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

BASELINE REPORT **No. 1**

Sesaco Ltd.

IFAD
Investing in rural people

YIELD UGANDA INVESTMENT FUND

ACKNOWLEDGEMENTS

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1. INTRODUCTION

The Small and Medium Agribusiness Development Fund (SMADF) is a $22.6 million investment fund aiming to address a major barrier to rural development in Uganda. The Fund is a partnership between public and private investors and service providers which aims to stimulate the growth of Small and Medium Agri-businesses (SMAs) across Uganda by providing them with long-term financing products. SMAs have the potential to drive growth in developing countries, but are often too large to avail of microfinance products and too small or not sufficiently formalised to qualify for bank finance (Milder, 2008; Paglietti & Sabrie, 2013).

The Fund is part of the "impact investing" movement, in that its investments are guided by both financial and social returns (GIIN, 2017). The main intended social return of the SMADF is to boost the livelihoods of smallholder farmers with whom investee SMAs are economically linked. The initiative also provides incentives for investee SMAs to avail of Business Development Services (BDS) for themselves and to supply these to smallholder farmers.

There are a number of stakeholders involved in the SMADF, including the Fund's investors: the European Union (EU) and the Ugandan National Social Security Fund (NSSF); the implementing partner of the BDS: Klynveld Peat Marwick Goerdeler (KPMG); and the local private company who is managing the Fund: Pearl Capital Partners (PCP). As well as acting as a carrier for the EU's investment, IFAD has also been tasked with leading the impact assessment of the Fund through its Research and Impact Assessment (RIA) division.

The impact assessment of the SMADF will focus on smallholder farmers linked to investee firms, and will cover around half of the investee firms of the Fund. For each firm, quantitative and qualitative data will be collected from beneficiary (treatment) and non-beneficiary (control) smallholder households, allowing for both firm and Fund level impact measurement[1]. The type of impact assessment that is being conducted is termed as "ex-ante" because it is designed before the investments take place and includes a round of baseline data collection. With the benefit of a baseline, "ex-ante" approaches facilitate a more rigorous analysis than "ex-post" impact assessments, where data is only collected after an intervention is completed (MCC, 2012).

For each firm included in the impact assessment, one round of baseline data will be collected shortly after the firm is selected by the Fund, and a follow-up round of endline data will be collected approximately five years after the baseline. In each case one report will be produced at the baseline stage, and one report will be produced at the endline stage which will detail the estimated impact of the investment. This is the baseline report for Sesaco Ltd, the first investee firm to be included in the assessment, and the first investee firm of the Fund.

Sesaco Ltd is a family-owned agro-processing firm specialising in soy-based products including beverages and fortified flour. Thanks to the Fund investment the firm is expected to overcome

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[1] See Paolantonio et al. (2017) for further details on the overall SMADF impact assessment design.

the many limitations they face in their production and marketing processes. One of the main improvement Sesaco expects to reach is to stabilise and formalise its produce procurement process through establishing formalised supplier arrangements with smallholder soybean growers. Sesaco will support these farmers in improving their organisation and their ability to mobilise so that they can provide goods on time at the required quality standard. This will benefit farmers from having guaranteed demand and a guaranteed price for their goods, helping to make their income smoother and more reliable.

This baseline report serves a number of purposes. First, it outlines all of the expected benefits of the SMADF investment in Sesaco, thus identifying the key impact indicators that will be tracked over the next five years. Second, it provides a detailed documentation of the methodology that was followed for the baseline, that can be referred to upon starting the endline data collection to ensure that the two rounds are perfectly aligned. Third, in analysing the baseline data, the report provides a snapshot of the pre-investment situation of the expected beneficiaries, highlighting the challenges that they face, areas of opportunity, and contextual factors that may help or hinder impact. Finally, in conducting statistical tests to compare the treatment and control group, the report provides a descriptive assessment of the quality of the non-beneficiary (control) group that will be used for comparison to measure the impact of the Sesaco investment.

The report is structured as follows: Section 2 provides a background of Sesaco and of the investment that will be made by the SMADF; Section 3 outlines how the Sesaco investment is expected to impact smallholder farmers, and presents the Theory of Change for the investment; Section 4 describes the sample design and the data collection process that was followed for the Sesaco baseline; Section 5 presents the comparison of the treatment and control groups to assess the quality of the sample design; and Section 6 uses insights from the quantitative and qualitative data to give a description of the beneficiary households and discusses how their characteristics and environment may interact with the expected impact channels. Finally, Section 7 presents concluding remarks and outlines the next steps of the Fund impact assessment.

2. BACKGROUND

2.1 THE YIELD UGANDA INVESTMENT FUND

The Yield Uganda Investment Fund is an innovative partnership that was initiated between the European Union (EU), Government of Uganda and the International Fund for Agricultural Development (IFAD) . The fund was created in a bid to have a catalytic effect in the increase of financing to Uganda agribusinesses increasing the demand for agriculture goods and labour thus improving the lives of rural woman and men. The Fund is a partnership between public and private investors to offer innovative financial products, such as equity quasi-equity and debt funding, to small and medium agri-business companies. The fund aims to invest USD 250 000 to 2 million in small and growing agribusinesses in Uganda offering a good growth potential as well as an attractive impact proposition.

The Yield Uganda Investment Fund was officially launched in January 2017 with initial capital from the European Union through the International Fund for Agriculture Development (IFAD) and the National Social Security Fund (NSSF). Since the establishment, the fund has made 5 investments in agro-companies for a total of EUR 3.3 million.

2.2 THE CONTEXT

Despite manufacturing and services playing a key role in the country's recent impressive economic growth, agriculture remains at the core of the Ugandan economy, with over 80 per cent of the population involved in the sector (Anderson et al., 2016; PwC, 2018). The majority of farmers in Uganda are smallholders, comprised mainly of poor family-farming households who cultivate mainly for home consumption but increasingly for sales. These farmers lack the cash, assets, skills and networks to maximise their gains from farming and market participation, restraints which, if loosened, could have considerable impacts on income, employment and poverty in the country (Walker et al., 2018).

Small and medium-sized agribusinesses have been identified as an important tool in growing the agriculture sector in Uganda. For smallholders, they can help to release their potential by addressing gaps in input availability, demand for their goods and labour, and access to value chains (Paglietti & Sabrie, 2013). These companies are still hindered, however, by a lack of access to investment capital which the Fund aims to address (Milder, 2008).

The potential benefits of the SMADF investment in the Sesaco agribusiness are amplified by the growing demand for soybeans in the country. Now recognised as one of the most nutritious crops in the world, the once minor crop is seeing its demand and value rise in Uganda as a source of protein for human consumption (particularly for use in nutrition programs) and for livestock feed (Thoenes, 2007; Kaizzi et al., 2012; Tukamuhabwa and Obua, 2015). Uganda is now one of the largest producers in the continent but there remains significant potential for further scaling-up (Khojely et al., 2018). Soybeans are particularly suitable for production by smallholders as the crop can be produced in both cropping seasons; is relatively easy to harvest, store and prepare for sale; and new high-yielding disease-resistant

varieties require less inputs during the production process (Tukamuhabwa and Obua, 2015). With production of soybean increasing amongst Ugandan smallholders, the focus now is upon increasing the efficiency of production (especially by improving access to seeds for improved varieties) and connecting producers to reliable value chains to increase their profits (Randall and Stepanovic, 2015; Tukamuhabwa et al., 2016).

2.3 THE BUSINESS

Sesaco Ltd is a family-owned agro-processing firm specialising in soy-based products including beverages and fortified flour. The roots of the business date back to 1978, when the company's owner and founder, Charles Nsubuga, began selling groundnuts on a building site where he was working as a day labourer. By 1986, he had accumulated enough capital to open a small bakery which he formally registered in 1987. From this time, taking advantage of the growing market for fortified products in Uganda and thanks to investment from the Gatsby Trust and the Private Sector Foundation Uganda, the business has grown into an SMA with an annual turnover of $603,600 and assets of $196,100[2].

Through its business model, Sesaco is capitalising on two key trends in the country. The first is the country's growing middle class, who are characterised by their disposable income and health consciousness (Ayoki, 2012). This group is targeted with their Soya Cup product: a non-caffeinated, nutrition-rich beverage sold as a healthier alternative to coffee or tea. Currently, they supply this product to a number of small and large supermarkets in the country, along with their range of healthy snacks such as soya-based yoghurt and cookies.

The second trend is the growing use by governments and development organisations of locally-sourced products for school and community nutrition programmes (See Sumberg and Sabates-Wheeler, 2011). In the past, the fortified foods for these programmes have been imported, but procurement practices have been shifting thanks to the success of initiatives such as Purchase from Africans for Africa (PAA Africa), a school feeding programme based in Ethiopia, Malawi, Mozambique, Niger and Senegal which procures primarily from local smallholders (de Miranda et al., 2017). Currently Sesaco sells its products, primarily soya-fortified maize and millet flour, to a number of international NGOs supporting the health and nutrition of children, refugees and those with HIV/AIDS, along with local schools and health centres. The company's largest contract is with Living Goods, an international NGO specialising in providing health foods for people on medically prescribed diets.

In 2003, Sesaco began leasing the small processing facility in Central Uganda where it is currently based. From this facility, all of Sesaco's products are processed and packaged. In addition to soya beans, the main raw materials for Sesaco's production are millet, maize, groundnuts and sesame. These are mainly sourced on an informal basis from smallholder farmers within the nearby districts of Budaka and Iganga, often through traders and middlemen. The company keeps a database of smallholder Farmers' Groups, middlemen and traders and purchases raw materials from them on an ad-hoc basis, based on who can provide the required materials at the required time for the best price. At their processing facility, raw

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[2] Figure for year ending 2016, for which the most recently audited accounts are available. Conversion to US Dollars made on 25 September 2018 using the following source: https://www.xe.com/

materials are first manually checked for quality, and are then processed and packaged through a semi-automated process. The firm mainly relies on agents to identify buyers for their products, but are also approached for contracts, especially by NGOs.

By the end of 2016, Sesaco employed 85 staff, mostly of whom are considered semi-skilled. Of these, 52 are permanent, and the remaining 33 are employed on a short-term piecemeal basis. Around 75 per cent of the staff are women.

2.4   THE INVESTMENT

The goal of the Sesaco management is to become a multinational food processing enterprise, penetrating more markets in Uganda and abroad, and winning larger contracts with international health NGOs. To reach this goal they face a number of challenges which they hope to address using the SMADF investment. The main challenge that they face is their production capacity and efficiency. With their low storage space, limited automation, limited working capital, high debt repayments, and informal procurement system, the firm is unable to supply their goods at the quantity, speed and profit margin that is required in order to drive growth. As a result, the firm has been hindered in pursuing potential new markets, especially in Northern Uganda, and have been unable to secure lucrative potential contracts with buyers including the Clinton Health Access Initiative and Together Africa Twaweza (an NGO providing fortified foods to South Sudan) due to concerns over capacity and pricing.

The way Sesaco procures its raw materials potentially poses the biggest challenge to their growth. Currently they source their soybeans and other crops from within a pool of nearby suppliers consisting of Farmers' Groups, individual farmers, traders and middlemen. Without storage facilities and working capital to allow them to buy goods in bulk in the peak production season—when the prices are most favourable and supply most reliable—the firm purchases on an ad-hoc basis whenever there is need, at which time they evaluate who from the pool can provide the amount they need at that time at the best price. The competition from other local and international buyers for these raw materials is high, and the lack of any formal arrangements with these buyers leaves supply, quality and prices uncertain.

A total of UGX7.2 billion will be invested in Sesaco through the SMADF, with Phase One of the investment covering the first two years and totalling UGX1.6 billion. The Phase One investment will be split into three parts, with around 55 per cent being used for working capital, and the remaining 45 per cent being evenly split between capacity expansion purchases and debt restructuring.

In addition, the firm will avail of the cost-shared BDS option of the Fund, which will be focused upon improving the management and governance of the firm, producing a new marketing strategy, and on establishing formalised supplier arrangements. Specifically, the Fund will support Sesaco in hiring and training new Non-Executive Directors and board members, along with a Financial Management Expert, a Production Manager, and a Marketing Consultant. A new electronic accounting system will also be established, health and safety procedures at the production facility will be improved, and the support will also help them to obtain certifications of product quality. The Marketing Consultant will assist with devising the new

marketing strategy aided by a product and market feasibility study. Finally, the supply network support provided through the BDS will involve assistance in recruiting, training, monitoring and supporting Farmers' Associations to provide the company's raw materials.

The parts of the Phase One investment intended for working capital and for capex improvements, combined with the BDS support, are expected to address Sesaco's challenges in a number of ways. The part intended for working capital will be used to purchase raw materials in bulk at times when the price is lower. Together with the BDS support, increased working capital is also expected to facilitate the strengthening of their supplier network, whereby they will invest in establishing formalised out grower arrangements with a fixed group of suppliers—dealing directly with Farmers' Groups and reducing the need for traders and middlemen—which will include providing the groups with training and inputs to improve the quality, quantity, reliability and timeliness of their supply. In turn, the more reliable supply of raw materials, plus a better ability to cover day-to-day operating expenses, is expected to increase production capacity and efficiency, allowing the firm to produce more, and at a lower operating cost.

Using the capex investment in Phase One, Sesaco is also expected to improve its production volume and efficiency by increasing the automation of the processing and packaging stages of its production process. This will include a new packaging line which is expected to reduce delivery time by five-fold; a new milling machine expected to increase machine running hours with lower power consumption; and new roasters that are faster, have less spillage, and are cheaper to maintain. This increased production capacity and efficiency, combined with a new marketing strategy, is expected to start a snowball effect, whereby the firm is better placed to explore the new markets and to secure the lucrative supply contracts that have eluded them in the past, all the while increasing profits which can then be used to re-invest in the business to drive exponential growth.

Phase Two of the investment is scheduled to begin in Year 3 and is expected to total UGX5.6 billion. This investment will focus on achieving near full automation of the firm's production process, likely to be located in a new plant on other land already owned by the firm with more space for storage. As a result of improvements in revenue, capacity and management from Phase One, it is also expected during this phase that additional investors will be attracted to the firm, money from which will be used for working capital requirements, all of which is expected to drive more aggressive growth during this phase and to feed a snowballing of the benefits achieved during Phase One.

3. EXPECTED IMPACT OF THE INVESTMENT ON SMALLHOLDERS

Around 80 per cent of Uganda's farmers are smallholders and this group contains some of the country's poorest people (NPA, 2013). These farmers face numerous challenges to their agricultural production including limited access to inputs, technology, credit, information and markets, which subsequently affects their ability to access lucrative value chains (IFAD, 2016). They also face additional livelihood challenges, such as exposure to climatic shocks and changing rainfall patterns; poor infrastructure; conflict and displacement; youth unemployment; shifting value chains and food demand; and land scarcity and degradation (DRT, 2012; Munyambonera et al., 2012; IFAD, 2016).

The Agriculture Sector Strategic Plan (2016-2020) of the Ugandan Government cites the development of SMAs as a key tool in addressing some of these challenges, and thus to reducing poverty and stimulating rural development, food production and export growth in the country (MAAIF, 2016). SMAs have been identified because a thriving SMA sector produces higher demand for the goods and labour of smallholder farmers, thus providing greater value chain opportunities, as well as improving the services available to smallholders, such as provision of agricultural inputs (Paglietti & Sabrie, 2013).

The investment in Sesaco is expected to lead to smallholder farmers gaining more benefits from being part of Sesaco's value chain. Sesaco currently sources its raw materials partially from Farmers' Groups consisting of smallholder farmers. However, as this procurement is informal and does not involve a fixed set of groups, the company does not have the incentive to invest in developing the capacity of these groups and their members. Smallholder farmers in these areas thus face uncertain demand and uncertain prices for their goods, do not receive support for improving their production and post-production operations, and are not well organised.

In this current situation Farmers' Groups and their members can become trapped in a negative cycle. As well as not receiving external support, a lack of a guaranteed price and demand for their goods, the groups will be disincentivised from investing in improving and expanding their production activities (Fiala and Apell, 2017). Furthermore, a lack of organisation leaves these groups at risk of side-selling, and means they do not have the bargaining power to secure good prices for their goods, or to ensure that any supply agreements they make are honoured by the buyer. Also without extension support, these groups are unable to meet the volume, quality, reliability and timeliness requirements to secure supplier agreements with Sesaco or other bulk buyers, leaving them reliant on middlemen who can encourage unsustainable farming practices, use inaccurate weighing scales, and offer unfair prices, especially when they are aware of an urgent need for cash which is common amongst poor farmers (Latynskiy and Berger, 2016; Mwesiga, 2018).

With the Phase One investment, Sesaco is expected to stabilise and formalise its procurement process, with the intention of establishing a fixed network of Farmers' Groups who will enter into formal arrangements to provide goods at a set price. The price will be set according to the average price for each crop in the area at the beginning and end of the season. With the help of the BDS support, Sesaco will also help these groups to improve their organisation and their ability to mobilise so that they can provide goods on time at the required quality standard. Members of these groups will thus benefit from having guaranteed demand and a guaranteed price for their goods, helping to make their income smoother and more reliable, and reducing their need to sell to middlemen on less favourable terms.
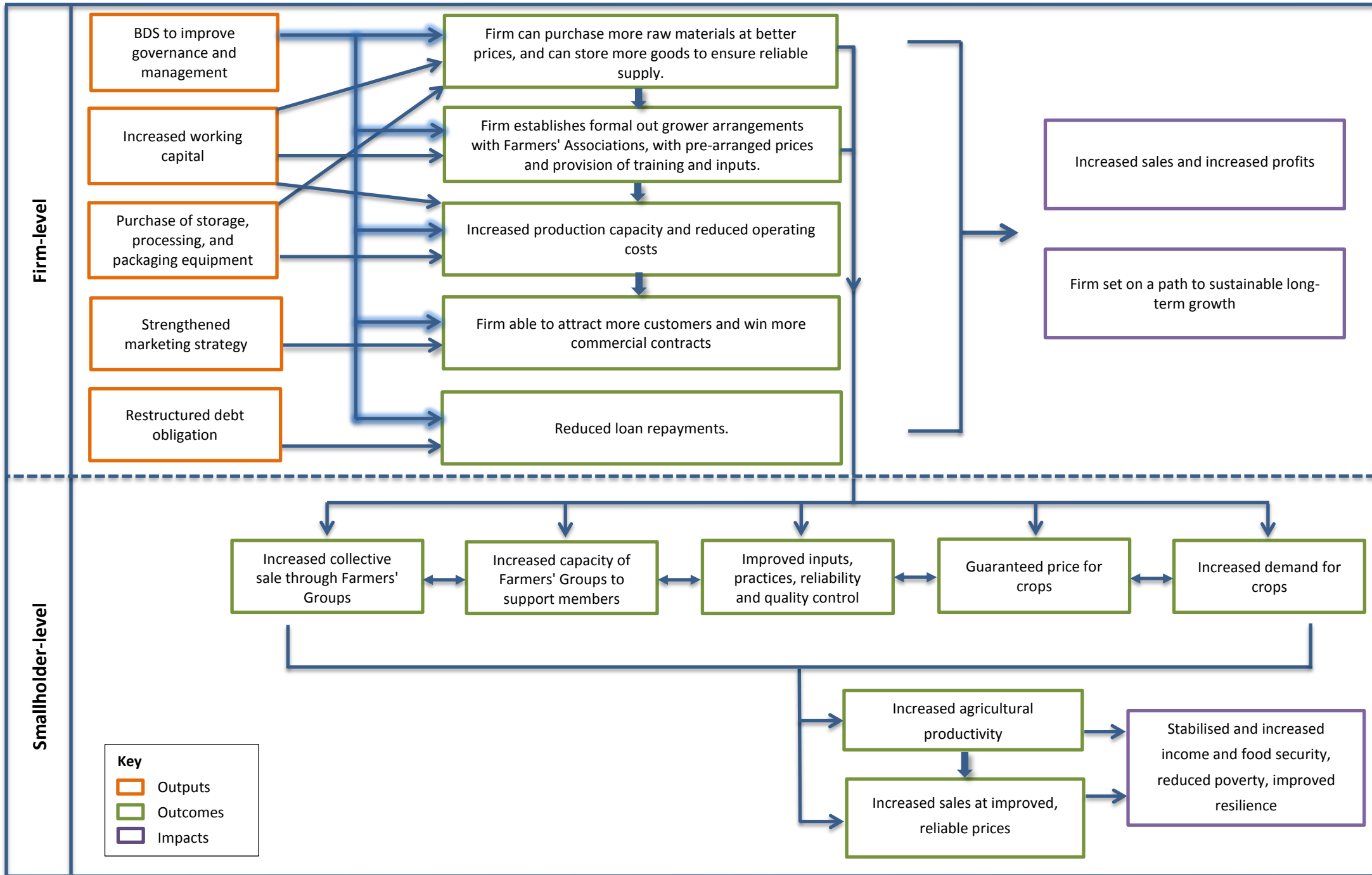
In addition, as the firm expands, their demand is likely to increase, meaning members can sell more and increase their income. Members will also benefit from the more organised and formalised groups being better equipped to provide them with additional support—such as access to credit and savings facilities, risk sharing, off-farm income generating opportunities, opportunities for women and youth, information and technology access, and agricultural training. The strengthened groups are also expected to have higher bargaining power, and as Sesaco also plans to help the groups to produce goods to a higher standard of quality, members' incomes will likely receive a further boost from higher prices, increased capacity, and better chances of accessing additional value chains.

Ultimately, these benefits are expected to stimulate higher and more reliable incomes for smallholder households.. With higher and more stable income, households are expected to be able to purchase more varied and nutritious food, have better access to healthcare facilities and medicine, and be able to afford to send their children to school (being able to pay school fees and having a reduced need for child labour), as well as improving their capability to cope with shocks such as extreme weather events.

Resilience refers to the ability of a household to withstand shocks and to deal with risk, and is an important component of long-term household wellbeing (Folke et al., 2002). The need for improved resilience in the country, particularly due to climate change, is highlighted by the fact that for every three people in the country who are able to move above the income poverty line, two will fall back below the line (World Bank, 2016; Monjane, 2018). As well as having more money to protect against risk, which they can save or use to buy assets for example, the increase in the reliability of demand expected through the investment also means that households can plan ahead and mitigate risks with the knowledge that they will receive a steady income in the near future.

Figure 1 presents the Theory of Change for the SMADF investment in Sesaco, outlining how the investment is expected to impact Sesaco itself (based on the expected benefits of the investment at the firm-level outlined in Section 3), and how it is expected to benefit the smallholder farmers who are linked to Sesaco, 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 (see White, 2009).

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

4. METHODOLOGY

4.1   SAMPLE DESIGN

Robust impact assessment involves the comparison of a well-matched set of beneficiary (treatment) and non-beneficiary (control) households. The non-beneficiary households should be similar to the beneficiary households at the baseline stage, as they will then provide a simulation of how beneficiaries would have fared in the absence of the intervention (in this case the Fund investment). Therefore, whenever possible, data for treatment and control groups should be collected before and after the intervention. With the benefit of baseline data, we can use real-time data to construct a control group that best matches the situation of beneficiary households before the intervention began, thus removing the need for recalled data.

Using the investment, Sesaco is expected to strengthen its bonds with existing Farmers' Group suppliers. The beneficiary population for this impact assessment is therefore defined as households who are members of groups who Sesaco plans to strengthen its bonds with going forward. Based on this definition of the beneficiary population, the control population therefore consists of farmers who are members of similar Farmers' Groups who are not currently linked with Sesaco, and with whom Sesaco do not plan to connect in the future. This latter point is very important to consider at the baseline stage, as we intend to re-interview the same control households at the endline stage, so we must ensure that at no point before the endline stage they become connected to Sesaco through the Fund investment, which would make them an invalid control household.

Through consultation with the Sesaco management, a set of 11 beneficiary Farmers' Groups were identified for the treatment group. Although Sesaco sources its produce from a wider group of suppliers, these are the groups that Sesaco plans to buy from going forward, meaning these represent the beneficiary population for this impact assessment. Through consultation with the Sesaco management, as well as the Fund management and the Chairman of the National Soyabean Association (NSA), we identified 16 potential control Farmers' Groups. These were groups who are not currently linked to Sesaco, and who Sesaco could guarantee would not become linked to them over the next six years. To maximise comparability, these potential control groups were also identified from within the same districts as the beneficiary population (Budaka and Iganga).

From this set of potential treatment and control Farmers' Groups, we sought to identify those that are likely to contain the most similar members. We did this with the assistance of the NSA Chairman, through whom we administered a short questionnaire to each group to obtain key information on the groups' organisation, size, selling practices, and the average income and farming practices of their members. We used this information to assess the similarity of the beneficiary and potential control Farmers' Groups, and based on this eliminated six control Farmers' Groups who were not sufficiently similar to be included, or for whom there were

lingering concerns that they might become involved with Sesaco at some point in the future. This left us with a final set of 21 Farmers' Groups to be included in the sample. [3]

Once the set of treatment and control Farmers' Groups were decided, the next step was to determine the strategy for sampling households from these groups. Again with the assistance of the Chairman of the NSA, we obtained lists of the members of each of the Framers' Groups identified for the sample. On average, the number of members was 30. This meant that the total beneficiary population for Sesaco was expected to be around 330 households, based on which we decided to sample all of the households from within the 11 treatment Farmers' Groups we had selected for the sample, and all households from the 10 control Farmers' Groups. Using a sub-sample of households from each Farmers' Group would have left us with too-small a sample size to robustly measure the impact of the Sesaco investment. Based on this sampling strategy, the final dataset covered a total of 469 households, which was less than originally expected due to some cases in which two or more members on the lists provided were part of the same household, or due to their no longer being members of the group.

Table 1 below presents the distribution of household sample across the 21 Farmers Groups and across the two sample districts, with the groups' names hidden to maintain their anonymity.

Table 1: Distribution of sample across the treatment and control Farmers' Groups

Treatment Farmers' Group	No. of households	Control Farmers' Group	No. of households
Budaka District		**Budaka District**	
Farmers' Group 1	30	Farmers' Group 12	27
Farmers' Group 2	31	Farmers' Group 13	21
Farmers' Group 3	29	Farmers' Group 14	23
Farmers' Group 4	21	Farmers' Group 15	38
Farmers' Group 5	19	Farmers' Group 16	24
Farmers' Group 6	24		
Iganga District		**Iganga District**	
Farmers' Group 7	15	Farmers' Group 17	20
Farmers' Group 8	31	Farmers' Group 18	11
Farmers' Group 9	20	Farmers' Group 19	6
Farmers' Group 10	16	Farmers' Group 20	23
Farmers' Group 11	15	Farmers' Group 21	25

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[3] We also initially intended to remove one additional control Farmers' Group and two treatment Farmers' Groups to further ensure comparibility, however, during the data collection the number of households who were members of the groups was lower than expected in some cases, leading us to add these two groups back into the sample to ensure a sufficient sample size.

Table 2 below presents some descriptive statistics for the 21 Farmers' Groups selected for the sample. For both the treatment and control Farmers' Groups, the smallest groups contain 20 members, whilst the largest treatment Farmers' Group contains 36 members, and the largest control contains 40 members. In both cases the average number of members was around 30 (in many cases it was stated that 30 members was the maximum number of members that was permitted by the group). In both cases the majority of the groups' members are female, and for no group is the proportion of male members above 63 per cent. There is quite a range in terms of the age of the groups, however, ranging from one year to 19 years since the group was formed. On average, the age of the group is slightly higher amongst the treatment Farmers' Groups (10.5 years) compared to the controls (9 years). Overall, these statistics highlight the similarity of the two sets of Farmers' Groups included in the sample.

Table 2: Descriptive statistics of Farmers' Groups included in the sample

	Treatment Farmers' Group (11 in total)			Control Farmers' Group (10 in total)		
	Mean	Min	Max	Mean	Min	Max
Nr. of members	30.64	20	36	29.50	20	40
Gender of members (%):						
- Female	67.34	42.86	89.55	62.05	37.50	93.33
- Male	32.66	10.45	57.14	37.05	6.67	62.50
Nr. of years since formation	10.45	2	19	8.70	1	19

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 2017. As noted above, the investment in Sesaco is mainly expected to impact smallholders through improved agricultural production and higher sales of their produce at improved prices. The questionnaire therefore contained detailed questions on agricultural production practices by season, plot and crop, plus questions on individual and collective crop sales. As we want to capture the holistic livelihood impact of the investment, the questionnaire also covered all other 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 household questionnaire data, we also conducted focus group discussions with the leadership of the 21 Farmers' Groups included in the sample, as well as with the management of Sesaco and with PCP. These interviews focused on the current situation of Sesaco and its smallholder suppliers, including their advantages, challenges and expectations for the future, and were designed to be linked with the household questionnaire in order to generate a holistic snapshot of the context before the investment begins to have an impact.

4.3   IMPACT INDICATORS

In this baseline report, the statistics presented are for descriptive purposes, aiming to provide a picture at the pre-investment stage of beneficiary households' current situation and how well-matched they are with the control households. In this sub-section we describe the indicators we use in this analysis, which in most cases will also be those used to measure impact at the endline stage.

Table 3 describes all of the indicators we use in the report, identified based on the Theory of Change for the investment presented in Figure 1. The indicators relate to crop and livestock production; household income and its composition; poverty-levels; credit access and savings; other household wellbeing indicators (including nutrition, food security, education, resilience, and gender equality); and receipt of external support (namely, training and advice services). These indicators are constructed using the data from the household survey, covering the 12 month period between January-December 2017. For the indicators of agricultural production, these are aggregated across parcels and plots and are presented in the report for the full 12 months, as well as separately for the two main cropping seasons in Uganda (January-June and July-December).

Table 3: List of impact indicators for the Seasco investment

Indicator	Description	Impact area
Agricultural production and sale		
Gross value of crop production	Converts harvest of all crops into a common unit ($), 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.
Expenditure on inputs for crop production	Cash expenditure on buying seeds, fertilizers, chemicals, wage labour, etc.	Investment in farming practices/Input access.
Net value of crop production	Equal to the gross value of crop production minus the value of all inputs purchased.	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.
Crop-specific yields	The amount produced per unit of land of key crops: soybean, beans, maize, rice, groundnuts.	Input access, effectiveness/efficiency of farming practices.
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.
Crop prices	The amount received per kilogram for key crops: soybean, beans, maize, rice, groundnuts.	Market access, bargaining power.
Harvest uses	Proportion of harvest dedicated to home consumption, sale, and lost due to disease, pests, etc. For soybean expressed in percentage of kg harvested; for all crops combined expressed in 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.
Expenditure on inputs for livestock prod.	Cash expenditure on buying livestock, livestock feed, vaccinations, wage labour, etc.	Effectiveness/efficiency of livestock prod.
Net value of livestock production	Equal to the gross value of livestock production minus the cost of all inputs purchased.	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 Sesaco investment

Indicator	Description	Impact area
Livelihood composition and poverty		
Gross household income	Total income from all sources (crop, livestock, formal and casual wage, household businesses, and other (remittances, pension, etc.)).	Income, poverty.
Net household income	Equal to the gross household income minus expenditures on ag. and household business inputs.	Income, poverty.
Above poverty line	Gross household income is above the $1.90 per person per day international poverty line (Ferreira et al., 2015).	Poverty.
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 2017 and the source of loan.	
Loan size	Total amount received, totalled across all loans.	Market access.
Loan rejected	Household has had one or more loan applications rejected in 2017 and the reason for the rejection.	
Cash savings	Household has had one or more members with cash savings in 2017; 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	Standard indicators 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	Household has experienced at least one shock in 2017; composition of shocks.	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.
External support receipt	Support (training and advice) received in 2017, separated by type of support and by provider.	Farmers' Group organisation/effectiveness.

5. COMPARISON OF TREATMENT AND CONTROL HOUSEHOLDS

Tables 4a and 4b present key statistics for the treatment and control households. The statistics we present relate to the household characteristics that are most likely to have an influence on households' progress over the next five years, including education level in the household; income; agricultural capacity; assets; and access to loans, savings and support services. Due to their influence, it is imperative that these are balanced across the treatment and control groups at the baseline stage. The P-score column contains the results of the test for the statistical significance of the difference between the treatment and control groups, where a score of below 0.1 means that the difference is statistically significant at the 10 per cent level. All but four (out of 28) of the differences are statistically not significant, indicating that the treatment and control groups are very similar to each other along these dimensions.

In terms of household characteristics (Table 4a), we see that treatment and control households are of similar sizes (both averaging around eight members), and have similar shares with a female heads (both around 20 per cent with a female head). In terms of education, the average education of the household head, and of all adult household members, are also similar across the treatment and control groups (between eight to nine years, or up to J2 to J3 level, in both cases).

Regarding household income, there is a slightly larger difference. The average income per capita is $381 amongst treated households, and is $271 amongst controls, a difference of $110. However this difference is not statistically significant. Breaking income down by source, both treatment and control households gain most of their income from crop production whilst treatment households show higher proportions from household businesses and other sources, although none of these differences is statistically significant.

In terms of agricultural production, the gross value of crop production is remarkably similar amongst the two sets of households, averaging $880 for treatment households and $875 for control households. We also see that the amount of land cultivated throughout the year is very similar, averaging between 2.6 and 2.7 hectares in both cases. We do see a statistically significant difference in the market orientation of the two groups in terms of all crop types with crop revenues accounting for around seven per cent more of the gross value of crop production for control households compared to treatment households. This difference almost disappears, however, in relation to soybean production. The difference is very small and not statistically significant for both the proportion of the soybean producers who are selling their crop and the revenues received from soybean sales.

We do not find any statistically significant differences between the ownership of key assets and livestock, or in loan access and savings (Table 4b). The number of televisions, mobile phones, vehicles, agricultural buildings, carts or ploughs, and livestock are all roughly the same between the two groups. In terms of credit, 67 per cent of treatment households took a loan during 2017 compared to 61 per cent of control households and this difference is statistically significant. The proportion of households with at least one member who has cash savings during 2017 is higher for

control compared to treatment households (74 per cent against 70 per cent respectively, however, neither this difference nor the $2.3 difference in the average amount of savings per capita is statistically significant.

Finally, treatment households received more training and advice services during 2017. Regarding training and advice on agriculture, 63 per cent of treatment households received this at least once, compared to 45 per cent of control households. In terms of training and advice on other topics, 44 per cent of treatment households received this at least once, compared to 29 per cent of control households. However, it has to be noted that this indicator does not take into account intensity of training but it rather looks at whether the household ever received training or advice on a number of different topics even if only for one time. This may explain the fact that we do not see this difference reflected in any significant gain for treatment as opposed to control households in terms of their value of crop production.

In addition to the information collected through the household surveys, we also found very similar responses from the focus group discussions with the Farmers' Group leadership. As will be described in the next section, the discussions with beneficiary farmers highlighted a number of challenges that they face including hindered access to inputs, machinery and storage; poor roads; poor access to health and education facilities; and the need for more external support. In all of these cases, similar challenges were also expressed through the discussions with control Farmers' Group leaders. The similarity we have achieved amongst these households in terms of the challenges they face highlights the benefit of sampling households from within the same districts, as many of these challenges are local issues that will apply to the majority of households living in the same area.

As described in the methodology section, we undertook extensive efforts to ensure that we created well-matched treatment and control groups for Sesaco, and the comparison in Table 4 suggests that these efforts have largely been successful. However, there are still some significant differences, such as those between formal land ownership, the proportion of crop revenue on the gross value of crop production, as well as access to training and advice services. Nonetheless, there are a range of statistical techniques that can be applied during the endline data analysis stage that can address these differences and ensure comparability across the two groups based on observable characteristics.

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

	Treatment mean	Control mean	Diff.	P-score
Household characteristics				
Household size	8.02	7.94	0.08	0.803
Female household head (%)	21.12	19.35	1.77	0.637
Education of household head (years)	8.07	8.41	-0.34	0.527
Average ed. in household (years)	8.59	9.2	-0.61	0.108
Land owned with title/cert. (ha.)	0.21	0.34	-0.13	0.092*
Income				
Gross household income p/capita ($)	381.32	270.63	110.69	0.327
Proportion of gross income from (%):				
- Crop production	53.38	56.71	-3.33	0.176
- Household enterprise	14.13	11.71	2.42	0.249
- Livestock production	14.07	14.38	-0.32	0.831
- Formal waged labour	6.64	8.36	-1.72	0.314
- Informal waged labour	4.58	2.92	1.66	0.108
- Other	7.21	5.92	1.29	0.132
Agricultural production				
Gross value of crop production ($)	879.9	874.92	4.98	0.963
Land cultivated (ha.)	2.7	2.62	0.08	0.697
Proportion of harvest sold (%)	41.38	47.92	-6.54	0.007***
Proportion of soybean producers selling soybean (%)	83.12 (154)	82.68 (127)	0.44	0.923
Revenue from soybean sales ($)	81.84 (128)	77.27 (105)	4.57	0.802

Note: Number of observations for treatment group is 251 and for control group is 217, unless otherwise stated in parentheses.

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

	Treatment mean	Control mean	Diff.	P-score
Asset ownership				
Household owning at least one (%):				
- Television	7.57	5.99	1.58	0.500
- Mobile phone	90.84	89.86	0.98	0.721
- Motorbike/Car	11.16	8.29	2.87	0.300
- Ag. building (storehouse, livestock shed,etc)	18.33	21.2	-2.87	0.436
- Cart/Plough	11.55	10.14	1.41	0.624
Nr. of livestock owned (TLU)	1.76	1.53	0.23	0.474
Loans and savings				
Household took at least one loan in 2017 (%)	67.33	60.83	6.5	0.143
Household had at least one member with cash savings in 2017 (%)	70.12	74.19	-4.07	0.328
Total cash savings per capita ($)	18.98 (179)	21.31 (161)	-2.33	0.659
Training				
Household received training/advice during 2017 on:				
- Agriculture	62.95	45.16	17.79	0.001***
- Other	43.82	29.49	14.33	0.001***

Note: Number of observations for treatment group is 251 and for control group is 217, unless otherwise stated in parentheses.

6. KEY CHARACTERTICS OF TREATMENT HOUSEHOLDS

This section presents various characteristics of the 251 treatment households covered by the household questionnaire, complemented by insights provided by the focus group discussion. We also incorporate findings from a nationally representative survey of smallholder farmers conducted by CGAP in 2015, which we use to provide comparison and contextualisation (Anderson et al., 2016).

6.1 CROP PRACTICES

Table 5 presents details of the overall crop production and land use of the treatment population. The statistics on gross value of crop production indicate how much households are producing expressed in monetary terms. During 2017, beneficiary farmers produced, on average, around $880 worth of crops, at a rate of $341 per hectare. For seasonal crops, the volume of production is much higher in the January-June season, averaging $518 compared to $249 in the July-December season, with production per hectare also much higher at $421 compared to $297 per hectare.

The net value of crop production is equal to the gross value minus expenses, giving an idea of the efficiency of production. This is quite strong amongst beneficiary farmers in both total and per hectare terms—averaging $714 in total, and $275 per hectare—and once again the performance of these farmers is much more favourable in the January-June season. The more intensive farming in the January-June season is also reflected in input expenditure and land use, with an average of $85 spent on inputs and 1.2 hectares being cultivated in the January-June season compared to $36 being spent on inputs and 0.9 hectares being cultivated in the July-December season. For the whole year, which includes the cultivation of trees and perennial crops, the average amount of land cultivated is 2.7 hectares. From the number of households included in these seasonal statistics, in season two, only 228 of the 251 households cultivated any seasonal crops, compared to 247 households in season one.

Of the farms cultivated by these farmers, the average size is 0.8 hectares, which is slightly lower than the average for the Eastern Region of the country in which these households are based, which averages 1.1 hectares (Anderson et al., 2016). This suggests that, even amongst smallholders, these are some of the smaller-scale producers in the country, and this was explained during the focus group discussions that land in the area is scarce and expensive. Land ownership status can play a very significant role in the farming activities and profitability of households in developing countries across the world, with households who have a formal title for their land being more likely to invest more in their farming and achieve higher farm incomes (Higgins et al., 2018). In the case of the Sesaco beneficiaries, a very small proportion hold land with a government-issued title (0.1 per cent), or another type of formal certificate for their land (12 per cent). The majority of landholdings are either owned with an informal claim (21 per cent) or no document at all (30 per cent), or are rented in or sharecropped (29 per cent).

Table 5: Overall crop production and land use of beneficiary households

	Whole year (Jan-Dec)	Season 1 (Jan-Jun)	Season 2 (Jul-Dec)
Gross value of crop production ($):			
- Total	879.90 (251)	517.54 (247)	248.76 (228)
- Per hectare	341.17 (251)	421.10 (247)	297.31 (228)
Expenditure on inputs for crop production ($)	155.12 (251)	84.67 (247)	35.62 (228)
Net value of crop production ($):			
- Total	713.82 (251)	405.71 (247)	199.37 (228)
- Per hectare	275.37 (251)	328.95 (247)	242.74 (228)
Land cultivated (ha.)	2.70 (251)	1.18 (247)	0.86 (228)
Land access status (%):			
- Owned w. gov't title/deed	0.11 (251)	-	-
- Owned w. other formal cert.	11.83 (251)	-	-
- Owned w. informal claim	20.51 (251)	-	-
- Owned w. no document	29.99 (251)	-	-
- Rented/Sharecropped	29.12 (251)	-	-
- Borrowed/ Held as collateral	8.42 (251)	-	-

Note: Figure in parentheses represents the number of households.

Table 6 presents production details of the main crops cultivated by the beneficiary households. Crop diversity amongst the beneficiary households is reasonably high (although lower than the average for Ugandan smallholders based on the CGAP survey), with households growing an average of 7 different types including trees, seasonal and perennial crops. Amongst the main crops, a very high proportion of the beneficiaries grow maize (237 households), although this is more so in the January-June season, whilst large numbers also grow beans (159 households) followed by soybeans (154 households), groundnuts (142 households) and to a lesser extent rice (96 households).

In terms of production, rice is produced in the largest volume, at 900 kg for the year, and has the highest productivity at 1,669 kg per hectare, although these figures are low by international standard for rice. Maize is also produced in large quantities at 880 kg for the year and 1,393 kg per hectare. In terms of soybean production, 126 households grew the crop in the January-June season (around 50 per cent of the beneficiary sample) and 92 households in the July-December season (around 37 per cent of the beneficiary sample). For the full 12 month period, the households who produced soybean produced an average of 241 kg of the crop, at a rate of 639 kg per hectare. Unlike some of the other crops, the production of soybean varied little across the two main cropping seasons, with an average of 170 kg produced in the January-June season at a rate of 713 kg/ha, and an average of 170 kg produced in the July-December season at a slightly lower rate of 679 kg/ha.

Table 6: Crop production of beneficiary households

	Whole year (Jan-Dec)	Season 1 (Jan-Jun)	Season 2 (Jul-Dec)
Nr. of crop types	7.03 (251)	3.53 (247)	2.32 (228)
Harvest (kg):			
Soybean			
- Total	240.69 (154)	170.09 (126)	169.93 (92)
- Per hectare	638.96 (154)	713.37 (126)	678.83 (92)
Beans			
- Total	136.12 (159)	119.07 (121)	73.84 (98)
- Per hectare	473.26 (159)	608.81 (121)	287.95 (98)
Maize			
- Total	879.90 (237)	609.90 (222)	417.94 (175)
- Per hectare	1393.05 (237)	1601.86 (222)	1318.23 (175)
Rice			
- Total	899.14 (96)	699.53 (94)	501.49 (41)
- Per hectare	1668.94 (96)	1811.04 (94)	1057.78 (41)
Groundnuts			
- Total	275.80 (142)	218.07 (129)	239.84 (46)
- Per hectare	859.25 (142)	886.54 (129)	769.08 (46)

Note: Figure in parentheses represents the number of households. The statistics for the whole year are calculated for all households who grew the crop in either Season 1 or Season 2, whereas the seasonal statistics are only calculated for households who grew the crop in that season—thus the statistics for the whole year are not cumulative.

Table 7 presents statistics on pre-harvest crop losses experienced by the beneficiary households. There is a high proportion of plots on which farmers were unable to harvest some of their crops, averaging 62 per cent for all types of crop, and 55 per cent for plots planted with soybean. Across seasons, these percentages are reasonably similar, with the issue being slightly more severe in the July-December season. On 2 per cent of plots, households reported being unable to harvest anything at all, and for soybean plots only, 1 per cent were unable to harvest at all. A variety of reasons were given for this inability to harvest, most common of which was drought and irregular rainfall, followed by disease, insects, and weeds. Whilst the issue of irregular rains was more severe for the July-December season, disease and insects caused more problems in the January-June season.

From the focus group discussions with the Farmers' Group leaders, a number of challenges to farmers' crop production were revealed that reflect the data in Tables 5 and 6. In particular, the groups note that the biggest challenge is access to high quality agricultural inputs, including having the money available to buy them. They explain that, especially without access to the right seeds, they are unable to grow the crops they want, noting that they would especially like to grow more

sesame, onions, cabbage and eggplants. They also report that they lack the access and the information on fertiliser and pesticides. Regarding the pesticides, this has led to a widespread issue with crops lost to pests and weeds as also shown in Table 5, with the kayongo weed being the biggest menace. None of the groups reported they had any pre-existing arrangements with an input supplier, nor did they report having any credit-lines with suppliers. Rather, they simply buy on an ad-hoc basis from shops, who they complain charge high prices.

In addition to input access, Farmers' Group leaders also reported that their productivity is hindered by poor access to machinery. They state that this especially hinders them during land preparation and also processing. In addition, they blame production issues on unpredictable weather, including significant issues with unreliable rainfall, flooding, and excessive sunlight, something which may explain the seasonal variation in their production. Finally, although this was not mentioned in the focus group discussions, the low level of formalised land ownership may also be hindering productivity as households feel less comfortable investing their farming without the security provided by a formal claim to the land.

Table 7: Crop production of beneficiary households

	Whole year (Jan-Dec)	Season 1 (Jan-Jun)	Season 2 (Jul-Dec)
Proportion of plots where household was unable to harvest some or all of the planted area (%):			
- All crops	62.12	52.45	58.70
- Soybean only	54.75	50.69	54.21
Reasons given for being unable to harvest (% of plots):			
- Drought	46.00	51.45	48.18
- Iregualr rains	26.25	22.28	31.73
- Crop disease	18.78	21.92	15.89
- Insects	16.44	18.48	13.28
- Weeds	4.48	5.98	4.95

Table 8 presents details of the crop selling practices of the treatment population, for all crops combined. During the January-June season of 2017, 85 per cent of beneficiary households sold at least some of their seasonal crops, which reduces to 71 per cent for the July-December season. When the sale of perennial crops is also considered, however, the proportion of households selling at least some of their harvest during the full 12 month period increases to 90 per cent.

From these sales, beneficiary households made an average of $485 from selling their crops, at a rate of $167 per hectare. The seasonal variation in this income reflects the different production volumes in the January-June and July-December seasons, with a much higher amount of income from seasonal crops obtained in the first half of the year when households produce more.

Prices received for crops vary significantly across the two cropping seasons, likely linked to the issues discussed in Section 3. Although for beans and maize the price is very similar across seasons (around $0.44 and $0.18 per kg), the price received for rice was higher by $0.09 per kg in the January-June season, whilst for groundnuts the price was higher by $0.03 per kg in the July-December season. For soybeans, the average price received for the full 12 month period was $0.38 per kg, but as with groundnuts, this price is higher for the July-December season, averaging $0.47 per kg in this season compared to $0.36 per kg in the January-June season. It is surprising that the price received for soybeans is lower than that for beans, but based on the lower number of households selling beans, this may be due to this small group of households producing a more lucrative variety or having specialised arrangements that allow them to gain a higher price.

For all crops combined, beneficiary households retain around 47 per cent of their harvest for home consumption. Although not fully comparable, around 76 per cent of households in the CGAP survey reported that they did not sell any of the crops they grew, suggesting that Sesaco beneficiaries may be slightly more market oriented compared to other Ugandan smallholders (Anderson et al., 2016). In total, around 41 per cent of beneficiary households' crops were sold, but the statistics highlight the issue discussed in Section 3 of their being unable to secure sales arrangements with bulk buyers who provide better prices. Although not shown in the table, we find that only around 1 per cent of harvests were reported to have been sold to large-scale traders within the sample, whilst 17 per cent was sold to other individuals in their locality and 18 per cent was sold to small-scale traders. We also see from the statistics reported in the table that around 3 per cent of harvest were lost to disease, pests or floods.

Table 8: Crop selling practices of beneficiary households

	Whole year (Jan-Dec)	Season 1 (Jan-Jun)	Season 2 (Jul-Dec)
All crops			
Proportion of sample selling crops (%)	90.44 (251)	85.43 (247)	70.61 (228)
Revenue from crop sales ($):			
- Total	484.88 (227)	351.21 (211)	175.35 (161)
- Per hectare	167.49 (227)	250.37 (211)	171.61 (161)
Price received per kg of ($):			
- Soybean	0.38 (128)	0.36 (102)	0.47 (64)
- Beans	0.43 (70)	0.43 (52)	0.44 (33)
- Maize	0.18 (156)	0.18 (143)	0.17 (87)
- Rice	0.60 (85)	0.64 (81)	0.55 (36)
- Groundnuts	0.79 (92)	0.78 (83)	0.81 (26)
Proportion of harvest (%):			
- Used for home consumption	47.25 (251)	39.52 (247)	49.27 (228)
- Sold	41.38 (251)	46.58 (247)	39.43 (228)
- Lost due to disease, pest, flood, etc.	2.99 (251)	3.55 (247)	2.55 (228)
- Used for seed or feed or other uses	8.38 (251)	10.35 (247)	8.75 (228)

Note: Figure in parentheses represents the number of households.

Table 9 presents statistics specifically regarding the sale of soybean harvests. A larger proportion of soybean producers sold at least some of their crop in the January-June season (81 per cent) compared to the July-December season (70 per cent). Households sell a much higher proportion of their soybean production compared to their total harvest, with only 28 per cent of soybean harvests being used for home consumption compared to 58 per cent being sold. As shown in Table 8, the price for soybeans was higher in the July-December season—which may be due to less households growing the crop in this season, meaning the demand is higher—but despite the higher prices, households actually sold less during this season compared to the first half of the year. It is not clear from the household questionnaire or the qualitative data why this is the case.

In addition, a higher proportion of soybean was sold to other individuals during the second season (35 per cent compared to 32 per cent), whilst more was sold to small-scale traders during the January-June season (24 per cent compared to 16 per cent). As with all crops, a very small percentage of soybean was sold to large-scale buyers (0.24 per cent), whilst around 3 per cent was lost due to pests, disease and floods, and 8 per cent was saved for seeds or animal feed. Although not shown in the table, we also find that a very low proportion of households sold their crops collectively.

From these sales, beneficiary households earned an average of $82 during 2017, at a rate of $189 per hectare. Despite yields being slightly higher in the January-June season, income from soybean

sales was higher for the July-December season, which reflects the more favourable prices during this season.

In most cases, the prices received amongst beneficiary households are lower than the average price for these crops noted in the Uganda National Panel Survey 2013-14, thus reflecting sub-optimal selling practices of these farmers. In the focus group discussions, Farmers' Group leaders provided a number of explanations for why they are unable to maximise their income from their crop production.

In particular, reflecting the issues encountered by smallholders across the country discussed in Section 3, group leaders report facing numerous market access barriers, as well as being unable to establish any formal out grower arrangements. In terms of market access, group leaders reported that they lacked transport facilities and that roads often become unusable during the rainy months. Combined with a lack of storage facilities, these issues push groups to sell to individual traders to whom they do not have to transport their goods, which is reflected in the statistics by the large amount of harvest sold to small-scale traders. The additional pull factor of these traders is that they provide immediate payment, which is often favoured by the group members due to emergency cash requirements. However, it is widely reported in the focus group discussions that these traders often cheat the farmers, mainly through the use of inaccurate weighing scales.

This desire to sell quickly and gain immediate payment is reported as the main barrier to establishing formal outgrower arrangements, noting that group members are unable to wait or unwilling to undergo any formalised processing requirements. Some groups reported that they have made efforts to establish these arrangements but either have failed due to issues of organisation, or have made the arrangement only for the buyer not to adhere to the arrangement at harvest time. The latter issue has hence bred a feeling of mistrust against potential buyers.

As we see in the statistics, a large amount of crops are sold to small-scale traders which, as mentioned above, is reported by group leaders to be highly problematic.

Table 9: Crop selling practices of beneficiary households

	Whole year (Jan-Dec)	Season 1 (Jan-Jun)	Season 2 (Jul-Dec)
Soybean only			
Proportion of soybean producers selling soybean (%)	83.12 (154)	80.95 (126)	69.57 (92)
Revenue from soybean sales ($):			
- Total	81.84 (128)	55.06 (102)	75.92 (64)
- Per hectare	189.24 (128)	200.52 (102)	262.78 (64)
Proportion of harvest (%):			
- Used for home consumption	27.69 (154)	28.36 (126)	31.81 (92)
- Sold – to other individual	33.58 (154)	31.58 (126)	35.05 (92)
- Sold – to small-scale trader	23.36 (154)	24.29 (126)	16.23 (92)
- Sold – to large-scale trader	0.24 (154)	0.63 (126)	0.00 (92)
- Sold – to other buyer	0.53 (154)	0.66 (126)	0.87 (92)
- Lost due to disease, pest, flood, etc.	3.11 (154)	3.45 (126)	2.63 (92)
- Used for seed or feed or other uses	8.19 (154)	8.24 (126)	10.60 (92)

Note: Figure in parentheses represents the number of households.

6.2   LIVESTOCK

Livestock is a key part of smallholder households' livelihoods in Uganda. The CGAP study, for instance, finds that 60 per cent of smallholders rear some form of livestock. The study also notes that Ugandan smallholders use livestock both as a means of generating income and as a way of protecting themselves against shocks, with livestock serving as an asset that can be sold in times of hardship. Table 10 presents livestock statistics for the beneficiary households. In our sample, chickens, goats and cows are the main livestock that are owned by beneficiary households. It is interesting to look at the maximum values for livestock ownership as this gives a reflection of the range of wealth of the sampled households. The maximum values suggest that the richest households are still unlikely to be wealthy in absolute terms, owning a maximum of six bulls and four oxen, although one household owns 60 cows and heifers.

The average value of livestock production amongst beneficiary households is $217, whilst households made an average of $119 from selling livestock or livestock products. This difference means that around $98 worth of livestock and livestock products, on average, were consumed at home or used for other purposes. With an average of $119 of income from selling livestock or livestock products, and an average of $95 spent on livestock inputs such as feed and vaccinations, beneficiary households are seemingly operating on slim profit margins in terms of livestock production. In terms of livestock products, the majority of income from the sale of livestock products comes from the sale of cuts of meat, following by income from the sale of milk.

Table 10: Livestock ownership, income and expenditure of beneficiary households

	Mean	Min	Max
Nr. of animals owned:			
- Chicken	11.16	0	120
- Goats	2.14	0	45
- Cows/Heifers	1.26	0	60
- Calves	0.69	0	30
- Pigs	0.53	0	16
- Bulls	0.22	0	6
- Oxen	0.13	0	4
Gross value of livestock production ($)	216.80	0	2,051.73
Expenditure on inputs for livestock production ($)	94.62	0	1,259.55
Net value of livestock production ($)	122.18	-1,031.94	1,976.13
Revenues from sale of livestock and livestock products ($)	119.38	0	1,940.76
Revenues from sale of ($):			
- Whole livestock (alive or slaughtered)	98.28	0	975.78
- Milk	17.40	0	816.48
- Cuts of meat	1.37	0	194.40
- Eggs	1.16	0	129.60
- Manure	1.08	0	270.00

Note: Number of households is 251, unless otherwise stated in parentheses.

6.3 INCOME, LIVELIHOOD COMPOSITION, AND POVERTY

Table 11 presents details of the total income, income composition, and poverty level of the treatment households. The average income per capita of $381 is far below the national average of $604 (World Bank, 2017), and the beneficiary population contains a large number of poor people, with only around 61 per cent having a total income that is below the international $1.90 per day poverty line.

The minimum and maximum values of income, however, highlight a reasonable amount of diversity within the sample. The richest beneficiary household earned around $24,500 per capita during 2017, whilst the poorest earned just $12 (likely due to their surviving on subsistence farming). It is well documented that Farmers' Groups may contain a diverse range of members, often with the wealthiest in positions of power within the group (Adong et al., 2013; Mwesiga, 2018). This is an area that was probed through the focus group discussions but in all cases it was reported that the groups follow an egalitarian system, with all members permitted equal rights as long as they pay their membership fee and follow the group's code of conduct.

Around 53 per cent of the income of the beneficiary households comes from the sale of crops, followed by income from households businesses and livestock activities, which both contribute around 14 per cent. Lesser contributions to household income come from formal and informal wage labour (seven per cent and five per cent). During the focus group discussions, a number of respondents noted that households in these areas faced very limited livelihood opportunities due to poverty and poor market access (primarily due to poor roads). They noted that off-farm income was usually limited to the operation of small household businesses by female household members, as is reflected in the data. Household income composition differs somewhat to the CGAP survey, which finds that only five per cent of households own a household business and only ten per cent have waged labour employment.

Given that households derive almost 50 per cent of their income from sources other than crops, and their complaints about limited income diversification, there is an implication that households are dissatisfied with the livelihoods they are able to derive from farming. This is a feeling that is also expressed widely in the CGAP survey. This dissatisfaction is very likely to be linked to the lack of inclusion in value chains, and the inability of the Farmers' Groups to organise collective farming, both of which would likely increase the benefits that these households can derive from specialising in farming activities.

Table 11: Total household income and income composition of beneficiary households

	Mean	Min	Max
Gross household income ($):			
- Total	2,187.45	70.04	48,993.47
- Per capita	381.32	11.67	24,496.74
Net household income ($):			
- Total	1,820.93	-789.45	48,421.61
- Per capita	329.56	-87.72	24,210.81
Below $1.90 per day poverty line (%)	60.56	-	-
Proportion of income from (%):			
- Crop production	53.38	2.20	99.95
- Household enterprise	14.13	0.00	90.89
- Livestock production	14.07	0.00	90.44
- Formal waged labour	6.64	0.00	94.50
- Informal waged labour	4.58	0.00	82.17
- Other	7.21	0.00	53.02

Note: Number of households is 251, unless otherwise stated in parentheses.

6.4   LOANS AND SAVINGS

Table 12 presents statistics on the loan access and savings of beneficiary households. In terms of loans, just under 70 per cent of beneficiary households had taken a loan in the past 12 months, with the average size of the loan being around $159 (although this reaches as high as $2,160). This high percentage suggests that credit access may not be a significant issue amongst these households, something that is also highlighted by the low proportion of households who have applied and been rejected (around 4 per cent).

The main provider of these loans were savings groups (57 per cent), followed by Farmers Groups or Cooperatives (24 per cent), and friends and relatives (eight per cent). The findings are very much aligned with the CGAP survey, which notes that access to services from formal institutions is a major issue amongst smallholder farmers in Uganda, adding that community groups can play a key role in providing the services that are missing from formal institutions. The CGAP study explains that smallholder farmers in Uganda find it almost impossible to obtain credit from formal institutions, with savings or Farmers' Groups (which are often combined into one group), or friends and relatives, proving the most accessible and trustworthy option.

Despite the high amount of loans, it was often noted in the Farmers' Group focus group discussions that households lacked the capital to access the agricultural inputs they required, such as improved seeds. This suggests that the current credit access situation of beneficiary households may not be fully solving their liquidity needs. Some also complained that the groups would force them to take loans when they did not want to take them. This provides a potential caveat to the high percentage of credit access amongst the sample, suggesting that the timing and flexibility of loans needs to be improved.

A large number of the Farmers' Groups included in the sample also function as savings groups. In fact, the groups mention in the focus group discussions that this is often the primary function of the group due to difficulties in establishing effective collective crop sale arrangements. The fact that the 70% of households with some cash savings only have an average of $19 in savings, however, suggests that in this sense the groups could perform better, although it may be the case that households are choosing to save in the form of assets, such as livestock, rather than cash.

The CGAP survey shows that poor savings habits is a pervasive issue amongst Ugandan smallholders, with only nine per cent having savings in a bank, 28 per cent with savings with a savings or credit group, and 36 per cent with savings held with friends and family. They note that this is due to the high daily expenditure requirements of households compared to daily income, and note that emergency requests from family members for money is often the main barrier to savings amongst these households. They also find that households are often unable to open bank accounts for savings or otherwise due to a lack of identification (the voter's card is the country's most common form of identification and is held by only 56 per cent of smallholders in their sample).

Table 12: Credit and savings access of beneficiary households

	Mean	Min	Max
Household took at least one loan in 2017 (%)	67.33	-	-
Source of loan (%):			
- Saving group	57.32 (164)	-	-
- Farmers' Group/Cooperative	24.39 (164)	-	-
- Friend/Relative	7.93 (164)	-	-
- Commerical bank	3.66 (164)	-	-
- Trader/Buyer	3.66 (164)	-	-
- Microfinance institution	1.83 (164)	-	-
- NGO	1.22 (164)		
Loan size ($)	158.74 (164)	2.16	2,160.00
Household had at least one loan rejected in 2017 (%)	3.98	-	-
Reason for rejection (%):			
- No collateral	30.00 (10)	-	-
- Unsatisfactory application	20.00 (10)	-	-
- Other	50.00 (10)	-	-
Household had at least one member with cash savings in 2017 (%)	70.12	-	-
Total cash savings per capita ($)	18.98 (176)	0.3	675.00

Note: Number of households is 251, unless otherwise stated in parentheses.

6.5 WELLBEING

Table 13 presents statistics for beneficiary households relating to nutrition, food security, shock exposure and gender equality. Regarding nutrition, the insights are reasonably positive. The average Dietary Diversity Score of ten—which means, on average, households had consumed ten of the 16 main food groups over the past seven days—suggests the average beneficiary household has a reasonably varied diet. However, this score reaches as low as three for some households. The reasonably high average Household Dietary Diversity Score is somewhat misaligned with the high amount of income poverty within the sample (see Section 6.3). A potential explanation is that, whilst income is low, household nutrition is benefitting from the livestock rearing of the household (see Section 6.2). Livestock rearing is heavily linked with the consumption of animal source foods and could likely be contributing to the nutrition of many of the beneficiary households (See Carletto et al., 2015; Hetherington et al., 2017).

The statistics for food security amongst beneficiary households are not as positive as for nutrition. Table 10 shows that 78 per cent of beneficiary households were worried about having enough food to eat during 2017, whilst around 36 per cent had to forgo eating for a whole day at some point during the year. These findings are more aligned with the income poverty level of these households, with a high percentage of the sample having ongoing concerns about meeting their basic needs. The

contrast of these statistics with the Dietary Diversity Score may be due to the latter only relating to the past seven days, while the food security questions refer to the full 12 month period. Therefore, there may be specific lean periods during other parts of the year that are not covered by the Dietary Diversity Score.

Regarding education, around 30 per cent of school-age children within the beneficiary sample are not currently enrolled in school, and within some households none of the school-age children are enrolled. This issue with school enrolment is likely to be closely linked to the low incomes amongst beneficiary households, meaning households cannot afford school costs, and may require children to participate in income generating activities as is common amongst poor rural households worldwide (FAO, 2012). In addition to income, access may also be an issue. In a large number of the focus group discussions, respondents noted that access to both good quality schools and hospitals are a big problem in these areas, mainly due to unusable roads and poor management of the local schools and health centres.

Smallholder farmers worldwide are one of the groups most at risk of being exposed to shocks, and this is reflected in the sample, with around 73 per cent of beneficiary households have experienced at least one shock during 2017. This is very similar to the CGAP study, which reports this figure at around 80 per cent. These shocks are primarily weather-related (drought and irregular rain), as well as pertaining to crop or livestock disease and the death or illness of an income earner. These shocks were also discussed with the Farmers' Group leaders during the focus group discussions, with drought and rain also being noted as issues along with excessive sunshine and crop pests such as the aforementioned kayongo weed. Comprising around 16 per cent of shocks in the household data, issues of thievery were also commonly noted as a major issue during the focus group discussions.

Although being exposed to a shock may be out of the control of a household, how the shock affects them provides an indicator of the resilience of the household to withstand the shock (See Béné et al., 2014). From the table, we see that in 80 per cent of cases, households reported that the shock had a strong or very strong impact, and in only 6 per cent of cases did the shock have no impact or a slight impact. This aligns with the poverty-level of these households, highlighting that, likely due to a lack of assets, savings or sufficient support or coping mechanisms, households are left very vulnerable to these shocks and find it difficult to recover when they are affected.

The statistics from the beneficiary sample on women's autonomous income generation and decision making involvement have mixed implications. In terms of their income generation, only eight per cent of total household income is provided by women's income generation (either from their wage labour or from household businesses that they own or manage)—although this rises up to around 86 per cent in some cases. Although the average amount is low, it should be noted that this does not include all women's income generating activities such as those on the farm, or joint income generation.

In terms of decision making involvement, only 54 per cent of households reported that a female household member is involved in decisions about households purchases, and 60 per cent reported that a female household member is involved in decisions about sending children to school. More positively, 77 per cent reports that female household members are involved in decisions regarding

agricultural production and sale. Interestingly, this aligns with the findings from the CGAP survey, which notes that women are heavily involved in on-farm decision making.

Table 13: Food security, education, shock exposure and gender equality of beneficiary households

	Mean	Min	Max
Food security and nutrition			
Dietary Diversity Score (1-16 scale)	9.86	3	16
Worried would not have enough food due to lack of money/resources (%)	77.69	-	-
Went without eating for a whole day due to lack of money/resources (%)	36.25	-	-
Education			
Per cent of school-age children enrolled (%)	68.03 (239)	0	100
Shock exposure			
Exposed to a shock in past year	73.31	-	-
Shock type experienced (%):			
- Drought	60.33 (184)	-	-
- Crop pest/disease	51.09 (184)	-	-
- Illness/accident/death of income earner	35.87 (184)	-	-
- Irregular rains	29.89 (184)	-	-
- Ag. input/output price change	14.13 (184)	-	-
- Livestock pest/disease	15.22 (184)	-	-
- Theft	16.30 (184)	-	-
- Other	21.20 (184)	-	-
Severity of shock impact (%):			
- None	2.7 (184)	-	-
- Slight impact	3.3 (184)	-	-
- Moderate impact	14.1 (184)	-	-
- Strong impact	68.5 (184)	-	-
- Worst ever happened	11.4 (184)	-	-
Gender equality			
Per cent of household income from women's wage and enterprise activities (%)	8.46	0	85.65
Women involved in decision making for (%):			
- Household purchases	53.78	-	-
- Sending children to school	60.16	-	-
- Crop or livestock production	76.49	-	-

Note: Number of households is 251, unless otherwise stated in parentheses.

6.6   EXTERNAL SUPPORT

Table 14 presents statistics on the external support received by beneficiary household over the past 12 months, showing that a reasonably high percentage of households (around 66 per cent) have received some form of training or advice. The majority of this support has been related to farming (such as advice on seed varieties, soil and crop management, and harvest techniques), as well as on livestock rearing. Interestingly, a very small amount of households received any support relating to social issues such as health and education.

The majority of this support was provided by NGOs and charities (around 35 per cent), as well as the Ugandan government (around 33 per cent), often through the National Agricultural Advisory Services (NAADS) department of the Ministry of Agriculture, Animal Industry and Fisheries. We see that 21 per cent of the support was provided directly though Farmers' Groups. In the focus group discussions, it was reported that, as well as providing direct support, the groups also helped members to access additional support from elsewhere, something noted as being one of the main benefits of group membership at this point in the absence of collective sale benefits. However, a number of respondents reported that the training they received was often either unsuitable, poorly timed, or unreliable. For instance, they explained that some support would be provided and would then cease, often after households had already invested in the activities promoted through the support.

One of the main messages that we take from this baseline data analysis is the wide-ranging role that Farmers' Groups play in the lives of their members. Moreover, both the household survey and the focus group discussions confirm that collective agricultural production and sale is one of the more minor reasons for joining, compared to benefits from better access to external support, as well as access to savings and loan facilities. This highlights that, if improvements can be made in the collective agricultural activities performed by these groups, group membership has the potential to provide extensive benefits to the overall wellbeing of members, in addition to their on-farm production and income.

Table 14: External support received by beneficiary households

	Mean	Min	Max
Received any training or advice in 2017 (%):			
- Any	65.74	-	-
- Farming	62.95	-	-
- Livetsock rearing	35.06	-	-
- Obtaining credit	27.89	-	-
- Marketing and sales	25.90	-	-
- Social (health, education, etc.)	1.59	-	-
Source of support (% of support):			
- NGO/Charity	34.55 (165)	-	-
- NAADS/Governemt	26.67 (165)	-	-
- Farmers' Group	21.21 (165)	-	-
- International organization	6.67 (165)	-	-
- Individual trader/buyer	3.64 (165)	-	-
- Private company trader/buyer	3.03 (165)	-	-
- Other	4.24 (165)	-	-

Note: Number of households is 251, unless otherwise stated in parentheses.

7. CONCLUDING REMARKS AND NEXT STEPS

One of the main concerns about the impact investment movement is that the most disadvantaged households will not be reached. These households often face more significant livelihood barriers, which could lead to investors being incentivised to target less poor households who are less problematic and have greater potential to provide financial returns to the investment (Wilson, 2016). The profile of the expected beneficiary households presented in this report suggest this is not the case for the Sesaco investment. Based on this profile, the investment is expected to reach some seriously disadvantaged households, whose livelihoods are based on subsistence agriculture and who face significant barriers to their agricultural production and sales. They also face challenges in terms of access to food, protection from shocks, access to basic services, and rely on subsistence agriculture, all of which potentially combine to produce complex poverty traps.

Although this is positive in terms of the outreach of the investment, it also has implications for its potential impact. From this report we have seen that amongst the expected beneficiary households, many have low landholdings mostly without a formal title, face substantial market access barriers, have very little savings, assets, and resilience to shocks. These issues have implications for the farming capacity of farmers—such as their ability to meet the quality standard requirements set by Sesaco—as well as the organisation of the Farmers' Groups. As noted, one key issue amongst the groups is that households often need immediate cash for various emergency needs, and with the poverty levels of these households, this is likely to remain a common factor as the investment moves forward and is thus a key challenge that the investment, especially the BDS support, will need to overcome.

In addition to profiling the expected beneficiaries of the Sesaco investment, this report also serves to validate the design of the impact assessment. In Section 5 we see that the treatment and control households that were sampled are highly comparable, and will thus help to produce a robust assessment of impact at the endline stage. The value of this study is also highlighted in this report by the similarity of the sampled households with households covered by the nationally-representative survey of Ugandan smallholders by CGAP. Accordingly, the insights that we generate from this research may also be applicable to other work to improve the livelihoods of this group across the country.

Moving forward, the next step for Sesaco will be to begin work with the investment while tracking progress by the other monitoring tools of the Fund. In five years' time, the same households included in the sample will be re-interviewed for the endline survey to conduct a rigorous assessment of the impacts of SMADF investment in Sesaco. This impact assessment, together with the other similar analyses to be conducted for selected SMADF investee firms, will contribute to the larger fund level impact assessment to draw lessons for future impact investments and policy.

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