

Uganda

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

BASELINE REPORT No. 3

Pristine Foods Limited (Pristine)



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1. INTRODUCTION

This is the third baseline report for the impact assessment of the Small and Medium Agribusiness Development Fund (SMADF), also known as the Yield Uganda Investment Fund (YUIF). The SMADF is an impact investment fund which provides tailored financing to Small and Medium Agribusinesses (SMAs) in Uganda. The fund invests in agriculture-related business across all value chains, including input supply, production, and processing of agricultural products. SMAs are selected based on their growth potential and on their linkages with smallholder farmers.

Given the fund's novelty, the scope for learning from its implementation is high. To capture these lessons in a thorough and systematic way, the fund's implementing partners have established an innovative monitoring and evaluation system including rigorous ex-ante impact assessment (IA) for a selected set of SMAs.

For the ex-ante IA, five SMAs have been selected to study the impact of the SMADF investments on smallholder farmers who are part of the SMAs supplier network. The ex-ante IA design involves two rounds of data collection: one at the point of the initial investment (the baseline) and again after five years (the endline). To estimate the impact of the investment on smallholder farmers linked to investees, a set of beneficiary and non-beneficiary households are compared for each SMA. This comparison is based on in-depth quantitative data collected from these households through a household questionnaire and qualitative inquiry through Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). Once all the assessments are completed, a final report is 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. The baseline round of the ex-ante IA is supported by IFAD's Research and Impact Assessment (RIA) (Paolantonio et al., 2017).

This report presents details of the baseline data collection for the Pristine Foods Limited (Pristine), a start-up business producing and selling liquid, frozen and powdered egg products. This report follows the first two baseline reports conducted for Sesaco and CECOFA (Paolantonio and Higgins, 2019; Paolantonio et al., 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 for this baseline data collection (Section 4), followed by results that compare the treatment and control groups identified for this SMA (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 AGRIBUSINESS DEVELOPMENT FUND

The SMADF (or YUIF) is an innovative public-private partnership established in 2017 by the European Union (EU), the International Fund for Agricultural Development (IFAD) and the National Social Security Fund (NSSF) of Uganda. The initial budget amounted to EUR 12 million, which reached EUR 20.4 million in 2019 thanks to the additional financing from Soros Economic Development Fund of the Open Society Foundations (OSF) and Finnish Church Aid Investments Limited (FCAI). The fund is managed by Pearl Capital Partners (PCP), that contributed EUR 0.4 million, and IFAD acts as implementing partners.

The fund was created to increase the flow of financing to Ugandan SMAs. SMAs have the potential to stimulate sustainable and inclusive growth throughout the rural economy. However, because they are often too large to access micro-credit enterprises and too small to access traditional means of bank financing, they lack access to necessary capital and credit needed to expand their operations. 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 from EUR 250,000 to EUR 2 million. In addition to financial products, the fund also offers a Business Development Services (BDS) facility which investees can use to improve both their own operational capacity and the operational capacity of the smallholder farmers that supply them with agricultural products.

Since the establishment and launch of the Fund in January 2017, the Fund has invested a total of EUR 15.9 million in fifteen agribusinesses. In addition, a BDS support commitment of EUR 3.2 million has been made across the investment portfolio (PCP, 2022).

2.2 THE CONTEXT

Like many areas in Sub-Saharan Africa, Uganda's human population is expected to grow exponentially within the next couple of decades. Projections suggest that by 2050, a large proportion of this growth will occur in cities and towns (Zimmer et al., 2020). In addition to projected growth, per capita GDP and per capita income are also expected to increase. As income and living standards increase, consumer diets often shift from a majority subsistence diet of grains and staples to a more diversified diet that is rich in poultry, fish, and protein dense food products like eggs (Giller, 2020). Projected demand for more nutritious and protein dense foods will provide significant income generating opportunities for poultry and livestock producers throughout the region.

In Uganda, poultry is an important animal resource for both consumption and sales. Poultry provides cheap protein to supplement staple based diets and can be sold quickly to generate income during shocks. Chickens, specifically, are owned by almost every rural household because they are easy to acquire, and under proper management they reproduce at a high rate and rapidly produce eggs with minimal levels of investment (State et al., 2009). Despite widespread ownership, farmers face barriers to scale poultry operations to a profitable level. Specifically, poultry is highly susceptible to several livestock diseases, many of which carry high mortality rates (Otiang et al.,

2020), and smallholder farmers often lack the access to vaccines and veterinary services. Additionally, feed availability, quality, and cost are highly variable and increased input costs are often unexpected (Sebuliba-Mutumba et al., 2017).

While barriers to poultry production exist, the demand for eggs is high and growing across the East African region. Currently the Ugandan market for eggs is dominated by supermarkets and large-scale egg traders who export to Kenya, Rwanda, DRC, South Sudan, and the Central African Republic. These supermarkets and large-scale traders commonly source their eggs from commercial farmers leaving smaller poultry producers with informal and poorly maintained relationships with passing-by traders who offer lower prices for both birds and eggs (Kiprop et al., 2020).

2.3 PRISTINE FOODS LIMITED

Pristine is uniquely placed to assist smallholder farmers in tackling some of the barriers to entry of the poultry sector. Pristine is based in Kireka (a Kampala suburb) Uganda and is the first company in East and Central Africa to provide regionally produced processed, pasteurized, and homogenized liquid egg products (whole, white, and yolk) in chilled and frozen forms as well as egg powder for fortification in foods as a protein enhancer for medical patients, especially malnourished children. Because processed eggs provide a higher level of food safety, reduce the risk of contamination, and have an extended shelf-life demand for them is high.

Historically, due to suitable climates that have made it possible to have sufficient volumes of inputs such as soya and maize for chicken feed, there has been a steady increase in egg production throughout Uganda. As supply of eggs has increased so has demand. To date, Pristine's major egg suppliers are commercial farmers who provide about 80 per cent of their eggs. The remaining 20 per cent of eggs are sourced from smallholder farmers. To increase the representation of smallholder farmers in their supply chain up to 50 per cent, Pristine seeks to establish a strong extension team to engage with smallholder farmers, defined as rearing less than 1,000 birds. Extension workers will engage with farmers across different supply zones. To keep accurate records for both Pristine and suppliers, Pristine will utilize a receipt software. This software will be operated on handheld devices that have capabilities to instantly send an SMS and print a receipt for the supplier while still at the collection point. This advanced technology solves a key problem in bookkeeping of many small-scale poultry producers.¹

To increase physical market access to smallholder farmers, collection points will be set up in key trading areas within the egg supply zones which include Kampala, Wakiso, Mukono, Luwero, Mityana, Nakaseke, and Kayunga. Egg suppliers are paid 80 per cent in cash as per consignment and 20 per cent will be paid after the eggs have tested and passed stringent quality standards.

With the SMADF financing, Pristine has the working capital and capital expense to establish the business processing facility, expand its farmer's out-grower scheme network, and route the market during its early stages. Pristine has also utilized BDS facility to strengthen its governance, financial management, administration, and marketing strategy (PCP, 2022).

¹ The software is under development and has not yet been deployed. Likewise, the handheld devices are not yet in use.

3. EXPECTED IMPACT OF THE INVESTMENT ON SMALLHOLDERS

Through the SMADF investment, Pristine is expected to increase its supplier network by purchasing more eggs from smallholder farmers. This expansion will (1) increase the market access for smallholder farmers, (2) create employment opportunities, and (3) provide extension services to smallholder farmers.

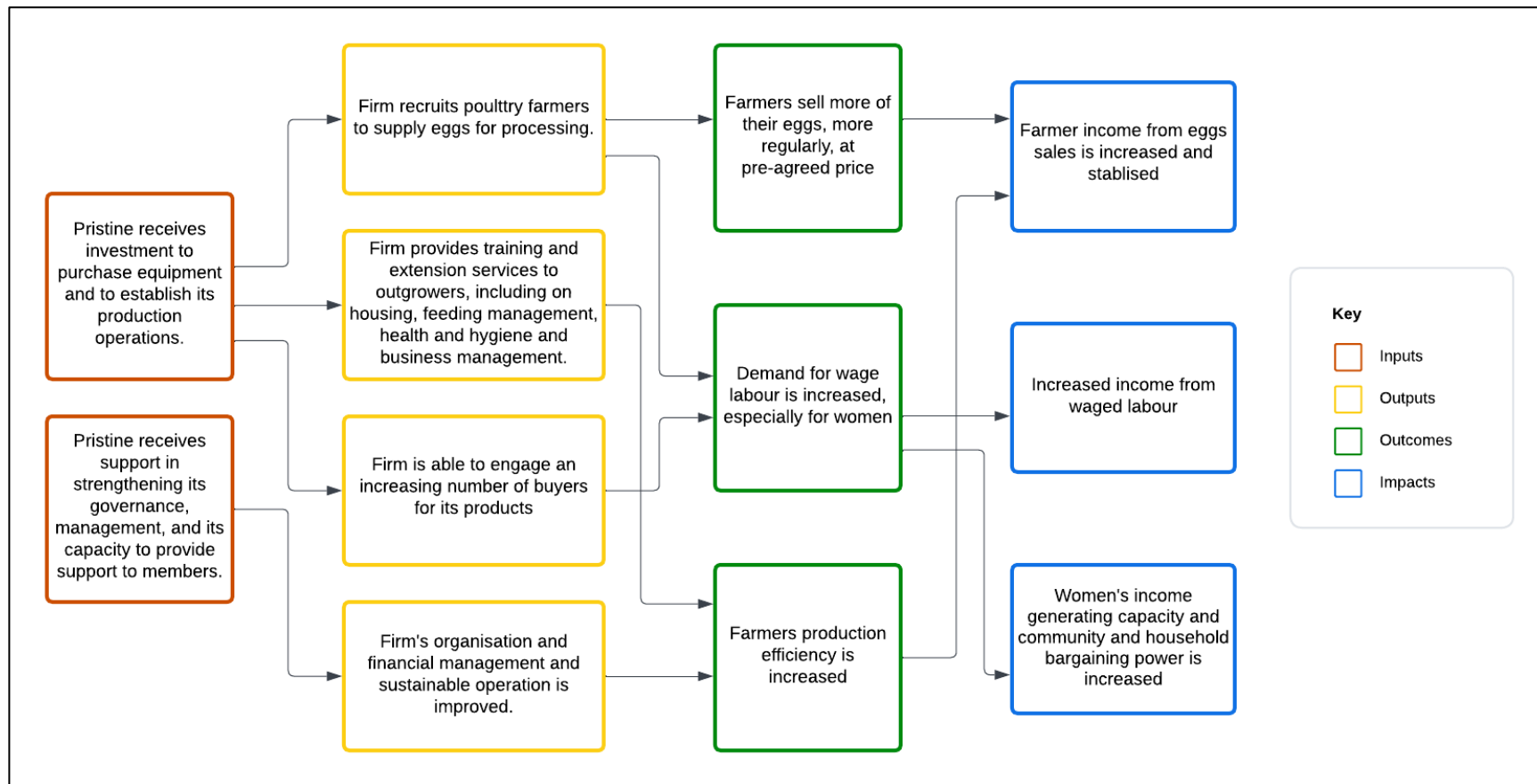
Pristine plans to make smallholder farmers the primary suppliers for local eggs. The SMADF investment will substantially improve market access for poultry producers. Additionally, Pristine seeks to provide a consistent market and pricing for eggs. Currently, farmers who produce a lower volume of eggs sell inconsistently to passing traders who offer lower prices.

Pristine also plans to provide ancillary support to its farmers through the provision of eggshells at a reduced cost. Eggshells are essential inputs that are used in chicken feed and calcium rich animal feed additives. The cost of inputs remains a barrier to poultry and egg production by smallholders. The distribution of eggshells is expected to lower and stabilize some of these costs. Additionally, in the case of a potential failure to supply, Pristine will make advance payments for high performing suppliers. As access to credit remains a barrier to expansion for several smallholder farmers, this provision will assist farmers with unexpected shocks such as disease outbreaks that threaten profitability. Finally, as disease outbreaks remain persistent throughout much of the sector, Pristine will make its veterinary doctors available to assist farmers with vaccinations and treatments. This will not only ensure the health of the flock but also assist in maintaining phytosanitary standards.

The inputs for egg processing are completely dependent on both commercial and smallholder farmers. The investment will assist Pristine in expanding its supplier network thereby increasing the employment of individuals throughout the poultry sector. Additionally, while egg processing is an automated process, Pristine plans to employ a total number of 21 staff and expects to increase this number gradually as the business scales up.

Figure 1 presents the Theory of Change for the SMADF investment in Pristine. Outlining how the investment is expected to impact Pristine and in turn how this investment will impact smallholder farmers through the pathways discussed above.

Figure 1: Theory of change: Expected impact channels of the SMADF investment in Pristine.



Note: Authors' elaboration.

4. METHODOLOGY

4.1 SAMPLE DESIGN

An important aspect of quasi-experimental impact assessments is the construction of a reliable counterfactual. This involves identifying non-beneficiary (control) households that are like beneficiary (treatment) households across a range of characteristics at the baseline stage. We therefore design the sample framework such that non-beneficiary households live in the same context as beneficiary households in terms of economic background, market access, and agro-ecological production potential.

Pristine identified smallholders as potential poultry suppliers in five districts: Buikwe, Kayunga, Luwero, Mukono, and Wakiso. In order to facilitate the egg transport and minimize transport costs, these districts were selected because of their distance from Pristine headquarters in Kampala. Pristine plans the expansion of their supplier farmer network to begin in Mukono, Wakiso and Luweero and will later expand into the remaining districts. Therefore, we considered these districts as treatment districts.

We then considered all other districts as potential control districts. We exclude Kampala because it is primarily an urban area with limited farm activities. We matched treated and untreated districts using Propensity Score Matching (PSM). Using data from the nationally representative 2020 LSMS-ISA, we matched control districts to treatment districts on the following characteristics: (1) the percentage of households involved in egg production, (2) the percentage of households involved in commercial poultry systems, and (3) the percentage of household involved in agricultural activities. These variables serve as a proxy of the poultry system in the district.

Because egg production is more developed in peri-urban areas, Pristine identified beneficiary farmers in areas characterized as peri-urban. To capture this in our matching scheme we also included population density and the average value of the travel time in minutes to reach major cities. We extracted population density estimates from WorldPop Global Project Population Data and the travel time in minutes to cities from the accessibility project outlined in Nelson et al. (2019). Results from the PSM identified two districts Namutumba and Mbale, both of which are in the Eastern Region.

As discussed above, Pristine will provide farmers with training and extension services through digital devices, access to quality animal feed (generally expensive for farmers), and market access. Pristine will organize supplier farmers in bulking centres of about 5 – 15 individuals. Pristine plans to select poultry farmers who have at least 100 to 3,000 laying birds and own a cellular phone. Ownership of a phone is important because Pristine will use digital extension services and payment procedures.

Pristine provided a list of supplier farmers who met these criteria. Farmers were randomly selected from this list as treatment households. In the event of being unable to locate farmers the other identified farmers on the list were used as replacements. A local consultant was hired to identify and list farmers in the control districts who met these criteria. A random sample of farmers were

selected from this list as control farmers. Due to the difficulty of finding poultry farmers specializing in layer chickens most villages have no more than 2-4 Pristine recruited farmers. Because of the large number of villages, we randomly sample across the districts.

Table 1 shows the distribution of the baseline sample by treatment and control groups. Despite extending the time in the field, a shortfall between the targeted and achieved sample persisted due to substantial challenges that emerged in locating respondents.² A reduced sample size would not significantly affect the overall analysis, as data from all SMAs will be aggregated into a single analysis. However, a smaller sample size for the individual SMA could affect the ability to detect modest impacts in the Pristine assessment. Only large impacts will be more likely to be detected. A potential mitigation option would be to collect missing control household data during endline data collection and use the recall data to reconstruct some of the key indicators and characteristics at baseline.

Table 1: Baseline sample distribution.

Assignment	District	No. of targeted households	No. of achieved households
Treatment	Luweero	91	114
	Mukono	69	67
	Wakiso	73	46
	<i>Subtotal</i>	233	227
Control	Mbale	98	76
	Numutumba	135	100
	<i>Subtotal</i>	233	176
Total		466	403

4.2 DATA COLLECTION TOOLS

Each household selected from the control and treatment samples was administered an in-depth quantitative questionnaire that covered various details of their livelihoods and agricultural practices for the period of July 2021 - June 2022. Pristine first recruited farmers during the fourth quarter of 2022 and plans to continue expanding its smallholder supplier network. This timeframe allows us to capture the situation of both control and treatment households before Pristine extends its supply network to include the treatment farmers. As noted above, the investment in Pristine is mainly expected to impact smallholder farmers through poultry production and increased sales of their eggs at higher and consistent prices. The questionnaire, therefore contained detailed questions on livestock production.

Additionally, as many poultry producers are also involved in agricultural production the questionnaire contains detailed questions on agricultural production by season, plot, and crop. To capture a holistic purview of the impact of the investment on household livelihood the questionnaire also covers sources of income, household characteristics, asset ownership, access to credit and savings, shock exposure, societal capital, food security, and women’s empowerment.

To complement the quantitative household data, we also conducted qualitative data collection. This consisted of focus group discussions (FDGs) and key informant interviews (KIIs). The KIIs were conducted with the managing director of Pristine, three extension officers, a Pearl Capital Partners Analyst, and the M&E officer. FDGs were conducted with farmers in both the treatment and the

² Due to small number of poultry farmers, it has not been entirely feasible to replace farmers who could not be reached or did not want to participate in the survey.

control groups. FDGs were organized to consist of six to 10 participants of all genders and designed to last 1.5-2 hours. Respondents were recruited from parishes where a large number of farmers resided in close proximity to each other. FDGs focused on livestock rearing practices, village conditions, and challenges to production. KIIs were organized and attended by one qualitative enumerator and lasted 30 to 60 minutes.

4.3 IMPACT INDICATORS

Table 2 describes the main outcome and impact level indicators that will be used to assess the quantitative impact of the investment on smallholder farmers, organized by subject domain.

Table 2: List of impact indicators for the Pristine investment.

Indicator	Description	Impact area
Poultry production and sale		
Number of birds	The number of new laying birds.	Effectiveness/efficiency of farming practices.
Expenditure on inputs	Cash expenditure on buying feed, vaccines, wage labor etc.	Investment in farming practices/Input access.
Poultry uses	Proportion of poultry dedicated to home consumption, sale, and lost due to disease.	Market access, effectiveness/efficiency of farming practices.
Revenue and prices from poultry sales	Cash income received from sale of all poultry products.	Market access, income, effect of certification.
Poultry sales practices	Type and location of buyer.	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\$ ³), 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.
Number 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.

³ All values are converted from Ugandan Shillings (USH) to United States Dollars (US\$) using the following conversion factor: $\left(\frac{CPI_{2019}}{CPI_{2021}}\right)\left(\frac{1}{PPP_{2019}}\right)$ where CPI denotes the consumer price index and PPP denotes the purchase price parity rate for GDP, both rates are provided by the World Bank. Prices are normalized to 2019 levels for comparisons to previous baseline reports.

Indicator	Description	Impact area
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.

Note: Values with outliers are winsorized such that values exceeding the 95th percentile of the respective distribution are replaced with values at the 95th percentile. This is done for outliers throughout analysis.

5. COMPARISON OF TREATMENT AND CONTROL HOUSEHOLDS

In Table 3 we compare key characteristics of the treatment and control households, such as income, agricultural production, asset ownership, financial inclusion, and receipt of support and advice. Table 3 presents mean values along with the standardized difference (SD) in the means. The SD is a measure of the difference between the treatment and control groups that is comparable across different indicators (Austin, 2009). The threshold to decide whether the SD is too high and indicates an imbalance between treatment and control is subject to discussion in the literature, but an absolute value of 0.10 or 0.25 is used widely (Austin, 2009). 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 general households within the treatment and control are balanced on household size, asset ownership and several characteristics related to agricultural production and livestock ownership. To measure household asset ownership, we construct an asset index using principal component analysis (PCA)⁴ that is normalized to a scale of zero to one. The asset index assigns a relative score to proxy for the asset level of each individual in the analysis. The mean of the asset index does not tell us much on its own, but it allows us to compare the relative wealth of individuals or groups of individuals within the sample. For instance, the average scores of the asset index for the treatment and control groups are 0.53 and 0.49, respectively. This indicates that treatment households, on average, own slightly more assets than control households.

Households in the treatment and control groups are balanced on some agricultural production variables. Control households have on average a higher amount of production value per hectare. However, the gross value of crop production per hectare is balanced across both treatment and control groups. Additionally, households in both groups cultivate a similar number of hectares of land.

As indicated in both the qualitative and quantitative surveys households in both groups are highly engaged in livestock production; the number of total livestock units across both groups is balanced. The number of poultry currently owned by households are similar, meaning we were successfully able to identify both treatment and control households engaged in similar poultry and livestock producing activities. However, we find that households in the treatment group generated approximately US\$2,000 more in total revenue from poultry production than control households in a three-month period.

Households in the control and treatment groups differ significantly on the distribution of their income composition. Income generated from agricultural production is a bit higher for households in the control group but relatively balanced across both groups. Other proportions of income are

⁴ Assets used in the the PCA analysis to construct the asset index are binary indicators for the following: household appliances, TV, radio, solar panel, bike, motorcycle, jewelry, flush toilet, and the count of the number of rooms.

quite different. Control households earn a higher proportion of their income from formal waged labor than households in the treatment group. Households in the treatment group earn a higher proportion of their total income from household enterprises.

Household composition across households differs. While household size in both the treatment and control groups is well balanced, households in the treatment group have a higher percentage of female headed households, and in general have a lower degree of household education. Control and treatment households also differ across several other indicators. Treatment households are less educated, earn less in overall gross household income per capita, and were less likely to take a loan.

Due to increases in input prices, a large number of farmers left the poultry production sector, leaving a small pool of eligible farmers for recruitment. In some cases, it was challenging to find and identify poultry farmers. When the impact analysis is conducted at the endline stage, the baseline differences will be addressed using rigorous statistical methodologies designed to eliminate imbalances and ensure an accurate comparison of the treatment and control groups.

Additional matching rounds at the household level could be implemented to ensure that beneficiary and non-beneficiary households are comparable. Furthermore, difference-in-difference modelling will include a set of variables to control for these imbalances and to ensure that differences between beneficiary and non-beneficiary households are only attributable to the intervention.

Table 3: Comparison of household characteristics, income and agricultural production between treatment and control households.

	Treatment	Control	SD
Household characteristics			
Household size	6.08	6.54	-0.13
Education of household head (years)	14.11	15.53	-0.28
Average education in household (years)	13.41	14.26	-0.24
Female household head (%)	29.96	15.34	0.35
Income			
Gross household income p/capita (US\$)	1,792	3,850	-0.41
Proportion of gross income from (%)			
Crop production	36.45	37.72	-0.04
Household enterprise	16.95	12.63	0.19
Livestock production	18.87	22.18	-0.11
Formal waged labor	11.84	19.16	-0.27
Informal waged labor	0.19	0.13	0.05
Other	15.71	8.18	0.34
Agricultural production			
Cultivates crops (%)	82.82	92.05	-0.28
Total value of crop production (US\$)	2,444	5,044	-0.46
Total value of crop production per hectare (US\$)	1,644	1,675	-0.01
Land cultivated (ha)	2.59	3.42	-0.24
Number of crops grown	4.73	5.26	-0.25
Assets and Livestock			
Asset index	0.53	0.49	0.18
Livestock ownership in Tropical Livestock Unit	8.84	9.30	-0.02
Total income received from chickens (US\$)	6,244	4,664	0.16
Number of chickens	453.91	498.37	-0.04
Loans and savings			
Took at least one loan (%)	36.12	50.57	-0.29
Has savings (%)	58.15	52.84	0.11
Total cash savings per capita (US\$)	265	208	0.07

	Treatment	Control	SD
Received training and support on (%)			
Agriculture	17.18	32.95	-0.37
Other	13.22	25.00	-0.30

Note: Number of observations for treatment group is 227 and for control group is 176.

6. KEY CHARACTERISTICS OF TREATMENT HOUSEHOLDS

6.1 POULTRY PRODUCTION AND SALES

Table 4 presents the main characteristics of the poultry system of Pristine supplier farmers. As standard practice in such household surveys, poultry production and sales refer to the 3 months prior to data collection. On average, at the time of surveying, poultry farmers had 450 birds in their ownership. According to qualitative data, this number used to be higher. However, many poultry producers are severely limited in their poultry production due to a lack of access to inputs. In the FDGs, farmers widely reported a recent increase in the price of inputs leading to an inability to afford feed, drugs, and vaccines. As a result, competition within the sector has decreased – a large number of producers have left the sector all together, and those that remain have sold off many of their birds.

Farmers raise a variety of birds. However, as expected, the most popular amongst beneficiary households is layers, which are most commonly known for producing eggs. Several producers report that while layers earn more income by fetching a higher sale price, they are becoming more expensive to rear due to input prices. As a result, many farmers are starting to rear broilers and kroilers – birds that receive a lower price when sold and do not lay eggs. Despite the difficulties in accessing inputs, the decrease in competition within the sector has made it easier for many farmers to sell eggs and birds at higher prices than before. In addition to decreased competition, many farmers report a high consumer demand for eggs. Most farmers sell eggs and birds to local markets.

Demand for eggs and birds is high and producers have the potential to increase their sales, however they are constrained by high input prices. Additionally, due to a lack of access to vaccines, producers report a high number of poultry diseases that are spreading quickly through farms. If farmers had better access to less expensive inputs and training on effectively containing the spread of disease, profit margins could greatly increase. Currently, the average total revenue earned from poultry production is US\$6,356. Most of this is made through the sale of whole alive chickens and eggs.

Table 4: Poultry ownership, income and expenditure of beneficiary households.

	Mean	Std. Dev
Number of chickens owned:		
Total number of chickens	453.91	1,213.09
Indigenous dual-purpose	7.26	15.23
Layers	265.99	666.70
Broilers	67.58	203.34
Kroilers	42.89	123.51
Total revenue (US\$)	6,356	10,483
Expenditure on inputs for poultry production (US\$)	2,516	3,784
Net value of poultry production (US\$)	3,840	9,170
Revenues from sale of (US\$)		
Whole chicken slaughtered	67	407
Whole chicken alive	2,586	5,070
Eggs	2,689	5,241

Note: Number of households is 223, the sample decreases due to four households which did not rear poultry during the reference period.

6.2 LIVESTOCK

According to both the household questionnaire and the qualitative data, beneficiary households are especially involved in livestock production. According to qualitative interviews, the most common income generating activity amongst beneficiary households is livestock rearing. Table 5 below presents key livestock (excluding poultry) statistics for beneficiary households from the household questionnaires. In addition to poultry, beneficiary households commonly own goats and pigs. The annual gross value of beneficiary household's livestock production is approximately US\$1,468. Beneficiary households report that a major detriment to livestock rearing is the cost of inputs, however despite this, livestock remains a valuable and profitable stream of income for most beneficiary households.

Table 5: Livestock ownership, income and expenditure of beneficiary households.

	Mean	Std. Dev
Number of animals owned		
Goats	5.20	12.84
Calves	0.45	1.32
Pigs	5.38	15.23
Bulls	0.18	0.62
Oxen	0.01	0.16
Gross value of livestock production (US\$)	1,468	2,586
Expenditure on inputs for livestock production (US\$)	864	1,649
Net value of livestock production (US\$)	693	2,351
Revenues from sale of (US\$)		
Whole livestock (alive or slaughtered)	542	983
Milk	494	1,074
Manure	101	258

Note: Number of households is 223, sample decreases due to four households which did not rear livestock during the reference period.

6.3 AGRICULTURAL ACTIVITIES

Table 6 presents details of beneficiaries' overall agricultural production, covering all seasonal and perennial crops. Eighty-three percent of beneficiary households are involved in agricultural production. The gross value of crop production is measured by the overall monetary value of all crops harvested during July 2021 - June 2022. The gross value of crop production is calculated using the median reported selling price of each crop. On average beneficiary household's gross value of crop production is US\$2,945.

Most of the expenditure spent on inputs for crop production are labor costs – labor accounts for approximately 65 per cent of total input expenditures. Other input costs include seeds, fertilizer, pesticides, and machinery. Beneficiary households cultivate approximately 2.59 hectares of land, but there is a wide dispersion of land cultivated size – the largest amount of cultivated land equals 15.18 hectares.

While the majority of agricultural production is sold, much of it is also used for home consumption. Approximately 35 per cent of the harvest is used for home consumption. Revenue from crop sales amounts to approximately US\$1,270 annually. Several farmers in the qualitative interviews reported localized flooding which affected some crop and livestock production, but most farmers reported favorable weather conditions across the reference period which contributed to positive crop sales.

Table 6 also reports the median price of the top sold crops which include maize, cassava, beans, groundnuts, and sweet potatoes. Of the five commodities groundnuts received the highest price per kilogram followed by beans.

Table 6: Overall agricultural production and sales of beneficiary households.

	Mean	Std. Dev
Production		
Percent of households involved in cropping (%)	82.82	
Gross value of crop production (US\$)	2,945	4,741
Total value of crop production per hectare (US\$)	1,644	2,330
Land cultivated (ha)	2.59	3.63
Number of crops grown	4.73	1.88
Expenditure on inputs (US\$)		
Total	722	1,085
Labor	451	640
Seeds	86	184
Fertilizer	53	138
Pesticide/Insecticide/Herbicide	55	114
Machinery	15	72
Gross margin (value of production - expenditure on inputs)	2,161	3,941
Proportion of harvest (%)		
Used for home consumption	35.18	33.53
Sold	43.14	35.31
Lost due to disease, pest, floods, etc.	1.06	3.57
Used for seed or feed or other uses	20.85	27.46
Median prices received per kg of (US\$)		
Maize	0.78	
Cassava	0.51	
Beans	1.81	
Groundnuts	2.89	
Sweet potatoes	0.72	

Note: 82.82 per cent of 227 households produce crops. All statistics on crop production are reported for crop producing households (N=188).

6.4 INCOME AND LIVELIHOOD COMPOSITION

Table 7 presents statistics on income and livelihood composition for beneficiary households. The average total income and per capita income is US\$8,604 and US\$1,792, respectively. For context, in 2021 the World Bank classified the lower-middle income economies as those with a gross national income per capita of US\$1,085.⁵ Beneficiary households on average exceed this threshold. Most beneficiary households are located in peri-urban areas where household income is generally higher than in rural areas. However, as indicated by the high standard deviation, beneficiary per capita income is highly variable.

Qualitative interviews indicate that the most common income generating activity is livestock rearing. However, most of this income is obtained through poultry production, which is not represented in the table below. For this reason, livestock production is not the first income source. Another important source of income is crop production, showing that households involved in poultry production also engage in crop production. In contrast, the other income-generating activities do not represent a relevant component of household income.

⁵ The World Bank constructs the gross national income per capita threshold for lower-middle income countries using the World Bank Atlas method. This is different from the method used to construct the average income per capita. Thus this number should not be used as a direct comparison.

Table 7: Total household income and income composition of beneficiary households.

	Mean	Std. Dev
Gross household income (US\$)		
Total	8,604	9,890
Per capita	1,792	2,497
Proportion of income from (%)		
Crop production	36.45	35.67
Livestock production	16.95	27.66
Household enterprise	18.87	31.21
Formal wage labor	11.84	27.30
Informal wage labor	0.19	1.61
Other	15.71	26.95

Note: Number of households is 227. This table does not include income from poultry production.

6.5 LOANS AND SAVINGS

Table 8 presents details of the loan access and savings of the beneficiary households. The qualitative data indicates that places to access credit exist nearby, but they require high levels of collateral, and the interest rates are high.

From the quantitative data below, 36 per cent of beneficiaries received at least one loan during July 2021 - June 2022, with an average amount of US\$1,702. Although 35 per cent of these loans were obtained from the bank, savings groups are highly active in extending loans to beneficiaries – savings groups were the main loan providers and were responsible for more than half of all loans.

However, disaggregating loan sizes in US\$ by the type of loan received by the beneficiaries indicates that loans made by savings groups are for the second lowest amount. The average loan provided by savings groups is US\$1,071. In comparison, the average loan provided by a bank is US\$2,861. Considering the qualitative and quantitative data together suggests that beneficiary households have difficulty obtaining sufficient capital to adequately fund their production.

Despite having low access to loans, 58 per cent of households have at least one member with cash savings in the bank and the average savings amount is US\$431. The average loan amount exceeds the average savings amount by more than four times.

Table 8: Loans and savings access of beneficiary households.

	Mean	Std. Dev
Household took at least one loan (%)	36.12	
Source of loan (% of sample who took a loan)		
Savings group	51.22	
Bank	34.15	
Microfinance institution	12.20	
Farmer's group/cooperative	0.00	
Trader/Buyer	4.88	
Friend/Family	0.00	
Loan size (US\$)	1,702	1,630
Household had at least one member with cash in savings (%)	58.15	
Total savings per capita (US\$)	431	654

Note: Number of households is 227. Source of loan and loan size statistics are generated conditional on having taken a loan.

6.6 WELLBEING

Table 9 presents statistics reflecting other areas of beneficiaries' wellbeing including food security outcomes, children's education, shock exposure, and gender equality. We summarize the

household's food security status using two measures – the Household Dietary Diversity Score (HDDS) and the Food Insecurity Experience Scale (FIES). Following Kennedy et al. (2010), we construct the HDDS from a total of 12 food groups. FIES is the summation of eight yes or no questions capturing the severity of household level food insecurity over the last 12 months, where yes equals one and no equals zero. Lower scores indicate higher levels of food security.

Beneficiary households on average have low food insecurity. The average 7-day HDDS is 10 and 1-day HDDS is 7.30, meaning in the past week households on average consumed the majority of the major food groups required for a healthy diet. On average beneficiaries answered yes to less than two food insecurity questions included in the FIES. The FIES is usually not summarized by the score, but by the response to certain questions that indicate the severity of food insecurity by response mechanisms. The two questions indicating the most severe level of food insecurity are: during the last twelve months was there a time where 1) you or a member of your household went without eating for a whole day and 2) you or a member of your household were hungry but did not eat. Approximately 34 per cent of households responded yes to a) and 4 per cent responded yes to 2).

School enrolment statistics are less positive: at least 25 per cent of school-age children are not enrolled in school during the study period. The household head in beneficiary households has on average low levels of education. Also as noted above, household education levels are lower in beneficiary households in comparison to non-beneficiary households. A high percentage of school aged children not enrolled in school may be a function of the overall lack of household education or it may also reflect local education infrastructure in the study areas.

Over 85 per cent of households experienced at least one livelihood shock during the reference period, reflecting the high level of vulnerability. Weather-related shocks are particularly prevalent in the sample. Almost half of the sample experienced a drought. Drought severely affects the agricultural production of maize, which is a primary source of poultry feed. Livestock and crop pests and diseases were also commonly experienced shocks. Qualitative interviews suggests that the spread of poultry diseases is high and often deadly. Small-scale poultry producers are often unable to access veterinary services. Pristine has acknowledged this barrier and plans to provide access to veterinary services.

Although women in rural Uganda face numerous barriers to their economic activities and involvement in decision making (Sell & Minot, 2018) the gender equality indicators in Table 9 indicate that at least 75 per cent of important decisions related to household purchases, sending children to school, and crop/livestock production are made jointly with women within the household.

Table 9: Food security, education, shock exposure, and gender equality of beneficiary households.

	Mean	Std. Dev
Food security and nutrition		
7 day Household Dietary Diversity Score (1-12 scale)	9.96	1.57
1 day Household Dietary Diversity Score (1-12 scale)	7.30	2.12
Household Food Insecurity Experience Score	1.71	2.21
Assets		
Asset index	0.53	0.21
Education		
Percent of school aged children enrolled (%)	71.31	
Shock exposure		
Exposed to shock in past year (%)	88.11	

	Mean	Std. Dev
Shock type experienced (%)		
Drought	41.85	
Crop pest/disease	23.35	
Illness/accident/death of income earner	3.52	
Irregular rains	26.87	
Ag. input/output price change	48.90	
Livestock pest/disease	33.48	
Theft	18.50	
Other	7.05	
Gender Equality		
Women involved in decision making for (%)		
Household purchases	77.31	
Crop or livestock production	78.50	
Sending children to school	85.92	

Note: Number of households is 227.

6.7 EXTERNAL SUPPORT

Table 10 presents statistics on the different types of advice and training received by each household and who the training was received from. Only 24 per cent of the sample received any form of training or advice. If training or advice was received it was primarily on farming practices or livestock rearing. As Pristine expands its supplier networks to include small scale poultry farmers, they will simultaneously provide advice and training on livestock rearing through extension services. Currently most of the training or advice is provided from Farmer's groups and NGO's or charities.

Table 10: External support received by beneficiary households.

	Mean
Received any training or advice (%)	23.79
Received any training or advice ON (%)	
Farming	53.70
Livestock rearing	38.89
Obtaining credit	24.07
Marketing and sales	35.19
Social	3.70
Received any training or advice FROM (%)	
NGO/Charity	24.07
NAADS/Government	20.37
Farmer's group	33.33
International organization	7.41
Individual trader/buyer	3.70
Private company trader/buyer	16.67

Note: Number of households is 227. Received any training or advice on and from statistics are conditional on having received any training or advice.

7. CONCLUDING REMARKS AND NEXT STEPS

This baseline report provides a profile of small-scale poultry producing households who are or will be targeted by Pristine as new suppliers of eggs. The descriptive analysis provides evidence that Pristine Foods has linkages to poultry producers who have demonstrable potential to expand their poultry operations but are limited by significant barriers such as market access, access to credit and capital, and rising input costs.

Based on the identified barriers and key operating capabilities of Pristine Foods the Fund's investment has considerable potential to spur inclusive rural development in Central Uganda through increasing the operating capacity of Pristine.

In the coming years, Pristine will continue with the investment by providing the technical assistance and market opportunities to poultry farmers. In five years, the endline data will be collected from the same households included in the baseline. These two rounds of data collection will allow a rigorous estimation of the impact of the investment on smallholder farmers and understand the potential that this type of investment can have on rural development.

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International Fund for Agricultural Development
Via Paolo di Dono, 44 - 00142 Rome, Italy
Tel: +39 06 54591 - Fax: +39 06 5043463
Email: ifad@ifad.org
www.ifad.org

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Delegation of the European Union to Uganda

Crested Towers Building, 15th Floor, Plot 17-23,
Hannington Road, P.O.BOX 5244, Kampala
Uganda

Tel: +256 312-701 000

Email: delegation-uganda@eeas.europa.eu

Website: eeas.europa.eu/delegations/uganda_en

Pearl Capital Partners

Plot M697 Equata Building, 2nd floor, UMA
Showground, Lugogo Kampala, Uganda

Tel: +256 393 264983/4

Email: info@pearlcapital.net

Website: pearlcapital.net/