phases and possible further expansion.
5. Document best practices and lessons learned.

Structure of the Report

The main body of the report provides a general narrative assessment of the major project outcomes and achievements organized around the four central project components (seedling production, farm production, crop supply chains, and capacity building and training). This section includes an assessment of the enabling environment and household livelihoods in 2018 before the TLADP trees begin commercial production, an assessment of the forecasted impact on farmers, CCT and Timor-Leste, and presents the estimated rate of return on the project from the results of the Final Evaluation Survey (FES).

Following this is a cross-referenced summary of results to the key evaluation questions utilized by USDA in their standard evaluation format, focusing on project relevance, effectiveness, efficiency, impact and sustainability.

Methodology

The Timor-Leste Agriculture Development Project began in October 2013 and ended in March 2019, including approximately five and a half years of operations. Seedling distribution began in 2014 with just 5,000 cocoa seedlings, and the last seedlings (more than 700,000) reached farmers in early March 2019 before the project closed. As seen in Table 12 in the text below, the first yields from tree crops appear in years two to six (average 4 years), and mature yields are not realized until years five to twelve (average 8 years). A very few trees were produced in 2018, but the earliest commercial yield will begin in 2019 after the project closed.

This makes two key USDA indicators, actual productivity (yield per tree) and annual sales by farms and firms, impossible to calculate in a meaningful way for the final evaluation. Calculating productivity for cassava was similarly challenging as the first significant sales contract was being finalized in March 2019, and procurement had not yet been scaled-up. As a result, the final evaluation survey focused on estimating a) the number of TLADP trees growing on farms, and b) the area of garden plots prepared for cassava planting. Conservative yield amounts and timelines were estimated in consultation with the field crop advisors, and the ten-year projections included in this analysis are based on these plus the estimated number and age of each type of tree.

Project Updating and Stakeholder Interviews

The final evaluation consultant followed a process parallel to that used in the mid-term evaluation. Project documents were collected and reviewed, and periodic reports and updates obtained from NCBA in Washington, DC, Klaten, Indonesia and Dili, Timor-Leste. Interviews were conducted in Dili and during all field survey trips. The senior consultant also met with implementing partners for all ongoing donor-funded agriculture projects in Timor-Leste. A list of stakeholder interviews is contained in Annex X.

Survey Strategies

To achieve the objectives of the final evaluation, the consultant employed a combination of quantitative and qualitative methods to gather data and information.

A **quantitative survey** followed the basic structure of the mid-term evaluation and added a few refinements.

- Extension workers measured all farm plots and counted TLADP tree crops of each type.
- Enumerators asked respondents a series of questions including questions linked to the baseline survey, detailed questions about crop harvests and sales and livestock sales during 2018.

A simple random sample survey process was followed with a confidence interval of 95 percent and an error level of five percent at the overall project (national) level. CCT reported there were 9,576³ participating farmers in the project distributed unevenly over the three active districts. Standard sampling formulas⁴ indicated a target sample size of 367, and the consultant followed the same procedure used in the mid-term evaluation of sampling 450 to adequately cover the minimum number and allow for any failed surveys.⁵ The design of the **sample selection did not allow for statistically valid comparisons between districts** – stratification at that level would have required roughly tripling the total sample size, and this was not feasible due to budgetary and time limitations. During the analysis of the survey data, the consultant aggregated data at the national level, and did not weight the totals by district results. District results are presented for illustrative purposes only.

Qualitative techniques employed for the final evaluation included semi-structured interviews with key informants, stakeholders and selected individual and groups of beneficiaries. The questions asked were generally open-ended and intended to draw out their opinions and views on how the project might have been improved. Prior to field visits, a brief set of key questions were finalized for each type of stakeholder, and a general note-taking format was developed. Respondents were recruited using a purposeful sampling method in targeted districts and subdistricts. The interviews and discussions were conducted in multiple locations in each district and targeted sub-districts in parallel to the MTE Field Survey activities. They were conducted by the senior consultant and a Timorese research assistant fluent in Bahasa Indonesia hired by the senior consultant, plus one translator depending on the local language. The research assistant wrote summary notes in Bahasa

³ As of November 17, 2018. The final number of registered farmers as of March 31, 2019 is 12,374, of which 11,969 received commercial seedlings. The remainder received moringa and shade trees only.

⁴ The random sample calculator on <http://www.custominsight.com/articles/random-sample-calculator.asp> was used to determine the appropriate sample size.

⁵ There were no failed surveys in the final evaluation, although one husband and one wife (both registered TLADP farmers) were consolidated into a single household for a total number of 449.

Indonesia using an agreed structure,⁶ and the senior consultant consolidated these notes into the complete story. Field notes are attached in Annex 5.

Survey Development and Sample Selection

The survey instrument was based on the instrument utilized in the mid-term evaluation to maximize comparability with that and the baseline survey. Some questions were expanded to yield more accurate responses, and some additional questions were included. The English language version of the survey is contained in Annex X, while the Excel file with both the English and Tetun versions is included in the file transfer. The draft survey instrument was submitted to NCBA before field work began as part of the Initiation Document.

The method of random sample selection followed that used for the mid-term evaluation. In consultation with CCT's IT and M&E specialists, an online random number generator (<http://stattrek.com/statistics/random-number-generator.aspx>) was used to select 450 numbers between 1 and 9,576. These were used to identify corresponding farmers to participate in the survey, and the lists were distributed to the relevant extension workers so they could invite them to participate and schedule visits. The distribution of all TLADP farmers and the Random Sample is summarized in Table 1. Twenty-eight percent of the random sample selection were female farmers, which is roughly equivalent to the 30 percent actual female farmer participation in TLADP and is considered representative of women farmers' experience and views.

<i>Table 1 Distribution of TLADP Farmers: Overall & Random Sample</i>						
all TLADP	Aileu	Baucau	Lautem	Viqueque	Grand Total	%
Male	1,221	1,041	3,831	2,261	8,354	70%
Female	266	364	2,259	726	3,615	30%
Total	1,487	1,405	6,090	2,987	11,969	
	12%	12%	51%	25%		
Random Sample	Aileu	Baucau	Lautem	Viqueque	Grand Total	%
Male	63	38	129	93	323	72%
Female	11	12	71	32	126	28%
Total	74	50	200	125	449	
	16%	11%	45%	28%		

Baseline Environment

Respondents were asked a series of questions from which a picture of the overall environment could be obtained. They were questioned about their enabling environment and about household livelihoods, including the volume and value of agricultural production and sales (4 main crops, livestock and fishponds) during 2018, and all sources of off-farm income received during 2018. **The objective was to develop a baseline average against which projected and actual future changes can be measured.**

Enabling Environment

A variety of questions were included in the FES that were intended to provide a picture of socio-economic conditions for TLADP farmers. In most cases these questions are comparable to questions

⁶ The research assistant focused on details including dates and numbers, while the senior consultant captured the larger story.

included in the 2015 TLADP Baseline Survey. Since seedlings are just starting to yield marketable product, it is unlikely for differences with the baseline survey to reflect changes in income. Differences can come from the impact of government policies or programs, general economic strengthening not related to TLADP, or self-selection biases of TLADP farmers.

Household Size

The size of TLADP households closely reflects the baseline survey results, with the average household size for the FES random sample being 7.1.

School Enrollments

The baseline survey included questions on the number of school age children in each household but did not ask about school enrolments. Education is a key element in improving family welfare over the long term, and enrolments typically improve with household income. The FES survey broke down the

Figure 1 Household Size

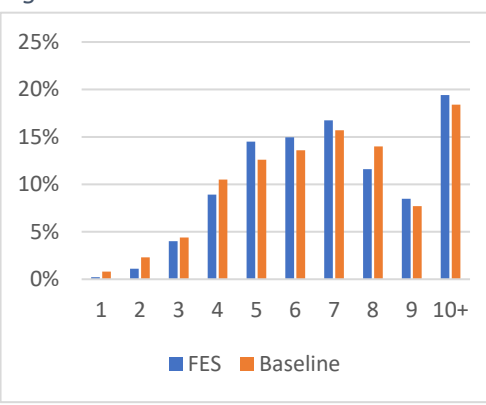
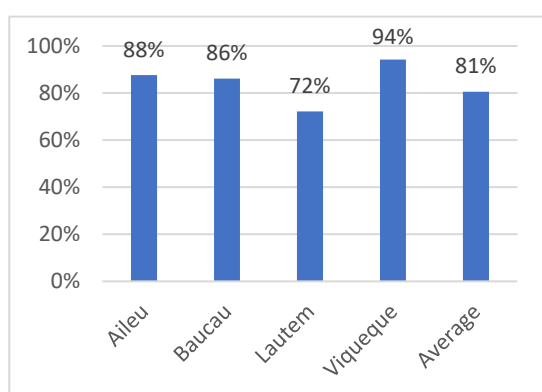


Figure 2 % Children aged 5-12 enrolled in school

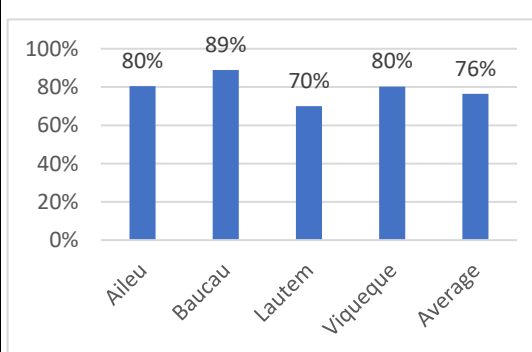


enrollment questions into elementary and secondary age groups. School enrolments for primary-aged students in the FES random sample were relatively high at an average of 81 percent but still well below where it should be. This is particularly true in Lautem, where only 72 percent of primary-aged children are enrolled.

Secondary enrolments were surprisingly high (an average of 76 percent of children aged 13-18 are enrolled) considering many of these students need to either a) travel long distances daily, or b) board away from home in order to

attend school, and both are expensive options in Timor-Leste. However, the results are consistent with responses from interviews – when asked how they used their earnings, “school costs” was always the immediate answer for households with children – families in Timor-Leste are strongly motivated to educate their children. As seedlings start yielding commercial production levels and household revenues increase, it would be logical to see enrolments increase. It is recommended to include questions on enrolments in any opportunity to survey TLADP households in another five or more years to confirm (or refute) this result.

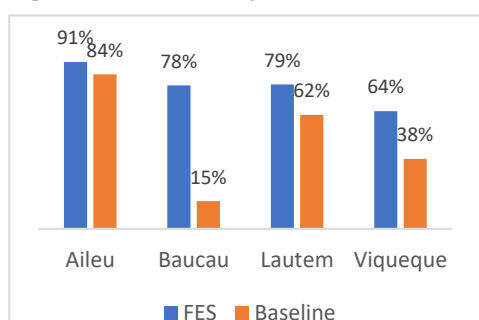
Figure 3 % Children aged 13-18 enrolled in school



Basic Living Conditions

Several questions were asked about basic living conditions, including availability of piped water in or near the house, access to sanitation (toilets), and access to electricity.

Figure 4 Access to Piped Water (%)



Access to piped water is still a challenge in many rural areas in Timor-Leste – WHO/UNICEF calculates that only 55 percent of the total population has access to piped water⁷, and that falls to just 45 percent of rural households. TLADP households have better access to water than both national averages and the Baseline sample in every district. The result is particularly striking in Baucau, where only 15 percent of the Baseline sample had access to piped water compared to 78 percent for TLADP households.

Sanitation is also a challenge in Timor-Leste, with serious implications for health – WHO/UNICEF counts 24 percent of the overall population who lack any sanitation facilities and practice open defecation.⁸ The FES survey results for access to sanitation are similar to those for piped water: TLADP households have better access to sanitation in every district compared to the Baseline sample, with Baucau showing the biggest difference followed by Viqueque. The overall average of 80 percent for TLADP households is higher than the national average.

Figure 5 Access to Sanitation

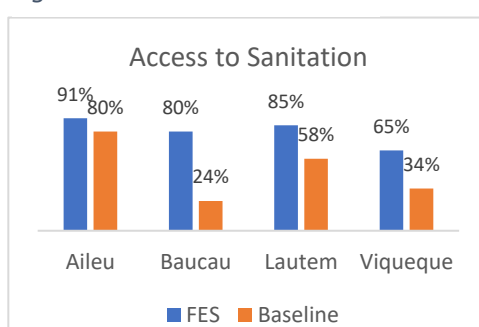
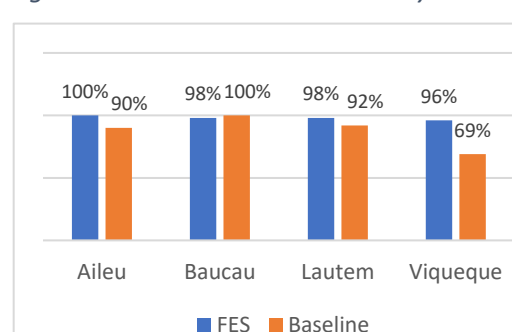


Figure 6 Households with Electricity



The results for household electricity connections are better than the Baseline survey report – almost all TLADP households have electricity. Viqueque was the last district to be connected to the national electrical grid during 2017 which probably accounts for a large portion of the improved results there, and completion of that project could account for the better results overall.

⁷ WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (<http://www.wssinfo.org/>).

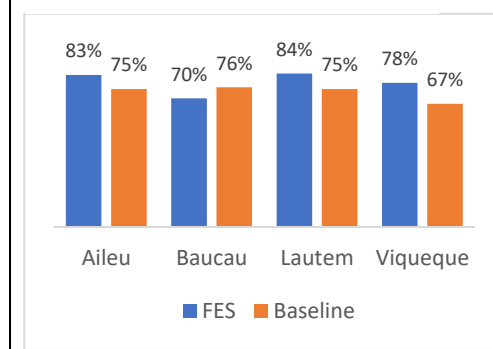
⁸ Ibid.

Communications

Handphone ownership in Timor-Leste is generally high, and the FES survey indicates an average of 80 percent of TLADP households use one. The district numbers are somewhat higher than the baseline survey results except in Baucau.

More than half (58 percent) of TLADP households own televisions, more than double the average from the baseline survey (24.5 percent).

Figure 7 Mobile Phone Ownership



Household Livelihoods

Respondents were asked a series of questions from which a picture of the overall economic environment could be obtained. These questions included their volume and value of agricultural production and sales (4 main crops, livestock and fishponds) during 2018, sales of TLADP crops before the program and in 2018, and all sources of off-farm income received during 2018. **The objective was to develop a baseline average income against which the projected values of TLADP production can be measured.**

Agricultural Incomes

The rural households of Timor-Leste are predominately agricultural, and even those with regular off-farm employment are typically occupied with cultivation and rearing livestock, as well. The FES survey asked respondents **about incomes obtained from their four most important crops plus livestock during 2018**. Since TLADP trees had generally not begun producing, this should be considered the baseline income for future comparison.

The results show that raising and selling livestock generates substantially more household income than crop sales. This reflects two key aspects of agriculture in Timor-Leste: a) produce markets are generally undeveloped, and b) the traditional subsistence orientation of rural households. On the other hand, animals are essential for traditional clan activities and their limited number results in high prices. A buffalo can sell for up to \$800, and mature pigs are commonly traded for \$300-400. With such high prices, it is not surprising that 82 percent of respondents reported raising and selling livestock in 2018. Rural households in Timor-Leste depend heavily on livestock raising for cash incomes, and TLADP will assist in reducing that dependency.

Figure 8 TLADP Average Annual Agricultural Income

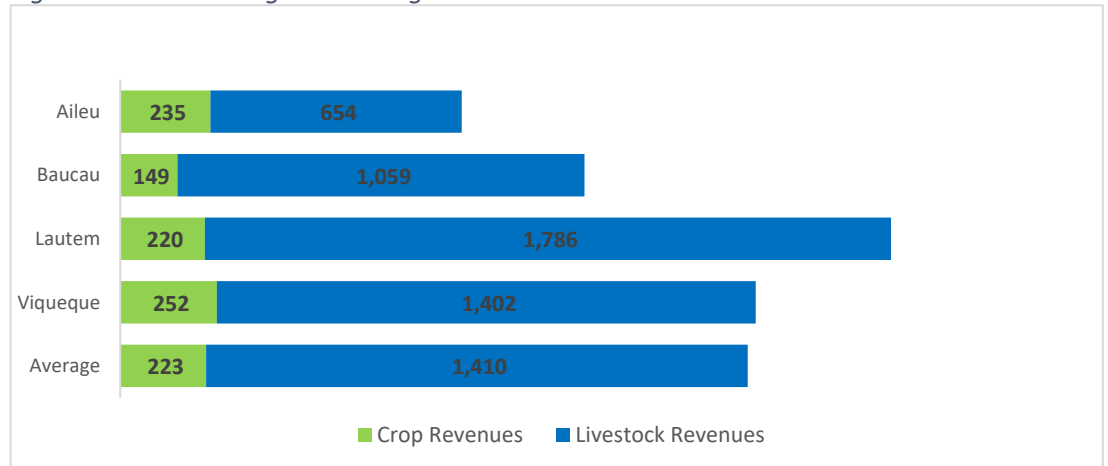


Figure 9 Number of animals sold 2018 (n=450 households)

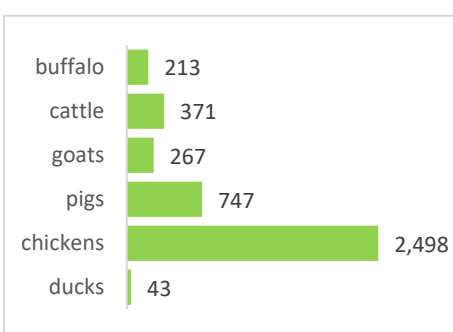
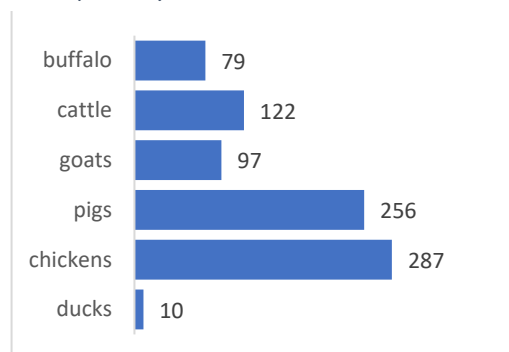


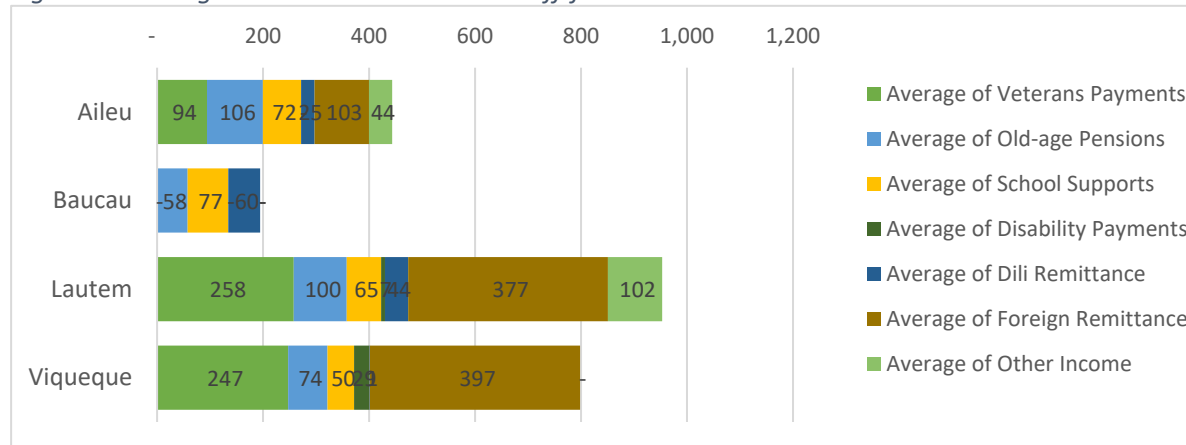
Figure 10 Number of farmers selling livestock 2018 (n=450)



Off-farm Incomes

Households in Timor-Leste supplement their cash incomes through a variety of channels. Family members have off-farm employment in the civil service or the private sector. The government offers pensions to the elderly, and veterans and their families; education grants for school-aged children; and income supports for the disabled. Domestic remittances from family members working in Dili are important, and foreign remittances from family members (mainly young men) working overseas can add significant funds to rural communities.⁹ On average, TLADP households add an extra \$741 annually through these cash resources, with wide variation among the districts.

Figure 11 Average Annual Cash Grants and Off-farm Income 2018

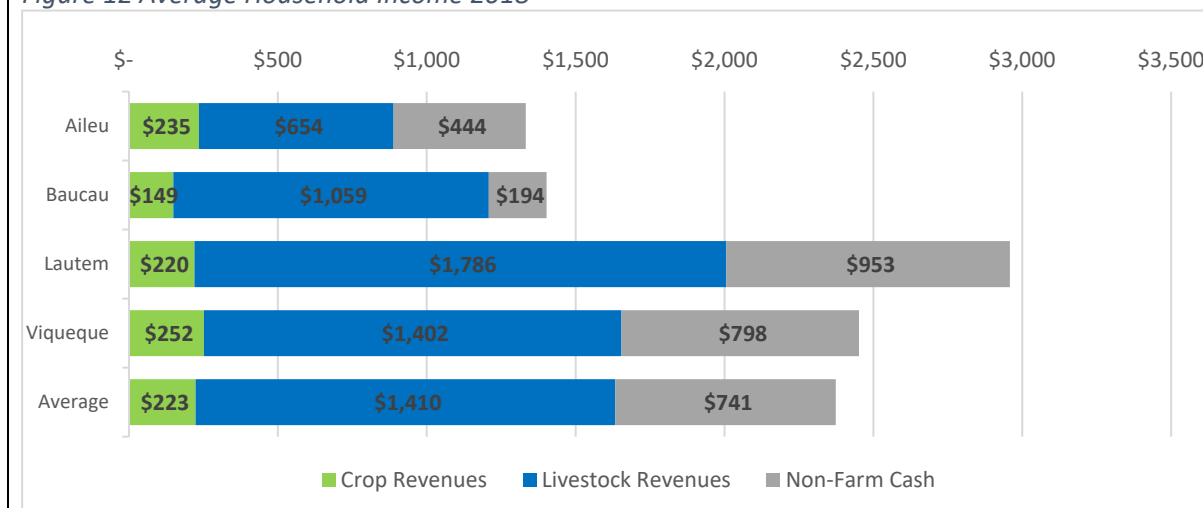


TLADP Household Incomes

The total household income is made up of these three components: crop revenues, livestock sales and non-farm income. The average for all respondents is \$2,374 per year.

⁹ Young men typically apply for a Portuguese passport and are recruited to work on 2-year contracts in Europe, often in Ireland and the UK.

Figure 12 Average Household Income 2018



CCT committed to begin buying existing TLADP commodity production from farmers before TLADP seedlings began yielding commercial volumes. CCT has maintained data on purchases from TLADP farmers detailed in the table below.

Table 2 CCT Purchases of TLADP Crops (USD)

	2014	2015	2016	2017	2018	total
Cloves	-	156	42	1,351	61,675	63,224
Cocoa	152	782	-	884	910	2,727
Robusta	-	-	-	-	-	-
Pepper	-	-	-	-	3,648	3,648
Vanilla	-	266	442	1,120	3,010	4,838
total tree crops	152	1,204	484	3,355	76,872	82,066
Cassava	4,802	115,549	13,769	8,143	7,629	149,892
total value	\$4,954	\$116,753	\$14,253	\$11,497	\$84,501	\$231,958

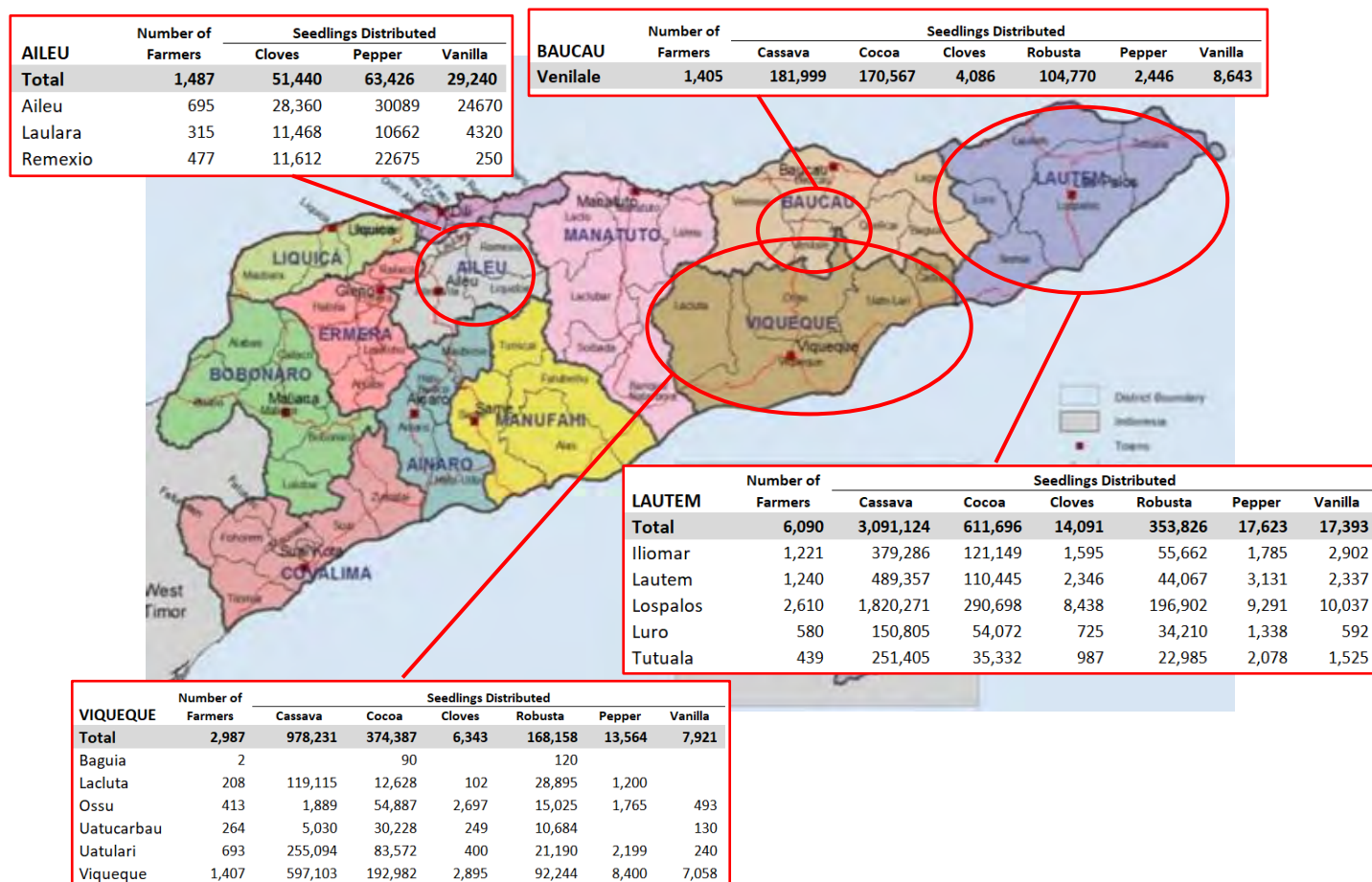
Two questions emerge from these numbers: Why did clove purchases jump so sharply in 2018 when TLADP clove seedlings are not yet producing? Why did cassava purchases drop after 2015?

- The purchase pattern for cloves reflects the fact that Aileu was late to be formally included in TLADP and farmers in this district own many (most) of the pre-existing clove trees.
- There are two reasons for changing cassava purchases. Cassava prices dropped from \$0.18 to \$0.15/kg after the 2015 harvest and many farmers chose to leave the tubers in the ground to wait for the possibility of a better price next year – it is very price sensitive. Second, cassava is a completely new business line for CCT and NCBA, and they decided to limit cassava purchases while they sorted out processing issues and developed a buyer.

Overall, 14 percent of TLADP farmers reported they sold product to CCT in 2018.

Project Outcomes

Figure 13 Distribution of TLADP Activities



Nurseries and Seedling Production

The overall number of seedlings for the five commercial non-cassava crops produced by nursery owners and distributed to TLADP farmers is roughly equal to the target, as seen in Table 3. The variation between numbers targeted and produced for each type is a logical result, as farmers choose the seedlings they want to receive. The number of Robusta seedlings produced was the only type significantly below the target, and the lower corresponding production levels in the future could have implications for profitability. (See the section on Pepper and Robusta Questions later in this evaluation for more detailed discussion.)

Planting material came from a combination of improved, imported seed stock for cocoa and Robusta coffee, imported cutting materials for a new, high-starch cassava, clove seeds from established Timorese farmers, and pepper and vanilla cuttings from established Timorese growers. Cassava stems were imported the first year only, each cut into five cuttings, planted and harvested 9 months later. CCT purchased harvested stems from farmers for redistribution to the next round of farmers. This 5-to-1 stem to cutting ratio makes it very quick to scale up cassava production – for a total of 4,251,334 cuttings distributed. Seeds for the disease-resistant cocoa and high-yielding Robusta were developed at ICCRI in Indonesia, and seeds were imported annually with support from MAF. Clove, pepper and vanilla materials were purchased from reliable, experienced local growers.

CCT contracted a total of 90 farmer nursery owners 338 times over the life of the project. Ninety nursery owners participating in the final project year had an average production of 8,000 seedlings each. Newer nursery owners were growing smaller numbers, and experienced nursery owners were interviewed who were growing up to 30,000 seedlings each. Both new and experienced nursery owners reported they had very few losses (counted in the tens) and the larger nursery owners were confident of their ability to manage such a large undertaking based on their previous success.

As part of the FES, at least two current nursery owners were interviewed in each of Lautem, Viqueque and Aileu districts. All nursery owners from the largest to the smallest were pleased with the experience and were ready to work again on contract with CCT. However, only one nursery owner in Aileu said he would continue in the nursery business after TLADP closed. This owner had experience working in the Portuguese commercial nursery in Aileu, supplied seedlings to a variety of program buyers, and said program buying was the only way nurseries were a viable business. He agreed with the other nursery owners that individual farmers were not willing to buy seedlings but preferred to wait for an organized program to provide them. This is the same opinion voiced during the MTE.

Table 3 Seedling Production by Type and Year

	2014	2015	2016	2017	2018	2019	TLADP total	EOP Target
cloves		4,242	23,781	20,378	11,859	15,700	75,960	45,000
cocoa	4,977	117,271	233,440	184,796	245,493	370,673	1,156,650	850,000
Robusta		450	62,503	117,185	151,056	295,560	626,754	1,000,000
pepper		4,241	7,513	27,994	23,231	34,080	97,059	100,000
vanilla			5,299	14,665	29,531	13,702	63,197	25,000
cassava								
total	4,977	121,962	308,755	344,640	449,311	714,015	1,943,660	2,020,000

Table 4 Distribution of Total Seedlings by Type and District

	Aileu	Baucau	Lautem	Viqueque	Total
Cassava		181,999	3,091,124	978,231	4,251,354
Cloves	51,440	4,086	14,091	6,343	75,960
Cocoa		170,567	611,696	374,387	1,156,650
Robusta		104,770	353,826	168,158	626,754
Pepper	63,426	2,446	17,623	13,564	97,059
Vanilla	29,240	8,643	17,393	7,921	63,197
Total	144,106	472,511	4,105,753	1,548,604	6,270,974

The system of farmer-owned nurseries located throughout the project areas is a sensible strategy for several reasons.

- With basic training and support, farmers are capable of producing good quality seedlings. Based on feedback from nursery owners, the strategy of starting nursery owners with smaller, more manageable numbers and increasing the numbers annually diversifies risk, builds confidence and is effective.
- Decentralized nurseries reduce the travel distance required for distribution thereby limiting stress on the seedlings, increasing quality on delivery and maximizing the likelihood of seedling survival.

- Decentralizing nurseries puts more cash in farmers' pockets – another \$74,000 this year, and a total of \$205,000 over the six years of seedling distribution.
- Sourcing seedlings locally builds program ownership among farmers.
- Local nurseries can be reactivated and scaled-up on demand.

A comprehensive analysis of seedling production and distribution costs was completed as part of the FES, and the total cost of the target number of seedlings for 2019 was \$224,000, or an average cost of \$0.32 each (including bundles of cassava sticks).

Farmer Numbers and Distribution

The number of farmers included in TLADP in March 2019 totaled 12,374, exceeding the project target of 10,000. 88 percent of the farmers are located in the three primary target areas of Lautem, Viqueque and the area of Baucau adjacent to Viqueque. The distribution of crops among the districts is outlined in Table 6, where the totals do not sum to 12,374 because farmers typically multi-crop and took several types of seedlings.

Table 5 Total TLADP Farmers by District

District	Number of Farmers	%
Aileu	1,488	12%
Baucau	1,445	12%
Lautem	6,290	51%
Viqueque	3,141	25%
Total	12,374	100%

Table 6 Total TLADP Farmers by District and Crop

	Cassava	Cloves	Cocoa	Robusta	Pepper	Vanilla
Aileu	0	890	0	0	1023	318
Baucau	71	86	812	470	48	104
Lautem	1296	462	3005	1732	585	265
Viqueque	491	120	1725	911	169	109
Total	1,858	1,558	5,542	3,113	1,825	796

Tree Crops

The FES survey repeated the same process employed in the MTE, counting all live trees on farms in the random

Table 7 Distribution of Farmers by District and Crop (%)

	Cassava	Cloves	Cocoa	Robusta	Pepper	Vanilla
Aileu	0%	57%	0%	0%	56%	40%
Baucau	4%	6%	15%	15%	3%	13%
Lautem	70%	30%	54%	56%	32%	33%
Viqueque	26%	8%	31%	29%	9%	14%

sample, comparing these numbers with the number of seedlings of each type issued to these farmers, and calculating the seedling survival rates as listed in Table 8. While the district variations can provide valuable information to CCT and their extension workers on success and weaknesses, the **district samples were too small to be statistically valid** and the **overall averages were applied to the total number of seedlings distributed in order to obtain project-wide projections of productive trees**.

Based on the projected tree numbers, yields over time and projected prices, there are sufficient numbers of all tree crops for processing to be profitable for CCT. The number of trees for Robusta coffee and pepper will generate relatively low values for exports, and this issue is discussed in more detail in the section, "Robusta and Pepper Questions."

Seedling Survival Rates

How do the seedling survival rates compare to the MTE results? The FES average counted survival rate was roughly comparable to the MTE rate for cloves and Robusta, and was lower for cocoa, pepper and vanilla. Arithmetically, this seems to be caused by very small tree counts for cloves in Baucau and Viqueque, and for surprisingly small counts for pepper and vanilla in Viqueque. Farmers have not been reporting higher seedling mortality rates over the past few years, so the underlying cause for this difference is unknown and is likely attributable to the random sampling process.

To maintain the most conservative projections for farm revenues and exports in the analysis, the lower FES survival rates were applied.

Table 8 FES Seedling Survival Rates

	Cloves	Cocoa	Robusta	Pepper	Vanilla
Aileu	77%			81%	76%
Baucau	38%	58%	84%	50%	47%
Lautem	43%	69%	69%	51%	82%
Viqueque	10%	67%	58%	16%	25%
Total	71%	66%	65%	59%	68%
<i>MTE</i>	<i>69%</i>	<i>74%</i>	<i>66%</i>	<i>79%</i>	<i>78%</i>

Cassava

CCT and NCBA undertook substantial experimentation to find both cultivation and processing strategies that are commercially viable and feasible for the 1,858 TLADP cassava farmers. Cultivation is addressed here, while processing is addressed in the section below on supply chain development.

Based on the random sample included in the FES, TLADP farmers have prepared an estimated 796 hectares for cassava cultivation (see the section on methodology in Project Yields and Revenues for more detail on estimation methods).

In 2018, CCT reevaluated its strategy for cultivating and purchasing cassava as a result of farmers' complaints about time for processing and the risks in drying.¹⁰ CCT has developed a four-part strategy to ensure an adequate supply and improve commercial viability and address farmer concerns of tubers to the processing facility in Patoo:

1. CCT is negotiating to use 100 hectares of MAF land adjoining the facility, and CCT staff will cultivate 40 hectares directly. CCT has negotiated with the local MAF office to repair two of their inoperable tractors and will maintain it in exchange for priority use.
2. Sixty hectares will be cultivated by local farmers under contract to CCT. CCT will provide tractor services, fencing material, planting material and fertilizer, with costs reimbursed at the time of sale.
3. CCT trucks will pay full price and pick up fresh tubers from TLADP farmers located within 20 km of the Patoo facility.
4. CCT will buy fresh tubers from TLADP farmers further than 20 km with a transport charge, or they will pay full price for tubers delivered to the Patoo facility.

All four sources combined should provide a stable production base and overall adequate supply of cassava to meet the anticipated demand.

Crop Supply Chains

Individual crop supply chains were discussed in detail in the midterm evaluation, and this section is intended to provide updated information and changes. The main challenges for CCT as they expand procurement will be coordinating organic certification while maintaining separate processing and

¹⁰ Lautem has a different weather pattern than other areas of Timor-Leste and gets two lengthy seasons with intermittent rains. Increasing uncertainty on seasonal timing now makes sun-drying any product (cassava, cocoa or pepper) riskier in Lautem.

storage lines for organic and non-organic products. This will diminish the closer the certification process moves towards full coverage in approximately four years.

Cloves

As of March 2019, there were 1,558 TLADP clove farmers (71 percent men and 29 percent women), the fourth most popular crop among the five tree crops offered under TLADP. Table 7 indicates that Aileu will dominate clove production with 57 percent of producers, followed by another 30 percent in Lautem, and Viqueque and Baucau splitting the remaining small numbers of clove producers. Based on the calculated average seedling survival rate, 75,960 TLADP clove seedlings distributed through March 2019 are likely to result in an estimated 54,000 clove trees (using the FES calculated seedling survival rate of 71 percent). Initial commercial yields from TLADP trees are projected to start in 2021 with approximately 4,500 kg, reaching mature annual production above 300,000 kg in 2029 (see Table 15).

Clove production was common during the Indonesian era (especially in Aileu), and most TLADP clove farmers have pre-existing trees. CCT has been purchasing cloves from these older trees throughout the project period, totaling \$63,224 through March 2019.¹¹ Three shipments of hand-picked gourmet cloves have been sent to the McCormick Corporation in the US.

After the dried cloves are purchased from the farmers at the three buying stations in Patoo, Viqueque and Comoro, they are transported to CCT's NT facility in central Dili where they are cleaned, sorted and graded. TLADP resources contributed to the refurbishment of the NT grading, packing and storage facility, although CCT is now moving all clove storage to the new TLADP-built facility in Comoro, Dili which is better equipped to handle large volumes. Bagged cloves will be packed in containers and delivered to the port directly from the Comoro facility.

Cocoa

Cocoa has been the most popular crop among TLADP farmers with 5,542 farmers (45 percent of all farmers, of which 70 percent are male and 30 percent female) choosing to receive a total of 1,156,650 cocoa seedlings. The FES tree count for sample farmers indicated a seedling survival rate of 66 percent. Surprisingly, more than half (54 percent) of all cocoa farmers are located in Lautem, and only 31 percent are in Viqueque where there is a strong, established cocoa-growing tradition from the Indonesian era. The remaining 15 percent of cocoa farmers are in Baucau.¹²

The supply chain for cocoa is straightforward. Cocoa is purchased from farmers in Lautem, Viqueque and Comoro in the form of bagged, dried beans. These are transported to the Comoro facility where they are tested for moisture content, cleaned and dried further as required and graded, bagged and stored. Bagged cocoa is containerized and delivered to the port directly from Comoro. No cocoa has been exported (just one bag inside a coffee container for testing in Australia). CCT has 2.5 metric tons of dried cocoa beans in storage at Comoro waiting to accumulate enough beans for a first export container requiring 13 metric tons.

Over the project period, CCT has purchased 1.58 tons of cocoa for \$2,727 from TLADP farmers with existing trees, just over half CCT's total procurement of cocoa of which was from TLADP farmers with pre-existing trees. During the past two years they have shipped TLADP cocoa samples from early-yielding trees to potential buyers for flavor profiling. TLADP commercial yields are just beginning on

¹¹ These purchases from TLADP farmers are 18 percent of CCT's total clove procurement over the project period. All clove purchases were processed and consolidated into the export shipments.

¹² TLADP cocoa seedlings were not distributed in Aileu in order to avoid overlapping activities with another project.

the earliest seedlings distributed, likely totaling around 40 tons in 2019 and all seedlings should reach their peak mature yields in 2026 producing over 400 tons.

Robusta Coffee

Robusta coffee has been the second most popular crop among TLADP farmers with 3,113 farmers (69 percent male, 31 percent female) receiving 626,754 seedlings. The FES tree counts for sample farmers indicated a seedling survival rate of 65 percent. Fifty-six percent of Robusta farmers are located in Lautem, another 29 percent in Viqueque and the remaining 15 percent of growers are in Baucau.¹³

The current method of processing Arabica coffee will be used to process Robusta. Ripe cherries will be purchased from TLADP farmers (eventually all certified organic) in Lautem, Viqueque and Baucau which will be transported to the Patoo facility. CCT has used TLADP resources to purchase the same pulping mill used in other CCT coffee installations, and will allocated resources to construct and commission it in Patoo together with drying areas. The dried beans will be stored at Patoo. When CCT has finished the final processing and export of the Arabica crop in the NT facility, the system is cleaned, the bagged, dried Robusta beans will be brought from Patoo to NT, and the final stages of processing the Robusta beans can be completed prior to export.

The first yields should begin in 2019 with about 19 tons of Robusta, gradually increasing to a total of a thousand tons when all distributed seedlings reach maturity in 2029. CCT has only bought Robusta once (in 2017) from non-TLADP farmers and managed the processing and sale without any difficulty. This product was sold to Royal Coffee (USA) and small coffee roasters in New Zealand, and TLADP production is likely to follow this route.

Pepper

A total of 1,825 farmers (71 percent male, 29 percent female) elected to grow pepper seedlings. The FES tree count of sample farmers indicated a seedling survival rate of 59 percent – the lowest of all types of seedlings. More than half of all pepper farmers (56 percent) located in Aileu. Lautem follows with 32 percent of pepper farmers, with Viqueque (9 percent) and Baucau (3 percent) taking the rest.

The supply chain for pepper is similar to the ones used for cloves and cocoa. Farmers sell dried pepper to CCT at their buying locations in Patoo, Viqueque and Comoro. This is transported to the Comoro facility where it is tested for moisture content, dried further as required and cleaned, bagged and stored. When an adequate volume is collected, the pepper is shipped to Java where it undergoes a specialized cleaning process to meet phytosanitary requirements for human consumption, is consolidated with stocks there, packaged or bagged, containerized and exported.

¹³ No Robusta coffee seedlings were distributed in Aileu, as this area is dominated by Arabica production.

CCT has traditionally purchased dried black pepper in Timor-Leste with the volumes typically moving together with the price: when prices are higher, farmers are more interested in drying and selling their pepper. This tends to reinforce the cyclical nature of the international price for pepper in the procurement values as seen in Figure 14 CCT Pepper Procurement. The increased volume in 2018 purchases despite

the current low in the cyclical price is a result of TLADP pepper farmers' first yields. Just under two tons of TLADP pepper was purchased this year – one year ahead of projections – and is expected to rise to 86 tons at mature production levels in 2025.

Vanilla

Of all the TLADP crops, the smallest number of farmers have chosen to plant vanilla: 796, or about 6.5 percent of all farmers according to the TLADP MIS (73 percent male, 27 percent female). The largest proportion of vanilla farmers are located in Aileu and Lautem (40 percent and 33 percent of all vanilla farmers, respectively) where there was some experience with the crop during the Indonesian era. The remainder of the farmers are split evenly between Baucau and Viqueque. Considering the extremely high value of vanilla to farmers (it had a farmgate price of \$57 per kg in 2018), it is unclear why more farmers did not elect to plant vanilla. One reason might be the availability of water, as vanilla requires more water than the other tree crops and water in farmers' gardens can be scarce. Another reason might be the perceived labor intensity of vanilla as each flower needs to be hand-pollinated in order to produce a bean. This reluctance might decline once farmers get a realistic picture of the labor input.

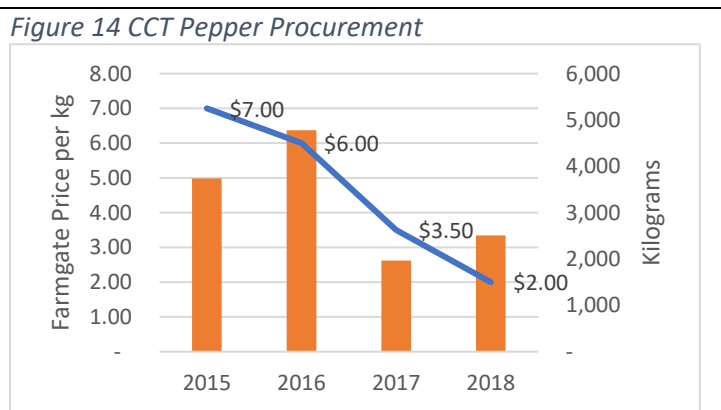
Farmers sell fully ripe green beans to CCT the day they are picked. During the harvest season, these will be transported daily to Comoro where the drying process starts immediately. A slow curing and drying process produces higher quantities of vanillin in each bean, and the carefully-managed process takes about six weeks to complete. The dried beans are then graded, bundled, and air-shipped to Java to be consolidated into larger export shipments.

In 2018, CCT purchased a total of 7,028 kg of green beans in Timor-Leste, of which only 61 kg (less than 1 percent) came from TLADP farmers. TLADP procurement should rise rapidly starting in 2020 and is projected to reach more than 100,000 kg by 2024.

Cassava

The TLADP MIS counts 1,858 cassava farmers (69 percent male, 31 percent female). Based on the FES survey data, the total area ready for cassava planting is 796 hectares. The survey also indicates that 70 percent (or about 560 hectares) of the total cultivation area for cassava is located in Lautem, supported by the MIS data showing that 70 percent of TLADP cassava farmers are located there. A further 26 percent of farmers are located in Viqueque, and just four percent in Baucau. Cassava was not distributed to farmers in Aileu district.

Cassava was initially included in the crop mix design in order to give farmers the opportunity to grow a quick-return crop while waiting for the longer-term return on the tree crops, but actual behavior reveals that cassava farmers have generally chosen to focus on that one crop. Analysis of the mix of



crops TLADP farmers are growing in the random sample reconfirmed the results of the MTE, with 30 of the 33 cassava farmers (91 percent) growing only cassava.

CCT's adaptive strategy for cassava production includes a MOCAF production and cassava starch production in Tibar that will produce MOCAF for domestic sale and consumption, where the warehouse and annex were supported by TLADP resources and CCT purchased the milling equipment. In consultation with Heineken, cassava starch processing has recently been upgraded to meet higher quality standards which will also benefit local retail sales of MOCAF. The second processing facility has now been built at Patoo, Lautem District with TLADP resources to produce dried cassava chip. This line takes fresh, wet tubers from TLADP farmers, peels and chips them, after which they are dried on platforms or in a drying tunnel. This dried product is converted into flour and fiber for export and domestic consumption at the Tibar cassava mill. This line became operational in March 2019 and should be able to process all cassava wet tuber production from Lautem. CCT will continue to purchase farmer dried cassava chip for farmers in Baucau and Viqueque. Any dried, chipped cassava produced by Viqueque farmers for a higher price will be transported to Tibar for further processing into MOCAF and cassava starch.

In 2018, CCT purchased 136 tons of mixed wet and dry cassava, virtually all of which came from TLADP farmers harvesting the improved, high-starch variety suitable for milling. Depending on the mix of wet vs. dried, the flour yield from these purchases would be between 45 and 120 tons of flour. This is a small fraction of the nearly 20 thousand tons of estimated potential tuber production,

Table 9 Cassava Projections

	cassava	flour
CCT 2018 Procurement	136 tons mixed wet & dried	45-120 tons
Potential full-cultivation	20,000 tons wet tuber	6,600 tons
Heineken T-L	1,091 tons wet tuber	360 tons

with an equivalent flour yield of 6,600 tons (33 percent by weight). Discussions with Heineken indicate their initial purchases will be approximately 30 tons of flour per month, or 360 tons per year, depending on sales. To fulfill this demand, CCT will have to count on buying approximately 1,100 tons of wet tuber (not counting draw-down of flour stocks), which is substantially above current levels but feasible based on earlier

procurement (see Table 14). Other regional Heineken installations have also expressed an interest in monthly purchases of cassava flour, and this will have to be worked into procurement and production plans once Heineken locally certifies the quality of the product.

The table above indicates that procurement will have to increase by three-to-six times the 2018 level in order to meet Heineken's local needs, and CCT staff are confident this can be realized, especially with the new wet tuber processing line installed in Patoo. A CCT manager who worked on a previous CCT project in Same district commented that in his experience "supply of cassava is not the constraint – it's the demand for the flour." He is sure that if you let farmers know you're ready to buy their tubers, they will show up with ample product.

Infrastructure

CCT has used TLADP resources to build and renovate substantial a range of infrastructure to enable production and processing of the TLADP crops. All of the infrastructure listed in Table 10 is complete and operational, with the exception of the coffee cherry pulping mill that is being stored in the Patoo warehouse and will be installed when Robusta yields are available for purchase. All of these were essential investments and will play a role in CCT's sustainable business development.

Table 10 Infrastructure Investments

Location	Buildings	Equipment
Tibar	Construction of 8,100 cubic meters to house the MOCAF production line and provide additional storage. Construction of 4,680 cubic meters annex to the Tibar warehouse.	
NT, Dili	Renovation of 440 cubic meters for the processing and storage of cloves.	
Comoro, Dili	Construction of 11,300 cubic meters to house the cocoa drying and storage, vanilla drying and curing, clove storage, and pepper storage.	
Patoo, Lautem	Construction of 4,050 cubic meters to house the cassava wet tuber processing line, buying station for cloves, cocoa, Robusta cherries, pepper and vanilla green beans, semi-finished stock storage, plus additional area for drying of all commodities. Renovated/constructed administrative and accommodation facilities.	Cassava wet tuber peeler and chipper. Coffee cherry pulping mill. Drying tunnels.
Baucau, Viqueque, Aileu	Renovated rented project office facilities as recommended in the MTE. These will be retained after the project closes and used for local administration and buying stations.	
Other		Purchase of two 4WD trucks for project operations, which have been transferred to CCT for crop transportation.

Organic Certification

One of the key concerns of the MTE was CCT's ability to achieve any number of organic certifications for TLADP farmers before the project closed. Organic certification can only be completed two years after the trees have been planted, and it would have been inefficient to start certification before a large number of the farms are ready for harvesting and a large number of on-farm crops can be inspected and certified in one external inspection process. The timelines for initial yields meant CCT would not have access to project funds for much of this costly activity. The FES found this process had been planned and

Table 11 TLADP Farms with Organic Certification

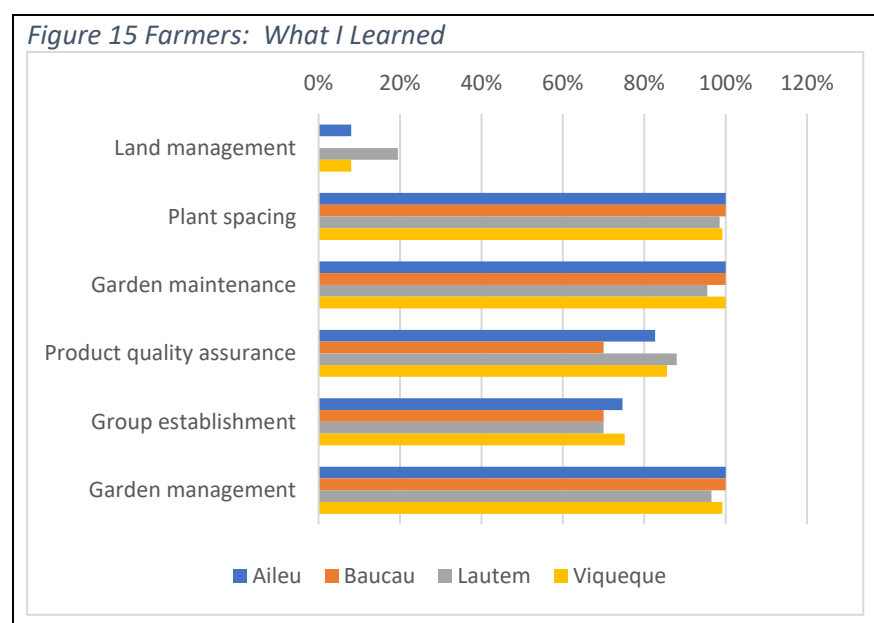
Cloves	164
Cocoa	267
Robusta	101
Pepper	19
Vanilla	24
Total	575

organized, with the first 575 farmers having successfully completed the process during 2018. Farmers have received training in this process and understand the need for certification in order to obtain higher organic and Fair Trade pricing from CCT – a strong incentive. Certification in Aileu is expected to be simpler than in other areas because most farmers are already certified organic Arabica producers and the TLADP commodities would be an expansion of this certification. However, farmers in Baucau, Lautem and Viqueque will be starting this process from a zero base. CCT has an ongoing working relationship with the certification organization and the basic strategy is as follows:

- An internal certification team has been established.
- Twenty extension officers have been trained to transition to Internal Compliance Officers.
- A plan to add the new farms for cloves, coffee, pepper and vanilla has been created to begin certification just prior to their first harvest.
- Organic certification for cocoa is likely, but will be decided depending on future commercial considerations.
- Processing of crops purchased from TLADP organic certified farms will be undertaken separately from non-organic farms to maintain trackability and organic status that will ensure the highest possible value is obtained for exports.
- Funds are being budgeted to support its completion during the four years after TLADP closes.

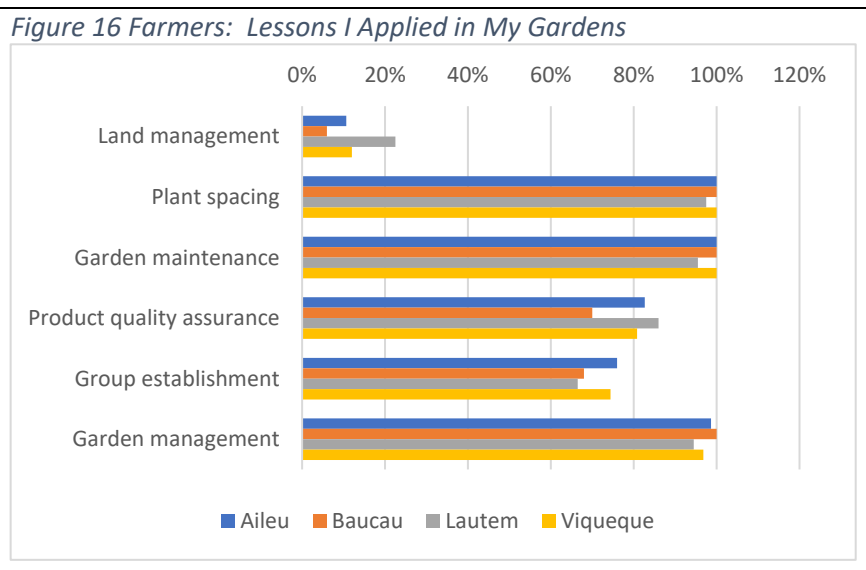
Capacity Building and Training

The MTE recommended increased capacity building for extension workers and participating farmers, and this was reportedly followed up. Discussions with extension workers confirmed these activities had taken place, and the FES survey included questions about what the farmer-participants had learned as part of their participation in TLADP, and whether or not they applied those lessons on their farms.



Questions were asked about lessons on plant spacing, garden maintenance, product quality assurance, group establishment and garden management. These lessons were apparently well-received in view of the proportion of farmers who said they applied what they learned in their gardens. The weaknesses in the lessons on land management are unclear, although the

fact that more farmers reported they applied the lessons than learned them is a strong indicator that the weakness lies in the survey question.



Impact Analysis

One of the weaknesses of TLADP design and monitoring lies in the fact that the project investment period is limited, while tree crops can take time to begin yielding and even longer to reach their mature commercial yields. TLADP ceased field operations in March 2019, and farmers are likely to get their first tentative yields of some tree crops the following harvest season. Moreover, seedling production and distribution has continued every year of the project, with the final seedling distribution completed in early March 2019. While cassava can be harvested as an annual crop, the trees will take another two-to-six years to begin producing, as outlined in Table 12.

One of the key objectives of the Final Evaluation was to develop **projections** for production levels, farmer incomes and exports during the decade after the project ended – based on evidence of seedling survival rates and projected market prices.

Production

Among the six crops promoted under the project, cassava is unique. Cassava is an annual tuber all farmers of Timor-Leste are familiar with as a traditional staple crop which farmers have the option of

Table 12 Approximate Yield Timeline for Tree Crops

Commodity	Year of first yield	Year of mature yield	Estimated Lifespan Years
Cloves	6	12	50
Cocoa	3	7	60
Robusta	4	10	100
Pepper	4	6	20
Vanilla	2	5	10

sources: NCBA Tree Crop Advisor, FAO

leaving in the ground if they do not need or want to harvest it in any given year. This is a valuable characteristic in a harsh environment subject to drought and food shortages, although it results in some uncertainty for CCT's commercial processing activity as farmers can be very sensitive to price changes. For example, the drop in price for dried chipped cassava from \$0.18 per kg to \$0.15 per kg resulted in most farmers choosing to leave their existing crop in the ground and to reduce planting of new sticks. Output is very price sensitive and can change dramatically from one year to the next – both up and down.

The current rate of cassava production and procurement is not a sound basis for projections for both supply and demand reasons. Investment in the new processing plant in Lospalos was completed in early 2019 which will enable wet tuber processing – although the price paid to farmers is lower, it is a popular option as peeling, chipping and drying is hard work, and the sale of wet tubers does not

depend on good weather to dry. On the demand side, CCT now has a firm domestic buyer ready for regular delivery and expressions of interest from reputable buyers outside Timor-Leste. The demand in global markets is unpredictable but the outlook is optimistic right now,¹⁴ and the supply response from farmers could be very quick. For these reasons, the cassava flour production output and values below should be considered indicative parameters.

On the other hand, output from tree crops is predictable. For the FES, the author worked with the NCBA Tree Crop Advisor to develop yield timelines for each of the tree crops, including the year of first yields and rates of increase up to mature yields (see Table 12). Among the TLADP tree crops, only vanilla has a relatively short, ten-year lifespan with slight declines in productivity during the last two years, but it is also easy to propagate and has the shortest period to first yield (second year after planting). Projections of output and revenues from vanilla assume that farmers have an ongoing seedling development strategy for replanting and expansion, and a constant mature yield rate is assumed (based on field discussions, expansion and increased production is more likely).

Methods for Projecting Farm Output

A simple method was used to determine the maximum potential production levels for cassava. The FES survey included measurements for each of four possible plots used to plant TLADP seedlings. Cassava plots require full sun while the tree crops require shade trees, thus the cassava plots were used for cassava only. The total square meters for cassava plots in the FES random sample (both planted or fallow) were measured and averaged by the number of farmers growing cassava, and this number (4,284 m²) was multiplied by the total number of TLADP cassava farmers (1,858 farmers). The resulting total of cassava-ready hectares for production is 796,¹⁵ with a realistic *potential* production of just under 20 thousand tons per year. This production level was used throughout, although increased demand and a rising price could induce farmers to open new land to cassava cultivation.¹⁶

*Table 13 TLADP
Farmers by Crop*

	number
Cassava	1,858
Cloves	1,558
Cocoa	5,542
Robusta	3,113
Pepper	1,825
Vanilla	796

TLADP tree crop production is more predictable, as are the global markets for their output. The plots of the random sample of 450 farmers were measured and the number of TLADP trees of each type were counted. The number of seedlings distributed to these farmers was used to determine the seedling survival rate for each type of tree, and these rates were applied to the total number of seedlings distributed to all TLADP farmers to yield the total number of trees of each type. The numbers of trees were then applied to the yield stream to calculate total production by type.

¹⁴ Beverage manufacturers are looking at cassava for beer and alcohol production, and cassava starch is being used to replace plastic in bag production. https://www.washingtonpost.com/outlook/2018/10/23/our-research-found-that-climate-change-could-cause-beer-shortage-heres-why/?utm_term=.3833c621755f

¹⁵ This is higher than the estimated 547 hectares calculated from the MTE survey.

¹⁶ There is ample unused land, especially in Lautem, that is suitable for cassava cultivation.

Yields of Targeted Commodities

As noted previously, TLADP tree crops are expected to begin yielding small amounts in 2019 and all seedlings distributed under the program will reach mature yields by 2020. CCT has been buying crops from TLADP

Table 14 CCT Purchases of TLADP Crops (KG)

	2014	2015	2016	2017	2018
Cloves	-	26	7	193	10,064
Pepper	-	-	-	-	1,820
Vanilla	-	41	26	32	61
Cocoa	76	391	-	505	608
Robusta	-	-	-	-	-
total tree crops	76	458	33	730	12,553
Cassava	28,246	491,632	75,845	52,435	136,522

farmers in the volumes (KG) shown in Table 14, but these were almost exclusively products from pre-existing trees. Some preliminary yields could have come from TLADP cocoa and vanilla trees in 2018 (highlighted cells), although these would have been very small, first year yields. TLADP Robusta coffee and pepper are projected to begin producing in 2019, and cloves not until 2021.

The projected production yields 2019-2029 based on seedling distribution and maturation rates are shown in the table below.

Table 15 Projected TLADP Farm Production 2019-2029 (MT)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cloves, dried	-	-	4.51	32.83	74.39	121.34	180.80	234.68	288.57	339.44	373.45
Cocoa, dried beans	43.46	80.88	140.05	228.06	289.61	347.66	392.32	419.19	419.19	419.19	419.19
Robusta Coffee, cherries	19.18	29.37	48.55	121.72	228.65	312.02	468.20	634.21	779.84	925.47	1,021.85
Pepper, dried	1.25	4.73	16.48	33.85	59.07	76.02	86.10	86.10	86.10	86.10	86.10
Vanilla, green beans	5.21	17.05	36.27	58.72	80.97	100.74	107.75	107.75	107.75	107.75	107.75
Total	69.11	132.03	245.86	475.19	732.69	957.79	1,235.17	1,481.93	1,681.45	1,877.95	2,008.33

Farmer Incomes

Tree Crops

A detailed price projection was developed for each crop based on NCBA's extensive experience and understanding of these international markets. Market prices were used to derive farmgate prices and applied to total projected production. Total TLADP farmer revenue by tree crop is found in Table 16, projected for the years 2019-2029.

The most recent distributions of vanilla seedlings will all reach mature productivity in approximately 2024, and the price is projected to remain relatively stable at that level.¹⁷ Pepper prices are historically cyclical, typically following a ten-year cycle: prices are currently low, are expected to rise through 2023-2024, and then decline again. As with the other crops, the general upward trend reflects increasing yields from maturing vines.

¹⁷ Assuming Madagascar avoids further hurricanes which have damaged vines and sent prices soaring the past few years.

Based on the seedlings distributed through March 2019 and assuming average survival rates as calculated in the FES survey, the 12,374 TLADP farmers should enjoy increased total annual revenues of over **six million USD by 2029** when plantings are at mature yield levels.

Table 16 TLADP Projected Farmgate Revenues Tree Crops 2019-2029 (\$)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cloves	-	-	27,083	196,965	446,340	728,061	1,084,779	1,408,085	1,731,391	2,036,642	2,240,675
Cocoa	73,888	137,491	238,081	387,705	492,329	591,026	666,951	712,626	712,626	712,626	712,626
Robusta Coffee	4,987	7,636	12,623	31,648	59,449	81,124	121,732	164,894	202,758	240,622	265,680
Pepper	2,508	16,554	82,413	203,106	413,524	456,127	430,492	301,344	172,197	172,197	301,344
Vanilla	267,318	699,888	1,190,751	1,638,765	2,259,529	2,811,470	3,007,062	3,007,062	3,007,062	3,007,062	3,007,062
Total	348,701	861,568	1,550,951	2,458,190	3,671,172	4,667,808	5,311,015	5,594,012	5,826,035	6,169,150	6,527,388

Average revenues per farmer were calculated based on total projected revenues and the number of farmers receiving each type of seedling. (Note the sum of all types in Table 13 is greater than the total 12,374 TLADP farmers because farmers often cultivate more than one crop.) The average incomes by tree crop are shown in Figure 17 and Figure 18, where the cyclical nature of black pepper prices becomes very clear. Vanilla is shown separately because the very high price and relatively small number of farmers merits a different scale.

Figure 17 TLADP Average Farmer Income by Tree Crop

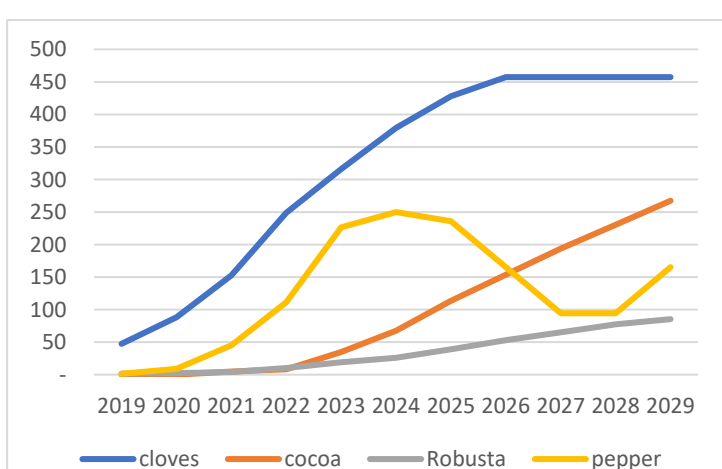
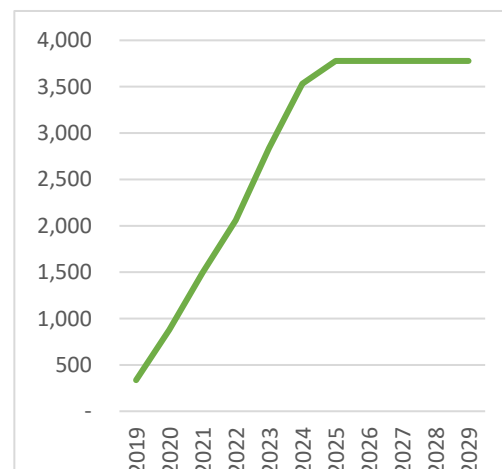


Figure 18 TLADP Average Vanilla Income



Cassava

As noted above, predictions for farmer revenues and CCT revenues from cassava are less certain and a simple approach was taken to determine a conservative projection.

- *Potential* harvests of this annual crop were calculated based on measured plots TLADP farmers have prepared for cassava, regardless of their production or sales in 2018.
- Current prices for fresh tubers (sold to CCT and in the local markets) and dried chipped cassava were applied to the potential harvest.
- The current contract price for cassava flour was taken as a constant.

Based on these assumptions, cassava farmers have *the potential* to produce approximately 20 thousand tons of Ailuka I (high starch) cassava tubers. From previous experience with cassava farmers in other districts where Ailuka I was introduced, CCT estimates that farmers will sell them 25 percent of their production and sell 75 percent in local markets for a higher price. Using these parameters, TLADP cassava farmers have the potential to earn about **\$4 million per year** at full production, although only about \$350,000 would come from sales to CCT. This is an **average income of roughly \$2,200 per TLADP cassava farmer**.

In comparison, the value of CCT's purchases from pre-existing trees plus the new variety cassava is shown in the table below.

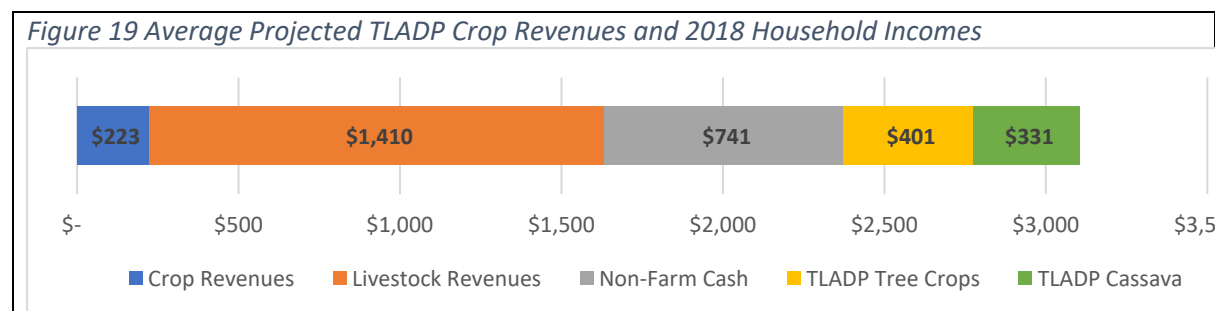
Table 17 Value of CCT Purchases 2014-2019

USD	2014	2015	2016	2017	2018	total
Cloves	-	156	42	1,351	61,675	63,224
Cocoa	152	782	-	884	910	2,727
Robusta	-	-	-	-	-	-
Pepper	-	-	-	-	3,648	3,648
Vanilla	-	266	442	1,120	3,010	4,838
total tree crops	152	1,204	484	3,355	76,872	82,066
Cassava	4,802	115,549	13,769	8,143	7,629	149,892
total value	\$4,954	\$116,753	\$14,253	\$11,497	\$84,501	\$231,958

Average Household Incomes

The farm revenue projections were combined with the FES survey results for household incomes from all sources (see Figure 12) to determine the impact TLADP crops will have. The total incomes per crop were weighted by the proportion of TLADP farmers growing each crop by district to obtain a district total value, and then divided by the number of farmers to get the weighted average. While the sample number in each district is insufficient to be statistically reliable, the overall weighted average in Figure 19 is a good general indicator. The additional income is broken into two parts: an average of \$401 from tree crops (a reasonably confident projection), and a general potential for \$331 from cassava (low confidence, could be higher or lower). The total increase averages out to \$732 per household, or a 31 percent increase over 2018 incomes (17 percent from tree crops plus 14 percent from cassava). Comparing the more reliable value of tree crops to current crop revenues, this is a substantial 180 percent increase over the value of 2018 crop sales.

Figure 19 Average Projected TLADP Crop Revenues and 2018 Household Incomes



Trade Volumes & Values

The projection of the volume of trade from TLADP crops is based on projected farmer production and CCT/NCBA's detailed conversion analysis of commodity output after processing. Note the

volume of cassava is fixed at 360 tons per year – the sale amount being finalized with the local Heineken brewery. Inquiries from other buyers indicate this amount is very likely to rise.

Table 18 Projected TLADP Retail Production (MT)

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
cloves	-	-	4	32	71	116	174	225	277	326	359
cocoa	40	74	129	210	267	320	361	386	386	386	386
Robusta	3	5	9	22	41	56	84	114	140	167	184
pepper	1	4	15	30	52	67	76	76	76	76	76
vanilla	1	3	6	10	13	16	18	18	18	18	18
tree crops	45	87	162	303	445	576	713	819	897	972	1,022
cassava	360	360	360	360	360	360	360	360	360	360	360
Total	405	447	522	663	805	936	1,073	1,179	1,257	1,332	1,382

The projected value of trade from TLADP crops is based on projected farmer production and CCT/NCBA's detailed market perspectives for each of the crops. The total projected value of trade for TLADP crops is summarized in Table 19.

Table 19 Total Projected TLADP Exports 2019-2029 (\$)

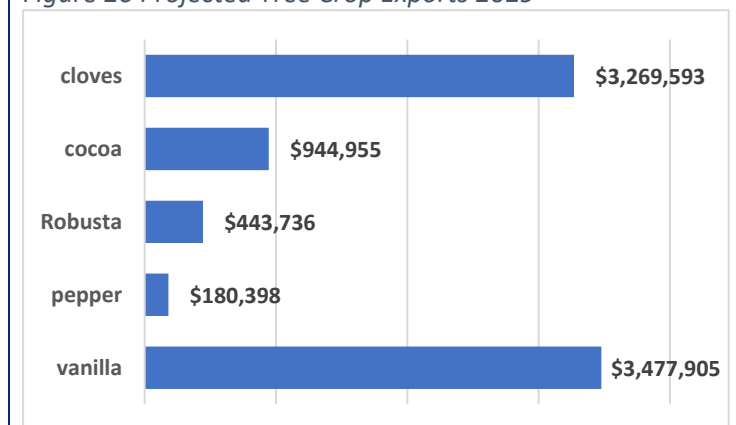
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Cloves	-	-	39,519	287,412	651,300	1,062,386	1,582,909	2,054,678	2,526,446	2,971,869	3,269,593
Cocoa	97,977	182,315	315,699	514,104	652,837	783,710	884,389	944,955	944,955	944,955	944,955
Robusta Coffee	8,328	12,754	21,082	52,859	99,291	135,493	203,315	275,405	338,646	401,886	443,736
Pepper	2,628	9,910	60,437	177,316	371,332	557,495	541,195	450,996	315,697	180,398	180,398
Vanilla	290,252	759,931	1,377,198	1,895,361	2,613,324	3,251,687	3,477,905	3,477,905	3,477,905	3,477,905	3,477,905
Total	399,185	964,909	1,813,935	2,927,052	4,388,084	5,790,772	6,689,713	7,203,939	7,603,649	7,977,013	8,316,588

Over the next ten years, CCT believes it will buy all of the TLADP production of cloves, Robusta coffee, and black pepper produced by participating farmers, but it predicts additional buyers will be buying cocoa and vanilla and are likely to absorb a portion of the production.¹⁸ CCT predicts it will buy 60 percent of the vanilla produced by TLADP farmers, and 50 percent of the cocoa. CCT expects to export all the tree crops it procures and processes.¹⁹ The values shown in Figure 20 represent total TLADP production for tree crops and assume that non-CCT buyers will export all their product at the same prices – a reasonable assumption considering the competitive international markets for these commodities.

¹⁸ Farmers are free to sell to any buyer, they are not bound by a contract system. This means CCT has to compete for its product on the basis of price.

¹⁹ They think local demand for cocoa could possibly grow to take up to one percent of the crop.

Figure 20 Projected Tree Crop Exports 2029



The total projected value of tree crop exports in 2029 – when all tree crops are yielding at mature rates but pepper prices are expected to be at a cyclical low – is **over USD 8 million per year**.

CCT/NCBA currently estimate the annual value of processed cassava at approximately \$700,000 for domestic sale. Based on buyer inquiries, they predict that by 2029 roughly 60 percent of sales will be

exported. Even holding the current sales value constant, this would add another \$400,000 to the total exports above, pushing it to **towards \$9 million**.

TLADP is fully consistent with the Government of Timor-Leste's policy to diversify and increase agricultural exports. The most recent export statistics for Timor-Leste date from 2017,²⁰ and coffee is the number two export at USD 26 million after petroleum. An additional USD 8 million would **boost agricultural exports by roughly 30 percent, from commodities not previously exported**.

²⁰ <https://atlas.media.mit.edu/en/profile/country/tls/>

Table 20 Product Buyers

	% of CCT sales	to number of US buyers	estimated value of US sales (2029)
cloves	80%	3	2,615,675
cocoa	70%	8	668,150
Robusta	60%	8	266,242
pepper	70%	5	126,279
vanilla	80%	3	2,782,324
Total			6,458,669

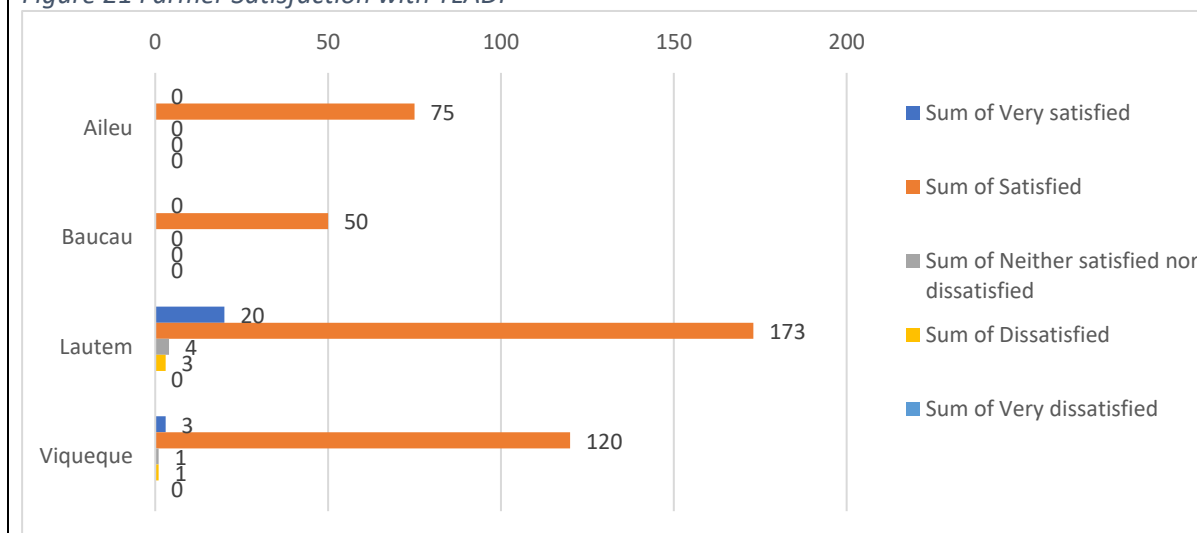
Product Buyers

NCBA expects principle buyers to include the following numbers of US firms and they will be receiving high quality products with traceability, at competitive prices. Overall, US firms are expected to buy 60-80 percent of the tree crops, while all cassava products are expected to go to non-US buyers. At mature yields (2029), the value of sales to US firms is projected to be roughly \$6.5 million per year.

Beneficiary Satisfaction

The FES asked all farmers in the sample how satisfied they were with the project, and the results were overwhelmingly positive, with only four out of 450 farmers saying they were dissatisfied.

Figure 21 Farmer Satisfaction with TLADP



This question is usually followed up by asking about the reason they were satisfied (or dissatisfied, according to the first response). However, the FES enumerators asked all respondents all reasons they were both satisfied *and* dissatisfied, which provides some interesting perspectives. When asked why they were happy with the project, three reasons were consistently given in all districts (Figure 22): (i) they learned how to grow new crops, (ii) they received free seedlings, and (iii) they will become members of the cooperative.

When asked if they were unhappy with aspects of the project, the results are not surprising. Farmers in Lautem said the prices were too low – 70 percent of cassava farmers are located in Lautem, and they expressed their dissatisfaction over cassava prices early in the process. The other two dominant responses are (ii) it takes too long to earn money, and (iii) too many of my seedlings died. Complaints about the length of time for tree crops to produce are predictable, and cassava was apparently not an attractive alternative. High seedling mortality rates were exacerbated by the severe El Nino drought suffered during the first two years of the project, and one lesson learned would be to ensure farmers prepare adequate water delivery strategies to minimize losses.

Figure 22 Reasons Farmers are Satisfied

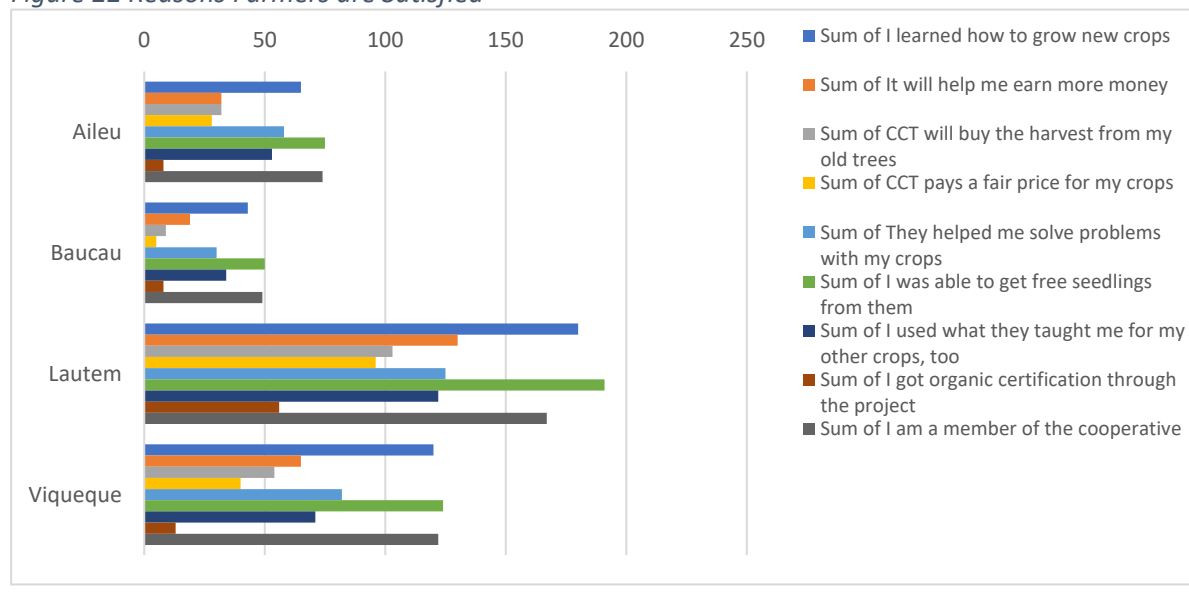
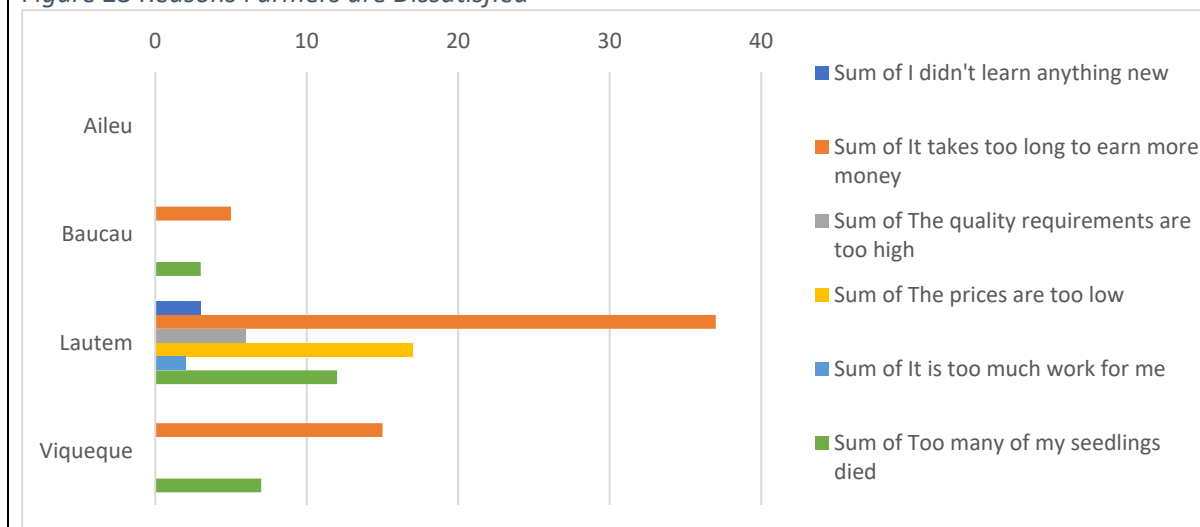


Figure 23 Reasons Farmers are Dissatisfied



Job Creation

CCT and NCBA have prepared a comprehensive employment schedule based on mature yield production and processing. The jobs include part time processing of the various crops during and after harvest, and the full array of operational positions: operating factory equipment, farmer extension and compliance monitoring, monitoring & evaluation, data entry, housekeeping, drivers, office & cashier staff, management & supervision, etc. Eight-seven percent of the full time jobs would be outside Dili where economic opportunity is extremely limited, plus 38 percent of the seasonal jobs. For more detail on the array of jobs, see Annex 2. Implementation of TLADP employed 61 people full time, and many of whom have been transitioned to regular CCT staff post-TLADP.

Table 21 Projected Employment at Full Production

number of full time positions	112
number of part time positions	80
total	192

CCT estimates this at 169 full time equivalent (FTE) positions, and at current wage levels it will have an annual wage cost of \$358,000.

Rate of Return on TLADP Investment

The calculation of the rate of return was based on the value of increased production to TLADP farmers – it does not include any profits accruing to CCT as this level of accounting detail was not included in the study. However, as audited cooperative profits are largely rechanneled back to farmer members, the farmgate revenues can be considered a floor level – a conservative estimate. The value of jobs created was not included in the calculation because the projection for value of employment is for full production at mature yields (year 2029), and the annual path to that level is unclear.

Table 22 Estimated Rate of Return

Rate of Return	
tree crops only	13%
all crops	25%

Estimating the rate of return on the investment is challenging because of the range of confidence in the projections: NCBA is an experienced participant in all of the markets for the tree crops, but CCT and NCBA are new to the cassava industry at a time when demand is dynamic and prices are difficult to

predict. For this reason, the rate of return was calculated twice

– one based only on more confident tree crop projections, and the second including the less-reliable cassava projections – providing a lower and upper bound on the estimates. The total investment was set at USD 9,204,012, the total value of the TLADP project, and returns were calculated on total farmer incomes over 2019-2029. A standard Excel discounted rate of return (IRR) formula was used to obtain **a lower bound estimate of 13 percent and a high of 25 percent**. Development infrastructure projects typically use a benchmark of 12 percent to determine an efficient investment, although returns on smallholder agriculture investments are more typically around the six to eight percent range.

A **sensitivity analysis** was conducted on the lower bound – the rate of return for tree crops – calculating the returns if revenues are overestimated or underestimated by 25 percent. This can be interpreted as a +/- 25 percent change in the estimated number of productive trees, changes in international prices (from which the farmgate price is derived), or a combination of factors. The IRR in these cases is 11 percent and 16 percent, still within an acceptably positive range. How large of an estimation error could be tolerated before performance became marginal? An overestimate of 50 percent (that is, reducing revenues by 50 percent) resulted in a 7 percent rate of return, which is still positive but probably near the lower acceptable bound. Thus, if there was zero return on investments in cassava and farmer revenues for tree crops only were half of the estimated projections, the project would be minimally successful. **On this basis, the rate of return is rated fully successful.**

Multiplier Impact

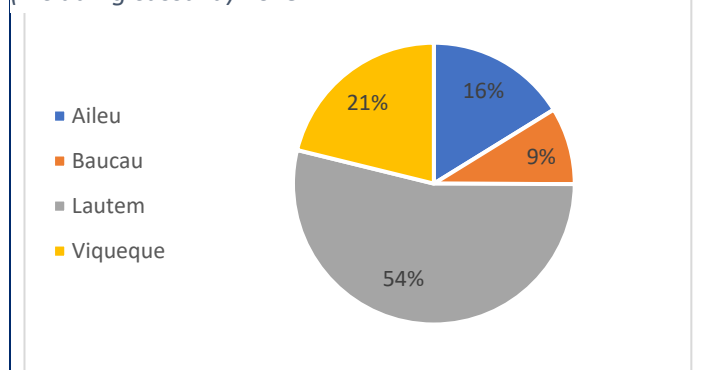
Cash infusions into a community are not the final impact. Increased income is used to purchase goods and services, and the recipients of that cash use it to buy more goods and services. This is the multiplier impact of increased incomes and is often estimated in its simplest form by surveying spending in two cycles – in this case, the farmers' initial spending and a survey of local business spending patterns for round two. The multiplier in these areas *was not estimated* because the required data was not available and would have required an additional survey for which there were no resources. However, participants and businesses for community development projects in Nusa Tenggara, Indonesia – an area not too dissimilar from rural Timor-Leste – were surveyed in 2015 and

a multiplier of 1.5 was estimated.²¹ If this multiplier is applied to Timor-Leste, this means the addition of USD six million in farmer incomes from tree crops would have an **ultimate economic impact of USD nine million once expenditures are recycled through the local economy**. While the size of the multiplier and the actual impact of the increased revenues remains unknown, it is accurate to say it is larger than the value of the payments to farmers from CCT – this should be considered the lower bound estimate.

Regional Distribution of Income

Increasing incomes in Lautem, Viqueque and Baucau was a key project objective for the Government of Timor-Leste, and the results for mature production levels in 2029 are shown in Figure 24. The distribution of increased income to farmers (including cassava) was weighted by the number of farmers of each type by district. The three primary target districts in 2029 account for 84 percent of the projected farmer incomes – a substantial increase in rural incomes.

Figure 24 Regional Distribution of TLADP Income (including cassava) 2029



If cassava is removed from the calculation, the three districts' share falls to 72 percent of total farmer income. This is due to the fact that lower-value cassava plantings are concentrated in Lautem, and Aileu farmers only received vanilla, clove and pepper seedlings – with vanilla and cloves being the most valuable crops in the long term.

Robusta and Pepper Questions

The value of Robusta coffee and pepper to both farmers and CCT are the smallest of all the TLADP crops, as reflected in Figure 20. While the projected export value of pepper at mature production levels in 2029 is estimated at under \$200,000, it should be noted that this year also is projected to be the trough in the international price cycle. Nevertheless, even at its height, exports from current plants would only be around the \$600,000 level – still small by CCT standards. The question for both Robusta and pepper is whether production should be encouraged, or should CCT consider abandoning these crops because of their low value? This evaluation supports the continued production and processing of both these crops for several reasons:

- Approximately 40 percent of TLADP farmers are now growing Robusta and/or pepper, and it would be very unpopular to withdraw from these crops.
- Product diversification in general is potentially beneficial for both farmers and CCT.
- Coffee buyers could be attracted by the ability to purchase organic Arabica and Robusta blends from a single country of origin.
- There would be little-to-no cost savings in eliminating these two crop lines.

CCT is highly experienced in managing coffee farmers, crop procurement, processing and selling coffee. The same equipment line is already purchased and will be installed in Patoo as in Railaco, and there is virtually no learning curve for staff or management. There would be no cost benefit in

²¹ "Economic Analysis of PNPM Rural 2012-2015," World Bank Jakarta.

halting Robusta procurement, and in fact, it would eliminate the primary component (the discarded cherry pulp) of future compost production and sales. The cost argument for pepper is even simpler. Farmers dry the berries before they are sold to CCT, and the product is simply shipped to Java for cleaning and consolidation into larger export orders. As long as profits are made from each ton, it would make no sense to discontinue this activity. Increased Robusta and pepper plantings and procurement would entail approximately zero additional processing cost – on the contrary, average costs are likely to decline with larger volumes – and should be encouraged. With minimal training, pepper can be propagated easily at the farm level. Propagating Robusta coffee without seeds is slightly more complex in that it requires grafting onto good local root stock, but CCT is already planning to develop this capacity in its larger nurseries.²²

Sustainability

Looking forward over the next decade as seedlings begin to produce commercial yields and reach mature production levels, there is no reason for activities at the farm level, procurement, processing and export not to be fully sustainable. Thirty-five positions (including extension workers) are being transitioned into field support positions to prepare farmers for the certification process and future compliance, and to support production activities. CCT has successfully completed procurement from the districts,²³ processing and export of all the tree crops, and is confident it can manage the cassava wet-tuber processing in addition to the MOCAF processing line already installed in Tibar. Once Heineken certifies hygienic performance of the MOCAF/flour production line, CCT anticipates additional sales in the Southeast Asian region.

While TLADP was able to achieve sufficient scale for the range of crops to be profitable to both farmers and CCT, the very low marginal cost of expanded processing makes expanding production very attractive. Expansion of some activities (especially cocoa) could be challenging without additional support, as outlined in Table 23. CCT has already received an inquiry from another bilateral donor interested in supporting continued seedling production, so the outlook is positive.

²² Farmer-managed nurseries in Eastern Indonesia are successfully propagating coffee and cocoa using this method.

²³ Procurement at scale is not a simple procedure in Timor-Leste with extremely poor banking infrastructure. Once the funds arrive in-country, daily cash demands need to be accurately estimated and cash transferred long distances to ensure adequate resources are available.

Table 23 Practical Elements of Sustainability

Activity	Post-TLADP	Notes
Imported inputs	No	Polybags for seedlings, cocoa seeds, Robusta seeds
Propagation of certain crops	Partial	No cocoa – imported seeds required. Extension workers can advise on on-farm propagation of vanilla, pepper, and Robusta from cuttings, clove from seeds from existing trees.
Farmer nurseries	No	Capacity remains, can be easily re-started with other donor support.
Additional farmers	No	
Farmer extension work	Partial	Extension workers will be transitioned to To manage certification and provide farmer support
Other staffing	Yes	Borrowed staff go back to their home units, buying and supply chain staff supported by economic activity.
Organic certification	Yes	CCT is funding this over 4 years as crops begin to yield.
Farmer groups	Not yet	The original plan was for farmer groups to become members of CCT. This can happen once the groups start to contribute to CCT revenue generation.
Post-harvest systems for commercial crops	Yes	Cassava, cloves, cocoa, Robusta, pepper and vanilla supply chains established or ready.
Post-project support for non-commercial crops	Partial	No support for moringa anticipated. Once fruit orchards develop adequately, CCT plans to graft improved seedlings onto local rootstock and distribute.
Soil management	Yes	Extension workers to teach cocoa farmers to compost with cocoa remainder, compost production from coffee cherry pulping (as in Railaco) at Patoo mill and sale.

Lessons Learned & Recommendations for Future Design

Some of the lessons learned identified in the mid-term evaluation remain true for the overall project, and some additional issues are listed here.

- The original project timeframe did not match the time needed for the target crops to mature and show results. Even with the expected project extension to June 2019, commercial yields have just begun and mature yields won't be achieved from all the seedlings until 2029 – a full ten years after the project closes. Ideally, a project like TLADP should be designed in two phases. The first phase should focus on nursery establishment, seedling distribution, farmer group development and extension work. The second phase, contingent upon phase one milestones, would include infrastructure and supply chain development, and would encompass the first few years of commercial yields. For TLADP, the impact on farmer households should be assessed five years after project closing when a good portion of revenues have begun to flow. Lack of product sales at the end of TLADP is not a project failure but should have been foreseen.
- The farmer nurseries proved to be a very successful strategy.

- o With basic training and support, farmers are capable of producing good quality seedlings with minimal losses. Starting nursery owners with smaller, more manageable numbers and increasing the numbers annually diversifies risk, builds confidence and is effective.
- o Decentralized nurseries reduce the travel distance required for distribution thereby limiting stress on the seedlings, increasing quality on delivery and maximizing the likelihood of seedling survival.
- o Decentralizing nurseries puts more cash in farmers' pockets.
- o Sourcing seedlings locally builds program ownership among farmers.
- o Local nurseries can be reactivated and scaled-up on demand.
- High seedling mortality was frustrating for farmers (see discussion in "Farmer Satisfaction") and was no doubt exacerbated by the severe El Nino drought Timor-Leste suffered during the first two years of the project. In a country vulnerable to drought and where access to water can be a key issue even in good years, a design that supports climate resilience would incorporate experimentation with small-scale, low-technology micro-irrigation techniques.
- Cassava was added to the crop mix during project design, and several lessons emerged from this.
 - a. The intention in adding cassava was to provide a faster (annual) income source for farmers while tree crops matured, but farmer preferences turned out quite differently than anticipated. Approximately 70 percent of farmers who chose to receive cassava seedlings chose **only** cassava from TLADP and did not use it as a bridge to longer-term tree crop revenues. It is unclear whether these farmers were confident of their ability to grow cassava and unsure of the other crops with which they had no experience, or if there were other obstacles to the adoption of the tree crops.
 - b. Farmers' ability to maintain or expand cassava cultivation is fully dependent on access to tractor services which are managed by the district offices of the Ministry of Agriculture and Fisheries, and are very scarce due to breakdowns and lack of repairs. This is a constraint in all relevant districts – every farmer or farmer group interviewed said it was a problem – and the GoTL does not yet seem capable of overcoming it.
 - c. Neither NCBA nor CCT had experience with cassava, and it was risky for them to undertake an entirely new venture while they were managing a large-scale expansion. It looks like this will be successful in the medium-term, but a question remains as to whether the time and resources spent on experimentation and adaptation required to make the cassava line successful could have been more profitably used to support tree crop activities.

Recommendation: be very cautious when adding an unknown or untested element to a project design, and make sure the justification can withstand intense scrutiny.
- The traditional nature of subsistence agriculture in the key target districts (Lautem, Viqueque and Baucau) are providing challenges that CCT has not experienced in the Arabica coffee producing areas of the country. CCT has been working with coffee farmers in the western part of the country for nearly 25 years, and farmers in these areas understand how commercial agriculture works. As a result, traditional cultural practices have been adapted to support livelihoods development that have not yet been considered in the eastern districts.

The key issue noted during discussions with farmers is livestock management. In Lautem and Viqueque, one of the key impediments to expanding commercial planting is the risk of livestock intrusion and destruction of the crops. Cultural norms in these areas allow for free-range grazing of livestock. One vanilla farmer in Lautem told me her family had plenty of extra land and tried planting cassava the first year under TLADP, but buffalos broke through the wattle fencing and destroyed the crop. She wouldn't risk planting anything else without very strong fencing, and she felt she and her husband had limited time and resources to build and maintain this. A similar story came from the Mother Superior of a convent who said they had planted extensive tree crops on a piece of land they owned including a variety of fruit trees as well as

TLADP seedlings and were looking forward to their first real harvest this year. They were devastated to find cattle had gotten into the garden, eaten the young fruit and destroyed many of the trees. There is no recourse for these losses, and many farmers have been discouraged from replanting.

The situation in Aileu is very different. I commented to one farmer that her thriving commercial vegetable garden was open to the road while there was a large community pasture on the other side – wasn't she nervous? She informed me there were strict rules about grazing livestock and they had to be securely tied. If a buffalo or cow got into her garden and caused any damage, the owner would be fully responsible for paying the damages. Everyone knew and accepted this.

Free-range grazing was the traditional cultural norm throughout Timor and began to change in (Indonesian) West Timor in the early 20th Century. The practice of livestock control spread eastward only gradually with commercial agriculture, and while it is applied today in Aileu, it is not observed in Viqueque and Lautem where subsistence agriculture is still the norm.

Discussions with GIZ program staff indicated a Japanese NGO was undertaking a process of intensive community planning consultations and several communities had recognized this as a constraint to progress and had changed it, but it was a long process requiring consultations over years. CCT is now aware of this one aspect of the complicated transition from subsistence to commercial agriculture and will have to develop strategies to work around it. Other obstacles could emerge, as well.

Key Evaluation Questions

Summary Ratings

The consultant uses the standardized and long-established criteria used by the World Bank including for project evaluations and project completion reports. The “Harmonized Evaluation Criteria for ICR and OED Evaluations” (World Bank, 2005) are considered appropriate to rate TLADP project performance and results. A summary table of ratings is presented, followed by the summary analysis for each of the criteria. The analysis for each of the key questions includes in brackets hyperlinks to page numbered bookmarks where more detailed information can be found.

Highly Satisfactory	There were no shortcomings in the operation's achievements of its objectives, in its effectiveness, in its efficiency or its relevance.
Satisfactory	There were minor shortcomings in the operation's achievements of its objectives, in its efficiency, or in its relevance.
Moderately Satisfactory	There were moderate shortcomings in the operation's achievement of its objectives, in its efficiency, or in its relevance.
Moderately Unsatisfactory	There were significant shortcomings in the operation's achievements of its objectives, in its efficiency or in its relevance.
Unsatisfactory	There were major shortcomings in the operation's achievements of its objectives, in its efficiency, or in its relevance.
Highly Unsatisfactory	There were severe shortcomings in the operation's achievements of its objectives, in its efficiency, or in its relevance.

Relevance	
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1. To what extent has TLADP responded to the actual needs of beneficiaries, country's priorities and strategies, economic, cultural and political context, existing interventions, and USDA and USG goals and objectives?	Highly Satisfactory
Effectiveness	
2. To what extent have TLADP's interventions resulted in increased agricultural productivity and expanded trade by increasing the value of post-harvest products and access to markets at the end of the project?	Satisfactory
3. Has the project led to the planned activities? Has it achieved the expected results? What adaptations, if any, were made to the project's implementation process to achieve project objectives and targets?	Satisfactory
4. Have the following interventions and approaches been effective in reaching the intended project outcomes?	
a. Partnering with a local implementing partner, CCT, for post-harvest activities	Highly Satisfactory
b. The use and role of farmer nurseries	Highly Satisfactory
c. The selection and use of improved seedlings and cuttings	Highly Satisfactory
5. What were the lessons learned for the benefit of project implementers, beneficiaries and other stakeholders?	n/a
Efficiency	
6. To what extent have the various levels, size, and composition of project management and coordination supported the implementation of the project?	Satisfactory
7. To what extent has the knowledge and skill levels of project farmers increased so that they are able to continue activities, like crop development, crop expansion, and marketing after the completion of the project?	Satisfactory
8. Has CCT efficiently developed and implemented appropriate and cost-effective post-harvest logistical, processing, storage and marketing systems?	Highly Satisfactory
Impact	
9. What was the project's impact on Increased productivity and Increased market access?	Satisfactory
10. Assess the project's future potential income opportunity for beneficiaries resulting from project interventions projected to 5 years post project (based on the known CCT on-farm crops as of March 2019 and an assumed market price for crops)?	Satisfactory
11. What are some unexpected positive /negative outcomes resulting from the project?	n/a
Sustainability	
12. Assess to what extent local actors (value chain actors including farmers, farmer organizations, and the local agricultural cooperative) have been involved in the operation of the project? What is the probability that these actors will be able to provide succession?	Satisfactory

Relevance

1. *To what extent has TLADP responded to the actual needs of beneficiaries, country's priorities and strategies, economic, cultural and political context, existing interventions, and USDA and USG goals and objectives?*

TLADP remains very appropriate to the needs & objectives of:

Farmers. 12,374 direct beneficiaries and approximately 76,000 indirect beneficiaries in the targeted districts have few alternative economic activities and by 2029 future revenues from TLADP tree crops are estimated to add 180 percent to the current average household revenues from crops of \$223, adding an additional average \$401 annually. Cassava is a flexible tool to support incomes, well known to local farmers, and has the potential to add additional value once the markets are developed. [28]

CCT. TLADP crops have helped CCT build to efficient scale in local value adding supply chains and will both increase and diversify overall income for members. [17]

Government. GoTL objectives were to diversify and increase agricultural exports, and increase rural incomes in Lautem and Viqueque. TLADP is the only large-scale agricultural project in those districts and will increase incomes (see above). Agricultural exports in 2017 totaled \$26 million, and TLADP exports at mature production levels are expected to add another \$8 million, or about a 30 percent increase, of new export commodities. [27, 30, 34]

USDA and USG. TLADP is projected to result in 112 new full-time jobs and 80 new seasonal jobs at mature production levels (169 FTE), injecting another \$358,000 into the economy. 87 percent of the full-time jobs would be located outside Dili along with 38 percent of the seasonal jobs. [32] US firms will be important beneficiaries of future TLADP production. NCBA estimates that 60-80 percent of tree crops will go to US firms while all cassava products will go to non-US buyers. [31]

Effectiveness

2. *To what extent have TLADP's interventions resulted in increased agricultural productivity and expanded trade by increasing the value of post-harvest products and access to markets at the end of the project?*

Agricultural production at mature yields are expected to exceed 1,000 mt of processed, value-added product adding approximately \$6.5 million annually to farmers' incomes. The value of cultivated crops for sale by TLADP farmers is projected to increase by approximately 180 percent over 2018 levels and leverage a transition from subsistence to commercial farming – a difficult and critical process for Timor-Leste rural communities. Farmers in three districts will have access to a national buyer in CCT where none existed before, and through CCT will obtain the highest possible international prices for their products. [26, 27, 29]

3. *Has the project led to the planned activities? Has it achieved the expected results? What adaptations, if any, were made to the project's implementation process to achieve project objectives and targets?*

Activities in each of the four functional components (seedling production, farm production, crop supply chain development, and capacity building and training) were achieved to the planned levels. In the end, the mix of crops might have varied somewhat from the initial targets, but these results depended on farmers choosing which plants they wanted to invest in – decisions were influenced by information provided by extension workers, but the choices were ultimately up to the farmers and their year-on-year experience. Seedlings are just now beginning to yield their first crops, and mature yields across all distributed seedlings won't be reached until 2029. At that point, the full potential of the project should be achieved with the results meeting (if not exceeding) initial expectations. [15, 26, 17, 23]

Cassava – the one crop where NCBA lacked extensive experience – required an adaptive approach in the face of farmer dissatisfaction with the labor input/price ratio after the first year. CCT has

now added a wet tuber processing line which should make this more attractive to farmers, as well as adding a base section of own-cultivation adjacent to contract growing in Lautem, plus purchases from farmers to ensure sufficient supply of raw materials. NCBA also had to develop markets for the new products, and this appears to have been accomplished with the key monthly contract to Heineken which is expected to grow into sales beyond Timor-Leste. [17]
4. <i>Have the following interventions and approaches been effective in reaching the intended project outcomes?</i>
<i>a. Partnering with a local implementing partner, CCT, for post-harvest activities</i>
CCT has substantial experience processing commercial volumes of high quality exports with Arabica, and had been working with NCBA to develop spice procurement before TLADP began – they were the only logical partner in Timor-Leste. CCT has proven equal to the task and is managing the new supply chains very effectively. [17, 18, 18, 19, 19, 20, 21] International laboratory testing of the cured vanilla has yielded especially impressive results, and prospective cocoa buyers have been pleased with the flavor profiles from the initial samples.
<i>b. The use and role of farmer nurseries</i>
See the more detailed discussion in “Nurseries and Seedling Production.” The system of farmer-owned nurseries located throughout the project areas was a sensible strategy for several reasons. • With basic training and support, farmers demonstrated they are capable of producing good quality seedlings. Based on feedback from nursery owners, the strategy of starting nursery owners with smaller, more manageable numbers and increasing the numbers annually diversifies risk, builds confidence and is effective. • Decentralized nurseries reduce the travel distance required for distribution thereby limiting stress on the seedlings, increasing quality on delivery and maximizing the likelihood of seedling survival. • Decentralizing nurseries puts more cash in farmers’ pockets – another \$74,000 this year, and a total of \$205,000 over the six years of seedling distribution. • Sourcing seedlings locally builds program ownership among farmers. • Local nurseries can be reactivated and scaled-up on demand. [15]
<i>c. The selection and use of improved seedlings and cuttings</i>
Overall, the selection of seeds and cuttings used in TLADP was appropriate to the environment and risk levels. Cloves, vanilla and pepper stocks propagated under TLADP were common to both Indonesia and Timor-Leste, and there have been no issues with them. The Robusta coffee seeds used were the latest high-yielding, disease-resistant variety produced by Indonesia’s Ministry of Agriculture. There is limited, old-growth Robusta growing in some areas of Timor-Leste, but the selection of this high-yielding variety was a sensible choice when asking farmers to invest long-term in high-quality organic production. Parts of neighboring Indonesia have been hit hard by cocoa viruses and although it has not yet been found in Timor-Leste the use of this new disease-resistant variety is an important tool in preventing it from taking hold in the country. It would have been a poor decision to use any other variety. Finally, the introduction of the high-starch cassava variety is the only way commercial production can be viable and was a logical decision based on sound market research. [17]
5. <i>What were the lessons learned for the benefit of project implementers, beneficiaries and other stakeholders?</i>
Lessons learned are discussed in some detail in the section, “Lessons Learned & Recommendations” and are briefly summarized here. [36] • The project timeframe did not match the time needed for the target crops to mature and show results – serious yields have not yet begun and mature yields on all distributed seedlings won’t be realized until 2029. Ideally, TLADP would have had a two-phase design that encompassed the first few years of commercial yields: nursery establishment, seedling

distribution, farmer group development and extension work, with completed milestones followed by infrastructure and supply chain development.

- The farmer nurseries proved to be a very successful strategy. [15]
- High seedling mortality was frustrating for farmers (see discussion in “Beneficiary Satisfaction” [31]) and was no doubt exacerbated by the severe El Nino drought Timor-Leste suffered during the first two years of the project. Extension workers should work with farmers to ensure adequate water delivery strategies are in place when seedlings are received.
- Two lessons emerged from adding cassava to the crop mix during project design.
 - a. The intention in adding cassava was to provide a faster (annual) income source for farmers while tree crops matured, but it turned out quite differently in practice. Approximately 70 percent of farmers who chose to receive cassava seedlings chose **only** cassava from TLADP and did not use it as a bridge to longer-term tree crop revenues.²⁴ It is unclear whether these farmers were confident of their ability to grow cassava and unsure of the other crops with which they had no experience, or if there were other obstacles to adoption of the tree crops that are part of the complex transition between subsistence and commercial agriculture.
 - b. Neither NCBA nor CCT had experience with cassava, and it was risky for them to undertake an entirely new venture while they were managing a large-scale expansion. It looks like cassava will be successful in the medium-term, but a question remains as to whether the time and resources spent on experimentation and adaptation required to make the cassava line successful could have been more profitably used to support higher-value tree crop activities.
- The traditional nature of subsistence agriculture in the key target districts (Lautem and Viqueque) will provide challenges that CCT has not experienced in the Arabica coffee producing areas of the country where commercial agriculture is better understood. The custom of free-range livestock grazing is a particular challenge. The need for substantial fencing and maintenance increases farmer costs, often discouraging farmers from planting or replanting after damage. CCT will have to adapt to customary rules and find ways to help farmers manage these issues. [37]

Efficiency

6. *To what extent have the various levels, size, and composition of project management and coordination supported the implementation of the project?*

NCBA utilized experienced advisors on a part-time basis. The agricultural advisors had the appropriate research and practical application experience to manage the test gardens and to work effectively with the extension workers, and the other management advisors had the right mix of experience to meet project needs. The ability to share management advisors across additional CCT projects/activities reduced their cost to TLADP while making them available to project staff for extended periods of time.

7. *To what extent has the knowledge and skill levels of project farmers increased so that they are able to continue activities, like crop development, crop expansion, and marketing after the completion of the project?*

The survey asked farmers which subjects they had learned from extension workers, and a full range of skills development had been offered. The survey also asked which of the lessons they

²⁴ The survey results show that closer to 90 percent of cassava farmers reported they only grow cassava, although 74 percent of the cassava farmers in the survey received only cassava seedlings – 26 percent received tree seedlings, as well. The reason for the discrepancy is unclear -- the tree seedlings may have died.

had applied to their gardens, and the responses were generally good, ranging between 70 and 100 percent (see Figure 15 Farmers: What I Learned and Figure 16 Farmers: Lessons I Applied in My Gardens). Vanilla output was lower than expected from the first year hand-pollenating the flowers, but increases in subsequent years. Farm visits during the FES confirmed that farmers were already propagating pepper and vanilla plants to expand plantings, and extension workers report that once they receive guidance, farmers were able to prepare for organic certification without difficulty. The farmers who had pre-existing trees were very happy to be able to sell their harvests to CCT before their new plantings were productive, and generally noted the absence of buyers had been their main obstacle prior to TLADP. [23]

8. Has CCT efficiently developed and implemented appropriate and cost-effective post-harvest logistical, processing, storage and marketing systems?

CCT is already experienced in coffee processing, and Robusta will be handled the same way they are managing Arabica. NCBA had worked with CCT to establish limited procurement of cloves and pepper – these only needed basic cleaning and shipping – prior to TLADP. CCT was already familiar with handling these crops, and expansion will be straightforward. NCBA was able to use their extensive experience buying and processing the cocoa and vanilla in Indonesia to train CCT workers. The vanilla curing supervisor was trained at their facility in Java, and initial laboratory results have shown excellent vanillin content in the first few crops processed in Dili. Cocoa fermentation will begin when there is sufficient volume (possibly in five years), and process managers will be trained NCBA facilities in Indonesia to ensure the best quality output. The processing and warehousing investments provided under TLADP have been critical to ensuring adequate capacity to carry future production levels. CCT has effectively leveraged NCBA's access to these specialty markets and will have no difficulty sustaining this in the future. Processing and marketing of cassava was adapted over the course of the project. Rather than rely on the typical (Indonesian) process of only buying chipped, dried cassava from farmers and processing this in Tibar (the original plan), CCT added investment in a wet tuber processing facility in Patoo, Lautem together with drying tunnels to make sales more attractive to farmers. [17, 21]

Impact

9. What was the project's impact on Increased productivity and Increased market access?

TLADP activities are primarily focused on moving farmers from purely subsistence agriculture to a mix of subsistence and commercial agriculture. In 2018, TLADP farmers sold an average of just \$223 of crops, meaning agricultural productivity (value of output/unit labor input) is very low and focused on household consumption (confirmed in interviews). Existing seedlings from tree crops (not including cassava) are projected to increase this to an average of \$401, an increase in value of 180 percent and more than doubling labor productivity. One reason for the absence of crop sales is the overall underdevelopment of markets in these districts and lack of market access – there are no large or regular buyers of commodities and sales are limited to local markets for very small volume local consumption. CCT is now an important, consistent buyer in these areas and is playing a key role in the ongoing development of market access. They expect volume production to attract additional buyers – especially in cocoa and vanilla – and are working hard to develop competitive advantages, including facilitating organic certification so they can offer farmers the highest Fair Trade and organic prices for high-quality production. At mature production, CCT expects procurement and post-harvest processing to generate employment: 112 full-time jobs and 80 part-time jobs (not including impacts from other buyers). Moreover, somewhere between 60-80 percent of processed commodities are expected to be purchased by US firms – approximately \$6.5 million of high-quality, traceable product annually. [26, 27, 30, 31]

10. Assess the project's future potential income opportunity for beneficiaries resulting from project interventions projected to 5 years post project (based on the known CCT on-farm crops as of March 2019 and an assumed market price for crops)?

Because many of the crops have long maturity periods, it was decided to project production and incomes out to ten years when seedlings distributed in 2019 will be fully mature. The projected production and income streams to farmers and to CCT are contained in Table 15, Table 16, and Table 19. See the section of the report on “Farmer Incomes” for more detail. [26]

11. What are some unexpected positive /negative outcomes resulting from the project?

- The desire of cassava farmers to specialize in cassava and not diversify with tree crops was unexpected (neither positive nor negative) – the MIS indicates 70 percent of cassava farmers did not take any other seedlings despite the harvest values being significantly higher, and the survey data indicate tree seedlings taken by some cassava farmers may have died. The immediate effect is to change the way extension support is organized and delivered. The underlying reasons for this behavior should be explored and practical diversification strategies developed where appropriate in order to support higher incomes for farmers. [36]

Sustainability

12. Assess to what extent local actors (value chain actors including farmers, farmer organizations, and the local agricultural cooperative) have been involved in the operation of the project? What is the probability that these actors will be able to provide succession?

The implementation of TLADP has been built on the efforts of 12,374 participating farmers, farmer groups and staff CCT hired to work on this project, including extension workers, field supervisors, etc. Management from outside the cooperative was limited to part-time advisors who had no choice but to rely on the local implementation team to build results. The project team demonstrated clearly during the Mid-term Evaluation and the Final Evaluation that they effectively manage all day-to-day activities and are closely connected to project farmers – illustrated by the field team’s ability to review all registered farmers and identify multiple members in households. Most of these project staff are transitioning to regular CCT positions, and there is no reason to believe they will change their successful working relationships after the project closes. [17, 17, 32]

Annex 1. Scope of Work

Background

NCBA CLUSA is implementing a multi-crop farming program in East Timor known as the Timor Leste Agribusiness Development Project (TLADP) with funding from the United States Department of Agriculture (USDA). TLADP commenced in October 2013 with an original Project Anticipated Completion Date (PACD) of September 2017. Due to greater than expected resources from monetization activities, a project modification was approved by USDA in September 2017 with an expanded number of geographical areas and beneficiaries and a revised PACD of March 2019.

The specific activity objectives as per the project agreement include the following:

- **Increased agricultural productivity of tree and high value horticultural crops** through the use of improved agricultural techniques and technologies, increased knowledge of the farmers, more availability of appropriate improved inputs, and further use of financing services.
- **Expanded trade of agricultural products by increasing the value of post-harvest products and access to markets** through improved quality, increased efficiency, farmer procurement systems setup, enabling processing methods and process facility infrastructure development and improved marketing and market linkages.

The project has been implemented in 14 sub-districts of the four rural districts of Baucau, Lautem, Viqueque and Aileu in central and eastern Timor. The project has a beneficiary target of 10,000 farmers. The farmers receive project extension support and basic agricultural inputs, such as improved variety of seedlings and training to establish farms, improve farming techniques and produce new crops. Improving the agricultural skills and knowledge of farmers and local nursery business owners and the development of cooperative post-harvest processing and marketing by agro-businesses is the focus of the project. The value chains being developed are commercial cassava, Robusta coffee, cocoa, cloves, black pepper, and vanilla and associated shade trees. Non-commercial crops offered to farmers by the project are moringa and fruit trees. Through the project, farming households will receive the benefits of improved food security and increased household incomes.

Detailed Task Description

The following steps will be implemented for the final evaluation:

1. Undertake a literature review of relevant documents from country reports, national policies and regulations, special studies carried out by other agencies, most recent zone of influence level population-based survey conducted by FTF, and project documentation in this area;
2. Gain a full understanding of the project operations, implementation schedule and project indicators;
3. Using project documentation, calculate the economic impact of project interventions by the project including potential economic impact 5-year post project for project beneficiaries
4. Develop study design and methods that will be a mixed design involving quantitative and qualitative elements. This will include review of secondary data sources i.e. data from the project M&E system, project activity and beneficiary record systems. Design appropriate survey tool(s) for data collection from project farms and value chain partners including

farmer households, farmer groups, agro-input small farmer and cooperative nursery businesses, and other partners which considers but is not limited to the following items:

- i. Identify a representative sample of value chain partners to be interviewed/surveyed that includes all four districts targeted by the project;
 - ii. Pre-testing, editing, translation, finalization, and reproduction of interview/ survey instruments (final survey tools to be approved by NCBA and USDA prior to use);
 - iii. Integrate qualitative data collection methodology and survey tools;
 - iv. Apply statistical techniques for designing, analyzing and reporting quantitative data.
5. Develop data collection guide specifying data collection and management structure, field schedules and data quality assurance methodology.
- v. Coordinate, train, orient and supervise field interviewers and enumerators as necessary;
 - vi. Coordinate field data gathering using tested survey tools to address objectives of this study and apply quality assurance;
 - vii. Process and analyze collected survey data;
 - viii. Perform quality assurance during design, testing, fieldwork, data entry, data analysis and reporting;
 - ix. Organize all data collected into a database. This database will ensure anonymity of survey participants by using identification numbers and separating names from survey participants' data;
6. Analyze the collected data and prepare a final evaluation report.
- x. Using statistical methods where possible, undertake a comparative analysis of the evaluation findings against the project baseline and mid-term study results;
 - xi. Using project documentation and data collected, calculate the economic impact of project interventions by the project including potential economic impact 5-year post project for project beneficiaries;
 - xii. Report the study results in appropriate tables, charts and narrative;
 - xiii. Present findings, conclusions and recommendations (in both written report and PowerPoint formats).

Annex 2. Projected Employment Detail

Location	Employment type	Current status	Staff numbers	Category	Months worked	FTE	Equivalent Monthly salary	number of salaried months per year	Annual salary
A- Post harvest processing employment									
CASSAVA									
Patoo - Lautem	Chipping and peeling mill staff	existing / reallocated	5	full time	12	5.0	170	13	11050
Patoo - Lautem	Drying tunnels staff	additional	20	daily workers	12	20.0	115	12	27600
Patoo - Lautem	Truck drivers	additional	2	Full time	12	2.0	170	13	4420
Tibar - Dili	Mill staff	existing	7	full time	12	7.0	222	13	20202
Tibar - Dili	administration	existing	1	full time	12	1.0	224	13	2912
Tibar - Dili	driver	existing	1	full time	12	1.0	220	13	2860
Tibar - Dili	Assistant supervisor	existing	1	full time	12	1.0	360	13	4680
CLOVES									
Dili	factory staff	existing but increased time	20	daily worker	10	16.7	115	10	23000
Dili	factory staff	additional	10	daily worker	10	8.3	115	10	11500
Dili	supervisor	existing	1	full time	12	1.0	180	13	2340

Location	Employment type	Current status	Staff numbers	Category	Months worked	FTE	Equivalent Monthly salary	number of salaried months per year	Annual salary
VANILLA/PEPPER									
Dili	processing staff	existing	2	full time	12	2.0	150	13	3900
Dili	processing staff	additional	20	daily worker	6	10.0	115	6	13800
Dili	supervisor	existing	1	full time	12	1.0	180	13	2340

COCOA

Lautem	buying staff	additional	20	full time	12	20.0	170	13	44200
Lautem	truck drivers	additional	4	full time	12	4.0	170	13	8840
Dili	processing and warehouse staff	additional	6	full time	12	6.0	150	13	11700

ROBUSTA COFFEE

Patoo - Lautem	Coffee mill and drying tunnel staff	additional	10	daily workers	2	1.7	115	2	2300
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B- permanent support staff**Internal control staff**

Lautem	farmer extension and certification compliance	existing - reallocated	22	Full time	12	22.0	170	13	48620
Viqueque	farmer extension and certification compliance	existing - reallocated	7	Full time	12	7.0	170	13	15470
Baucau	farmer extension and certification compliance	existing - reallocated	3	Full time	12	3.0	170	13	6630
Aileu	farmer extension and certification compliance	existing - reallocated	3	Full time	12	3.0	170	13	6630

Location	Employment type	Current status	Staff numbers	Category	Months worked	FTE	Equivalent Monthly salary	number of salaried months per year	Annual salary
District support staff									
Lautem	manager	existing - reallocated	1	Full time	12	1.0	780	13	10140
Lautem	assistant manager	existing - reallocated	1	Full time	12	1.0	730	13	9490
Lautem	area supervisors	existing - reallocated	1	Full time	12	1.0	420	13	5460
Viqueque	area supervisors	existing - reallocated	1	Full time	12	1.0	420	13	5460
Aileu	area supervisors	existing - reallocated	1	Full time	12	1.0	420	13	5460
Lautem	data entry	existing - reallocated	1	Full time	12	1.0	230	13	2990
Viqueque	data entry	existing - reallocated	1	Full time	12	1.0	230	13	2990
Aileu	data entry	existing - reallocated	1	Full time	12	1.0	230	13	2990
Lautem	M&E	existing - reallocated	1	Full time	12	1.0	210	13	2730
Lautem	security	existing - reallocated	4	Full time	12	4.0	160	13	8320
Viqueque	security	existing - reallocated	1	Full time	12	1.0	160	13	2080
Baucau	security	existing - reallocated	1	Full time	12	1.0	160	13	2080
Lautem	Housekeeping/ cleaners	existing - reallocated	1	Full time	12	1.0	115	13	1495

Location	Employment type	Current status	Staff numbers	Category	Months worked	FTE		Equivalent Monthly salary	number of salaried months per year	Annual salary
Viqueque	Housekeeping/ cleaners	existing - reallocated	1	Full time	12	1.0		115	13	1495
Baucau	Housekeeping/ cleaners	existing - reallocated	1	Full time	12	1.0		115	13	1495
Lautem	Drivers - Administration	existing - reallocated	1	Full time	12	1.0		180	13	2340
Lautem	Environment / Quality control;	additional	1	Full time	12	1.0		150	13	1950
Lautem	Engineering / Maintenance	Additional	1	Full time	12	1.0		150	13	1950

Dili support staff

Dili	Security	existing - reallocated	1	Full time	12	1.0		160	13	2080
Dili	Driver	existing - reallocated	2	Full time	12	2.0		180	13	4680
Dili	Finance / Cashier	existing - reallocated	1	Full time	12	1.0		270	13	3510
Dili	Quality control	Additional	1	Full time	12	1.0		170	13	2210

Annex 3. List of Interviews

date	location	role
13/11/2018	Lautem-Lospalos	Farmer and Nursery
13/11/2018	Lautem-Lospalos	Farmer and Nursery
14/11/2018	Lautem-Lospalos	District Director of MAF
14/11/2018	Lautem-Lospalos	Farmer & social observer
15/11/2018	Lautem-Iliomar	Head of Farmer Group
16/11/2018	Lautem-Lospalos	Farmer
16/11/2018	Lautem-Lospalos	Head of Farmer Group
24/11/2018	Viqueque	Farmers
24/11/2018	Viqueque	Farmer and Head of Nursery Group
25/11/2018	Viqueque	Farmer and Nursery
26/11/2018	Viqueque	District Director of MAP
26/11/2018	Viqueque	social observer
27/11/2018	Viqueque	Farmer and Nursery
27/11/2018	Viqueque	Nursery
03/12/2018	Aileu	Farmer
03/12/2018	Aileu	Nursery
03/12/2018	Aileu	Farmer and Nursery
04/12/2018	Aileu-Remexio	Farmer and Nursery
04/12/2018	Aileu	Farmer and Nursery
04/12/2018	Aileu	District Director of MAF
05/12/2018	Dili-Caicoli	Director of MAF
06/12/2018	Dili-Comoro	TLADP Chief of Party
06/12/2018	Dili-Palm Business - Trade Center	National Adviser of GIZ Field Staff
07/12/2018	Dili-Comoro	Specialist Advisors, tree crops
10/12/2018	Dili-Timor Plaza	Cocoa Advisor, GIZ
10/12/2018	Dili-MAF	Program Director, TOMAK (Australian Aid)
11/12/2018	Dili-ADRA	Country Director, Program Director
12/12/2018	Dili - Palm Business-Trade Center	Specialist Agribusiness, USAID Avansa Project

Annex 4. Indicator Performance Tracking Tables (IPTT)

Results Indicators

Indicator Number	Foundational Result	Indicator (** FFPr Standard Indicator)	Total All-of-Project Result 31 March 2019	End of Project Target (Modification #3)	Percent End-of-Project Target	Comments & Clarifications
1	Contributions for Feed the Future	Number of farmers and others who have received training on improved agricultural techniques and technologies as a result of USDA assistance	12,368	10,000	123.7%	As of March 2019, there are a total of 12,368 "Established" TLADP Farmers. Established farmers have all received project training and have received and planted the projects seedlings on their improved farms.
2		**Number of farmers and others who have applied new techniques or technologies as a result of USDA assistance	male: 9,060 female: 3,308 total: 12,368	10,000	123.7%	As of March 2019, there are a total of 12,368 Established TLADP Farmers who have received project training and have received and planted the project seedlings on their improved farms.
3		**Number of hectares under improved techniques or technologies as a result of USDA assistance	3,958	2,500	158.3%	As of March 2019, there are 12,368 "Established" Farmers within TLADP. The average project cultivated farm area is 0.32 Ha per farm as measured by the FES. 12,368 farms X 0.32 ha per farm = 3,958 ha of cultivated project cropping.
4		**Number of private enterprises, producers' organizations, women's groups, trade and business associations and community-based organizations (CBOs) that applied new technologies or management practices as a result of USDA assistance	356	150	237.3%	<i>Private enterprises</i> TLADP Farmer Nurseries: 90 <i>Producer Organizations</i> TLADP Farmer Groups: 265 <i>Producer Organization</i> Cooperativa Café Timor: 1 Total: 356 There are no Women's' Groups, Trade and Business associations and CBO's associated with the project.

Indicator Number	Foundational Result	Indicator (** FFP Standard Indicator)	Total All-of-Project Result 31 March 2019	End of Project Target (Modification #3)	Percent End-of-Project Target	Comments & Clarifications
5		**Number of public-private partnerships formed as a result of USDA assistance	91	60	151.7%	<i>Contracted by the project</i> TLADP Farmer nurseries (90). Farmer nurseries are contracted for a 12-month period each June. <i>Partnered to the project</i> Cooperativa Café Timor (1) Total: 91
6		**Total increase in installed storage capacity (dry or cold storage) as a result of USDA assistance (Total cubic meters)	23,790	7,560	314.7%	Dry Storage: Total 23,790 cubic meters. Cassava Storage, Tibar: 8,100 cubic meters Cloves Storage Dili: 440 cubic meters Mixed Crop Storage Patoo: 4,050 cubic meters Spice and Cocoa processing and storage warehouse Comoro: 11,200 cubic meters
7	Increased Agricultural Productivity	**Number of beneficiaries benefitting directly from USDA-funded interventions	male: 9,060 female: 3,308 total: 12,368	10,000	123.7%	As of March 2019, there are a total of 12,368 "Established" TLADP Farmers. "Established" farmers are those that have received project training and have received and planted the projects seedlings on their improved farms. In this reporting period, there has been no change to the number of TLADP "Established" farmers.
8		**Number of beneficiaries benefitting indirectly from USDA-funded interventions	75,445	50,000	150.9%	FES found an average 7.1 members per household, minus the direct beneficiary is 6.1. $6.1 \times 12,368 = 75,445$. The TLADP M&E team used 5 to calculate this (from the Baseline Survey).
9		Volume of selected crops produced/harvested per hectare (yield): Kgs/ha (average yields for Robusta Coffee, Cacao, Dried Black Pepper, Cloves, Vanilla)	total volume: 13.85 mt	560	2.5%	The first yields from TLADP seedlings are not expected until the 2019 harvest. Nevertheless, CCT has purchased TLADP crops from farmers with pre-existing trees. A total of 13.85 mt of selected crops were purchased from TLADP farmers from Oct 2013 to March 2019: cloves (10.29 mt), cocoa (1.58 mt), pepper (1.82 mt) and vanilla (0.16 mt).

Indicator Number	Foundational Result	Indicator (** FFP Standard Indicator)	Total All-of-Project Result 31 March 2019	End of Project Target (Modification #3)	Percent End-of-Project Target	Comments & Clarifications
10		Volume of selected crops produced/harvested per hectare (yield) Mtons/ha for Cassava	total volume: 785 mt	25		There was limited purchase of cassava by CCT over Oct 2013-Mar 2019 (see Table 14 for detailed purchases by volume). Cassava farmers have alternative sales options or can leave the crop in the ground to harvest at a future date.
11		Value of agricultural and rural grants provided with USDA assistance". Note: That \$500,000 revolving loan grants within TLADP have been removed from the program. This indicator now reports on value of non-loan grants to farmers	280,280	1,000,000	28.0%	Value of Non-Loan Grants to TLADP Beneficiaries: - Seedlings/Cuttings to farmers \$242,869.83; - equipment to farmers \$37,410.00; - total grants to farmers \$280,279.83. Note, the target for this indicator relates to the original indicator as such has no relevance to the revised indicator result.
12	Increased Use of Improved Agricultural Techniques and Technologies	**Number of farmers and others who have applied new techniques or technologies as a result of USDA assistance	male: 9,060 female: 3,308 total: 12,368	10,000	123.7%	As of March 2019, there are a total of 12,368 "Established" TLADP Farmers who have received project training and have received and planted the project seedlings on their improved farms. In this reporting period, there has been no change to the number of TLADP "Established " farmers.
13		**Number of hectares under improved techniques or technologies as a result of USDA assistance	3,958	2,500	158.3%	See indicator #3, above.
14	Improved Capacity of Key Groups in the Agriculture Production Sector (Coops and Small Shareholder Farmers)	** Number of private enterprises, producers' organizations, women's groups, trade and business associations and community-based organizations that applied new technologies or management	12,724	150	8482.7%	Producer Organizations: TLADP Farmer Groups (265) + Cooperativa Cafe Timor (1) + TLADP Farmers (12,368) + Farmer Nurseries (90).

Indicator Number	Foundational Result	Indicator (** FFPr Standard Indicator)	Total All-of-Project Result 31 March 2019	End of Project Target (Modification #3)	Percent End-of-Project Target	Comments & Clarifications
		practices as a result of USDA assistance				
15	Increased availability of Improved Inputs	Number of specific improved inputs available to farmers in target region	8	6	133.3%	Improved Inputs available to TLADP farmers and farmer nurseries: Cassava, Cloves, Coffee, Pepper, Vanilla, Cocoa, Moringa, PG79 Shade Trees
16	Increased Knowledge by Farmers of Improved Agricultural Techniques and Technologies	Number of farmers who have adopted the new varieties of crops introduced by the project	12,368	10,000	123.7%	As of March 2019, there are a total of 12,368 "Established" TLADP Farmers. All Established farmers have received project training and have received and planted the projects seedlings on their improved farms.
17	Expanded Trade of Agricultural Products (Domestic, Regional, and International)	Value of regional or international trade in selected agricultural products (USD)	\$231,958	10,250,000	0.023%	Commercial production from TLADP seedlings is not expected to begin until the 2019 harvest. However, CCT has been purchasing TLADP crops from TLADP and other farmers from pre-existing trees. Domestic purchases from TLADP farmers (only) have totaled \$231,958 over the project period: cloves (\$63,224), cocoa (\$2,727), pepper (\$3,648), vanilla (\$4,838) and cassava (\$149,892). NCBA assisted with the consolidation of cloves, pepper and vanilla into larger volume export shipments, and the values attributed to TLADP were not tracked. Cocoa is being stored until an export quantity is reached. Cassava purchases were processed and stored in Dili.
18	Increased Leverage of Public-Sector Resources	Value of private resources in support of trade expansion	3,010,580	3,750,000	80.3%	The indicator value includes cost share for vehicle rental and rental of Expat Advisor Quarters in Dili, and warehouse rentals from the beginning of the project.
19	Improved Capacity of Key Groups in the Trade Sector (Processing	Number of private enterprises, producers' organizations, women's groups, trade and business associations and	1	25	4.0%	Processing Organization: Cooperativa Cafe Timor (1). There are no Trade and Business Associations associated with the project.

Indicator Number	Foundational Result	Indicator (** FFP Standard Indicator)	Total All-of-Project Result 31 March 2019	End of Project Target (Modification #3)	Percent End-of-Project Target	Comments & Clarifications																								
	Organizations and Trade Associations)	community-based organizations that applied new technologies or management practices as a result of USDA assistance																												
20	Increased Value Added to Post Production Agricultural Products	Total volume of value-added production derived from selected agricultural commodities (metric tons)	703.59	17,000	4.1%	The volume of value-added production from TLADP Crops is measured by taking the volume of CCT purchases of TLADP crops (mainly from pre-existing trees) and applying the final commodity conversion ratio. Total purchases over the project period: <table><tr><th></th><th>farmgate volume mt</th><th>processed volume mt</th></tr><tr><td>cloves</td><td>10.29</td><td>9.88</td></tr><tr><td>cocoa</td><td>1.58</td><td>1.49</td></tr><tr><td>Robusta</td><td>-</td><td>-</td></tr><tr><td>pepper</td><td>1.82</td><td>1.67</td></tr><tr><td>vanilla</td><td>0.16</td><td>0.03</td></tr><tr><td>cassava</td><td>784.68</td><td>690.52</td></tr><tr><td>total</td><td>798.53</td><td>703.59</td></tr></table>		farmgate volume mt	processed volume mt	cloves	10.29	9.88	cocoa	1.58	1.49	Robusta	-	-	pepper	1.82	1.67	vanilla	0.16	0.03	cassava	784.68	690.52	total	798.53	703.59
	farmgate volume mt	processed volume mt																												
cloves	10.29	9.88																												
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Robusta	-	-																												
pepper	1.82	1.67																												
vanilla	0.16	0.03																												
cassava	784.68	690.52																												
total	798.53	703.59																												
21	Improved Quality of Post-Production Agricultural Products	Volume of agricultural products certified as meeting international standards	-	500,000	0.0%	As of March 2019, 575 crops on TLADP farms were certified organic. (See Table 11 for details.) There were no purchases of crops from these farms since certification. Crops on farms (many with more than one crop, each requiring certification) can not commence until TLADP tree crops were ready for harvesting. With the delay from planting seedlings to first harvest, only very few																								

Indicator Number	Foundational Result	Indicator (** FFPr Standard Indicator)	Total All-of-Project Result 31 March 2019	End of Project Target (Modification #3)	Percent End-of-Project Target	Comments & Clarifications
						TLADP farms were ready for certification during the project period. Over the next 4 years post-project, CCT has planned to complete organic certification for vanilla, cloves, pepper and Robusta coffee crops on TLADP farms as crops become ready for harvest.
22	Increased Efficiency of Post Production Processes	Average number of days required to move selected agricultural products from purchase of initial inputs to final product ready for sale	5,840	14	41714.3%	The project inputs of seedlings/cuttings/seeds purchased by the project are placed with farmer nurseries for propagation and nurturing. From project farmer nurseries, the farm-ready seedlings/ cuttings are then distributed to TLADP farmers to plant and mature to harvest. Cassava can be harvested in the same year as planting. Tree crops (Vanilla, Cloves, Pepper, Cloves, Cocoa, Robusta Coffee) take 5 years from planting until first harvest , then another 5 years to reach peak productivity. The peak harvests for TLADP Trees Crops are not expected until 2029. Total Supply chain time: Cassava: 9 months Coffee, Cloves, Pepper, Cocoa, Vanilla: 5 years Average for all project crops: 5840 days
23	Increased Use of Improved Post-Production Processing and Handling Practices	Number of firms in target region using modern equipment to process agriculture products	1	1	100.0%	Cooperativa Café Timor (1): • Cassava (MOCAF) mill • Cloves Sorting and Grading Facility • Coffee processing mills • Vanilla curing and drying facility • Cocoa drying facility • Pepper drying facility
24	Improved Post-Harvest Infrastructure	Number of farms in target region that have access to post-harvesting processing facilities	12,368	10,000	123.7%	As of March 2019, all 12,368 TLADP farms have access to post harvest processing facilities:

Indicator Number	Foundational Result	Indicator (** FFPr Standard Indicator)	Total All-of-Project Result 31 March 2019	End of Project Target (Modification #3)	Percent End-of-Project Target	Comments & Clarifications
						<i>Cassava</i> • MOCAF mill and storage in Tibar. • Peeling mill, drying tunnels & storage in Lospalos. <i>Cloves</i> • Grading & packing facility in Lecidere, storage in Comoro. <i>Pepper</i> • Drying and storage facility in Comoro. <i>Coffee</i> • Drying and storage facility in Comoro. • Dry processing mill and storage in Lecidere. <i>Cocoa</i> • Drying and storage facility in Comoro. <i>Vanilla</i> • Curing, drying and grading facility in Comoro.
25	Increased Access to Market to Sell Agricultural Products	Number of markets to which selected agricultural products are exported	3	10	30.0%	TLADP Cloves to McCormicks (USA) TLADP Cassava flour to Indonesia TLADP Vanilla - transit warehoused and consolidated prior to export/sale to USA
26	Improved Marketing of Agricultural Products	Number of products with improved marketing	3	6	50.0%	Cassava flour/starch, graded whole cloves and cured, dried vanilla were sold or exported during the project period.
27	Improved Linkages Between Buyers and Sellers	Number of buyer-seller relationships established with MOUs signed	12,458	20	62,290.0%	TLADP farmers with signed establishment agreements (12,368), TLADP farmer nurseries (90).

Activity Indicators

Indicator Number	Activity	Indicator (** Indicates a FFPr Standard Indicator)	All-of-Project Result Oct 2013 to March 2019	All-of-Project Activity target	Percent achievement of All-of-Project Activity Target
1	Infrastructure: Post-harvest Handling and Processing	** Total increase in installed storage capacity as a result of USDA assistance (total cubic meters)	23,790	8,520	279%
2		Number of direct beneficiaries (Ag Producers) benefiting from new processing facilities	male: 13,981 female: 4,961 total: 18,942	6,000	316%
3		Number of processing facilities built	5	6	83%
4	Management System: Design and Establishment of Efficient Supply Chain Management Systems	Number of Agribusiness owners/employees trained in supply chain management systems - TC8	588	440	134%
5		Number of direct beneficiaries (Ag Producers) benefiting from new supply systems	male: 12,013 female: 4,104 total: 16,117	38,000	42%
6		Number of direct beneficiaries (Ag Producers) benefiting from training in supply chain management systems - TC8	male: 10,501 female: 4,022 total: 14,523	40,300	36%
7		Number of training sessions in supply chain management systems for agribusiness owner/employees - TC8	406	55	738%
8		Number of new Supply Chain Management systems developed	6	4	150%
9	Training: Crop Certification	Number of training sessions in organic and or fair trade certification for Ag Producers -TC5	8,629	330	2615%
10		Number of firms/farms certified organic and/or fair trade by international buyers	575	6,250	9%
11		Number of direct beneficiaries (Ag Producers) benefiting from farm certification	male: 425 female: 102 total: 527	13,000	4%
12		Number of Ag Producers who have received USDA supported training in organic/fair trade certification - TC5	11,979	10,000	120%

13	Training: Post-harvest Handling and Processing	Number of Ag Producers trained in post-harvest handling and processing - TC6	male: 8,211 female: 4,153 total: 12,369	3,800	326%
14		Number of agribusiness owners/employees trained in post-harvest handling and processing - TC6	447	300	149%
15		Number of training sessions in post-harvest handling and processing for agribusiness owners / employees -TC6	192	140	137%
16		Number of trainings sessions in post-harvest handling and processing for Ag producers -TC6	5,497	380	1447%
17	Capacity Building: Agriculture Extension Agents and Services	Number of training sessions in agriculture productivity conducted for Ag Producers - TC1	12,354	400	3089%
18		Number of Ag Producers receiving grants for local post-harvest processing equipment, machinery and tools	4,734	9,333	51%
19		Value (total value in USD) of grants provided to Ag Producers for post-harvest processing, equipment, machinery and tools	37,410	233,325	16%
20		Number of "contact farmers" or cooperative agricultural extension agents trained with USDA assistance	756	200	378%
21		Number of Ag Producers trained in agricultural productivity - TC1	17,971	10,000	180%
22		Number of demonstration plots created	27	20	135%
23		Number of grants provided to Ag Producers for post-harvest local primary processing equipment, machinery and tools	4,734	8,000	59%
24	Capacity Building: Producer Groups and Cooperatives	Number of producer groups trained in roles and responsibilities of cooperative membership and improved management practices - TC2	506	200	253%
25		Number of Ag Producers trained in roles and responsibilities of cooperative membership and improved management practices - TC2	10,534	10,000	105%
26		Number of training sessions in roles and responsibilities of cooperative membership and improved management practices conducted for Ag producers - TC2	1,833	400	458%
27	Inputs: Develop Agrodealers and Other Input Suppliers	Number of in-kind planting materials grants to Ag Producers	6,600,785	10,000	66008%
28		Number of Ag Producers receiving in-kind planting materials grants	16,468	10,000	165%
29		Value (total value in USD) of in-kind planting materials grants provided to Ag Producers	242,870	1,200,000	20%

30		Number of training sessions in producing improved inputs conducted for agricultural inputs/service providers - TC4	498	400	125%
31		Number of crop planting materials produced - coffee	626,754	1,000,000	63%
32		Number of crop planting materials produced - cocoa	1,156,650	850,000	136%
33		Number of crop planting materials produced - moringa	49,939	10,000	499%
34		Number of crop planting materials produced - cassava	4,531,226	5,000,000	91%
35		Number of crop planting materials produced - pepper	97,059	100,000	97%
36		Number of crop planting materials produced - cloves	75,960	45,000	169%
37		Number of crop planting materials produced - vanilla	63,197	25,000	253%
38		Number of nurseries assembled/constructed	90	250	36%
39		Number of Ag Producers benefitting from the procurement of crop planting materials	13,776	10,000	138%
40		Number of Agricultural Input/Service providers in the target region that receive training in producing improved inputs - TC3	473	880	54%
41		Number of indirect beneficiaries (Ag Producers) who are benefitting from training in producing improved inputs -TC3	16,078	42,000	38%
42	Market Access: Facilitate Buyer-Seller Relationships	Number of International Trade Shows/fairs attended by project participants	-	8	0%
43		Number of indirect beneficiaries (Ag Producers) who are benefitting from training in disseminating price and quality information - TC7	33,853	40,000	85%
44		Number of buyers contacted	1	1	100%
45		Number of CCT members trained in disseminating price and quality information to farmers - TC7	188	275	68%
46		Number of training sessions in disseminating price and quality information to farmers for CCT members	30	440	7%
47	Market Access: Facilitate Private and Public Partnerships	**Number of public - private partnerships formed as a result of USDA assistance	91	20	455%
48		Number of indirect beneficiaries (Ag Producers) who are benefitting for public-private partnerships formed	12,368	10,000	124%
49		Number of direct beneficiaries (cooperatives/producer associations) who are benefitting for public-private partnerships formed	266	50	532%
50	Training: Improved Marketing and Branding	Number of indirect beneficiaries (Ag Producers) who are benefitting from training in marketing - TC9	8,240	8,950	92%

51		Number of Agribusiness owners/employees trained in marketing - TC9	510	410	124%
52		Number of training sessions in marketing for agribusiness owners /employees - TC9	402	260	155%
53	Training: improved Agricultural Production Techniques	Number of training sessions in improved agricultural techniques and technologies for Ag Producers - TC4	9,300	510	1824%
54		Number of Ag Producers who have received USDA supported training on improved agricultural techniques and technologies - TC4	17,112	11,000	156%

Annex 5. Final Evaluation Survey Instrument

TLADP/USDA FINAL EVALUATION SURVEY

Good morning.

My name is (_____), and I am working with a company called PT Makna. We are working with Cooperative Café Timor (CCT) to evaluate their project known as TLADP or USDA. From all the participating farmers in this project, we selected a small number of farmers to survey so we can understand how the project has worked, and the impact it is likely to have on your future income.

We expect this discussion to take about 1 hour of your time.
Are you willing to help us?

If you are willing to talk with me about the project, please sign or place your thumb print below.

sign/thumb print

1		Date of Survey:
2		Enumerator:

3	Extension agent:
4	GPS location:

This survey is divided into several parts. The first part gathers some basic information about you, your family and how you live.

The second part looks at all the different ways your family earns its income, and this is followed by questions about the crops supported by USDA.

Finally, we want to know if you are happy with your participation in the project, and ways it could be made stronger.

	GENERAL INFORMATION
5	Farmer's Name:
6	USDA ID:
	Address
7	Municipality:
8	Administrative Post:
9	Suco:

10		Aldeia:		
11		Cell phone:		
12		Gender		
	a	male	yes	no
	b	female	yes	no
13		How old are you?		
	a	< 20	yes	no
	b	20-29	yes	no
	c	30-39	yes	no
	d	40-49	yes	no
	e	50-59	yes	no
	f	60+	yes	no
	g	don't know	yes	no
14		How many people live in your household?	#	
15		How many children between the ages of 5-12 years live in your household?	#	
16		In October 2018, how many of these children regularly attended primary school?	#	
17		How many children between the ages of 13-18 years live in your household?		

18		In October 2018, how many of these children regularly attended intermediate or high school?	#	
19		What is the highest level of school you attended? (not graduated)		
	a	none	yes	no
	b	Elementary School	yes	no
	c	Intermediate School	yes	no
	d	High School	yes	no
	e	University	yes	no
20		In October 2018, what were the walls of your house made of?		
	a	Thatch	yes	no
	b	Wood - timber/bamboo	yes	no
	c	Brick / concrete	yes	no
	d	Don't Know	yes	no
21		In October 2018, did you have a clean water source inside or near your house?		
	a	yes		
	b	no		
	c	don't know		
22		In October 2018, did your house have its own toilet?		
	a	yes		

	b	no		
	c	don't know		
23		Do you use electricity at your house? (can be more than one)		
	a	We did not have Electricity	yes	no
	b	EDTL Supply	yes	no
	c	Your Own Generator	yes	no
	d	Non-EDTL source	yes	no
	e	Solar panels	yes	no
	f	Don't Know	yes	no
24		Does anyone in your household have a handphone?		
	a	yes		
	b	no		
	c	don't know		
25		Does anyone in your household have a phone with internet access?		
	a	yes		
	b	no		
	c	don't know		
26		Do you have a TV in your household?		
	a	yes		
	b	no		
	c	don't know		

		INCOME & FARM PRODUCTION		
		In 2018, what were your FOUR most important crops?		
27		1.		
28		2.		
29		3.		
30		4.		
		Crop #1		
31		For your #1 crop, how do you count the harvest?		
	a	kg	yes	no
	b	gunny sack	yes	no
	c	jumbo gunny sack	yes	no
	d	sm/lg bucket	yes	no
	e	basket	yes	no
	f	bundle	yes	no
	g	other (write):	yes	no
32		In 2018, how many units did you harvest for your #1 crop?	#	
33		In 2018, how many harvest units of crop #1 did you sell?	#	
34		When you SOLD your #1 crop, what unit did you use?		
	a	kg	yes	no
	b	gunny sack	yes	no

	c	jumbo gunny sack	yes	no
	d	sm/lg bucket	yes	no
	e	basket	yes	no
	f	bundle	yes	no
	g	stack	yes	no
	h	can	yes	no
	i	other (write):	yes	no
35		How many of these selling units are contained in one harvest unit?	#	
36		In 2018, what price did you get for each unit of crop #1 that you sold?	\$0.00	
		Crop #2		
37		For your #2 crop, how do you count the harvest? (select one)		
	a	kg	yes	no
	b	gunny sack	yes	no
	c	jumbo gunny sack	yes	no
	d	sm/lg bucket	yes	no
	e	basket	yes	no
	f	bundle	yes	no
	g	other (write):	yes	no
38		In 2018, how many units did you harvest for your #2 crop?	#	

39		In 2018, how many harvest units of crop #2 did you sell?	#	
40		When you SOLD your #2 crop, what unit did you use?		
	a	kg		
	b	gunny sack		
	c	jumbo gunny sack		
	d	sm/lg bucket		
	e	basket	yes	no
	f	bundle	yes	no
	g	stack	yes	no
	h	can	yes	no
	i	other (write):	yes	no
41		How many of these selling units are contained in one harvest unit?	#	
42		In 2018, what price did you get for each unit of crop #2 that you sold?	\$0.00	
		Crop #3		
43		For your crop #3, how do you count the harvest? (select one)		
	a	kg	yes	no
	b	gunny sack	yes	no
	c	jumbo gunny sack	yes	no
	d	sm/lg bucket	yes	no

	e	basket	yes	no
	f	bundle	yes	no
	g	other (write):	yes	no
44		In 2018, how many units did you harvest for your crop #3?	#	
45		In 2018, how many harvest units of crop #3 did you sell?	#	
46		When you SOLD your crop #3, what unit did you use? (select one)		
	a	kg	yes	no
	b	gunny sack	yes	no
	c	jumbo gunny sack	yes	no
	d	sm/lg bucket	yes	no
	e	basket	yes	no
	f	bundle	yes	no
	g	stack	yes	no
	h	can	yes	no
	i	other (write):	yes	no
47		How many of these selling units are contained in one harvest unit?	#	#
48		In 2018, what price did you get for each unit of crop #3 that you sold?	\$0.00	

		Crop #4		
49		For your crop #4, how do you count the harvest? (select one)		
	a	kg	yes	no
	b	gunny sack	yes	no
	c	jumbo gunny sack	yes	no
	d	sm/lg bucket	yes	no
	e	basket	yes	no
	f	bundle	yes	no
	g	other (write):	yes	no
50		In 2018, how many units did you harvest for your #4 crop?	#	
51		In 2018, how many harvest units of crop #4 did you sell?	#	
52		When you sold your #4 crop, what unit did you use? (select one)		
	a	kg	yes	no
	b	gunny sack	yes	no
	c	jumbo gunny sack	yes	no
	d	sm/lg bucket	yes	no
	e	basket	yes	no
	f	bundle	yes	no
	g	stack	yes	no
	h	can	yes	no
	i	other (write):	yes	no

53		How many of these selling units are contained in one harvest unit?	#	
54		In 2018, what price did you get for each unit of crop #4 that you sold?	\$0.00	
		ANIMALS		
55		During 2018, how many animals will you SELL?	#	price each
	a	Buffalo		
	b	Cattle		
	c	Goats		
	d	Pigs		
	e	Chickens		
	f	Ducks		
		PAID LABOR		
56		During 2018, did you get paid to work away from your farm?		
	a	if yes, what did you do?		
	b	if yes, about how many days did you work?	#	
	c	if yes, how much did you earn from this during 2018?	\$0.00	
		OTHER INCOME		
		During 2018, how much income did your household receive from outside? (can be more than one)		
57		Veterans pension		

	a	- monthly	\$
	b	- six-monthly (every 6 months)	\$
	c	- yearly	\$
58		Old-age pension	
	a	- monthly	\$
	b	- six-monthly (every 6 months)	\$
	c	- yearly	\$
59		School-children support	
	a	- monthly	\$
	b	- six-monthly (every 6 months)	\$
	c	- yearly	\$
60		Disability payment	
	a	- monthly	\$
	b	- six-monthly (every 6 months)	\$
	c	- yearly	\$
61		family working in Dili	
	a	- monthly	\$
	b	- six-monthly (every 6 months)	\$
	c	- yearly	\$
62		family working outside Timor-Leste	
	a	- monthly	\$
	b	- six-monthly (every 6 months)	\$
	c	- yearly	\$
63		Other (write):	
	a	- monthly	\$
	b	- six-monthly (every 6 months)	\$
	c	- yearly	\$

		WORKING ON THE FARM			
64		How many members of your household regularly work on the farm?			
	a	male	#		
	b	female	#		
65		How often do you hire outside workers? (select all that apply)			
	a	never	yes	no	
	b	for planting	yes	no	
	c	for harvesting & processing	yes	no	
	d	all the time	yes	no	
	e	don't know	yes	no	
66		DURING 2018, are you harvesting any of these crops FOR SALE?			
	a	Cassava -- local variety	yes	not yet	no
	b	Cassava -- Ailuka I (CCT variety)	yes	not yet	no
	c	Cocoa	yes	not yet	no
	d	Coffee -- Arabica	yes	not yet	no
	e	Coffee -- Robusta	yes	not yet	no
	f	Cloves	yes	not yet	no
	g	Black Pepper	yes	not yet	no
	h	Vanilla	yes	not yet	no
	i	Cinnamon	yes	not yet	no
	j	Betel/Pinang	yes	not yet	no
	k	Fruit Trees (write type):	yes	not yet	no
	l	Fruit Trees (write type):	yes	not yet	no

	m	Other (write type):	yes	not yet	no
	n	Other (write type):	yes	not yet	no
		USDA CROPS			
		CLOVES			
67		BEFORE the CCT/USDA project, did you have any cloves trees?	yes	no	if no, skip to #71
68		BEFORE the CCT/USDA project, how many cloves trees did you have?	#		
69		BEFORE the CCT/USDA project, did you SELL any cloves?	yes	no	
	a	If yes, how many kilos did you sell the season BEFORE the USDA project?	Kg		
	b	What price did you get per kg?	\$0.00		
70		BEFORE the CCT/USDA project, where did you sell your cloves?			
	a	I did not sell it	yes	no	
	b	A trader came to buy it	yes	no	
	c	I sold it at the local market	yes	no	
	d	I took it to Lospalos to sell	yes	no	
	e	I took it to Viqueque City to sell	yes	no	
	f	I took it to Aileu City to sell	yes	no	
	g	I took it to Dili to sell	yes	no	
	h	Other (write):			

71		DURING 2018, did you sell cloves to CCT or another buyer?		
	a	CCT	yes	no
	b	Other buyer	yes	no
72		If you sold to ANOTHER buyer in 2018 (not CCT):		
	a	how many kilos did you sell to the other buyer?	kg	
	b	what price did the other buyer pay per kg?	\$0.00	
73		If you sold to ANOTHER buyer, why did you sell to them?		
	a	it was just a small amount	yes	no
	b	they offered a higher price than CCT	yes	no
	c	they would buy lower quality	yes	no
	d	they came to me to buy	yes	no
	e	CCT was not buying	yes	no
	f	other (write):		
		COCOA		
		No Cocoa in Aileu		
74		BEFORE the CCT/USDA project, did you have any cocoa trees?	yes	no

if no,
skip to
#78

75		BEFORE the CCT/USDA project, how many cocoa trees did you have?	#	
76		BEFORE the CCT/USDA project, did you SELL any cocoa?	yes	no
	a	If yes, how many kilos did you sell the season BEFORE the USDA project?	kg	
	b	What price did you get per kg?	\$0.00	
77		BEFORE the CCT/USDA project, where did you sell your cocoa?		
	a	I did not sell it	yes	no
	b	A trader came to buy it	yes	no
	c	I sold it at the local market	yes	no
	d	I took it to Lospalos to sell	yes	no
	e	I took it to Viqueque City to sell	yes	no
	f	I took it to Aileu City to sell	yes	no
	g	I took it to Dili to sell	yes	no
	h	Other (write):		
78		DURING 2018, did you sell cocoa to CCT or another buyer?		
	a	CCT	yes	no
	b	Other buyer	yes	no
79		If you sold to ANOTHER buyer in 2018 (not CCT):		
	a	how many kilos did you sell to the other buyer?	kg	

	b	what price did the other buyer pay per kg?	\$0.00	
80		If you sold to ANOTHER buyer, why did you sell to them?		
	a	it was just a small amount	yes	no
	b	they offered a higher price than CCT	yes	no
	c	they would buy lower quality	yes	no
	d	they came to me to buy	yes	no
	e	CCT was not buying	yes	no
	f	other (say):		
		ROBUSTA COFFEE		
		No Robusta Coffe in Aileu		
81		BEFORE the CCT/USDA project, did you have any Robusta coffee trees?	yes	no
82		BEFORE the CCT/USDA project, how many Robusta coffee trees did you have?	#	
83		BEFORE the CCT/USDA project, did you SELL any Robusta coffee?	yes	no
	a	If yes, how many kilos did you sell the season BEFORE the USDA project?	kg	
	b	What price did you get per kg?	\$0.00	
84		BEFORE the CCT/USDA project, where did you sell your Robusta coffee?		

if no,
skip to
#85

	a	I did not sell it	yes	no
	b	A trader came to buy it	yes	no
	c	I sold it at the local market	yes	no
	d	I took it to Lospalos to sell	yes	no
	e	I took it to Viqueque City to sell	yes	no
	f	I took it to Aileu City to sell	yes	no
	g	I took it to Dili to sell	yes	no
	h	Other (write):		
85		DURING 2018, did you sell Robusta coffee to CCT or another buyer?		
	a	CCT	yes	no
	b	Other buyer	yes	no
86		If you sold to ANOTHER buyer in 2018 (not CCT):		
	a	how many kilos did you sell to the other buyer?	kg	
	b	what price did the other buyer pay per kg?	\$0.00	
87		If you sold to ANOTHER buyer, why did you sell to them?		
	a	it was just a small amount	yes	no
	b	they offered a higher price than CCT	yes	no
	c	they would buy lower quality	yes	no
	d	they came to me to buy	yes	no
	e	CCT was not buying	yes	no
	f	other (say):		

		BLACK PEPPER		
88		BEFORE the CCT/USDA project, did you have any black pepper trees?	yes	no
89		BEFORE the CCT/USDA project, how many black pepper trees did you have?	#	
90		BEFORE the CCT/USDA project, did you SELL any black pepper?	yes	no
	a	If yes, how many kilos did you sell the season BEFORE the USDA project?	kg	
	b	What price did you get per kg?	\$0.00	
91		BEFORE the CCT/USDA project, where did you sell your black pepper?		
	a	I did not sell it	yes	no
	b	A trader came to buy it	yes	no
	c	I sold it at the local market	yes	no
	d	I took it to Lospalos to sell	yes	no
	e	I took it to Viqueque City to sell	yes	no
	f	I took it to Aileu City to sell	yes	no
	g	I took it to Dili to sell	yes	no
	h	Other (write):		
92		DURING 2018, did you sell black pepper to CCT or another buyer?		

if no,
skip to
#92

	a	CCT	yes	no
	b	Other buyer	yes	no
93		If you sold to ANOTHER buyer in 2018 (not CCT):		
	a	how many kilos did you sell to the other buyer?	kg	
	b	what price did the other buyer pay per kg?	\$0.00	
94		If you sold to ANOTHER buyer, why did you sell to them?		
	a	it was just a small amount	yes	no
	b	they offered a higher price than CCT	yes	no
	c	they would buy lower quality	yes	no
	d	they came to me to buy	yes	no
	e	CCT was not buying	yes	no
	f	other (say):		
		VANILLA		
95		BEFORE the CCT/USDA project, did you have any vanilla trees?	yes	no
96		BEFORE the CCT/USDA project, how many vanilla trees did you have?	#	
97		BEFORE the CCT/USDA project, did you SELL any vanilla?	yes	no

if no,
skip to
#99

	a	If yes, how many kilos did you sell the season BEFORE the USDA project?	kg	
	b	What price did you get per kg?	\$0.00	
98		BEFORE the CCT/USDA project, where did you sell your vanilla?		
	a	I did not sell it	yes	no
	b	A trader came to buy it	yes	no
	c	I sold it at the local market	yes	no
	d	I took it to Lospalos to sell	yes	no
	e	I took it to Viqueque City to sell	yes	no
	f	I took it to Aileu City to sell	yes	no
	g	I took it to Dili to sell	yes	no
	h	Other (write):		
99		DURING 2018, did you sell vanilla to CCT or another buyer?		
	a	CCT	yes	no
	b	Other buyer	yes	no
100		If you sold to ANOTHER buyer in 2018 (not CCT):		
	a	how many kilos did you sell to the other buyer?	kg	
	b	what price did the other buyer pay per kg?	\$0.00	
101		If you sold to ANOTHER buyer, why did you sell to them?		
	a	it was just a small amount	yes	no

	b	they offered a higher price than CCT	yes	no
	c	they would buy lower quality	yes	no
	d	they came to me to buy	yes	no
	e	CCT was not buying	yes	no
	f	other (say):		
		CASSAVA		
		<i>No Cassava in Aileu</i>		
102		DURING 2018, did you sell Ai-luka I to CCT or another buyer?		
	a	CCT	yes	no
	b	Other buyer	yes	no
103		If you sold to ANOTHER buyer in 2018 (not CCT):		
	a	how many kilos did you sell to the other buyer?	kg	
	b	what price did the other buyer pay per kg?	\$0.00	
104		If you sold to ANOTHER buyer, why did you sell to them?		
	a	it was just a small amount	yes	no
	b	they offered a higher price than CCT	yes	no
	c	they would buy lower quality	yes	no
	d	they came to me to buy	yes	no
	e	they were buying when CCT was not buying	yes	no
	f	other (say):		
		CAPACITY		

105		Did you learn about any of the following subjects with the USDA Extension workers?		
	a	Land management	yes	no
	b	plant spacing	yes	no
	c	garden maintenance -- weeding, pruning, etc.	yes	no
	d	product quality assurance	yes	no
	e	group establishment	yes	no
	f	garden management -- diversification, intercropping, monoculture, etc.	yes	no
106		Did you apply what you learned from these subjects in your own gardens?		
	a	Land management	yes	no
	b	plant spacing	yes	no
	c	garden maintenance -- weeding, pruning, etc.	yes	no
	d	product quality assurance	yes	no
	e	group establishment	yes	no
	f	garden management -- diversification, intercropping, monoculture, etc.	yes	no
		SATISFACTION WITH THE USDA PROJECT		
107		How satisfied are you with the USDA project? (one only)		
	a	Very satisfied	yes	no
	b	Satisfied	yes	no
	c	Neither satisfied nor dissatisfied	yes	no
	d	Dissatisfied	yes	no
	e	Very dissatisfied	yes	no

108		If you are satisfied with the project, what are the reasons? (can be more than one)		
	a	I learned how to grow new crops	yes	no
	b	It will help me earn more money	yes	no
	c	CCT will buy the harvest from my old trees	yes	no
	d	CCT pays a fair price for my crops	yes	no
	e	They helped me solve problems with my crops	yes	no
	f	I was able to get free seedlings from them	yes	no
	g	I used what they taught me for my other crops, too	yes	no
	h	I got organic certification through the project	yes	no
	i	I am a member of the cooperative	yes	no
	j	other:		
109		If you are dissatisfied with the project, what are the reasons? (can be more than one)		
	a	I didn't learn anything new	yes	no
	b	It takes too long to earn more money	yes	no
	c	The quality requirements are too high	yes	no
	d	The prices are too low	yes	no
	e	It is too much work for me	yes	no
	f	Too many of my seedlings died	yes	no
	g	Other:		

Annex 6. Field Interviews

