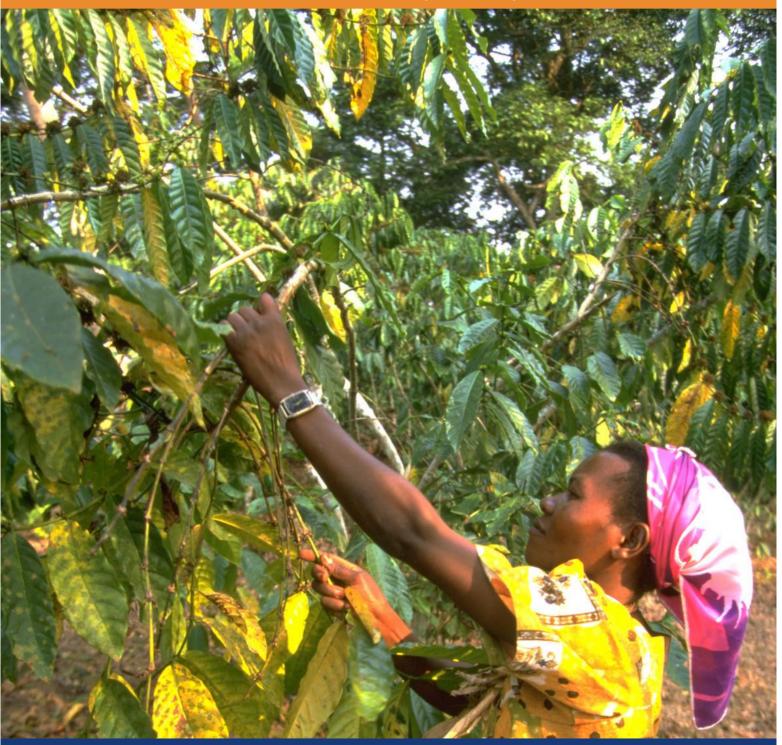# Uganda
Impact Assessment of the Small and Medium Agribusiness Development Fund (SMADF)

BASELINE REPORT **No. 2**

Central Coffee Farmers Association (CECOFA)

IFAD
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ACKNOWLEDGEMENTS

TABLE OF CONTENTS

1. INTRODUCTION

This is the second baseline report for the impact assessment of the Small and Medium Agribusiness Development Fund (SMADF), an impact investment fund for Small and Medium Agribusinesses (SMAs) in Uganda. The Fund will invest in 15-20 SMAs between 2017-2022, which will be selected based on their growth potential and on their linkages with smallholder farmers. As explained in the SMADF Impact Assessment Plan (see Paolantonio et al., 2017), the impact assessment is designed to investigate the impact of each investment using two rounds of data collection: one at the point of the initial investment (the baseline) and again after five years (the endline). Some SMAs will be covered by a "lighter" assessment involving solely qualitative data at the baseline and the endline, and a sub-set of SMAs will undergo a more in-depth assessment using a combination of quantitative and qualitative data. This report presents details of the baseline data collection for the in-depth assessment of the Central Coffee Farmers' Association (CECOFA), a robusta coffee cooperative association based in the Central Region.

The in-depth impact assessments employ best-practice techniques for estimating impacts of development interventions. To estimate the impact of the investment on smallholder farmers linked to investees, a set of beneficiary (treatment group) and non-beneficiary (control group) households will be compared for each SMA. This comparison will be based on in-depth quantitative data collected from these households through a household questionnaire, and qualitative data collected through Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). To capture impacts on the SMA itself as well as to obtain further details on smallholder impacts, additional meetings with key staff of the SMAs and staff of the SMADF will provide further qualitative insights.

Once all of the assessments are completed, a final report will be produced that collates the findings and estimates the overall impact of the Fund using aggregation and projection methods. This, combined with individual reports for each SMA, is expected to contribute extensive lessons that can be used to inform future investment funds and wider efforts to spur rural development in Uganda and beyond. This report follows the first baseline report conducted for Sesaco Ltd, a Kampala-based soybean processing company (see Paolantonio and Higgins, 2019).

In the proceeding sections of this report, we first present details of the SMA, of the investment and its expected benefits, highlighting the key areas of impact that will be tracked over the next five years (Sections 2 and 3). The next section details the methodology that was followed for this baseline data collection (Section 4), followed by results of statistical tests that compare the treatment and control groups identified for this SMA in order to assess the quality of the sample design (Section 5). Finally, using insights from the quantitative and qualitative data from the treatment group and SMA staff, the report provides a snapshot of the pre-investment situation of the SMA and the expected smallholder beneficiaries, highlighting the challenges and opportunities they face and contextual factors that may help or hinder impact (Section 6).

2. BACKGROUND

2.1   THE SMALL AND MEDIUM AGRIBUNESS DEVELOPMENT FUND

The SMADF (also known as the Yield Uganda Investment Fund) is an innovative partnership initiated by the European Union (EU), the Government of Uganda and the International Fund for Agricultural Development (IFAD). The Fund is managed by a local fund manager called Pearl Capital Partners (PCP). IFAD is acting as a carrier for the EU's investment and is tasked with managing the Business Development Services (BDS) facility, with support from with Klynveld Peat Marwick Goerdeler (KPMG). IFAD is also in charge the impact assessment of the Fund through its Research and Impact Assessment (RIA) division.

The Fund was created to provide a much-needed increase in the flow of financing to Ugandan agribusinesses in order to stimulate sustainable and inclusive growth in the rural economy. SMAs have the potential to drive growth in Uganda, but are often too large to access microfinance products and too small or not sufficiently formalised to qualify for bank finance (Milder, 2008; Paglietti and Sabrie, 2013). With funding from public and private investors, the Fund offers innovative financial products to SMAs, such as equity, quasi-equity and debt funding, ranging in size between US$250,000 to US$2 million. Along with the financial products, the Fund also offers a BDS facility, which investees can use to improve their own operational capacity and that of smallholder farmers with whom they are linked.

Since being officially launched in January 2017, the Fund has invested a total of EUR 4.66 million in 6 SMAs at the time of writing.

2.2   THE CONTEXT

Uganda has registered strong economic growth figures in recent years but still suffers from a range of development issues, including high levels of poverty and inequality, high unemployment, and low value-added across the economy (ADB, 2019). The agriculture sector remains central to the Ugandan economy and is still considered to be the main driver of future growth (NPA, 2015). For agriculture to support strong and inclusive growth, however, Ugandan farmers must address considerable inefficiencies in the production, processing and sales of their produce (Shiferaw et al., 2015; Kansiime et al., 2018). Around 80 per cent of Ugandan farms are smaller than two hectares, and smallholder farmers (the majority of whom are poor) face particular additional challenges due to restricted access to credit, training, information, technologies and infrastructure (Wedig and Wiegratz, 2018).

The untapped potential of Ugandan agriculture is particularly apparent in coffee production. Despite considerable yield gaps caused by climate change, suboptimal management practices, vulnerability to pests and diseases, and aging trees, Uganda has still managed to become one of the world's largest coffee producers and the crop is one of the country's main exports (Jassogne et al., 2013; NPA, 2015; Ssebunya et al., 2017). Coffee is thus clearly an area of comparative advantage in Uganda, which could be further capitalised upon if these challenges are addressed. Improvements in coffee production could also reduce poverty and inequality, given that around 85 per cent of coffee producers are smallholders (UCF, 2018).

In addition to low yields, potential benefits from coffee farming are also curtailed by inefficient sales practices, particularly for smallholders. Unable to afford costs of milling or transportation to larger markets, farmers

commonly sell individually for instant payment to local traders at the farm gate at a reduced price (Olapade et al., 2014). This lack of collective action has a strong negative effect on prices that farmers can obtain. For smallholders, effective collective action would allow them to pool their resources and benefit from economies of scale, thus making processing and market access more affordable. This also has the potential to increase their bargaining power, information access, and opportunities to obtain certification (Markelova et al., 2009).

Based on their potential benefits, the formation of cooperatives has become a policy priority. Agricultural cooperatives used to be commonplace in Uganda but suffered a downturn during the 1980s and 1990s caused by mismanagement, political instability, and the influence of market liberalisation (Kwapong and Korugyendo, 2010; Ruben and Heras, 2012). Coffee production was then mainly taken over by large-scale multi-national producers to the detriment of small-scale farmers. Although now in the early stages of a potential revival, farmers' groups still face significant challenges that must be resolved, most notable of which are delays in providing payment to members who are often poor and require immediate cash; and poor monitoring and communication between management and members (Olapade et al., 2014).

Producing coffee under certification standards can provide a considerable price boost for smallholder farmers. Commonly, a cooperative will obtain a certification, such as Fairtrade, Organic, or Common Code for the Coffee Community (4C), and members are required to produce according to specific standards to have their coffee accepted by the cooperative. Such certifications allow the cooperative to signal to potential buyers the quality and the sustainability of production practices, which provides the cooperative with a price premium (especially in the export market) that is then passed on to members (Chiputwa et al., 2015). In the case of Fairtrade certification, an additional premium is paid to be used for community projects, capacity building and other social activities, thus potentially providing wider development benefits (Fairtrade Foundation, 2019). Although these certifications are gradually increasing in Uganda, there is an ongoing concern that smallholders, who are unable to meet the financial and non-financial requirements, or to engage with collective action groups, will be excluded, to the detriment of equality and inclusive growth in the country (Chiputwa et al., 2015).

2.3   THE BUSINESS

The Central Coffee Farmers' Association (CECOFA) is a robusta coffee cooperative association based in the districts of Luwero, Masaka, Mubende and Wakiso in Central Uganda, consisting of approximately 3,664 members (as of June 2018). The association was formed in 2004 and a year later became a registered company under the management of its Executive Director and Founder Ronald Buule, who states that his mission is to promote coffee production, help farmers to obtain fair prices for their produce, and to foster community development across Central Uganda. For the 2016/17 financial year, the company posted a net income of approximately US$69,300, with US$416,800 in revenues.

The company's business model is to buy dried robusta coffee beans produced by its members, and then processes them before selling in bulk. After processing at its plant, the coffee is first sent externally for further drying, cleaning, sorting, grading and bagging, before being sold to large national and international buyers consisting of secondary processors, traders and merchants, mainly located in Belgium and Switzerland. These contracts have so far been won mainly through the work of the Executive Director, who regularly attends global coffee conventions to promote CECOFA and identify new buyers. The price paid to members is determined based on market rate (it offers a minimum price at a rate slightly above this) and quality, minus

a fee for milling. A portion of the husks removed during milling are then given back to members to be used as fertiliser, while the rest is sold to nearby poultry farmers.

CECOFA is governed by a Board of Directors, comprised of five of the founding members of the company. While Mr. Buule as the Executive Director executes the day-to-day operations of the company, all major decisions must be approved by the Board.

The CECOFA membership is heavily comprised of smallholder farmers, with an average farm size of around 1.2 hectares. In order to incentivise members to join and remain with CECOFA, the company provides training on production and post-harvest handling; subsidised inputs such as seedlings for improved coffee varieties (mainly Clonal Elite) and husks; and assistance with obtaining certification; all administered through a decentralised monitoring network. Other than a willingness to sell their coffee to the association, there are no other criteria or fees required for new members to join.

Farmers are organised into Farmer Groups of around 35-40 members, each of which has a Chairman, Treasurer and Secretary, who are democratically elected from within the group's membership. In addition, CECOFA employs regional Field Officers to monitor the groups, provide support, and conduct administrative tasks. The groups are spread across three geographic zones with differing climates and harvesting seasons, which are aimed to ensure a year-round supply of coffee from the groups. Due to capital constraints, however, CECOFA reports that it is currently only able to purchase around 15 per cent of the coffee cherries harvested by its members.

CECOFA procures and sells both certified and conventional coffee procured from its members. As of June 2018, 1,233 of CECOFA's members produced coffee according to 4C standards and 1,200 produced according to Fairtrade standards, while the remaining 1,231 sold conventional coffee to the association. Both types of certification require coffee to be produced according to a set of quality, ethics and sustainability standards. Fairtrade also provides a guaranteed minimum price to farmers, while 4C relies on the signalling strength of the certification to generate the price premium.

With the Fairtrade premium and its own resources, CECOFA carries out extensive work in the communities in which it operates, especially with young people, including training them on coffee production and organising youth groups and sports events.

CECOFA's goal is to grow its membership, capacity, and its sales to existing and new buyers using the SMADF investment, in order to become the main wholesale provider of robusta coffee in the country. CECOFA and the Fund, together, also aim to bring the company to a point where it serves as a much-needed example of how agricultural cooperatives can effectively operate in modern rural Uganda.

2.4 THE INVESTMENT

CECOFA will receive an initial investment of US$1.36 million from the SMADF spread over three years (2018-2020), as well as US$143,000 in BDS support in order to reach the goals mentioned above. This was determined based on an in-depth review and needs assessment conducted by the Fund Manager. Based on projections made by the Fund Manager, the investment is predicted to increase CECOFA's net income from US$69,300 in 2017 to US$202,600 in 2020, and to US$1.27 million by 2025.

Approximately 88 per cent of the investment will be dedicated to working capital, and the remaining 12 per cent to light capital expenditure. As mentioned above, CECOFA is currently able to purchase only 15 per cent of the coffee produced by its members, and the working capital facility will be used to increase this purchasing capacity, with a focus on certified coffee. The BDS support will be used to ensure that members can provide coffee in sufficient quantities and to the required standards, focusing on training members in agronomic practices and post-harvest handling, and assisting them in obtaining certification.

As well as enabling them to purchase more coffee from their existing members, the investment is also expected to attract more farmers to join the association and sell to CECOFA, with a projected increase of 36 per cent (up to 5,000 members) by 2020, all of whom are expected to be producing under 4C certification at a minimum by 2021. As mentioned above, smallholder coffee farmers in Uganda are mostly poor and favour quick sales at the farm gate even when the price is lower. Thus, with more working capital and BDS support, CECOFA is expected to outmatch the farm gate traders by offering larger and more reliable demand with reduced payment delays, more training and support, and prices that are sufficiently high to incentivise farmers to resist the farm gate sales for immediate cash.

The BDS support will also be used to strengthen the governance, management and strategy of CECOFA. This support will include training and recruiting members and assisting them with obtaining certification. The following types of support will also be provided: (i) training the Board of Directors and senior management team in governance, leadership and business management; (ii) improving internal auditing processes; (iii) hiring a Financial Management Expert and developing a financial management manual; (iv) establishing a system for better management and monitoring of members; (v) developing a commercial strategy and training the Commercial Manager; (vi) hiring a Project Manager to support the company with acquiring and installing new grading equipment; and (vii) hiring a consultant to assess the company's environmental impact to support obtaining National Environmental Management Authority clearance.

Regarding the light capital expenditure, this will be focused on increasing capacity, in anticipation of heavier capital expenditures that are expected to follow. Purchases from this part of the investment are expected to consist of a generator, weight bridge, computers and replacements of other existing facilities.

Subject to the achievement of key milestones from this initial investment, there is scope for a second phase investment from 2021. At this point, it is envisioned that this investment will be used to purchase a new grading facility, to avoid CECOFA having to send their coffee externally for grading as is done currently.

3. EXPECTED IMPACT OF THE INVESTMENT ON SMALLHOLDERS

Through the SMADF investment, CECOFA is expected to increase its membership, buy more coffee from its members, increase the productivity and quality of the coffee its members produce, and to increase the proportion of its members producing certified coffee. Based on these changes for the SMA, there are three categories of farmers expected to benefit from the investment. The first is farmers that are already members of CECOFA and produce certified coffee, the second is farmers that are already members but do not produce certified coffee, and the third is farmers that are not yet members of CECOFA but will join as CECOFA expands.

All three of these beneficiary types are expected to benefit from increased productivity, thanks to the training provided by CECOFA, and from improved sales arrangements with CECOFA. With improved agronomic practices, farmers should be able to produce coffee more efficiently, generating larger harvests per hectare of land using the same or less inputs such as labour and fertiliser. As noted in the previous section, with more working capital and improved management capacity, CECOFA is expected to be able to purchase more coffee from members in a more reliable manner with reduced payment delays. Accordingly, farmers will be able to sell more to CECOFA and in an improved way and rely less on local traders, allowing them to obtain higher prices without having to wait too long for the payment.

Selling more efficiently produced coffee at a higher price is expected to increase the total incomes and assets of these farmers – ultimately contributing to their improved economic mobility – and to improve the food security of their families. With more reliable demand and prices, their resilience is also expected to increase. Resilience refers to a household's ability to withstand and overcome shocks, such as extreme weather events, market shocks or the death of an income earner. Specifically, smoothed income is a particularly key factor of resilience as it allows households to plan ahead and build assets to cope with such shocks with the foundation of a predictable income stream. As well as reducing their vulnerability to shocks, increased resilience can also create a snowball effect for household income, as households feel more comfortable about making productive investments that can lead to increasingly higher income and asset accumulation.

In addition to these benefits, farmers will obtain other advantages depending on their category. Farmers, who are already a member of CECOFA and have 4C certification may benefit more from increased prices if they are able to obtain Fairtrade certification. In most cases, this is expected to bring an additional price premium compared to 4C certification.

Farmers, who are already members of CECOFA, but due to a lack of capacity and support are unable to produce certified coffee, stand to gain additional benefits from becoming certified. This added price premium should further enhance the income benefits they obtain from the improved sales arrangements outlined above. Some case studies estimate that household income can increase by up to 20 per cent as a result of coffee certification (Bray and Neilson, 2017).

Farmers, who are not yet a member of CECOFA and do not hold Fairtrade or 4C certification seemingly stand to benefit the most from the investment. They are likely to be farmers, who were not yet reached by CECOFA or were not attracted to the current offer it provides. They are likely to be selling their coffee individually to local traders for lower prices, and not receiving any support for improving their production or post-harvest

practices. These farmers are thus expected to benefit from the largest price increase along with more training and support with obtaining certification. With the higher prices and more efficient practices, which should translate into higher productivity gains, their profits are expected to increase, leading to greater household income, as well as more resilient livelihoods due to a more stable marketing arrangement than before.

As CECOFA grows, the association is also expected to hire more staff. They currently employ 10 permanent staff, but this is expected to increase as their processing plant gets busier and their membership increases. Local youth located close to the CECOFA premises are especially expected to benefit from the staff expansion through availability of casual and formal jobs.

Figure 1 presents the Theory of Change for the SMADF investment in CECOFA, outlining how the investment is expected to impact CECOFA (upper panel) and its smallholder members (lower panel) based on the pathways discussed above. Theory of Change diagrams present the expected impact pathways that link inputs (in this case the investment), with expected outputs, outcomes, and impacts, which are represented in Figure 1 by orange, green and purple boxes respectively (White, 2009).

Figure 1: Theory of Change: Expected impact channels of the SMADF investment in CECOFA

8

4. METHODOLOGY

4.1   SAMPLE DESIGN

Robust impact assessment involves the comparison of a well-matched set of beneficiary (treatment group) and non-beneficiary (control group) households. The groups are well matched if the non-beneficiary households are similar to the beneficiary households at the baseline stage, as they will then provide an accurate representation of how beneficiaries would have fared over the following years in the absence of the intervention.[1]

As noted in the previous section, the population of beneficiary households for CECOFA consists of three groups: (Group I) existing members, who already produce under certification; (Group II) existing members not producing under certification; and (Group III) non-members, who join CECOFA as a result of the investment. To maximise the accuracy of the impact estimate, each of these groups requires its own separate treatment and control group.

For the treatment group, it is straightforward to identify households from Group I and II, as these are members of CECOFA. By contrast, for Group III, we do not know the farmers that will join CECOFA after the investment and CECOFA was understandably unable to provide accurate information on potential future members at the time of the design of this baseline.[2] We thus decided to use households, who had very recently joined CECOFA (within the past three months), as they would still have been operating as individual farmers during the period covered by the quantitative questionnaire.

The control group for Group I and II, consists of households in the same area, who are members of other comparable coffee cooperative associations (and who hold certification in the case of Group I). Thus, they would still be a member of a cooperative but one that has not received similar support. For Group III, we assume that these will be farmers previously selling their coffee individually and who will choose to join CECOFA because they come to offer a more attractive prospect thanks to the Fund investment. Thus the control group households are those in the same area, who are currently not members of any cooperative.

At the time of the investment, there were 2,433 listed members of CECOFA, who were producing under certification, and a further 1,231 listed members producing conventional coffee. According to projections by the Fund Manager, CECOFA's membership is expected to rise by 1,336 by the end of 2020. Based on these numbers, the total beneficiary population for CECOFA is exactly 5,000 households. We conducted calculations to determine a sample size that would allow us to collect sufficient data from treatment and control households in order to accurately measure impacts for

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[1] This method is based on the parallel trends assumption, which assumes that the unobserved differences between the two groups is the same over time (Abadie 2005).

[2] Even if CECOFA had shared detailed information on farmers who they expect to become members in the future, this would have been too risky as there is no guarantee that they would actually join.

each group. Based on these calculations, the total sample size was set at 1,000 households, equally split between treatment and control households.[3]

In order to obtain a representative sample of the beneficiary population, we initially allocated the sample to each category based on the data from CECOFA and the Fund Manager. However, after a field verification, the number of members producing under certification was less than expected. This was seemingly due to a lack of rigorous record keeping by CECOFA, something that the investment aims to address. In addition, we were unable to identify a sufficient number of control households for Group I and thus re-allocated some of the control households to the other two groups. Table 1 below details the initial sample size, based on the stated distribution of households across the three groups, and the eventual sample size after the in-field adjustments. Due to over-sampling to address potential future attrition or data quality related dropouts from the sample, the final sample size is 1,038 households.

Table 1: Original and updated sample sizes

Group	Nr. households in population (stated)	Nr. households in population (actual)	Initial sample allocation	Eventual sample allocation
(i) Existing members with cert.	2,433 (49%)	2,161 (43%)	486 (T=243; C = 243)	461 (T = 273; C=188)
(ii) Existing members w/o cert.	1,231 (25%)	1,502 (30%)	246 (T=123; C = 123)	314 (T=147; C=167)
(iii) New members	1,336 (27%)	1,336 (27%)	268 (T=144; C = 144)	263 (T=112; C=151)

Note: Sample size for new members was reduced by five households because not enough new CECOFA members were available for the sample.

CECOFA is active in four districts in the Central Region of Uganda, but for the sake of feasibility and cost-efficiency, two of these districts, Luwero and Mubende, were selected for the treatment sample. These specific districts were selected as they contained a sufficient number of households from each category. In both districts, we were unable to identify households based on the records of CECOFA, therefore a local consultant travelled to each district and liaised with the local CECOFA officers, who assisted the data collection team in randomly selecting households from each of the three categories.

For the control group, four cooperatives from the Central Region that were similar to CECOFA at the pre-investment stage were identified. Two of these, based in the districts of Bukomansimbi and Masaka, were used to identify control households from Group I, and the other two, based in Bukomansimbi and Mityana, were used to identify control households from Group II. For Group III, individual farmers were identified in the Central Region districts of Butambala and Mityana. The choice of these cooperatives and districts was based on identifying comparable households to the treatment households sampled from Luwero and Mubende, balanced against feasibility restraints. With limited information, we relied on local contacts and expert consultations to identify the control cooperatives and individual farmers, and to obtain lists of farmers from which we randomly

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[3] The sample size was designed to ensure that results fall within a confidence interval of ±4 at a 95% confidence level.

sampled.[4] Table 2 below presents the distribution of the sample across districts and cooperatives, with the names of the control cooperatives anonymised for the sake of confidentiality.

Table 2: Treatment and control sample distribution

Treatment district	Nr. households	Control district/cooperative	Nr. households
Luwero		**Bukomansimbi**	
(i) Existing members with cert.	125	(i) Existing members with cert. (Control Coop. 1)	177
(ii) Existing members without cert.	79	(ii) Existing members without cert. (Control Coop. 2)	90
(iii) New members	79	(iii) Individual farmers	9
Mubende		**Butambala**	
(i) Existing members with cert.	63	(i) Existing members with cert.	0
(ii) Existing members without cert.	88	(ii) Existing members without cert.	0
(iii) New members	72	(iii) Individual farmers	50
		Masaka	
		(i) Existing members with cert. (Control Coop. 3)	97
		(ii) Existing members without cert.	0
		(iii) Individual farmers	0
		Mityana	
		(i) Existing members with cert.	0
		(ii) Existing members without cert. (Control Coop. 4)	56
		(iii) Individual farmers	53

Once the quantitative surveys were conducted, the data were verified and cleaned by the IFAD team. Based on this, 22 households had data errors and were dropped, leaving a final sample size of 1,016 households, which still leaves the number of household above the target sample size of 1,000 households.[5]

4.2   DATA COLLECTION TOOLS

Each household selected for the sample was administered an in-depth quantitative questionnaire that covered various details of their livelihoods for the period of January-December 2018. As the investment was released at the beginning of 2019, this period allows us to capture the situation of treatment and control households just before the investment was made. As noted above, the investment in CECOFA is mainly expected to impact smallholders through improved coffee production and increased sales of their coffee at higher prices. The questionnaire, therefore, contained detailed questions on agricultural production practices by season, plot and crop; plus questions on individual and collective crop sales and production under certification. As we want to capture the holistic livelihood impact of the investment, the questionnaire also covered all other

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[4] For the identification of control cooperatives we sought similarities mainly in terms of size, processing volumes, marketing channels, and membership features.

[5] These dropped households were reasonably evenly spread across the treatment and control group.

sources of household income, as well as household characteristics, asset ownership, credit access and savings, shock exposure, social capital, food security and women's empowerment.

To complement the quantitative household data, we also conducted qualitative data collection. This consisted of two FGDs with CECOFA members for each of the three categories, along with one FGD with control households from each category. KIIs were also held with the Executive Director of CECOFA and their M&E Officer who was hired as part of the BDS support of the Fund; along with two CECOFA zone leaders from Mubende and Luweero and two control cooperative leaders from Bukomansimbi and Mityana. The sessions with beneficiaries and CECOFA staff focused on the current situation of CECOFA and its members, including their advantages, challenges and expectations for the future. These sessions were designed to be linked with the household questionnaire to help generate a holistic snapshot of the context before the investment begins to have an impact.

4.3   IMPACT INDICATORS

Table 3 describes the main outcome and impact level indicators that will be used to assess the quantitative impact of the investment on smallholder farmers, organised by subject domain.

Table 3: List of impact indicators for the CECOFA investment

Indicator	Description	Impact area
Coffee production and sale		
Yields (kg/tree)	The amount of coffee produced per tree	Effectiveness/efficiency of farming practices.
Expenditure on inputs	Cash expenditure on buying seeds, fertilizers, chemicals, wage labour, etc.	Investment in farming practices/Input access.
Harvest uses	Proportion of coffee harvest dedicated to home consumption, sale, and lost due to disease, pests, etc. Expressed as a percentage of total coffee harvest in kg.	Market access, effectiveness/efficiency of farming practices.
Revenue and prices from coffee sales	Cash income received from sale of all crops and the amount received per kilogram.	Market access, income, effect of certification.
Coffee sales practices	Type and location of buyer; Amount sold under certification (by certification type)	Market access, effect of certification.
Overall agricultural production and sale		
Gross value of crop production	Converts harvest of all crops into a common unit (US$), equal to the income from crop sales plus the value of non-sale uses (including home consumption), valued using the median price for the sample for each crop when sold (Carletto et al., 2007).	Effectiveness/efficiency of farming practices.
Land cultivated	Number of hectares of land cultivated calculated as the sum of the hectares cultivated with annual crops in both seasons and the hectares of land under trees and perennials.	Input access, wealth.
Nr of crop types	Count of the different crops grown.	Input access, farming practices, resilience.
Revenue from crop sales	Cash income received from sale of all crops; Proportion of harvest sold as a percentage of the gross value of crop production (as opposed to the other non-sale uses).	Market access, income.
Harvest uses	Proportion of harvest dedicated to home consumption, sale, and lost due to disease, pests, etc. Expressed as a percentage of gross value of crop production.	Market access, effectiveness/efficiency of farming practices.
Livestock ownership and production		
Number owned	Count of the number of key livestock owned: bulls, cows, chickens, goats, oxen, and pigs.	Livelihood practices, wealth.
Gross value of livestock production	Value of all livestock and livestock products that were either sold or consumed at home. For non-sold, valued using median price for the sample for each animal/product when sold.	Livelihood practices, effectiveness/efficiency of livestock prod.
Revenue from sale of livestock and livestock products	Cash income from sale of whole livestock and livestock products (cuts of meat, milk, eggs, manure)	Effectiveness/efficiency of livestock prod., income.

Table 3 (cont'd): List of impact indicators for the CECOFA investment

Indicator	Description	Impact area
Livelihood composition and assets		
Gross household income	Total income from all sources (crop, livestock, formal and casual wage, household businesses, and other (remittances, pension, etc.)).	Income, poverty.
Asset ownership	Index of key household assets calculated using Principal Component Analysis (see Filmer and Pritchett, 2001)	Income, resilience
Income composition	Percentage of household income coming from each component of gross income listed above.	Livelihood practices, income.
Loans and savings		
Took loan	Household took at least one loan during 2018 and the source of loan.	Market access.
Loan size	Total amount received, totalled across all loans.	
Loan rejected	Household has had one or more loan applications rejected in 2018 and the reason for the rejection.	
Cash savings	Household has had one or more members with cash savings in 2018; Total cash savings per capita, totalled across all savings locations.	Market access, shock resilience, income.
Wellbeing and external support		
Household Dietary Diversity Score	Score based on the consumption of different food groups in the past seven days (FAO, 2010).	Nutrition.
Food Insecurity Experience Scale	Standard indicator of food insecurity measured by Food Insecurity Experience Scale (FIES) also adopted by SDGs (2.1.2) (See Ballard et al., 2013).	Food security.
Children's school enrolment	Proportion of school-age children currently enrolled in school.	Education.
Shock exposure and type	The extent to which household was able to cope in the event of a shock (five-point scale).	Vulnerability.
Women's autonomous income generation	Proportion of household income from the wage labour of female household members or from household businesses owned or managed by female household members.	Gender equality.
Women's' decision making involvement	Female household members are involved (either individually or jointly) in decisions regarding: household purchases, children's education, farm and livestock production and sale.	Gender equality.

5. COMPARISON OF TREATMENT AND CONTROL HOUSEHOLDS

In this section, we assess the quality of the sampling frame by investigating the extent to which we were able to construct well-matched treatment and control groups for each of the three farmer categories. Table 4a and 4b present mean values for key characteristics of the treatment and control households in each of the groups, along with the standardised difference (SD) in the means. The SD is the difference in means between the treatment and control groups, divided by the square root of half of the sum of treatment and control group variances. It is not influenced by the sample size as statistical significance testing is and provides a measure that is comparable across different indicators (Austin, 2009). The threshold to decide whether the SD is high to indicate imbalance is subject to discussion in the literature, but an absolute value of 0.10 or 0.25 is used widely (Austin, 2009). In the text below, a difference with an SD of more than 0.10 is referred to as a notable difference. It should be kept in mind that the chosen value depends on the importance of the covariate being tested (hence for some a value of 0.25 may be more appropriate) and that small samples are more likely to have higher SDs as balance is a large sample attribute.

In Table 4a, we see that the key household characteristics of household size, and gender of the household head are reasonably well-matched (except for Group 1). For Groups I and III, however, there is a notable difference in favour of the control group in the education of the household head and of all household members.

Similarly, the average income per capita is notably higher for the control households in Group III (and to a smaller extent in Group 1I). Importantly, however, for all groups most of the income shares from different activities are reasonably similar, meaning we were able to successfully identify households engaged in similar economic activities. Exceptions to well-balanced income sources are crop income and informal waged labour. Although all groups earn the majority of their income from crop production, this share is notably larger for the control group in Groups I and II. Informal waged labour contributes to around 3-4 per cent of income in all groups, except the control households in groups I and II, who are less involved in informal wage labour (less than 1.5 per cent) compared to treatment households.

Regarding key indicators of robusta coffee production, for Groups II and III, more than 94 per cent of households produced robusta coffee during 2018. Surprisingly, around six per cent of the treatment group in Group I did not, which is notably less than the control group. Incidentally, in the qualitative data those households who were not producing coffee generally reported that they were taking a temporary break from producing coffee as they were not obtaining sufficient benefits from producing the crop. For those who did produce robusta coffee, the mean yields per tree are notably higher in the treatment group in Group I, and are notably higher in the control group for Group III. Further investigation of the latter shows that this is driven by one very large outlier in the control group, which will be dropped from the analysis. The mean revenue from selling robusta coffee is notably higher for the control group in all cases, although again the large mean value for the control group in Group III is seemingly driven by one large outlier.

In terms of the production of all crops, the mean total value of harvests is again higher in the control group for all of the groups but is only notable for Group III. On the other hand, the amount of land being cultivated

is very similar for all groups. Treatment households in Group I are notably more market oriented than control households, with the opposite being the case for Group III.

Table 4b presents mean values for additional indicators covering asset ownership, access to loans and savings, and exposure to training. The difference in the proportion of households owning a television is notably higher for the treatment households in Group II and for the control in Group III. There are no notable differences in those owning their own car or motorbike, but control households in Group I have a higher proportion owning agricultural buildings, while the opposite is the case for Group II. Livestock ownership is balanced for Group I, but control households in Group II and III own notably more in terms of TLU units.

In Groups II and III loan access is balanced, but is notably higher for the treatment group in Group I. In both Groups I and II, treatment households also have a higher prevalence of people with savings, and the amount in savings is also higher. Although the prevalence of people with savings is balanced in Group III, the mean amount held in savings is notably higher in the control group.

Finally, the statistics in Table 4b indicate that treatment households had better access to training and advice than the control group in some cases. Access to agricultural training is only notably higher in Group I, in favour of the treatment group, while access to other types of training is notably higher for the treatment group across all three groups.

Overall, in none of the sample groups do the treatment or control households have consistently higher mean values. In Group I, whilst values such as household education, gross income and coffee sales revenue are notably higher for control households, the treatment group has notably higher values in terms of loans, savings and training receipt. Group II is perhaps the most well-balanced, with few notable differences. Group III is perhaps the least well-balanced, with notably higher values for the control group in terms of gross income, gross value of harvests and livestock ownership.

It is impossible to identify perfectly balanced treatment and control households, and trying to do so is made harder when households cannot be randomly allocated to the treatment or control group. In the case of CECOFA, the challenge was increased by the need to find other cooperatives (of which there are not a large number in the country) who were deemed comparable to CECOFA at this stage and were willing to be involved in the data collection. We also had to find individual farmers for Group III without a large amount of information on the status or location of potential candidates. The notable differences we see across the groups are a reflection of these challenges, although the size of the differences is not so large as to be problematic. When the impact analysis is conducted at the endline stage, the baseline differences will be addressed using rigorous statistical methodologies designed (e.g. difference in difference estimation – DID- in a matched sample using Propensity Scores) to eliminate such imbalances and ensure an accurate treatment and control comparison. Specifically, this methodology will enable us to remove imbalances due to time invariant differences in the trends of between different groups.

Table 4a: Comparison of household characteristics, income and agricultural production between treatment and control households

	Group I			Group II			Group III		
	Treatment mean	Control mean	SD	Treatment mean	Control mean	SD	Treatment mean	Control mean	SD
Household characteristics									
Household size	7.02	6.40	-0.20	7.13	6.78	-0.12	6.71	6.71	0.00
Female household head (%)	19.23	21.29	0.05	19.88	18.49	-0.04	11.49	14.41	0.09
Education of household head (years)	8.27	9.13	0.18	8.01	7.73	-0.06	7.89	9.60	0.35
Average ed. in household (years)	9.22	9.64	0.13	9.36	9.04	-0.09	8.48	9.47	0.29
Income									
Gross household income p/capita (US$)	528.26	890.73	0.11	597.24	581.18	-0.02	457.72	713.24	0.24
Proportion of gross income from (%):									
- Crop production	62.30	67.58	0.22	59.40	67.44	0.33	62.69	61.14	-0.06
- Household enterprise	11.59	9.48	-0.11	14.78	10.36	-0.21	14.01	16.17	0.10
- Livestock production	10.34	10.76	0.03	9.59	11.51	0.15	10.28	10.13	-0.01
- Formal waged labour	3.06	3.41	0.03	4.69	3.91	-0.05	3.98	4.38	0.03
- Informal waged labour	4.33	1.32	-0.28	3.32	1.36	-0.23	2.75	3.08	0.03
- Other	8.39	7.45	-0.09	8.22	5.42	-0.27	6.29	5.11	-0.12
Agricultural production									
Producing robusta coffee (%)	93.96	99.62	0.32	97.59	99.32	0.14	96.62	98.20	0.10
Coffee yield (kg/tree)	1.56 (171)	1.42 (262)	-0.12	1.72 (162)	1.58 (145)	-0.04	1.40 (143)	2.31 (109)	0.60
Revenue from coffee sales (US$)	555.24 (171)	889.28 (262)	0.22	651.78 (162)	926.27 (145)	0.22	481.69 (143)	1,135.54 (109)	0.15
Gross value of crop production (US$)	1,794.10 (176)	2,259.64	0.10	1,794.35 (164)	1,928.19	0.05	1,437.33 (146)	2,396.41	0.29
Land cultivated (ha.)	2.96 (176)	2.83	-0.05	3.26 (164)	3.42	0.05	3.28 (146)	3.26	-0.01
Proportion of harvest sold (%)	63.29 (176)	57.86	-0.25	64.18 (164)	63.76	-0.02	62.16 (146)	67.63	0.24

Note: Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I Treatment = 182, Group I Control = 263; Group II Treatment = 166, Group II Control = 146; Group III Treatment = 148, Group III Control = 111.

Table 4b: Comparison of assets, financial inclusion and training receipt between treatment and control households

	Group I			Group II			Group III		
	Treatment mean	Control mean	SD	Treatment mean	Control mean	SD	Treatment mean	Control mean	SD
Asset ownership									
Household owning at least one (%):									
- Television	28.57	34.22	0.12	37.95	28.77	-0.20	23.65	34.23	0.23
- Motorbike/Car	46.15	43.73	-0.05	45.78	41.10	-0.09	38.51	37.84	-0.01
- Ag. building (storehouse, barn, etc.)	43.41	52.09	0.17	40.96	32.19	-0.18	27.03	24.32	-0.06
Nr. of livestock owned (TLU)	1.54	1.42	-0.07	1.54	1.95	0.17	1.31	1.98	0.29
Loans and savings									
Took at least one loan in 2018 (%)	70.33	60.84	-0.20	65.06	64.38	-0.01	57.43	61.26	0.08
Has savings (%)	75.82	63.50	-0.27	74.69	62.33	-0.27	66.22	70.27	0.09
Total cash savings per capita (US$)	177.80	98.31	-0.25	219.94	117.21	-0.15	93.86	132.06	0.15
Training									
Received training/advice on (%):									
- Agriculture	91.76	84.03	-0.24	83.73	80.82	-0.08	74.32	75.68	0.03
- Other	75.27	63.12	-0.27	58.43	51.37	-0.14	54.73	44.14	-0.21

Note: Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I Treatment = 182, Group I Control = 263; Group II Treatment = 166, Group II Control = 146; Group III Treatment = 148, Group III Control = 111.

6. KEY CHARACTERISTICS OF TREATMENT HOUSEHOLDS

6.1 COFFEE PRODUCTION AND SALES

Table 5 presents mean values for key indicators of coffee production and sales for the three beneficiary samples. Across the three groups, mean yields range from 1.4kg per tree for Group III to 1.7 kg per tree for Group II. According to local experts, the mean yield for robusta coffee in Uganda is approximately 2.5 kg per tree, meaning production is below average across the three groups. With more land dedicated to coffee and higher yields, households in Group II have the highest overall volume of production on average compared to the other groups.

Based on the qualitative data, beneficiary farmers seem to have their coffee production restricted by poor input access. In the FGDs and KIIs, farmers widely reported being unable to afford to purchase the fertilisers, pesticides and seedlings of sufficient amount and quality required to boost productivity. Respondents particularly emphasised the widespread issue of fake pesticides and plant treatments, meaning farmers are unable to address the common coffee pest and disease issues such as Coffee Wilt. It was also reported that fertilisers that were available were expensive and of poor quality, and it was hard to obtain seedlings for improved coffee varieties. Issues of low soil productivity due to the overuse of limited land were also common. Beneficiary farmers reported having received training from CECOFA on farming practices to improve their productivity, but said they were largely unable to put this advice into practice due to these input access issues.

Production issues are further reflected in Table 6, which presents statistics on pre-harvest crop losses amongst the beneficiary households. Between 30 to 47 per cent of coffee producers across the three groups lost some or all of their coffee before they could harvest during 2018. Amongst the causes, the most common were weather-related, including drought and irregular rains. This was also a common theme in the qualitative data, with numerous respondents explaining that the rains often do not come when expected, meaning planting is delayed for those planting new trees, and then excessive sunshine harms coffee yields. In addition, crop pests and diseases are also a common cause of crop losses, reflecting the issues with accessing high quality pesticides noted above.

The statistics for sales of coffee in Table 5 reflect the procurement issues faced by CECOFA outlined in Section 2. The certified CECOFA members of Group I sold the largest proportion of their coffee harvest to CECOFA, but this still only amounted to around nine per cent, while the non-certified CECOFA members of Group II sold just five per cent to CECOFA. Group III farmers, by definition, do not sell to CECOFA as they had only recently joined at the time of data collection. One household reported selling to CECOFA during 2018 is either an exception or a data error, which will be addressed during analysis. For all of the groups, the largest proportion of coffee harvests were sold to small-scale traders, totalling 53, 50 and 45 per cent in Groups I, II and III, respectively.

CECOFA's issues with working capital and the lure of small-scale traders was a recurrent theme in the qualitative data. Numerous respondents stated that CECOFA cannot buy all of their harvest at the correct time, often coming a long time after the common harvest time, meaning that farmers, unable to wait for CECOFA because of their immediate financial needs as well as their lack of storage facilities, are forced to turn to other buyers, usually small-scale traders offering immediate payment. This occurs despite farmers

acknowledging that the traders offer lower prices and are known to use inaccurate weighing scales. A key cause of this issue on the side of CECOFA is transport, with roads sometimes being unusable and Field Officers covering large areas and not easily accessing vehicles to travel to collect coffee in a timely manner.

A further reason for the low number of members selling to CECOFA was related to trust. Many reported that they had made arrangements to sell to CECOFA in the past but CECOFA had taken a long time to collect the coffee, had not come to collect the coffee at all, or had taken a long time to deliver payments. Based on this they were reluctant to sell to CECOFA again. A final reason is linked to farmers' inability to afford production costs and to obtain credit on favourable terms. Farmers, therefore, enter into arrangements with local traders whereby the traders provide credit to purchase inputs, or inputs themselves, which then have to be repaid with harvests. Thus, even if households were willing to accept the other issues with selling to CECOFA, they are tied into selling to local traders through these arrangements.

More positively, those beneficiaries who did sell to CECOFA received the highest median prices for their coffee, at US$0.68 per kg for certified members (Group I) and US$0.81 per kg for non-certified members (Group II). Among other buyers, selling to small-scale traders and to individuals (such as friends and neighbours) yielded lower prices.

According to the qualitative data, low prices from small-scale traders were linked to their use of inaccurate weighing scales and of traders taking advantage of farmers in need of immediate cash. Looking at the price data and the total revenue from coffee sales, the Group I farmers do not seem to be receiving the expected benefits from producing under certification compared to non-certified farmers in Group II. In the qualitative data, farmers reported that other than CECOFA, other buyers do not provide the same premium for the higher quality coffee produced under certification standards. It is hard to explain the lack of difference in the price paid by CECOFA, however, which may be due to the median prices only being based on a small sample of households for Group I (19 households) and Group II (9 households). It could also be the case that the certified members from Group I did not have their coffee accepted as meeting the certification standards and were thus not paid the corresponding premium. Qualitative data indicated that most farmers were not able to tell whether the price they received was certified price or non-certified price, which is a point to improve in the endline data collection with additional prompting as needed in order to ensure that final analysis can assess the price premiums and their impacts efefctively.

Finally, the statistics in Table 5 highlight the value of supporting CECOFA to reach new members, who clearly face substantial barriers to their coffee production and sales. Although households in Group III have higher yields, they received the lowest income from selling their coffee due to lower prices compared to the other two groups from most categories of buyers. This may be linked to the quality of the coffee they are producing, and as we will see later, due to low levels of wealth that may have hindered the terms under which they trade their coffee.

Table 5: Coffee production and sales for beneficiary households

	Group I	Group II	Group III
Production			
Coffee production (kg):			
- Total	914.81	1,046.71	925.52
- Per tree	1.56	1.72	1.40
Land cultivated with coffee (ha.)	1.15	1.28	1.18
Sales			
Revenue from coffee sales (US$):			
- Total	555.24	651.78	481.69
- Per hectare	458.89	468.37	455.82
Sales and median prices by buyer:			
CECOFA			
- Proportion of all sales (%)	8.83	4.78	0.36
- Price received per kg (US$)	0.68 (19)	0.81 (9)	0.59 (1)
Other individuals			
- Proportion of all sales (%)	32.27	24.78	27.92
- Price received per kg (US$)	0.55 (44)	0.54 (32)	0.59 (31)
Small scale traders			
- Proportion of all sales (%)	53.17	49.83	44.53
- Price received per kg (US$)	0.58 (82)	0.56 (70)	0.54 (60)
Large-scale traders/wholesalers			
- Proportion of all sales (%)	12.17	22.72	28.38
- Price received per kg (US$)	0.55 (15)	0.59 (32)	0.58 (37)
Other buyers			
- Proportion of all sales (%)	9.68	12.99	10.40
- Price received per kg (US$)	0.68 (16)	0.62 (20)	0.68 (16)

Only coffee producing households are included for these statistics. Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 171; Group II = 162; Group III = 138. Median prices are reported after winsorising the values at the 99th percentile and above by the value at 95th percentile of the respective price distribution.

Table 6: Main coffee production problems for beneficiary households

	Group I	Group II	Group III
Proportion of coffee plots where household was unable to harvest some or all of the planted area (%)	47.37	40.12	30.07
Reasons for being unable to harvest (% of plots)			
- Drought	31.48	51.03	62.02
- Irregular rains	11.73	16.16	25.19
- Pests	22.22	21.28	20.54
- Disease	23.46	26.67	5.81

Only coffee producing households are included for these statistics. Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 171; Group II = 162; Group III = 138.

6.2 OTHER AGRICULTURAL ACTIVITIES

Table 7 presents details of beneficiaries' overall agricultural production, covering coffee and all other seasonal and perennial crops. The gross value of crop production is an overall monetary value of all harvested crops during 2018 calculated using median prices, and ranges from an averageof US$1,437 for Group III to US$1,794 for Groups I and II. Despite the almost identical average total values for Groups I and II, the average values per hectare are higher for households in Group I. Based on this and their lower expenditure on inputs compared to Group II, households in Group I seem to be more efficient farmers overall.

Across the groups, the majority of expenditures on inputs are labour costs, and, in general, the distribution of expenditures on different inputs is relatively similar. However, farmers in Group I reported spending more on both seeds and fertiliser compared to the other groups. Farmers in Group II spend the least on seeds, potentially due to not having to adhere to quality requirements, but spend the most on labour and machinery.

Farmers from all three groups sold just under two thirds of their harvests, and used the majority of the rest for home consumption. Although Table 6 shows that farmers had considerable issues with coffee crop losses before harvesting, this seems to be less of an issue after harvesting as only 0.5-0.7 per cent of harvests were lost due to rotting, theft, etc..

Average revenues from crop sales range from US$885 for Group III, US$1,210 for Group II, and US$1,325 for Group I. Based on the coffee sales statistics above, beneficiary farmers in Groups II and III gained around 54 per cent of their agricultural income from coffee, while those in Group I gained just 42 per cent.

The average number of crops grown for each of the groups are between five and six, highlighting a reasonable degree of crop diversification. The most popular crops grown amongst beneficiary households other than robusta coffee are maize, beans and matooke. In the case of all of these crops, farmers in Group I receive the highest prices compared to the other two groups. In the qualitative data, farmers reported that issues of input access and low prices were not restricted to coffee production, with maize and beans particularly being affected by a lack of high quality seeds and by cheating from local traders.

Table 7: Overall agricultural production and sales for beneficiary households.

	Group I	Group II	Group III
Production			
Gross value of crop production (US$)			
- Total	1,794.10	1,794.35	1,437.33
- Per hectare	686.46	620.88	524.64
Expenditure on inputs (US$)			
- Total	210.36	212.75	188.04
- Labour	152.72	161.13	143.09
- Seeds	11.38	5.06	7.61
- Fertiliser	11.32	9.67	5.39
- Pesticide/Insecticide/Herbicide	21.33	20.68	19.47
- Machinery	13.61	16.21	12.48
Land cultivated (ha.)	2.96	3.26	3.28
Number of different crops grown	5.53	5.59	5.73
Proportion of harvest (%):			
- Used for home consumption	31.11	32.18	33.28
- Sold	63.29	64.18	62.16
- Lost due to disease, pest, flood, etc.	0.46	0.46	0.66
- Used for seed or feed or other uses	4.80	3.16	3.90
Sales			
Revenue from crop sales (US$):			
- Total	1,324.68	1,210.16	884.73
- Per hectare	437.40	383.32	301.42
Price received per kg of (US$):			
- Beans	0.35 (76)	0.34 (85)	0.35 (68)
- Cassava	0.09 (32)	0.09 (22)	0.09 (16)
- Groundnuts	0.58 (10)	0.76 (14)	0.60 (13)
- Maize	0.14 (89)	0.13 (95)	0.13 (70)
- Matooke	0.23 (69)	0.18 (57)	0.17 (30)

Only coffee producing households are included for these statistics. Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 176; Group II = 164; Group III = 146. Median pricees are reported after winsorising the values at the 99th percentile and above by the value at 95th percentile of the respective price distribution.

6.3 LIVESTOCK

According to both the household questionnaire and the qualitative data, beneficiary households are not very involved in livestock activities. Table 8 below presents livestock statistics for beneficiary households from the household questionnaire. Very small amounts of key livestock are owned on average across the groups. Households spent on average between US$70 and US$152 a year on inputs for livestock (including vaccinations, housing, feed, equipment, etc.) and the gross value of production (including livestock and livestock products consumed at home) averaged between US$152-US$282 annually, amounting to around 11-16 per cent of the gross value of agricultural production. In terms of both livestock expenditure and income, households in Group III have much lower mean values compared to the other two groups.

It was reported in the qualitative data that a strategy of CECOFA to avoid their members selling to local traders for quick payment was to encourage them to diversify their production, in particular into livestock. This would mean that, when financial emergencies arise, they are able to sell other produce and keep the coffee for CECOFA. However, based on these statistics, livestock remains a minor activity for their members.

Table 8: Livestock ownership, income and expenditure of beneficiary households

	Group I	Group II	Group III
Nr. of animals owned:			
- Chickens	19.12	13.83	10.49
- Goats	1.53	1.48	1.19
- Cows/Heifers	0.66	0.73	0.82
- Calves	0.31	0.25	0.32
- Pigs	2.37	2.51	1.60
- Bulls	0.24	0.18	0.14
Gross value of livestock production (US$)	270.98	281.84	151.74
Expenditure on inputs for livestock production (US$)	100.50	151.82	68.97
Revenues from sale of livestock and livestock products (US$)	268.02	281.84	151.74
Revenues from sale of (US$):			
- Whole livestock (alive or slaughtered)	218.46	269.29	128.80
- Milk	39.87	12.39	13.41
- Eggs	9.65	0.11	9.51

Note: Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 182; Group II = 166; Group III = 148.

6.4 INCOME AND LIVELIHOOD COMPOSITION

Table 9 presents statistics on income and livelihood composition for beneficiary households, highlighting the low income levels that are typical of smallholder farmers in Uganda. Group III households are by far the poorest, earning just under half the income of households in Group II. As mentioned above, the poverty amongst these newly-reached households highlights the potential for inclusive growth of the Fund's investment in CECOFA.

Households in Group I may be expected to be the wealthiest as they are required to invest in more sophisticated coffee production practices to meet certification standards. However, their income is lower on average than households in Group II. Insights from the qualitative data, combined with the income breakdown, provide a potential explanation for this. A key theme in the qualitative data was that many CECOFA members have invested in producing coffee under certification specifications, only to find that the premium they receive from CECOFA, and CECOFA's buying practices in general, are not sufficient to justify these additional costs. This leads them to sell to local traders, who do not offer prices that reflect the certification premium. Based on the qualitative data, farmers in Group II were also negatively affected by CECOFA's unreliable buying practices, but from Table 9 we can see that these households are less reliant on income from agriculture, and receive less income from coffee as shown in Table 5 above. With larger shares of their incomes coming from household enterprises and formal wage activities, these households were likely benefitting from diversifying their income away from coffee during 2018.

Throughout the qualitative data, issues related to poverty were cited as the main reason for farmers selling to local traders. The main issue was the need for money to pay school fees, along with unexpected emergencies such as medical bills. These lead farmers to either sell their coffee harvests early to local traders, or receive an advance payment, which ties them to sell to the trader when harvest time comes. On more than one occasion, it was noted that these traders take advantage of the desperate situation of the farmers to offer very unfavourable prices. One of the control cooperatives used for Group I reported in their qualitative interviews that they provide similar types of cash advances to their members, but on more favourable terms than local traders in order to ensure their members are retained, something CECOFA may be able to also offer to its members with greater working capital.

Table 9: Total household income and income composition of beneficiary households

	Group I	Group II	Group III
Gross household income (US$):			
- Total	3,518.47	4,072.44	2,695.43
- Per capita	528.26	597.24	457.72
Below $1.90 per day poverty line (%)	80.22	78.92	83.11
Proportion of income from (%):			
- Crop production	62.30	59.40	62.69
- Household enterprise	11.59	14.78	14.01
- Livestock production	10.34	9.59	10.28
- Formal waged labour	3.06	4.69	3.98
- Informal waged labour	4.33	3.32	2.75
- Other	8.39	8.22	6.29

Note: Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 182; Group II = 166; Group III = 148.

6.5   LOANS AND SAVINGS

Table 10 presents details of the loan access and savings of the beneficiary households. As noted in Section 6.1, the qualitative data tells us that access to capital during production is a challenge for these farmers, leading them to enter into cash-for-harvest arrangements with local traders on unfavourable terms. Beneficiary farmers also noted in the qualitative data that if CECOFA could provide them with loans on favourable terms it would be a key factor for them to sell more coffee to CECOFA. From the quantitative data below, we see that the majority of households from all groups accessed at least one loan during 2018, with an average amount between US$183-US$221 across groups. Although between 12-20 per cent of these loans were from traders, the main loan provider was savings groups, a source that was not mentioned in the qualitative data. However, looking further into the data shows that the size of the loans obtained from savings groups were much smaller than for traders, averaging between US$79-US$106 across groups, compared to average values between US$126-US$333 from traders. Considering the qualitative and quantitative data together thus suggests that the main challenge to farmers is obtaining loans of sufficient size to adequately fund their production, rather than being unable to access loans at all, with local traders being the only source who are capable and willing to provide them.

Regarding savings, between 66-76 per cent of households had some form of savings during 2018 for each of the groups. The average amount held in savings reflect the different income levels across the groups, with households in Group II having the highest at around US$220 and households in Group III holding the lowest at US$94.

Table 10: Credit and savings access of beneficiary households

	Group I	Group II	Group III
Took at least one loan in 2018 (%)	70.33	65.06	57.43

Source of loan (% of sample who took loan):
  - Saving group
  - Cooperative
  - Friend/Relative
  - Commerical bank
  - Trader/Buyer
  - Microfinance institution
	
	56.06 (66)
	0.00 (66)
	18.18 (66)
	6.06 (66)
	19.70 (66)
	12.12 (66)
		
		73.33 (45)
		4.44 (45)
		8.89 (45)
		8.89 (45)
		15.56 (45)
		11.11 (45)
			
			58.54 (41)
			0.00 (41)
			39.02 (41)
			12.20 (41)
			12.20 (41)
			4.88 (41)

Loan size (US$)	220.54 (128)	191.55 (108)	182.77 (85)
Household had at least one loan rejected in 2018 (%)	3.85	2.41	3.38
Household had at least one member with savings in 2018 (%)	75.82	74.70	66.22
Total cash savings per capita (US$)	177.80	219.94	93.86

Note: Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 182; Group II = 166; Group III = 148.

6.6   WELLBEING

Table 11 presents statistics reflecting other areas of beneficiaries' wellbeing. Despite their low incomes, food insecurity is low as a very small percentage of households across the groups reported having to go a whole day without eating during the study period. Although seemingly not an acute problem, it is definitely a concern for some households given that one third of them reported being worried about having not enough food due to a lack of money or resources. Regarding nutrition, households averaged scores of 10.1-11.4 out of 16 for dietary diversity, meaning in the past week they consumed the majority of the major food groups required for a healthy diet. These reasonably positive food security and nutrition indicators are likely connected to the fact that across the groups households dedicated around a third of their harvests to home consumption.

School enrolment statistics for the three groups is less positive: at least 24 per cent of school-age children not enrolled in school during the study period amongst the beneficiary groups. As well as reflecting the high poverty rates in the sample—meaning households may not be able to pay school fees or that their children must skip school in order to contribute to the household's economic activities—these may also reflect local education infrastructure in the study areas. It was widely noted in all of the districts covered by the sample that there were few schools nearby, and that the buildings and teacher attendance of those available were of low quality.

Over 84 per cent of households in each group experienced at least one livelihood shock during 2018, reflecting the high level of vulnerability that is both a symptom and a cause of poverty (Sattelberger, 2016). Reflecting insights from the qualitative data noted in Section 6.1, weather-related shocks are particularly prevalent in the sample, as well as issues with crop pests and diseases. As noted above, one strategy of CECOFA is to encourage households to engage in more livestock activities in order to diversify their income, however a key challenge highlighted in the table is the incidence of livestock disease, which may be hindering such diversification.

Uganda remains a patriarchal society, especially in rural areas, where women face numerous barriers to their economic activities and involvement in decision making (UNDP, 2015; WEF, 2018). These issues are reflected in the gender equality indicators of the sample in Table 11, where income from women's wage employment and from household enterprises they manage makes up just 10-14 per cent of total household income across groups. Moreover, at least 30 per cent of the sample for each of the groups reported that women were not involved in decisions regarding household purchases, sending children to school or agricultural activities.

It is one of CECOFA's stated goals to involve more women and youth in CECOFA and in coffee production in general. The management believes that women can be the key to ensuring that production practices are adhered to and that household income is re-invested effectively. Given these low rates, a more strategic approach may be required in order for CECOFA to be successful in this area. With specifically designed and targeted interventions to increase women's inclusion, CECOFA has the potential to significantly improve the empowerment of the women that they reach.

Table 11: Food security, education, shock exposure and gender equality of beneficiary households

	Group I	Group II	Group III
Food security and nutrition			
Dietary Diversity Score (1-16 scale)	11.44	10.93	10.14
Worried would not have enough food due to lack of money/resources (%)	31.32	31.93	34.90
Went without eating for a whole day due to lack of money/resources (%)	3.85	1.81	3.36
Education			
Per cent of school-age children enrolled (%)	68.11	75.41	68.73
Shock exposure			
Exposed to a shock in past year	84.62	84.34	87.25
Shock type experienced (%):			
- Drought	47.40 (154)	44.29 (140)	52.31 (130)
- Crop pest/disease	25.32 (154)	22.86 (140)	30.00 (130)
- Illness/accident/death of income earner	29.22 (154)	34.29 (140)	30.00 (130)
- Irregular rains	37.01 (154)	32.14 (140)	46.92 (130)
- Ag. input/output price change	37.66 (154)	30.00 (140)	32.31 (130)
- Livestock pest/disease	30.52 (154)	28.57 (140)	36.92 (130)
- Theft	14.94 (154)	29.29 (140)	22.31 (130)
- Other	32.47 (154)	32.14 (140)	33.85 (130)
Gender equality			
Per cent of household income from women's wage and enterprise activities (%)	10.02	14.43	9.95
Women involved in decision making for (%):			
- Household purchases	59.89	57.83	63.09
- Sending children to school	69.23	64.46	67.11
- Crop or livestock production	57.69	61.45	59.73

Note: Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 182; Group II = 166; Group III = 148.

6.7 EXTERNAL SUPPORT

Table 12 presents statistics on the different types of support received by beneficiary households during 2018. The majority of households received some form of training, mainly on agricultural production and marketing. In Group I, around 57 per cent of households had received some form of training, followed by 42 per cent in Group II and 39 per cent in Group III. It is unsurprising that those in Group I received the most training as this is required in order to equip them to produce coffee that meets certification standards. The majority of this training and advice was received from other farmers, however, highlighting the importance of informal knowledge networks that are common amongst Ugandan farmers (Katungi et al., 2008).

The very low level of social support (including education, food security, nutrition, women's empowerment etc.) highlights an area of considerable opportunity for CECOFA. Problems of access to education, healthcare, good roads, water and electricity were all noted in the qualitative interviews, highlighting that there is plenty of demand for this kind of project. Fairtrade certification provides a premium to CECOFA to be used for community projects to address issues such as these.

Table 12: External support received by beneficiary households

	Group I	Group II	Group III
Received any training or advice in 2018 (%):			
- Any	92.31	85.54	77.03
- Coffee production	56.59	42.17	38.51
- Other agriculture	34.07	37.95	31.08
- Marketing and sales	73.08	53.61	54.05
- Livestock rearing	39.56	40.36	32.43
- Social (health, education, etc.)	0.00	0.60	0.00
Source of support (% of support):			
- Other individuals	33.33 (168)	33.10 (142)	38.60 (114)
- CECOFA	39.29 (168)	26.76 (142)	14.91 (114)
- NAADS/Government	14.29 (168)	17.61 (142)	25.44 (114)

Note: Samples sizes for each group are as follows unless otherwise stated in parentheses: Group I = 182; Group II = 166; Group III = 148.

7. CONCLUDING REMARKS AND NEXT STEPS

This baseline report has first shown that, despite the challenges, a sufficiently well matched set of treatment and control households have been identified to assess the impact of the SMADF investment in CECOFA. There are some remaining differences between the groups, which will be addressed during the endline analysis using statistical methodologies designed to ensure that the control group represents a reasonable counterfactual to the treated group. Specifically Propensity Score Matching before conducting DID analysis will control for all observable characteristics as well as the general time trend, which affect outcome indicators to be analysed.

This report also provides a thorough understanding of the expected smallholder beneficiaries, by providing a profile of the three categories of beneficiary households using the quantitative and qualitative baseline data. Overall, these are low income households with restricted production capacity, particularly those who have recently joined CECOFA. The descriptive analysis provides evidence that CECOFA has linkages with groups who are most in-need of support, highlighting the considerable potential of CECOFA's success to spur inclusive rural development in Central Uganda. However, these same opportunities also present challenges. In particular, CECOFA members' limited access to inputs and credit and their vulnerability to shocks highlight the potential problems of ensuring members can produce to the required standard, volume and timing required by CECOFA as it grows.

The next step for CECOFA and the SMADF will be for the Fund Manager and CECOFA to move forward with the investment. The endline data will be collected from the same households included in the baseline survey in five years and based on the two rounds of data, a rigorous estimate of the impact of the investment on the smallholders will be made. This analysis will also form part of the meta-analysis that will be conducted to estimate the Fund level impact as programmed in the SMADF IA Plan.

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