Uganda's Coffee Sector: The Sleeping Giant?

Can Financing Smallholder Farmers Unleash its Potential?

CENTRE FOR
DEVELOPMENT
ALTERNATIVES

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Acknowledgements:

Executive summary

This study aims to understand the systemic constraints faced by Uganda's coffee industry in attracting finance to the sector. In search of this understanding, the paper seeks to answer three core questions: (i) what challenges and constraints do smallholder farmers face when attracting finance to the coffee sector? (ii) how have financing delivery mechanisms been utilised thus far, and what can we learn from cases of success or failure? (iii) what policy advice can contribute to lifting constraints that inhibit smallholder access to finance? The study relied on a desktop evidence review, ethnographic observation supplemented by interviews with key interview partners, and modelling assessment that aimed to accurately determine the number of smallholder farmers engaged in Uganda's coffee industry.

Raising on-farm productivity in rural areas of Uganda will catalyse industrial growth. Centering smallholder farmers in the debate of raising agricultural productivity will be necessary if Uganda is to make any progress in this direction. Nearly 80 percent of Uganda's population that are engaged in rural production are smallholders overwhelmed by multiple constraints that undermine their ability to raise productivity.

A more efficient and productive coffee sector has the potential to create decent jobs that alleviate poverty. Uganda is among the world's largest coffee producers, ranked eighth globally and second only to Ethiopia among African producers. The country's 2020 Coffee Roadmap sets out nine key initiatives to improve demand, value addition, and production enablers in the sector with a target to produce 20 million 60 kg bags of coffee by 2030 - an increase of 3.5 million produced in 2015 (UCDA, 2017; Majoria et al., 2018). The coffee sector has represented between 12-15% of yearly exports for the past decade (second only to gold). Crucially, virtually all of Uganda's coffee emanates from smallholder farms.

However, coffee productivity is adversely affected by several factors. A lack of quality extension services has exacerbated the conditions perpetuating poor and unsustainable agronomic practices. Lack of access to agricultural inputs, such as fertilizer, is another constraint to smallholder coffee farmers. Social disparities have negative implications for productivity, and in turn, levels of poverty.

Further, climatic changes, crop diseases and pests severely threaten ecosystems and biodiversity that have been key to coffee cultivation. Market and foreign exchange risks are set to become more acute.

With the expected commencement of oil extraction in Uganda, the Ugandan Shilling is likely to appreciate against the United States Dollar, which is the main export currency for coffee exporters. Amidst these multiple challenges, meaningful potential still exists to improve the system which can be described as low-input and semi-subsistence agriculture.

The agricultural finance sector is facing a gross mismatch between demand and supply around the world. While financing to the agricultural sector has grown, smallholders are still severely underserved. Although the constraints that limit smallholder farming productivity are multiple, we see finance as pivotal to produce the knock-on effect in lifting other constraints that require finance. Smallholder farmers struggle to attract finance to the agriculture sector because of demand-side and supply-side constraints. On the demand side several constraints relate to lack of collateral, high interest rates and absence of historical information (see Mpuga 2010; Munyambonera et al. 2014). On the supply side, constraints related to limited penetration of banking services, banks' failure to design products that are suitable to smallholder contexts, and government failure to make it attractive for banks to lend to smallholders, to mention a few. Without ready access to credit, cash-poor farmers cannot buy agricultural inputs such as fertilisers, herbicides, and agricultural machinery, and as a result have been trapped in an unending cycle of low productivity.

Financing smallholder farmers will require value chain prioritisation and sequencing. This, in part, is because of scarcity of fiscal resources and the need for experimentation and adaptation of financing delivery mechanisms to contextual conditions of each sector. This is why this study has prioritised the coffee industry: a well-developed global value chain in which 65% of Uganda's smallholders are involved and which has enough global demand to absorb additional production from Uganda, with positive macroeconomic benefits for the country from foreign exchange earnings.

In part thanks to government initiatives such as the "Entandikwa" scheme and the Agricultural Credit Facility, financing to agricultural value chains has grown, but recent studies point to a deficit in credit supply which has seen the majority of farmers left out, with most lending credit going to downstream value chain activities such as processing and marketing. Lack of access to formalised credit systems means Ugandan coffee farmers must rely on informal sources such as community-based savings and credit associations, relatives and friends.

Where formal credit from commercial banks, microfinance institutions and mobile money lending services is available, accompanying terms are often ill-suited to the needs of smallholder coffee farmers: they are generally short-term, with high interest rates, large collateral requirements, and stringent repayment terms not adapted to agricultural seasons.

There are supply-side and demand-side constraints that lead to smallholder financial exclusion. On the supply-side, formal financial institutions view smallholders as high-risk, low-return customers, they are mostly located too far from smallholders (i.e. in urban centres), and typically do not tailor their lending products to the needs of smallholders. On the demand-side, land tenure systems make it difficult for farmers to obtain formal land titles - their only available form of collateral against which to secure a loan. Further, smallholders struggle to obtain documentation required by lending institutions, including legal business documents and financial and audit statements.

The case study of Ibero Uganda shows how the private sector, government and donor agencies can harness their synergies to overcome constraints. The case discusses the work of Ibero Uganda, a company of Neumann Kaffee Gruppe, one of the leading coffee exporters in Uganda, and how they have built structures that proved effective and sustainable in delivering fertiliser and other inputs services to farmers, credit finances as well as marketing in an integrated approach. The model has been implemented in Butambala, Gomba, Lwengo and Luweero districts with enormous promise for expansion.

Three important lessons can be taken away from this case study. First, cooperative or farmer groups will remain pivotal to the transformation economics for rural producers but it must also be considered that cooperatives or farmer groups are highly vulnerable to collapse. Second, harnessing digital technologies can be a powerful tool for expanding transparency and accountability. Third, instead of providing financing directly to smallholders, the government and development partners can play the vital role of de-risking through signalling, thus incentivising and supporting farmers and off-takers to innovate together.

Overcoming constraints to credit delivery will demand a much bolder role by the government and its agencies. The government places great emphasis on credit access, ensuring increased access to credit by putting in place measures to reduce the cost of doing business (UBOS, 2020). Overcoming the binding constraints to financing smallholders will require creative financing and delivery mechanisms. Public institutions such as the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and the Bank of Uganda (BOU), together with commercial institutions must establish financial mechanisms that support farmers' access to credit.

The report thus makes the following policy recommendations:

a. Scale up innovative unsecured lending solutions backed by public funds. There is a need for interventions which allow credit provision to smallholder farmers without necessarily using their land as collateral.

b. Embed sensitisation on digital financial services into agricultural extension services. With the growth in access to digital services and mobile money platforms, farmers can access credit but there is still a knowledge gap when it comes to how to use new technologies. Increased awareness, for example, through agricultural extension services, will go a long way to mitigate these issues.

c. Support and incentivise commercial banks to extend their programmes to rural areas. This will allow them to be directly embedded in the rural economy but also to understand better the needs of the rural smallholder farmers and identify mutually reinforcing benefits.

d. Enable farmer cooperatives to adopt digital financing solutions. Integrating digital technology within the cooperative farmer group model can drive economies of scale, increase confidence among both farmers and service providers, and improve transparency and accountability among cooperatives. This enables the evolution of mutually beneficial business relationships, underpinned by well-aligned incentive structures to promote social capital, efficiency, productivity, fairness, and trust in the system.

e. Scale up and ease smallholder access to the Agricultural Insurance Scheme. There is a need for more support to the Agricultural Insurance Scheme and especially strategies targeting the ease of access by smallholder rural farmers as this would inspire trust in banks thereby lowering interest rates but also offer confidence to farmers to apply for credit. The existing Uganda Agricultural Insurance Scheme is known by just a few and the application process requires guidance and a certain level of digital literacy which further complicates the application process for most smallholder farmers.

f. Leverage global financing initiatives - such as the Global Farmer Fund and the Global Warehousing Finance Program - to support smallholder financing.

g. Foster financial product innovation and tailoring. The Government of Uganda (GoU) should work with the private sector to establish de-risking products compatible with the different crop value chain segments, combined with conditionalities to induce the private sector to innovate and tailor financial products to the needs of smallholders.

h. Provide risk guarantees to offtakers. Given the strong presence of highly liquid coffee trading companies in Uganda, GoU and its development partners can provide credit risk guarantees that incentivise these offtakers to provide credit to farmers.

i. Improve data collection and analytics systems. Data remains an inextricable element of effective project implementation, evaluation, and improvement. It should never be taken as something secondary. Data is central to the entire life cycle of a project.

In all these proposed approaches, experimentation, selection, refining and adaptation will remain the mantra that is promisingly reliable. Wholesale implementation of untested ideas can lead to disastrous failures. Experimentation therefore can help to identify effective solutions and weed out problematic ones. It also allows one to acquire information about the local context where the intervention is being implemented thereby allowing one to refine models that are well-suited for specific contexts. Indirectly, experimentation can also be a useful mechanism for mobilising communities to buy-in, embrace and gear towards supporting project implementation.

Abbreviations

ACE   Area Cooperative Enterprise

ACF   Agricultural Credit Facility

AfDB   African Development Bank

BOU   Bank of Uganda

CMB   Coffee Marketing Board

DC   Depot Community

FAO   Food and Agriculture Organization of the United Nations

GDP   Gross Domestic Product

GoU   Government of Uganda

GWFP   Global Warehousing Finance Program

ICA   International Coffee Agreement

IMF   International Monetary Fund

MAAIF   Ministry of Agriculture, Animal Industry and Fisheries

MDI   Micro Deposit Taking Institution

MFI   Micro Finance Institution

NAADS   National Agricultural Advisory Services

NBFC   Non-Banking Financial Company

NGO   Non-Governmental Organisation

NPA   National Planning Authority (Uganda)

OCDIH   Christian Organization for Integral Development of Honduras

RPO   Rural Producer Organisation

SACCO   Savings and Credit Co-Operative Society

UBOS   Uganda Bureau of Statistics

UCDA   Uganda Coffee Development Authority

UCIRI   Union of Indigenous Communities of the Isthmus Region (Mexico)

UGX   Ugandan Shilling

USAID   United States Agency for International Development

USD   United States Dollar

VCO   Village Coffee Organisation

VSS   Voluntary Sustainability Standards

Introduction

This study aims to understand the systemic constraints faced by Uganda's coffee industry in attracting finance to the sector. In search of this understanding, the paper seeks to answer three core questions: (i) what challenges and constraints do smallholder farmers face when attracting finance to the coffee sector? (ii) how have financing delivery mechanisms been utilised thus far, and what can we learn from cases of success or failure? (iii) what policy advice can contribute to lifting constraints that inhibit smallholder access to finance?

Section 1 continues by detailing the methodologies employed by the research team before Section 2 goes into the background of Uganda's coffee industry. This section highlights the salience of the sector to Uganda's economy and the challenges that remain and threaten the growth and prosperity of the industry. Section 3 diagnoses the determinants of finance access by smallholder coffee producers and the constraints they face in accessing different forms of financing. This section also analyzes several past interventions undertaken by the Government of Uganda (GoU) in extending credit financing to smallholders, providing an understanding as to why many of these have produced differential and problematic outcomes. By challenging Uganda Coffee Development Authority (UCDA) figures, a subsection provides modelling that aims to produce a realistic estimate of Uganda's smallholder coffee farming households and thus a much better understanding of the level of financing required by the sector. The paper then examines common finance delivery mechanisms that have been utilized by smallholders and explores contemporary approaches that innovatively leverage digital technology that improve their performance in rural production. Section 4 details policy options that aim to lift barriers to finance access for smallholder producers and Section 5 concludes.
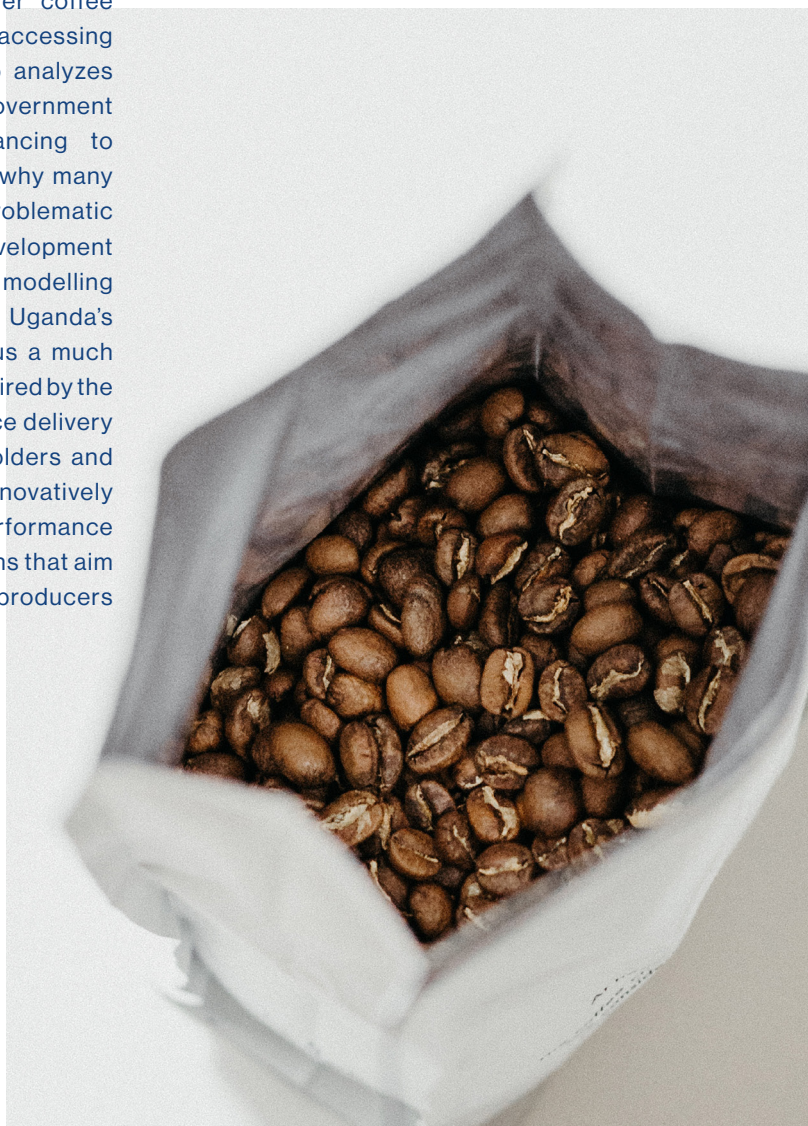
Methodology

Three methods were particularly central to gathering the material that informed the analysis and conclusions of this study: desktop review, ethnographic observation supplemented by interviews with key interview partners, and modelling assessment that aimed to accurately determine the number of smallholder farmers engaged in the coffee industry in Uganda. Each is detailed below:

a. **Desktop review of literature.** This involved a review of all relevant literature on Uganda's coffee industry, studies on the global determinants of credit access to smallholder farmers and analytical studies on the delivery mechanisms of finance in many developing countries. Each piece of literature was analyzed against their relevance to the three core research questions detailed above and was used to understand the historical and systemic constraining factors to smallholder access to finance. A review of the literature also informed discussions on the various initiatives that have been undertaken both locally and internationally in lifting these constraints for Uganda's coffee farmers.

b. **Ethnographic observations and key informant interviews.** The study benefited from evidence accumulated over the past four years (from February 2017 to June 2021) through ethnographic observation and interviews conducted by the lead author working in central and western districts of rural Uganda. The author tracked his observational work detailing how farmers organise and interact with farmer groups. First-hand observation took place at farmer meetings convened to discuss issues related to business development with third party off-takers in coffee, financial management and mapping of activities to enable farmers access to credit and input financing. Several interviews were conducted with key partners including lead farmers and field staff working in collaboration with coffee farmer organisations.

c. **Modelling-based assessment** was conducted to provide a close-to-realistic estimate of the population of Uganda's smallholder farmers engaged in coffee production. The UCDA has perennially reported the population of smallholder farmers engaged in coffee production to be 1.7 million farmers. The figure has formed the basis of key policy documents, such as Uganda's flagship coffee roadmap, despite there existing little evidence on how this figure came about. It was therefore considered relevant to attempt to devise a way that can provide a realistic population figure. Details of the assumptions made are provided in Section 3, with further details provided in Annex 2.

Agriculture and economic transformation

Raising on-farm productivity in rural areas of Uganda will catalyse industrial growth in two major ways. First, it will raise rural incomes which will drive demand for manufactured goods. An increase in demand for manufactured goods will spur industrial growth. Second, it will release labour into off-farm activities, producing an 'unlimited supply of labour' that is necessary for generating momentum in industrial growth (Lewis, 1954). Lewis' two sector model highlights the essentiality of a labour supply of cheap labour as a strong basis for driving industrialisation. As surplus labour from agriculture moves into the industrial sector, the capitalist is able to accumulate more and more capital and continue to expand, absorbing more labour into the industrial sector. This eventually leads to a structural shift of labour from the rural subsistence labour surplus sector to the industrial sector. In addition, productivity growth in agriculture will not only raise incomes but will also expand supply of raw materials required by industries. This reduces pressure on the exchange rate as local industrial firms substitute import of inputs for locally produced inputs. Therefore, it is evident that stimulating agricultural productivity is central to economic and rural transformation.

Centering smallholder farmers in the debate of raising agricultural productivity will be necessary if Uganda is to make any progress in this direction. Smallholder farmers form the major constituency in rural production. Nearly 80 percent of Uganda's population engaged in rural production are smallholders overwhelmed by multiple constraints that undermine their ability to raise productivity (Mpuga, 2010). Parizat et al. (2011) highlight several constraints including pests and disease, adequate finance, full exposure to price volatility that can wipe off their cash flows overnight, unstable markets, low access to extension services, use of low efficiency technology to mention a few. The impact of these constraints has been exacerbated by a rapidly growing population that has exerted more pressure on the land, further depressing productivity growth. Kurukulasuriya & Mendelsohn (2007) argue that many rural farmers in developing countries will be the most adversely affected by the effects of climate change. Therefore, considering that the bulk of Uganda's agriculture production relies on smallholder farmers, any interventions aimed at raising agricultural productivity must inevitably prioritise their inclusion addressing the constraints that limit their ability to raise on-farm productivity.

Uganda's coffee industry

The coffee sector is central to Uganda's economy. Uganda is among the world's largest coffee producers, ranked eighth globally and second only to Ethiopia among African producers (ICO, 2021). The cash crop has been Uganda's highest agricultural export for the past two decades, contributing between 20-30% of foreign exchange earnings and helping to cement itself among the top 15 commodities prioritised to promote growth and job creation by the Government of Uganda (GoU) (see Figure 2) (Mwesigye, 2020; MAAIF, 2016; UCDA, 2021). In a country where 24% of the rural population live below the international poverty line, the coffee sector is integral to the livelihoods of more than 1.7 million rural households, the majority of whom are smallholder subsistence farmers (IDH, 2020). Arabica and Robusta's processing regimes are different, but both involve mainly smallholder farmers in cultivation and harvest. The former is mainly pulped and washed while the latter is dry processed. Coffee represents no more than 20% of acreage on an average family plot but provides over 50% of household income in a year (UCDA,

2019). Deininger and Okidi (2003) point to evidence of coffee production prices being directly linked to macroeconomic performance indicators i.e., higher coffee prices are linked to lower inflation rates, higher employment, and more retail sales.

The Ugandan coffee sector was liberalised in 1990/91 and is today one of the most liberalised coffee marketing environments in the world (Ponte, 2001). Prior to this, commodity marketing boards-controlled prices and oversaw income stabilisation through fixed market prices for agricultural produce (see Figure 1 for coffee's structure). Liberalisation policies - such as the privatisation of state-owned enterprises, the removal of price controls, and the removal of import tariffs - opened avenues to integrate developing countries into the global market. Investment and trade in developing countries were touted as the missing pieces of the puzzle to bridge the technology, knowledge, and capital gap.

Agricultural products, including coffee exports, started fetching high prices due to rapid entry by various private companies into the market, simultaneously contributing to a rise in farmgate coffee prices. This led to an expansion and diversification of Uganda's agricultural exports. Pre-liberalisation policies did, however, provide some pricing guarantees to coffee farmers, the current absence of which could deter smallholders from producing for the coffee market opting instead to 'play safe' and diversify production.

However, the coffee market is now vastly controlled by downstream operators in countries of consumption, chiefly international traders, and roasters. The growing power of roasters, through the imposition of quantity caps and coffee blend substitutions, has been documented by Daviron and Ponte (2005). Concurrently, international traders are incorporating export organisations and local coffee processors and traders. While this has simplified coffee trading to some extent, Sheperd (2004) reports that it has positively affected margins achieved by operators in the consumer countries at the expense of those in producer countries. In some instances, the farmgate prices cashed to farmers is a meagre 8 percent of the price of roasted coffee.

The liberalisation of the market and the growth of donor aid saw an emergence of many member owned grassroots Rural Producer Organisations (RPOs), also known as farmer-groups or cooperatives.

These groups help organize smallholders in the coffee sector into (i) primary farmer organisations, which unify farmers from the same village or parish; and (ii) county or sub county level associations, which are usually referred to as depot committees (DCs) or area cooperative enterprises (ACEs) (Latynskiy and Berger, 2017). Though this structure helps secure better prices for farmers, farmers are often time pressed or burdened by prior contractual obligation leading to about 48% of the coffee produced by members of these organisations being sold to middlemen.

However, less than 10% of farmers belong to cooperatives mainly because of problematic issues of accountability and transparency and the openness of Uganda's coffee value chain that provides "exit options" for smallholder farmers to sell coffee to small traders. Though 345 farmer groups were in existence in 2011 (Parizat et al., 2011), coffee purchases were and still are normally carried out directly from farmers by small private sector traders who usually operate from farm to farm, village to village and sometimes, town to town. The small traders typically oscillate between being middlemen and traders. Middlemen range from small, medium, and large depending on the value chain segment. Notably, over 17,700 middlemen are reported to exist along the Robusta coffee supply chain alone (IDH, 2020). In the chain, larger traders buy from small ones and process the coffee either at private local town mills for a fee, at their own mills or at mills they rent for a season. The traders sell their coffee to the exporters who are mainly located in Kampala.

Figure 1: Uganda's coffee sector organisation prior to liberalisation
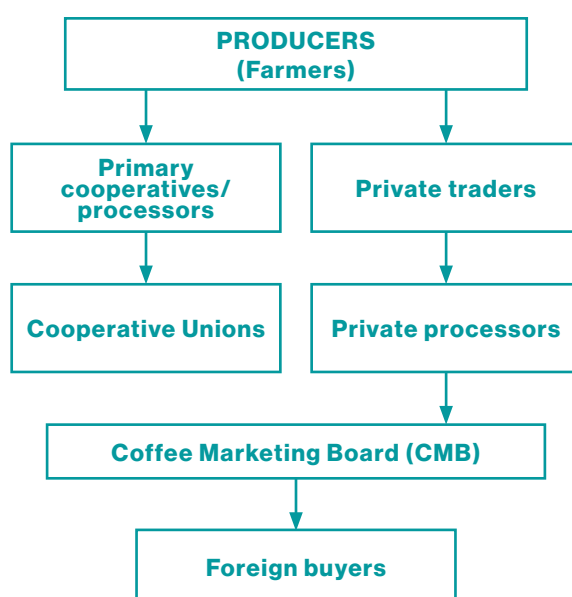

Source: Ponte (2002; 2001)

The previous decades have seen some stabilization and steady growth in the industry. According to the International Coffee Organisation (2020), the farmgate share of international market prices grew considerably following industry liberalization and the continued competitiveness has been essential in supporting the growth and stability trend across the coffee industry. This has been critical in attracting more rural farmers in Uganda to start growing the cash crop. The country's 2020 Coffee Roadmap sets out nine key initiatives to improve demand, value addition, and production enablers in the sector with a target to produce 20 million 60 kg bags of coffee by 2030 - an increase of 3.5 million produced in 2015 (UCDA, 2017; Majoria et al., 2018). The coffee sector has represented between 12-15% of yearly exports for the past decade (second only to gold) and is thus a key commodity in helping the GoU achieve the goals of Vision 2040 that seek to upgrade the country from low to middle-income status (OEC, 2021; Majoria et al., 2018; NPA, 2021). Despite the negative economic impacts brought about by the COVID-19 pandemic, Uganda's coffee exports rose by 972,962 bags in 2020, a 22% surge from 2019, equivalent to USD 515.94 million (UCDA, 2020). This has further fueled GoU's prioritisation of the sector's role in the country's economic growth.

A more efficient and productive coffee sector has the potential to create decent jobs that alleviate poverty. 99% of Uganda's coffee emanates from smallholder farms, totaling about 1.8 million farmers[1] (IDH, 2020). With worldwide coffee demand projected to double by 2050, Uganda is carefully strategizing ways to establish itself as a regional and global coffee powerhouse. Given the poverty alleviating opportunities presented by the sector it is possible to see why. It could be a solution to chronic problems such as rural poverty and food insecurity that affects 25% of the population, and a means of offsetting the USD 3.3 billion trade deficit (WFP, 2013). Indeed, 5% of the population suffer from poor food consumption with another 16% living on borderline food consumption (Integrated Food Security Phase Classification, 2017). Poverty levels are substantially lower during periods of high coffee market prices (Deininger and Okidi, 2003). In such boom periods, the positive income effects on smallholders are significant, reflected through spillovers from coffee production that allow them to diversify agricultural production and venture into other crops and non-agricultural activities (Bussolo et al., 2007). Moreover, the sector has been identified as one of the agricultural chains with the highest potential to create rural jobs and incomes (Mwesigye, 2020).

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1   This figure must be interrogated. Taking the UBOS 2014 census household population figures as the base for all coffee growing districts and adjusting them to the household size of seven using Demographic and Health Survey reports, the coffee farming population size is lower than what is often reported by UCDA. Therefore, there is a need to interrogate the methodology UCDA applied to produce this figure. The figure oscillates between 1.7 and 1.8 million, which has often generated confusion in debate.

Figure 2: Contribution of the coffee sector to Uganda's foreign earnings
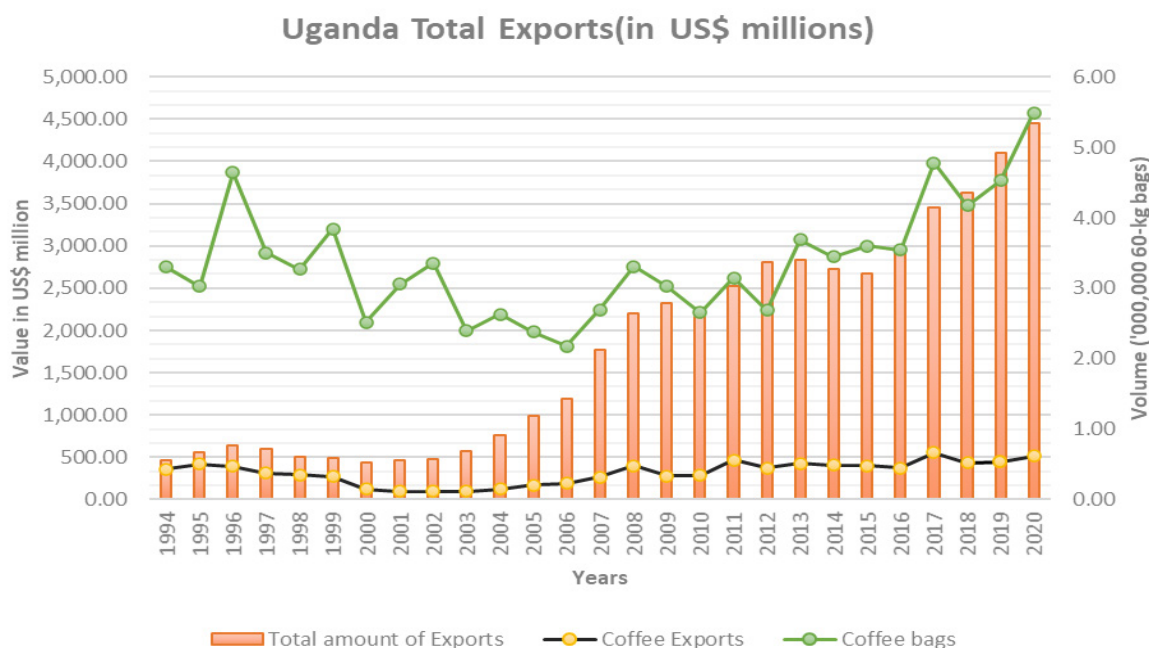
Source: BOU (2021); International Coffee Organisation (2020)

Uganda boasts favourable agronomic conditions that support quality coffee production. Much of the country's 242,000 sq km surface area sits between 1,000m and 1,300m above sea level, favouring quality yields of Robusta and Arabica coffee varieties (Uganda Investment Authority, n.d.). Indegenous to Uganda and well known for its mild taste and blending practicality, Robusta constitutes roughly 85% of yearly domestic coffee production and is supported by the country's strategic location (averaging 1,100m above sea level) and good tropical climate - two dry and rainy seasons per year with a total annual average precipitation of 1,197 mm² (USDA, 2021). These characteristics also support cultivation of higher-quality Arabica beans grown mainly on the slopes of the Rwenzori and Elgon mountains (UCDA, 2019). Despite this, however, Uganda only produces 1% of the global Arabica supply, thus limiting participation in a value chain that earns greater amounts in international markets and presents an easier way for farmers to increase incomes (Morjaria et al., 2018).

Challenges and threats to Uganda's coffee sector

Climatic changes, crop diseases and pests severely threaten ecosystems and biodiversity that have been key to coffee cultivation. Increasing variability in rainfall patterns due to climate change and poor soil management have been cited as reasons for poor farm yields across Uganda's agricultural sector (Place and Otsuka, 2002a). The recent swarm of locusts has decimated over 5 square kilometers and over 2 million hectares of cropland is threatened (FAO, 2020) while poor farming methods that lead to land fragmentation have been drivers of productivity-reducing soil erosion. It is reported that between 4 and 12% of Uganda's GDP could be lost annually due to land degradation (MWE, 2016). Investment in soil management practices in Uganda is not common, with landowners more likely to invest than smallholder tenants. These climatic changes have also been associated with mutations in coffee diseases and pests. Some diseases manifest in ecological zones where they never existed before (e.g., coffee leaf rust); there have also been variations in the appearance and severity of emergent pests such as the black twig borer (Parizat et al., 2011).

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2   https://climateknowledgeportal.worldbank.org/country/uganda/climate-data-historical

Common practices surrounding smallholder land use mean coffee productivity is adversely affected. On average, each Ugandan farmer operates on less than a hectare of farmland that must include space not just for export coffee cultivation but also staple crops for personal consumption. Externalities such as food shortages affect productivity of non-food crops like coffee and push farmers to abandon it in favour of edible crops such as maize, cassava, and beans (McDonnell, 2017). 'Intercropping' - the practice of cultivating various crops on the same land - is common in Uganda and often accompanies little or zero utilization of inputs such as fertilizers, out of date or inadequate farming techniques, and rudimentary technologies (Anderson et al., 2016). As rates of population increase and urbanisation rates rise[3], the reduced availability of farmlands sees smallholders intercrop with banana and cassava as this offers higher returns per unit of land and provides some protection against increasing food shortages (Jassogne et al., 2013; Kyomugisha, 2015). Households with limited access to land are found to use more labour per unit area cropped, substituting more intensive and labour demanding production for extensive land-demanding production. Opoki-Ameyaw et al. (2003) highlight the negative impacts of this practice on the coffee sector, affecting the productivity of coffee plants by up to 47% and causing a decline in the quality of coffee produced. The lack of workable economic units means that smallholders usually farm on poorly planned and highly fragmented pieces of land, averaging 0.5 hectares per household (Meemken et al., 2017). If not addressed, these challenges may derail the 2030 target of 20 million coffee bags produced and eventually slow down Uganda's economic development.

A lack of quality extension services has exacerbated the conditions perpetuating poor and unsustainable agronomic practices (Hepworth and Goulden, 2008). Better extension services to the coffee sector enhances productivity through improved farmer knowledge on disease-resistance coffee seed varieties, fertilizers and more efficient crop production methods (Luzinda, 2018). They can also equip farmers with more informed choices around where and how to market their agricultural products. Alongside rural producer organisations (RPOs) that help to organise smallholders to leverage their collective bargaining power in the agricultural value chains, extension services can also aid smallholders in the implementation of voluntary sustainability standards (VSS). Adoption of these standards has been correlated with enhanced coffee production processes and is a means to control management activities within the production unit in other coffee producing countries such as Brazil (Piao et al., 2019; Ssebunya et al., 2017).

Lack of access to agricultural inputs, such as fertilizer, is another constraint to smallholder coffee farmers. Fertilizer use among Ugandan farmers stands at an average of one kilogram per hectare, much lower than the sub-Saharan Africa average of eight kilograms per hectare (FAO, 2018). Moreover, fertilizer application has been found to vary according to land tenure type, with the highest rates applied on plots under freehold tenure (Place and Otsuka, 2002). Whilst the level of manure application is slightly higher than modern fertilizer use, it is still low and again mostly found on freehold land (Hartarska et al., 2015) . Fallowing also is most often found on freehold plots. This is likely because fallowing is considered a practice that increases tenure insecurity under customary tenure systems since it sends a signal to others that the land is available. Application of crop residues on farm plots has equally been found to be the most used short-term practice (Place and Otsuka, 2002). Mulching rates follow a similar pattern. Crop rotation is less common on mailo than on freehold plots. This may be due to insecurity about future access to land since crop rotation involves sequencing different crops on the same plot of land according to a predetermined plan. Evidence suggests a clear pattern where owner operated plots have a higher tendency for deployment of soil enriching practices (ibid). COVID-19 has exacerbated this constraint, restricting movement even in rural areas with the result that many farmers struggle to get to stores to purchase inputs.

Social disparities have negative implications for productivity, and in turn, levels of poverty. While it is predominantly women who are involved in the agricultural work, according to the FAO (2018), an average five-person smallholder household in Uganda is male-headed, with less than one third of family farms headed by a female, highlighting the gender disparity in the sector. Farmers' level of education rarely exceeds primary level, contributing to the 27% of smallholders already living below the national poverty line and exacerbating obstacles to increased productivity and competitiveness (Anderson et al., 2016). In addition to these challenges, smallholders are forced to operate within an informal, cash-based economy with little to no access to credit, savings or payment plans for their needs. Smallholder farmers have dynamic, distinctive and complex unmet needs that are constantly interacting and threatening their livelihoods (Fan and Rue, 2020).

3   Uganda's population density is approximately 230 people per square kilometer, well above the benchmark figure of 100 persons (Worldometers, 2021)

Market and foreign exchange risks are set to become more acute. With the expected commencement of oil extraction in Uganda, the Ugandan Shilling is likely to appreciate against the United States Dollar, which is the main export currency for coffee exporters.[4] With coffee purchased from farmers in Ugandan Shillings, the appreciation would mean that farmers will receive less for their coffee. The reduced farmgate prices may usher in a general farmer loss of interest in the sector, thereby threatening the 2030 20 million bag export target if not properly addressed. Volatile commodity prices further threaten realisation of this target. In Colombia, for example, between 2011 and 2013 prices fell by over 60%, highlighting price instability that impedes farmers' ability to plan or schedule economic activities (Arango-Aramburo; Acevedo and Sonnemans, 2019).

Inadequate financing is perhaps the most pressing challenge facing smallholder coffee producers, affecting everything from productivity-boosting agronomic inputs to post-harvest processing infrastructure. Good inputs and farming techniques lead to better farm performance and export growth (Schneider and Kernohan, 2006). This underlines the significance of availing cheap credit to smallholder farmers for investments in either agricultural technology and other forms of inputs (Baffes, 2006; Matthews et al., 2007). Lessons from other high-producing countries such as Brazil underscore the significance of improved financing delivery mechanisms in the coffee sector, which allows farmers access to credit facilities that improve mechanization and irrigation, better access to effective fertilizers that boost output, and storage and warehousing facilities (Batista, 2019).

Given that coffee crops are planted over three to five years from first planting to harvest, farmers require flexible financing to cover crop maintenance costs between these cycles. Moreover, farmers only earn an income at the end of the harvest cycle when crops are sold, reducing bargaining powers that could negotiate alternative sale schedules, increasing pressure on farmers to sell within a short time window. Arango-Aramburo et al (2019), in their study on the influence of financial institution strength on the investment-production delay of Colombian coffee farmers, conclude that financial institutions able to offer farmers (a) loans in periods of low prices and (b) reliable savings products during high price periods could also indirectly decrease price volatility. To increase access to financing provisions for smallholders, financial service providers must deviate from conventional credit provision mechanisms and explore other methods that seek to integrate access to credit in the production chain through embedded services such as integrated credits in the production chain (climate data, seeds, fertilizer, and insurance), which help to improve productivity (Batistsa, 2019).

Amidst such challenges, meaningful potential still exists to improve the system which can be described as low-input and semi-subsistence agriculture. For countries like Uganda which are landlocked with a high reliance on agricultural contributions to GDP, economic growth requires significant gains in productivity and leveraging typical competitive agricultural exports such as coffee and tea.

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4   The natural resource extraction phenomenon contributing to currency appreciation and reducing local incomes is known as the "Dutch disease" (Ebrahim-Zadeh, 2003).

Financing Uganda's coffee smallholders:
History and current status

Smallholder financing in context

The agricultural finance sector is facing a gross mismatch between demand and supply around the world. Globally, an annual investment of about USD 80 billion will be required to strengthen already stressed food and nutrition systems (Varangis et al., 2014). Improved access to finance also opens private investment pathways to enhance productivity in the sector.

While financing to the agricultural sector has grown, smallholders are still severely underserved. Finance to the agriculture sector has grown from around 400 billion UGX in 2007 to nearly 1 trillion UGX in 2019, most of it has concentrated on financing large scale farming enterprises rather than smallholders (BoU, 2019). A number of factors are cited to have contributed to this, including the establishment of the Agricultural Credit Facility (ACF) in 2009 and the increase in the number of commercial banks (Agricultural Finance Yearbook, 2020). However, Ugandan smallholder coffee producers still face systemic barriers to accessing the necessary financing needed for transformation in the sector. As a result, the potential growth and employment impact arising from backward and forward linkages that exist between agriculture, manufacturing and services sectors have not been harnessed.

Although the constraints that limit smallholder farming productivity are multiple, we see finance as pivotal to produce the knock-on effect in lifting other constraints that require finance. Smallholder farmers struggle to attract finance to the agriculture sector because of demand-side and supply-side constraints. On the demand side several constraints relate to lack of collateral, high interest rates, absence of historical information etc (see Mpuga 2010; Munyambonera et al. 2014). On the supply side, constraints related to limited penetration of banking services, banks' failure to design products that are suitable to smallholder contexts, and government failure to make it attractive for banks to lend to smallholders, to mention a few.

Without ready access to credit, cash-poor farmers cannot buy agricultural inputs such as fertilisers, herbicides, and agricultural machinery, and as a result have been trapped in an unending cycle of low productivity.

Alongside the subsistence nature of smallholder farming, some farmers have been pushed to abandon non-food crops like coffee to focus on more easily consumed crops for household use and the immediate market. The overall impact of this is a drop in coffee production which threatens the goal of achieving 20 million bags exported by 2030.

Financing smallholder farmers will require value chain prioritisation and sequencing. This in part is because of scarcity of fiscal resources and the need for experimentation and adaptation of financing delivery mechanisms to contextual conditions of each sector. This is why this study has prioritised the coffee industry. Four major reasons informed our choice for the coffee industry. First, coffee is a well-developed global value chain with potential to absorb any additional increase in coffee production without depressing local prices for producers. As an example, the Year ending 2020/21, Uganda has observed an increase in production and export growth over 1 million bags and yet the prices of coffee continued to rise (UCDA, 2021). Second, directly and indirectly over 1 million Ugandans and over 65 percent of farmers earn their income from coffee, majority of whom are engaged in intercrop farming. A rise in income from coffee therefore also often implies an intensified diversification into other cash and food specific commodity value chains (Munyambonera et al. 2014). This would therefore boost growth of other commodity sectors, further pushing household incomes up, generating food security, aggregate demand and significantly reduce poverty. Third, increased coffee exports have strong macroeconomic benefits i.e improved terms of trade and foreign exchange earnings that can boost macroeconomic stability in the face of rapid investment in infrastructure expansion. Fourth, the government through the coffee roadmap aims to raise production and exports from 6 million bags in 2021 to 30 million bags in 2030. This is indeed an ambitious target whose realisation will require an enormous amount of investment. Therefore, a study that interrogates previous mechanisms of financing delivery to smallholder farmers aiming at highlighting lessons from cases of success as well as failure would be important in providing useful policy advice. This would ensure effective implementation approaches that would anchor the sector to deliver on the objectives of the coffee roadmap.

Historical overview of financing to Uganda's smallholders' coffee sector

Prior to the transformative liberalization policies of the 1990s, Uganda's coffee sector was monopolized and managed by the government-instituted and colonially inherited Coffee Marketing Board (CMB) with a mandate to set domestic commodity prices and control all marketing activities, including exports. The marketing activities of the boards can be categorised into four streams as shown in Table 1. In terms of price and quotas, the market activities of the entire coffee commodity chain were controlled by the International Coffee Agreements (ICA) from 1962 to 1989 (Ponte, 2001). The boards ensured that producers would be able to access the necessary credit facilities for improved productivity. Indeed, by 1967 close to five types of official credit types were available to farmers: consumption credit, production credit, medium-term credit, long-term credit and crop finance (Hunt, 1967). The various credit types were meant for different categories of activities. For instance, consumption credit was earmarked for seasonal cash shortages, especially in the pre-harvest period, production credit for easing seasonal shortages of cash for recurrent farm inputs, medium-term credit for establishment and extension of enterprises, long-term credit mainly for estates operated by agricultural enterprises and crop finance for financing the purchase of crops from farmers (ibid).

Credit support played a huge role in galvanising productivity among farmer groups. With an objective of increasing producers' market intelligence in the coffee industry, the boards employed 'publicity secretaries' assigned with the task of roaming the country consulting cooperatives on how to address issues related to quality, productivity, and other aspects of marketing processes (Haring et al., 1969). CMB operations came to an end in 1991, giving way for direct involvement of cooperatives and private traders in commodity exportation. The CMB was subsequently split into two organisations, the Coffee Marketing Board Limited (CMBL) responsible for exports, and the Uganda Coffee Development Authority (UCDA), which is to this day responsible for regulating the coffee value chain (UCDA, 2019).

Table 1: Marketing activities of the marketing boards and price funds

No.	Marketing activity	Function
1.	Primary marketing activities	Licensing of primary buyers, designate the gazetted markets, and generally supervise the sale of Kiboko.
2.	The processing industries and the board's buying activities	Ensure a high processing efficiency and reduction in wastages. Monitor and streamline processing technologies. Ensure fair competition among processors.
3.	Buying activities and selling	Establishing grading and quality incentive schemes. Market monitoring to ensure risk reduction. Ensuring better prices through withholding supply.

Source: Haring et al., 1969; Oloya, 1968

Cooperatives - horizontal collective farmer structures - played a large role in availing technical and extension services to farmers. While a series of privatization initiatives created the environment for swift market entry and growth in private enterprises at various stages of the coffee supply chain (Baffes, 2006), the influx of private enterprise competitors took a heavy toll on the pre-existing cooperatives, with many failing to adapt and some accumulating high debt to the point of eventual collapse (Hill, 2010). Consequently, a total of 172 out of 199 new private sector exporters (mostly cooperatives) who ventured into the Ugandan coffee sector between 1991 to 2001 failed (Nalubega, 2019).

Figure 3: Global trends in coffee prices over the past 40 years

Source: Macrotrends (2021)

Government-led financing initiatives

The government's willingness to improve credit access has been manifested in various programmes. In the recent past, the Ugandan government has established initiatives such as the "Entandikwa" scheme and rural financial services programmes targeting farmers but there have been mixed reactions on the overall long-term performance of such programmes (See Table 2). For example, two decades ago, the Uganda Bureau of Statistics (UBOS) (2000) reported that 25% of farmers in rural communities had access to Entadikwa but within the two years between 1997-1999 there appeared a drastic decline in the availability of the scheme from 45% farmer access to 25% (UBOS, 2000). The timing and the delivery mechanisms have been cited as some of the causes for the failure of the scheme (Kasirye, 2007), but since then several other initiatives including the medium term competitive and investment strategy (CICS), rural financing services program of 2005-2008, prosperity for all (PSA)-2008, the national agricultural advisory services (NAADS)-2001, the microfinance support scheme (MSCL)-2005 and agricultural credit facility (ACF)-2009, have been established.

Even though the above programmes were touted to improve the agricultural sector (and indeed some are still running), it is not clear how impactful they have been. A number of factors ranging from political patronage to policy inconsistency on agricultural financing, a weak institutional framework, and household demand factors have been cited (Ssonko and Nakayaga, 2014) (See Table 2). Amidst such challenges, studies have shown that there appears to be a deficit in credit supply which has seen most farmers left out (FinScope, 2018).

Table 2: Key agricultural financing initiatives and policy failures

Initiative	Objective	Policy Failures
Entandikwa (1996)	Increase access to rural credit by farmers	Weak institutional framework for implementation
Medium term competitive and investment strategy	To support the private sector become a powerful growth engine and a central pillar for increasing incomes leading to sustainably reduced poverty through improved strength and access to the financial sector	Inadequate financing; narrow outreach; weak institutional framework for coordination and implementation
Rural financial services programme (2005-2008)	Increase financial services outreach	Weak regulatory framework for MFIs and SACCOs
Prosperity for All (2008)	Push annual household income to UGX 20 million through increased access to financial services	Limited access to the initiative; government failure to allocate resources on time; political interference
The National Agricultural Advisory Services (NAADS) (2001)	To increase farmers' productivity and household incomes through enhanced provision of extension services and support to the provision of financial services	Weak institutional framework for coordination, financing, and implementation; inadequate financing to cover a significant number of farmers
The Microfinance support Centre (2005)	Improved access to credit for farming at a lower interest rate of 9% and commercial credit at 13% annually	Inequitable distribution of loans across regions; shift of MFI and SACCO objectives from low credit provision to trade credit at rates competing with commercial banks and sometimes higher; lack of effective regulation, monitoring, and supervision
Agricultural Credit Facility (2009)	Improving access to finance for agricultural equipment for value addition and processing for commercial farmers at an interest rate of 12%	Biased credit facility to agro-processing and value addition for medium and large-scale farmers, i.e. not covering production inputs (fertilizers, pesticides and fungicides) which are critical for smallholder productivity gains; distorts the credit market

Source: Agricultural finance yearbook (2010)

Current status of smallholder financing in Uganda

Financing to agricultural value chains has grown but farmers are still seriously underserved. The last decade has seen increased involvement of commercial banks and other institutions in the financing of various crop value chains. Factors contributing to this growth include the rise in fintech innovations, the Agricultural Credit Facility (ACF), the establishment of a subsidized agricultural insurance scheme and the gradual reduction in risk aversion due to improvement in agricultural lending skills as levels of non-performing loans declined (Agricultural Finance Yearbook, 2020). Selective and pragmatic application of credit risk guarantees have also helped to mitigate the risk of lending to farmers (ibid).

However, this growth has been biased towards marketing and processing activities to the neglect of smallholder producers who instead must rely on costly informal sources of credit such as money lenders (Munyambonera et al., 2014). Moreover, the majority of loans on offer to smallholders are short and medium-term despite many agricultural activities being spread throughout the crop season, thus posing limitations to the longer-term transformation of the sector (Agricultural Finance Yearbook, 2020).

Figure 5: Total lending to agriculture, 2007-2019

Source: Bank of Uganda (2021)

Agriculture's share of financing from credit institutions lags other sectors. In comparison to other sectors of the economy, agriculture is still performing very poorly. A closer look at different institutions' lending figures reveals that commercial banks' credit disbursement went from just 2.1% of the total credit share in 2010 to

4.1% in 2020, while from formal credit institutions it rose from 2.2% in 2010 to only 4.2% in 2020 (Bank of Uganda, 2021). Compared to other sectors such as manufacturing, this is significantly low (Bank of Uganda, 2021) (See Figures 6 and 7). A 2008 report by the African Development Bank (AfDB) showed that the agricultural sector receives approximately 9% of total commercial bank credit annually, with only 3% going to crop production and the remaining 6% for crop finance (AfDB, 2008).

Manufacturing and trade in general merchandise sectors, on the other hand, received more than 25% and 50% of total commercial bank credit respectively while contributing only 10% to GDP. While the net stock of private credit increased from USD 329 million to USD 814 million between 1999 and 2006 the share advanced to agriculture remained low, increasing by only 3.5 percentage points in the same period (Bank of Uganda, 2006). According to Benni et al. (2019), the main constraints to the supply of credit also encompass large disaggregation of demand, inadequate regulative support for substitutes with better sectoral compatibility, and low levels of financial literacy.

Where formal credit is available, accompanying terms are often ill-suited to the needs of smallholder coffee farmers. The short and medium-term nature of credit offers does not adequately facilitate the adoption of new technology, agricultural inputs or new plant species which would require investment for longer-term pay off. Increasing private sector credit could play a role in supporting smallholders in this regard, however, access to credit also varies depending on company size, with larger organisations having a better standing than smaller firms in need of financing with limited options. High interest rates also signal that the sector is still perceived as a high-risk endeavour in comparison to other sectors of the economy.

Lack of access to formalised credit systems means Ugandan coffee farmers must rely on informal institutions. Overall, despite several innovations in the financial sector, a serious credit constraint persists among smallholder farmers (FinScope, 2018). As highlighted in Figure 10, most Ugandans rely on informal institutions to access credit, with rural producers adversely affected by the fact that formal sources are usually only accessible in urban centres and towns and to those with strong financial accounting documentation (see Figure 12). Even where formal applications for credit are possible, the loan applications have a lower likelihood of success and the few success cases are awarded smaller loans (Mpuga, 2010).

Figure 6: Financial institutions total lending by selected economic sector
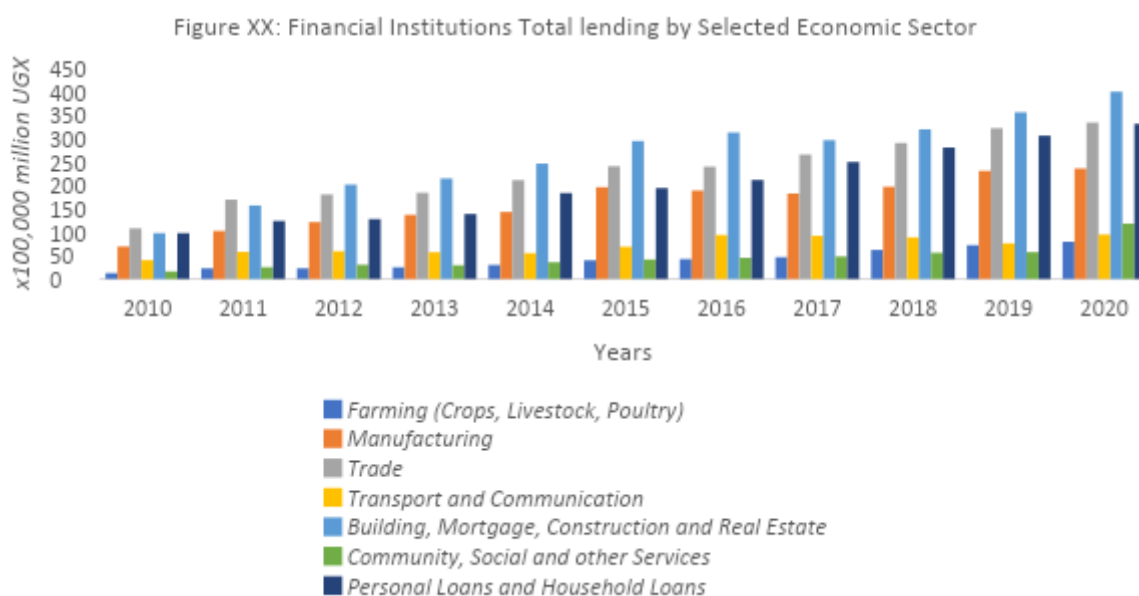
Source: Bank of Uganda credit by sector data

Figure 7: Credit institution lending by selected economic sector
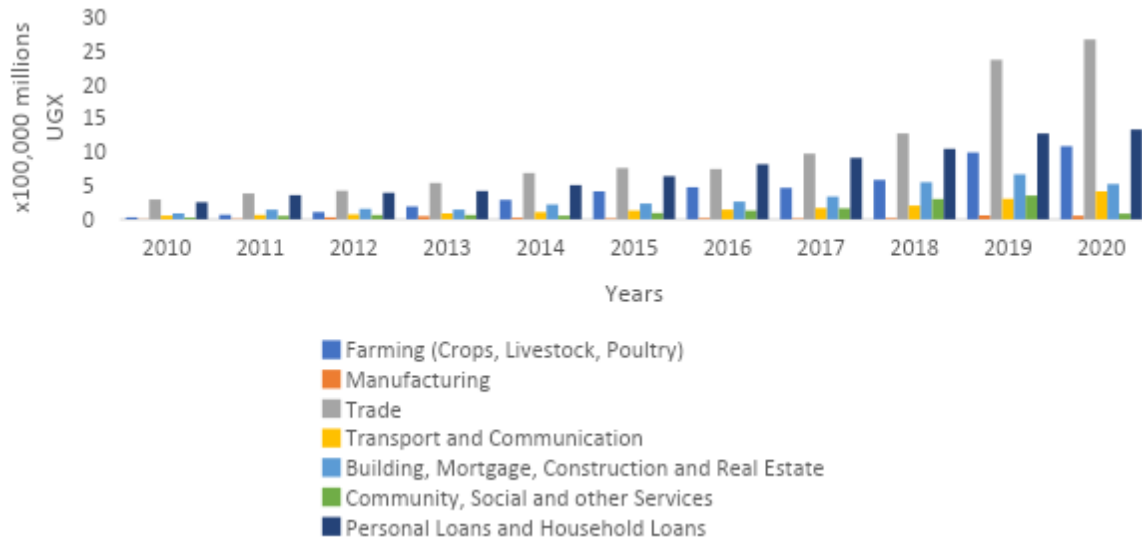
Source: Bank of Uganda credit by sector data

Figure 8: Main agricultural exports, 1994-2020
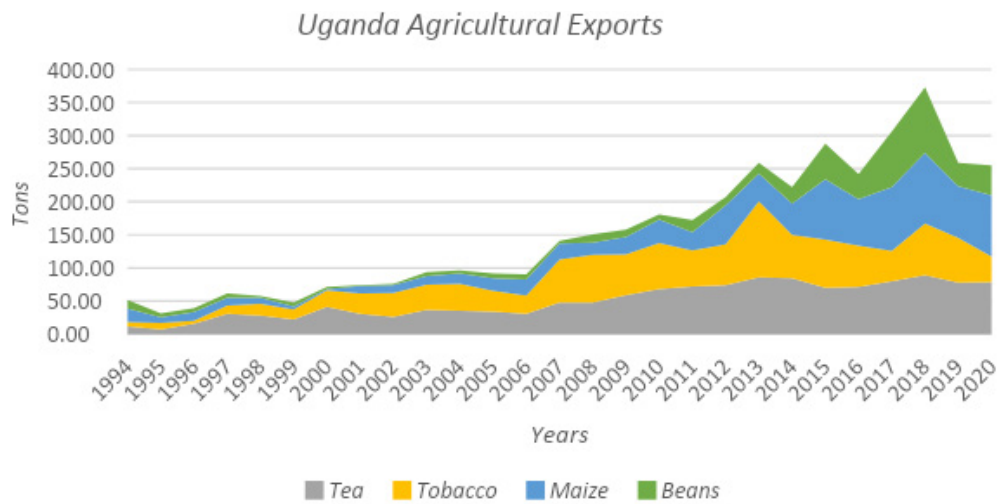
Source: BoU (2020)

Figure 9: Coffee vs cotton exports, 1994-2020
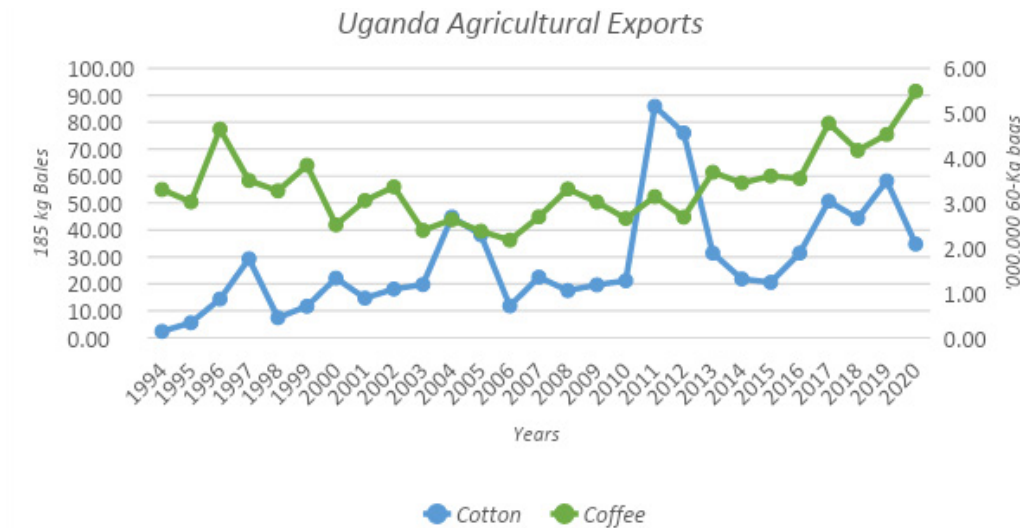
Source: BoU (2020)

Figure 10: Percentage of credit access by sources
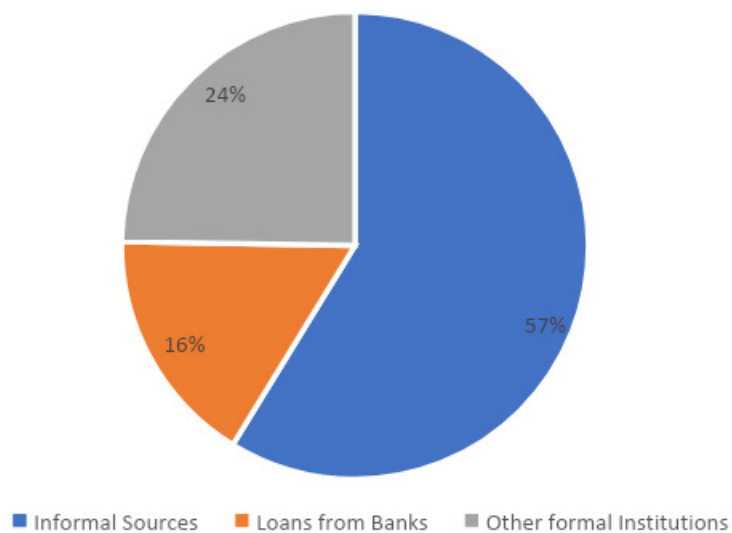
Source: Uganda National Survey Report (2020)

Figure 11: Credit opportunities for youth employment in Uganda
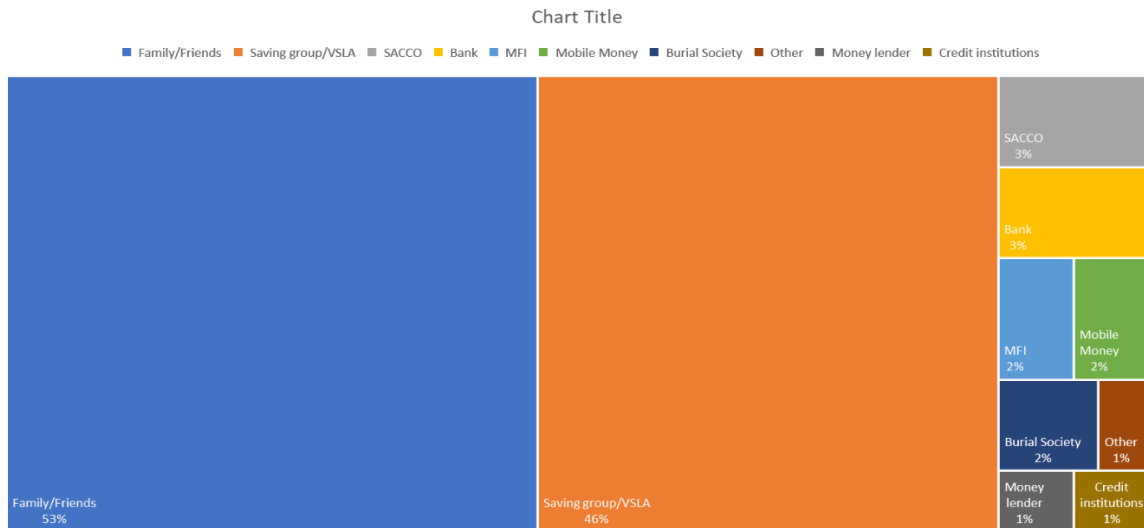
Source: Uganda National Survey Report (2020)

Figure 12: Rural and urban access to credit services
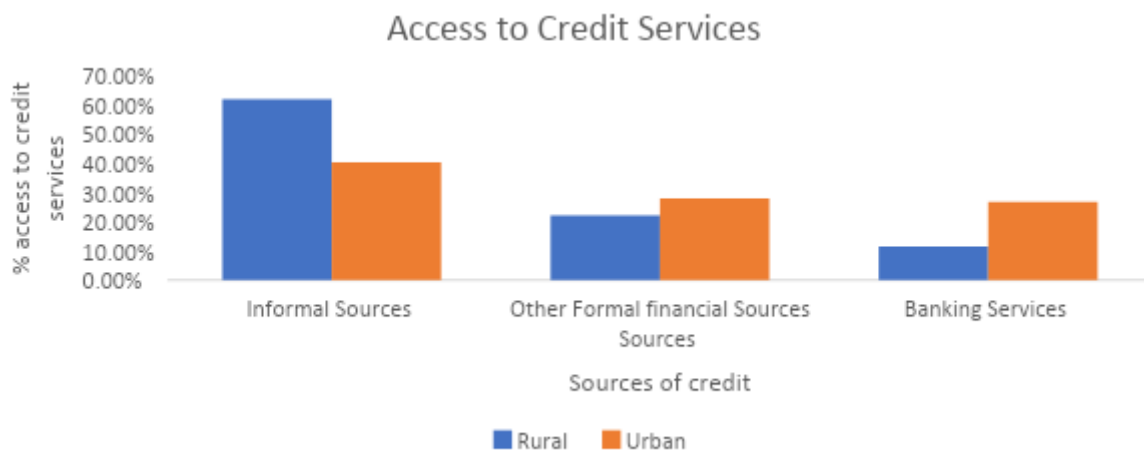
Source: Uganda National Survey report (2020)

Current forms of smallholder financing

Sources of credit to Uganda's smallholder farmers are split between formal and informal financial services. Formal institutions include commercial banks, micro deposit-taking institutions (MDIs) and mobile money services, and each are licensed and regulated by the central Bank of Uganda (BoU). On the other hand, informal institutions include village savings and loan associations, rotating savings and credit associations, community burial societies and other self-help credit associations (Bongomin et al., 2018; UBOS, 2020). Rural producers are principally supported by these informal mechanisms as well as relatives and friends. The most commonly found credit sources in Uganda are detailed below.

Microfinance institutions

Microfinance institutions (MFIs) have been widely used as a tool for reaching the rural poor and providing access to alternative credit sources. Since the 1990s, they have gained popularity in Uganda, with more than 90 currently in existence (Carlton et al., 2001; Global Brands, 2020). While MFIs exist as standalone organisations, the core service rendered - microfinance - can be offered by other institutions such as credit unions, cooperatives and commercial banks. However, MFIs have been tailored to meet financing needs of businesses and farmers within local, often rural communities, thriving where traditional financing institutions have floundered. The MFI itself acts as a middleman, obtaining funds from mainstream banks or other financial institutions and provides microcredit and support services to low-income earners and poor communities otherwise locked out from formal lending practices.

Despite being a force for rural development, MFIs face several challenges with repayment due to information failure and inadequate legal instruments. This has led some MFIs to design lending systems that ration loan amounts for new customers and reward consistent repayment behaviour by increasing the loan amounts that can be accessed by smallholders, among others. Known as 'progressive lending' or 'dynamic incentives', the system effectively acts as a loan repayment enforcement measure (Egli, 2004; Hering and Musshoff, 2017). Hering and Musshoff (2017) criticize the effectiveness of this method of finance delivery, citing that borrowers are more likely to default with repeated borrowing and tend not to exhaust the loan volume available.

Aside from individual lending schemes, MFIs also avail funds to groups of individuals where members are liable for one another. This method can be beneficial when individuals do not have sufficient collateral or credit history, protecting the MFI from loan defaults and increasing a farmer's access to loans. The process of obtaining loans from MFIs can be bundled with bureaucratic hurdles influencing a farmer's decision to take loans. In some cases, coffee farmers are required to provide a guarantor who will cover repayment in the event of default. Group lending schemes are therefore advantageous in the sense that they transfer the role of monitoring exact use of loans from the financing institutions to the borrowers, however, this comes at the cost of loss of privacy and additional risk to group members (Lehner, 2009).

Cooperative financing

Cooperatives result from horizontal coordination among farmers and serve as facilitators for smallholder access to markets, better economies of scale, and increased benefits from agricultural value chains that would otherwise be out of reach for the individual. Such benefits include supporting farmers with activities such as product standardisation required for greater international recognition on export markets and have led to farmer members benefitting from positive effects on income and profits (Beuchelt and Zeller, 2013). Indeed, 97% of all FairTrade certified coffee is produced by these cooperative structures (Smith and Loker, 2012). However, downsides of the cooperative structure can be seen in the hidden heterogeneity of members, arising from the disparity in impact cooperatives can have on members with different production capacities. In Rwanda, for example, Verhofstadt and Maertens (2015) point to more favourable outcomes for larger farms and members in remote areas especially because they have less access to markets and farm supplies.

In developing countries, cooperatives tend to be financed by local government, non-governmental organisations (NGOs), or donors (Milford, 2004). In some cases, cooperatives take out loans from commercial banks as a means of providing credit to their members (Beuchelt and Zeller, 2013). An example of an internal cooperative funding structure is a savings and credit cooperative society (SACCO). SACCOs are formed in rural communities as membership-based financial institutions, organized and led by their members in promotion of their economic interests. SACCOs are encouraged within developing countries to help farmers cultivate a savings habit which is difficult with poor stock market conditions, limited access to commercial banks often located in urban areas and non-regulated microfinance institutions with high interest rates (Tumwine et al., 2015). SACCOs serve as a form of MFI where the owners are also the clients. Cooperative membership is often structured around a farmer's capital. In SACCOs this could be tied to ownership of a savings account and microcredit loans available to farmers calculated based on the savings account (Nuwagaba, 2012). Cooperatives are beneficial for both society and the economy, with two successful examples detailed in Box 2. They offer members credit, serving farmers without access to formal credit systems. Furthermore, they can support MFIs and banks by providing information on the creditworthiness of borrowers, and based on their collective number, they make lending more profitable for banks and marketing firms (Milford, 2004). However, cooperatives have a track record of folding due to their structure of operation - one member one vote - which does not allow a separation of ownership and managerial control, more so the investment level is less efficient than an investor-owned firm because the share of capital of a cooperative does not appreciate and cannot be traded making long-term decisions susceptible to short run view (Royer, 1995).

Box 2: Small and medium farmers in a coffee cooperative in Honduras

Cooperativa Copan, a cooperative in Honduras, was formed in the wake of hurricane Mitch. The infrastructural damages caused by the hurricane forced the cooperative to sell its coffee wet, consequently lowering its quality and price. With the support of the Christian Organization for Integral Development of Honduras (OCDIH) and other NGOs farmers self-organized to purchase a dryer. The original producers of Cooperativa Copan were organized within a micro-financing program, a caja rural (rural savings and credit association). At registration and legalization in 2000 the cooperative had 43 members from the Copan area. The goal was to gain access to the fair-trade market where coffee prices were at $1.41/lb vs $0.57/lb, to achieve this the cooperative was able to leverage their collective power to access loans for the purchase of the dryer. In 2008 growers from Comayagua sold their first lot of organic coffee through the cooperative and earned prices between $1.65 -$1.70 in addition to a premium of $0.2/lb for organic coffee (Smith and Locker, 2012).

Another example comes from the Union of Indigenous Communities of the Isthmus Region (Unión de Comunidades Indígenas de la Región del Istmo - UCIRI). The story of UCIRI is one of many wins, established in 1982 by small coffee farmers of the Santa Maria Guienagati and Guevea de Humboldt municipalities with the support of missionaries from the Diocese of Tehuantepec of the Istmo Region. It grew from a community of 17 coffee-growing communities motivated to improve coffee production and sale as well as farmer welfare to boasting of a community of 56 communities in over 19 municipalities with more than 2600 members (UCIRI, 2012). After its establishment and the construction of roads, local farmers began trading directly with the Mexican Institute of Coffee, earning higher margins compared to what they earned from trading with middlemen (Davila and Molina, 2017).

The cooperative is also known as a pioneer in organic coffee trading and one of the first fair trade suppliers (Bray, Sanchez and Murphy, 2002). UCIRI assists members by providing technical and financial support in the production, storage, marketing, and distribution (internationally and locally) of locally produced coffee. The partners are indigenous smallholders who grow coffee in extensions from 2 to 5 acres, and sales of the produce constitutes 50% of income in the coffee growing communities. The co-operative also co-founded Max Havelaar, the world's first fair trade label and their active participation in fair trade coffee has created channels into European markets for their coffee products (Raynolds, Murray and Leigh Taylor, 2004).

Factors affecting success or failure of smallholder finance

Supply-side constraints to smallholder credit

Formal financial institutions view smallholders as high-risk, low-return customers. Decades of default on highly subsidised government loan schemes has served as a cautionary tale for private sector credit providers. The divide in access to credit for smallholders is an extended consequence of their inherent financial exclusion. Based on the results of a probit analysis, the probability of rural households applying for credit increased by nearly 39% with ownership of at least one savings account (Mpuga, 2008; Kasirye, 2007). Despite these figures, smallholders in rural areas remain largely unbanked with a lack of credit history against which formal institutions often base assessments, contributing to them being seen as high risk. Thus, without greater formalisation of farmer finances smallholder coffee producers' demand for credit is left largely unmet. In instances where funding can be obtained, challenges affecting rural households around high poverty and food insecurity lead some to utilize borrowed funds to assuage immediate family needs, increasing chances of default on such loans (Mpuga, 2010).

Financial institutions are too far from farmers. Most formal financial institutions are found in urban centres and towns despite the majority of Ugandans residing in rural areas (World Bank, 2018b). Distance to the credit facility impacts a farmers' decision to borrow: the nearer the credit facility, the higher the farmer's willingness to borrow (Ssonko and Nakayaga, 2014). Informal mechanisms, such as savings groups, suit smallholder financing needs better and are preferred for their provision of quick access to savings.

Financial institutions do not tailor their lending products to the needs of smallholders. One reason cited in the literature for the failure or poor performance of various credit schemes is their inability to adapt to the service requirements of rural households. The heterogeneity of smallholder farmers means there is no silver bullet to address their financing challenges, therefore solutions and financing models must be designed and tailored to the specific need of the region and crop in question. Further, the majority of formal institutions can only be used to provide working capital for non-farm enterprises and purchase of assets while funds sourced from informal channels (friends/relations) also serve household consumption expenses.

The private sector can provide appropriate credit in the form of inputs to farmers to avoid tendencies of using the money for other home expenses (see Case Study below).

Demand-side constraints to smallholder credit

Current land tenure systems can have exclusionary effects on smallholder coffee producers. For many smallholders land constitutes the only potential collateral in their possession, with a lack of other forms of collateral greatly contributing to perceptions of being high-risk by commercial banks. Uganda's land tenure system has been reported to severely impact smallholders' ability to leverage collateral when dealing with credit awarding institutions, particularly in the private sector (Pender et al., 2004). The 1998 Land Act recognizes four types of tenure – customary (80% of all land), freehold (4%), leasehold (2%), and mailo[5] (14%) (Hodges et al., 2020). The process of obtaining land titles is an extensive and expensive process for smallholders, where survey costs for one quarter of an acre can be as high as UGX 2 million (approximately USD 550) (Musinguzi et al., 2020). The most dominant land system - customary tenure - can predominantly be found in rural areas but due to high costs and levels of bureaucracy is largely undocumented, meaning rural populations are more likely to lack the necessary documentation proving land rights (ibid). For this reason, land insecurity is higher among rural households where ownership rights are often established with testimony from neighbours, village elders or clan representatives (Abraham and Pingali, 2020; Musinguzi et al., 2020; Place and Otsuka, 2002a). Alongside a lack of asset security, Uganda's land market development is characterised by poor understanding of property rights among smallholders and inadequate legal institutions and results in the majority of smallholder coffee producers being unable to leverage land assets as collateral for financing to improve productivity (Kyomugisha, 2015).

Farmers struggle to obtain documentation required by lending institutions. Finance from the private sector requires consumers to present items such as legal business documents, financial statements that meet formal accounting standards, formalized evidence of cash flow, audit statements, cash flow projections, valuation reports of collateral and proforma invoices for machinery, which are difficult to obtain for smallholder farmers. This challenge sits alongside the lack of other official documentation, such as formalised land titles also required by lending institutions.

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5   Dating back to the 1900s, mailo land tenure is unique to Uganda and similar to freeholds in that they allow registered land to be owned indefinitely. See World Bank (2018a).

Modelling

How many coffee farmers are there and what is the required level of financing to spur productivity growth?

This section critically assesses estimates of the number of coffee farmers and the required financing volumes in Uganda and provides alternative estimates based on a modelling exercise. The vision of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and the UCDA to raise coffee exports to 20 million 60kg bags by 2030 demonstrates the salience of the sector to policymakers. However, a plan that is not well grounded in reliable statistics risks exaggerating or distorting the required level of financing for effective interventions, policy design, and implementation.

The UCDA-reported figure of a total of 1.7 million smallholder farmers producing coffee in Uganda is particularly contentious due to a lack of clarity as to the methodology used to reach this figure. Nevertheless, the total reported figure continues to be used in publicly produced reports and debates, and has formed the basis for much policy formulation, including the flagship Coffee Roadmap. In an effort to challenge this figure and produce one with a clear methodological basis, we apply a logically based simple estimation using 2014 UBOS Population and Housing Census data as the baseline, and Demographic and Health Survey data on reported rural family size in Uganda in conjunction with a set of assumptions and estimates of the total population (see Annex 2). We arrive at a figure dramatically different from UCDA. We check the robustness of our figure by taking Uganda's coffee exports and work backwards to compute productivity per farmer and cross-check estimates against the UCDA figures. Again, we find similar figures. This highlights how policy discussion and formulation can commence from a misinformed position, creating problems during implementation.

Using the UCDA figure of 1.7 million smallholder farmers under different farmer categories as laid out in the Coffee Roadmap, we find that even in the recommended farmer scenario, the highest coffee export level Uganda can achieve by 2030 is 15 million 60kg bags. This implies that realising the 20 million bags target will demand a combination of raising productivity by promoting use of modern technologies in agriculture such as fertiliser use and increasing production by bringing more land under coffee production.

The latter, however, is quite problematic in the face of rapid population growth and the demand for additional food it will generate, environmental concerns especially climate change and other issues related to insecure land tenure.

Our modelling and estimations are based on three types of smallholder coffee farmer as developed by Mugoya (2018): traditional, improved and recommended. A traditional (subsistence) farmer produces coffee while exclusively relying on family labour to conduct basic agronomic practices. This means that they neither use pesticides or herbicides nor regularly apply manure or fertilizers. An improved farmer differs from a traditional farmer in that they follow the recommended good agricultural practices. However, this category of farmer applies less than the recommended fertilizer/manure quantity but conducts proper disease and pest control as well as canopy management. The recommended farmer follows and adopts the recommended good agricultural practices and applies the recommended fertilizer/manure quantities. This farmer further optimizes production by ensuring proper canopy management as well as pest and disease management.

We rely on some of the data provided in the recently released Uganda Coffee Country Profile (UCDA & ICO, 2019) to explore and explain the differences in costs incurred by smallholder farmers in coffee production in Uganda. The recommended farmer category experiences more costs in comparison to other farmers (see Figure 13). Table 3 shows a breakdown of the costs incurred and the production numbers by the three farmer categories. We further probe to try understanding which parts of the coffee production process are costlier than others. The highest costs in coffee production are seen in the earlier stages of preparation and planting. The traditional farmer only does the bare minimum. Due to data limitations involved in estimating the requirements for the two main coffee cultivars (Robusta and Arabica), we focus on Robusta.

Figure 13: Comparative Presentation of Costs of Production
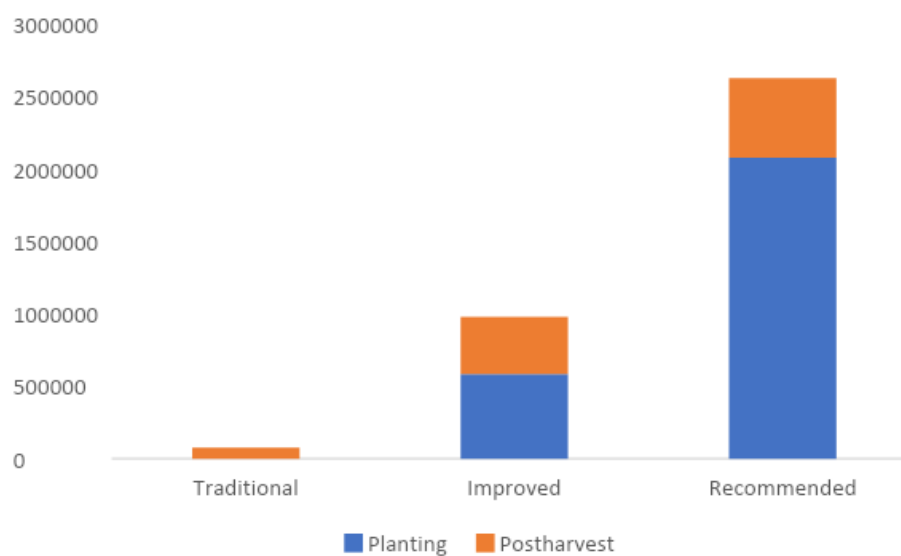
Table 3: Smallholder Coffee production expenses (in UGX)

Farming Method	Traditional	Improved	Recommended
Planting and Farm maintenance	0	585,700	2,079,200
Postharvest	76,023	392,849	549,670
Total Cost	76,023	978,549	2,628,870

In the first instance we ask, if the different farmer categories are considered on the basis of utilizing the entire area of land currently estimated to be under coffee production i.e., in the range of 0.66 - 1 acres (UCDA, 2019), what would be the yield? We consider the lower value of 0.66 acres as the worst case scenario, under the assumption that a farmer does not require additional land to 'graduate' into a higher farmer category. Table 4 shows the computations.

Table 4: Estimated coffee production by different farmer categories

Standard coffee bag size (kg)	60		
Total estimated number of farmers	1,700,000		
Estimated land per arabica smallholder (in acreage)	0.75		
Estimated land per robusta smallholder (in acreage)	1		
UCDA Model			
Required level of financing	Traditional (in million UGX)	Improved (in million UGX)	Recommended (in million UGX)
	129,239	1,663,533	4,469,079
Farmer categories	Traditional	Improved	Recommended
Yield (kilograms per 0.66 acres)	118.734**	311.982**	531.366**
Total coffee yield (number of 60kg bags)	3,364,130	8,839,490	15,055,370
Reality Check Model			
Required level of financing	Traditional (in million)	Improved (in Million)	Recommended (in million)
	84,757	1,090,982	2,930,921

Notes **estimates from Mugoya (2018); the rest are the authors' calculations

The estimates show that for the three different categories of farmers the gap between current production levels and the target 20 million bags reduces as farming practice improves. Based on Figure 14, which illustrates the period in the lifecycle of the coffee plant where investment is required, we can presume a positive correlation between input investment and crop yield. Furthermore, new investments in seed and technique are recouped in the future. Increasing yield requires inputs in advance of harvesting and sales and a significant portion of coffee farmers in Uganda require productivity-enhancing services, particularly fertilizer and credit products that they can use to invest in farm activities, or cover household expenses that arise throughout the growing season.

Figure 14: Number of coffee bags keeping other factors constant
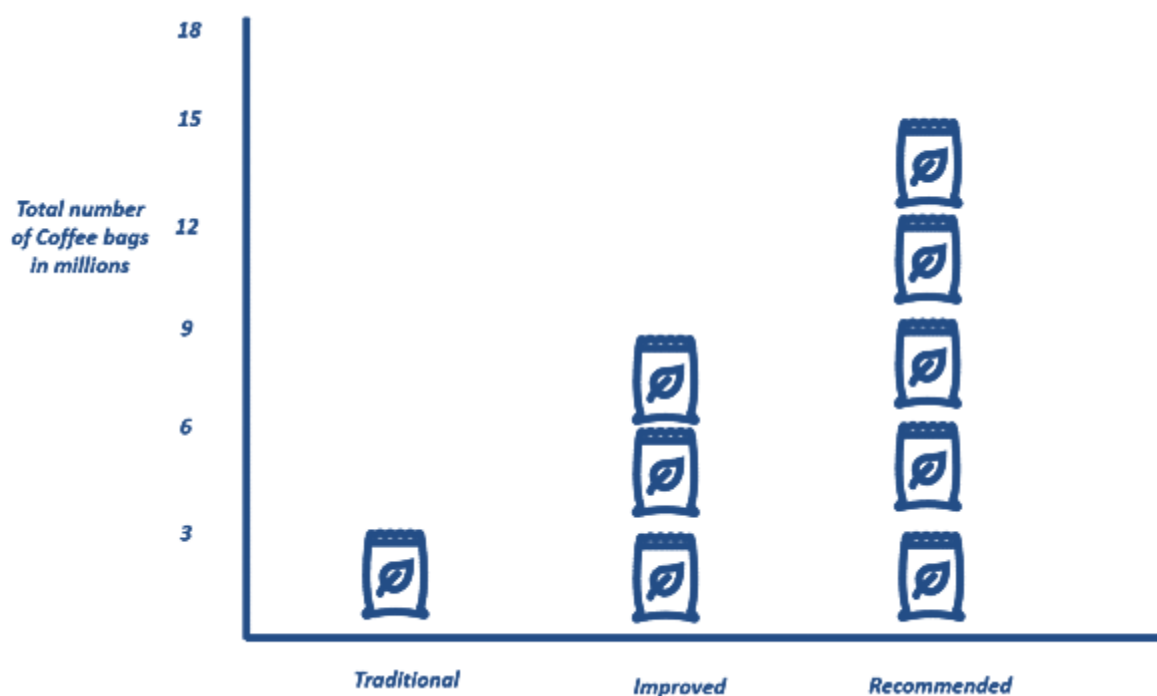
Keeping factors such as land size, fertilizer input and labour input constant, it is highly unlikely that the target of 20 million bags can be achieved among the three farmer categories. In fact, considering the input costs for a recommended farmer category, no level of investment can help reach 20 million bags without increasing the land size. The status quo is a mix of all three farmer categories. Further optimistic modelling using coffee production data from the last 20 years reveals that if the status quo is maintained the 20 million bags target will be achieved in 40 years' time, which falls far short of the 2030 target (see Annex 2).

Business-as-usual versus alternative scenario simulation

Business-as-usual: no intervention to lift financing constraint to the rural economy

If the status quo is maintained, optimistic predictions show that the goal set by the Coffee Roadmap is achievable in 40 years if other factors are kept constant. However, chances of reaching the 20 million bag target even in 40 years are low given the threats of climate change, declining soil fertility levels and the breakout of different pest species and crop diseases, which are almost certain to negatively affect coffee production in the long run.

The immediate effects will be felt mostly in the pockets of rural households, especially in coffee growing regions. According to UCDA (2019), one job was created for every 23kg output of coffee produced in 2017/2018. This translates to over 12 million jobs created that season from coffee alone. Uganda's population is reported to grow at a rate of 3.3% per annum, among the highest rates in Africa (World Bank, 2021). If crops such as coffee, which offer a high employment rate per unit produced, are not prioritized, there is likely to be a decline in the performance of rural economies coupled with high growth in rural-urban migration, which is already on the rise. This predicament translates into two main issues: (i) increased pressure on resources in urban centers which have not yet caught up with the pace of population expansion leading to further underemployment, insecurity, and high crime rates, and (ii) declining GDP per capita especially due to the youth population not being fully integrated into the country's workforce.

Figures on the population of smallholder farmers have remained elusive with different organisations reporting different figures. UCDA - the authority of coffee regulation in Uganda - reports 1.7 million as the total population of smallholder farmers involved in coffee across Uganda. Ameet & Martin (2018) recent paper on Ugandan Arabica value chain opportunities puts the figure at 532,000 smallholder farmers participating in Uganda's coffee value chain. Such conflicting statistics will often complicate policy debates especially when investment interventions for the industry are to be considered.

We address the problem of conflicting statistics by adopting a realistic modelling methodology. The methodology uses Uganda Bureau of Statistics (UBOS) 2021 data on total household population by district as a baseline. We segregate districts into Arabica and Robusta growing districts (see Figure 15 and Annex 2). Arabica is mostly grown on the hilly slopes of the eastern, western, and west Nile regions at an altitude ranging from 1200m to 1800m above sea level while Robustas is grown in lowlands at an average altitude of 1000m above sea level.

Figure 15: Distribution of Ugandan coffee growing by crop type
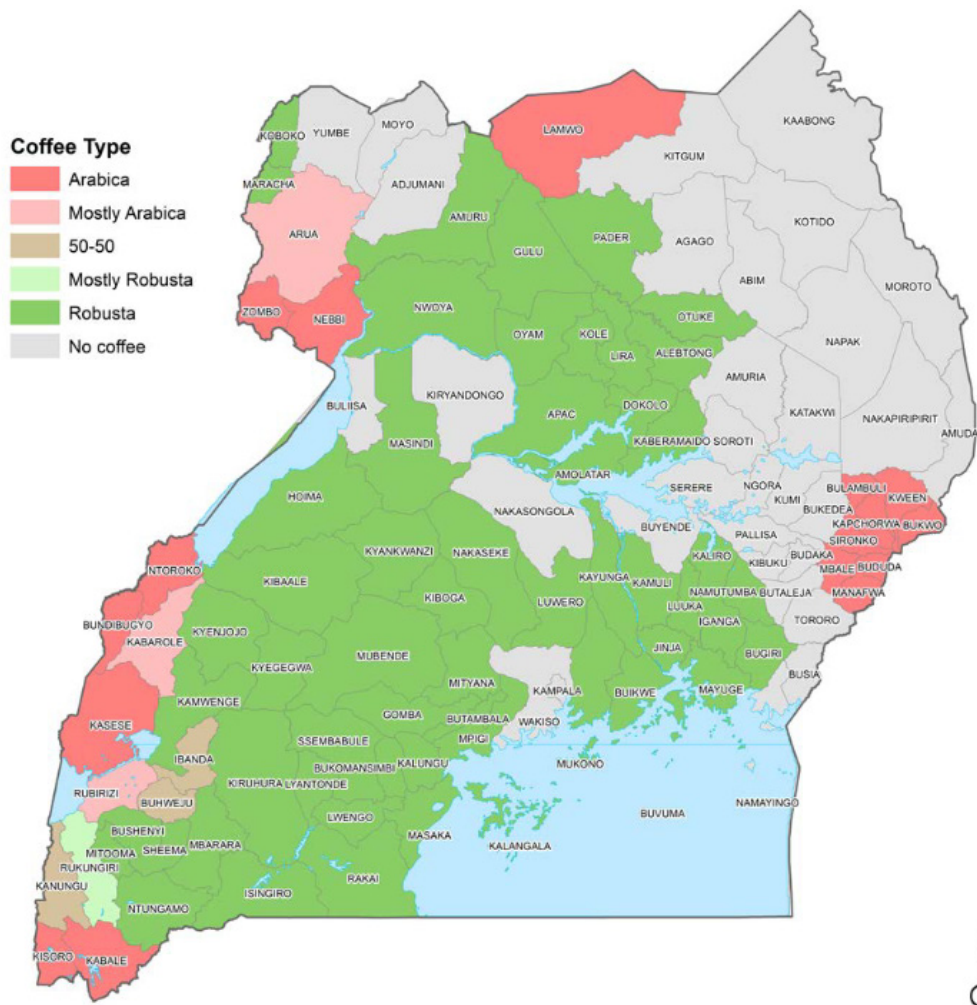
Source: Ameet & Martin (2018)

Our modelling technique suggests that Uganda has a total population 1,114,898 smallholders involved in coffee farming, 241,422 and 873,476 in Arabica and Robusta varieties respectively. Arabica farms are smaller relative to Robusta farms with a median acreage per household at 0.75 and 1 acre for arabica and Robusta growing households respectively.[6] Under the same modelling assumptions, we see that Robusta growing produce an annual production of 5.4 million bags of 60KG and 600,000 bags of Robusta and arabica respectively, bringing the total annual production to 6 millions bags which is close to the recently published annual export for year ending 2020/2021 at 6.5 million bags (Ojambo and Hunter, 2021).

Under our modelling assumptions, the annual financing required to raise production from 5kg per tree (business-as-usual scenario) to 30kg per tree (Vietnamese farmers scenario) is 2.9 trillion UGX in comparison to 4.4 trillion using the UCDA smallholder coffee farmer population. In generating the required level of financing, we take cost estimates as provided by Mugoya (2018) which were the same estimates in the modelling exercise that informed the Uganda Coffee Roadmap. This investment would cover all farm costs for key agronomic practices considered important in realising the full productive potential of the coffee tree. Providing this financing over the period of 10 years would generate a total investment expenditure of 29 trillion UGX under our modelling assumptions and 44 trillion under UCDA figures. Under the optimistic assumption of 30kg production per tree per year, this investment would ultimately increase yield from the current 6.5 million bags to 32 million bags far exceeding the coffee roadmap target (see Annex 2).

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6   Recent Impact studies undertaken by Ibero Uganda in collaboration with MasterCard Foundation.

Alternative finance delivery mechanisms

Turning structures of failure into structures of success

Direct delivery of credit by formal and microfinance institutions to smallholders in a sustainable manner would build and support a virtuous circle of productivity growth, increased income and wealth creation is not going to be possible. This is because of both high transaction costs related to the size of loans taken by farmers and the risk associated with lending to farmers often constrain this process.

Delivery of credit through cooperative or farmer groups appears to be the natural option in this context. This is due to cooperative or farmer groups serving two purposes: 1) by aggregating farmers thereby reducing information asymmetry, creating scale economies (at least on the marketing) and socialising the lending risk which aggregately reduces transaction costs.

However, as we observed from the cases of Latin America and indeed from Uganda's case, farmer groups or cooperatives are often the less desirable model. This comes down to one main reason: the cooperative leadership often appointed to coordinate and manage the cooperative business often quickly runs into problems of accountability and lack of transparency. Recent ethnographic research[7] with farmer groups known as Depot Committees (DCs) in Mityana, Masaka and Luweero have helped to understand why nearly all cooperatives in Uganda present the same behaviour.

Farmers operate in an environment that is perpetually fragile characterised by reduced productivity due to intensification of land which results in low or declining income. And yet their household expenditure has continued to increase because of the high fertility rate. Demands related to social provisioning within the households in areas such as education often put overwhelming pressure on the household head. A weather shock such as flooding, hailstorms or drought might be the household's final stroke into abject poverty. In this context, leaders that are often collaboratively appointed (very often in a democratic and transparent process) end up presiding over an aggregation centre for agricultural produce or output that can be a major source of rents.

This presents the greatest temptation to which many leaders often succumb by indulging in understating the price at which farmers' produce was sold to make some extra income, diverting farmers' produce income into personal speculative or short to medium term investments to make extra income. This diversion occasionally leads to delayed payment of farmers which weakens social trust. In an open market environment characterised by "exit" options, in the following season, the farmer often chooses to sell to the middleman, exiting the group one by one until the group remains with only a handful of members, in many cases only the leaders that sowed the seeds of the cooperative destruction. Therefore, delivering credit through cooperatives is most likely going to confront the same challenges. There are serious implications of this ethnographic work for the delivery of finance to parishes through recently commissioned government parish models.

One might ask, however, why not channel credit through the middleman, who has proved to be the most efficient in serving farmers? They buy farmers' produce and pay cash instead of cooperatives that often delay paying farmers after delivery of their agricultural produce. One would in fact further argue that why not empower these middlemen for them to scale up lending since (a) they are already integrated and embedded in the value chain right at the foundational level and (b) are already in the business of lending to farmers. The argument appears intrinsically persuasive until you look deeply into the structure of aggregation that middlemen or the marketing environment has created.

Middlemen often enjoy substantial control in export production markets by virtue of their ability to attract a much larger number of agricultural sellers. This puts smallholders at a disadvantage when it comes to pricing negotiations and has contributed to farmers joining collective groups that increase smallholder bargaining power, reduce market imperfections and better secure economic standing (Milford, 2004; Shumeta and D'Haese, 2016).

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7   One of the authors spent nearly four years in different regions working with farmers in Butambala, Gomba, Masaka, Lwengo, Kasese where much of the material used in this research was gathered during field work. He spoke to and observed several activities involving coffee farmers and dealt with several leaders on matters related to farmer training, coffee bulking, and marketing. He also engaged and interfaced with various cooperative leaderships as they went about their day to day work.

There is a three-tier middleman structure in Uganda's coffee industry depending on where you are operating. The first layer is the small middleman: this is usually a farmer with some basic entrepreneur skills. His entrepreneurial ability has won him or her admiration from the middle-size middleman that waits for coffee or any other agricultural produce at the local milling station. The medium sized middleman has connections with the large size middleman from Kampala who in turn has contacts with banks, other financing agents, and exporters (access to market). So, the way the financing structure works, many times, the large size middleman will extend marketing credit to the medium size middleman who in turn will diversely extend credit to several small-size middlemen. Therefore, the middlemen (i.e small and medium size middlemen) closest to farmers have no experience or capacity of managing a growing and expanding operations comparable to lending farmers on scale and yet they are the closest to farmers. This perhaps explains why very often they are less considered within the analysis of the value chain particularly when it comes to the debate of delivery services to the farmers.

Therefore, cooperatives or farmer groups, despite their internal governance challenges, still present the most viable alternative for delivery finance to small holders. The question now relates to how to overcome challenges of accountability and lack of transparency that undermine management of finance and delivery of service to farmers. More recently making off-takers are getting very creative in overcoming these challenges but they do so with collaborative efforts.
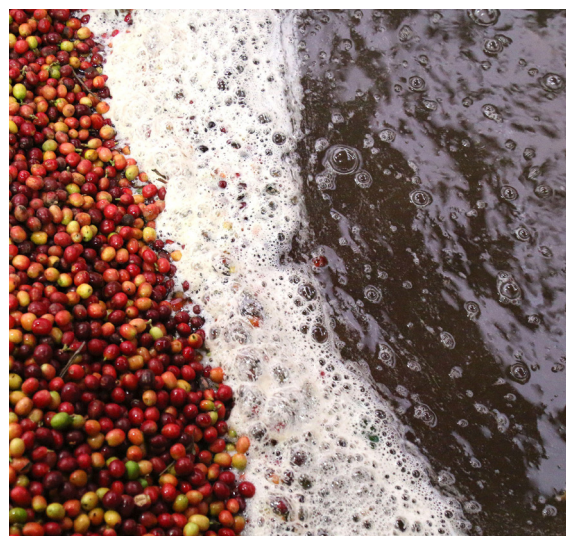
Case Study: Ibero Uganda

This brief case study demonstrates how the private sector, government and donor agencies can harness their synergies to overcome constraints often presented in analytical studies as insurmountable. The case discusses the work of Ibero Uganda, a company of Neumann Kaffee Gruppe, one of the leading coffee exporters in Uganda, and how they have built structures that proved effective and sustainable in delivering fertiliser and other inputs services to farmers, credit finances as well as marketing in an integrated approach. The model has been implemented in Butambala, Gomba, Lwengo and Luweero districts with enormous promise for expansion.

In 2017, the organisation piloted a cash advance system using mobile money for its farmers. The offering was available to cover the diverse needs of farmers including domestic consumption and was provided in addition to an existing credit service for inputs. This model helped to tackle the constraints of repayment that arise when farmers divert funds initially intended to increase farm productivity to personal needs - a trend that has often been overlooked by formal financial institutions. As a point of entry, Ibero leveraged existing depot committees and village coffee organisations, emphasizing the need for more aggregated and organised farmer groups. Ibero has since then been able to grow its sourcing capacity by 100% (Learning Lab and Fund for Rural Prosperity, 2020).

Ibero's decentralised system of service delivery known as village coffee organisations (VCOs) has proved to be the most effective and reliable. VCOs operate at the parish level. Farmers are self-organised following several meetings of Ibero employees with farmers where farmers are introduced to the opportunities associated with Ibero Uganda. Prior to that, Ibero endeavours to generate buy-in from district officials of the target district who are encouraged to attend all the planned meetings during the organisation's formation stage. This builds confidence in the project and socialises the project as a collaborative project of livelihood improvement between local government and Ibero. Interested farmers are then registered using a mobile application and are immediately enrolled in farmer field schools in order to ensure that they begin acquiring knowledge on rehabilitating the crop prior to receiving agricultural inputs. Farmers are encouraged to appoint a Lead Farmer who becomes a point of liaison for all important communication between Ibero Uganda and the farmer group.

The service delivery relies on a collaborative effort between Ibero employees and VCO Lead Farmers. The Lead Farmers not only coordinate communication but also act as the source of knowledge on agronomic practices for farmers after receiving extensive training from Ibero Uganda. In addition, they oversee planning and execution of bulking and coffee delivery to Ibero, and coordinate farmers' application for input and credit advances. They are therefore pivotal to the process. The role of payment for farmer produce (in this case coffee) after delivery to Ibero Uganda is executed using mobile money payment solutions or online bank account transfers, giving farmers autonomy to choose a mode of payment. These payments or credit advance transfers are made directly by Ibero, creating one centre of accountability whilst increasing transparency through an open system using digital technology.

The coordination capability of the VCO model provides the business incentive for Ibero to continue delivering famer-centered innovative services. This system is far from perfect and Ibero Uganda continues to innovate and improve the system. However, the system has proved effective and reliable in serving farmers that would otherwise not have joined the farmer groups for fear of challenges that often undermine farmer groups and thereby become vulnerable to exclusion. The economies of scale arising from working through groups to increase coffee delivery volumes have given Ibero Uganda interest and willingness to design such solutions for farmers, thereby learning from the mistakes of the past, and taking advantage of the opportunities provided by digital technology to overcome service delivery constraints previously deemed insurmountable.

The model's success has relied on development partners who de-risked the process of lending to farmers. USAID in collaboration with other development partners established a risk guarantee[8] which has given Ibero Uganda the confidence to take a risk with smallholders, showing creative and effective ways of how donor aid can be used as an effective tool for development. In this case, donor efforts focused on lifting constraints to capability development by creating the environment that allows those best suited to imagine innovative solutions to problems of development to do so as opposed to information devoid, contextual misinterpretation approaches that have undermined previous development efforts.

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8   See de Wit (2019)

Three important lessons can be taken away from this case study.

First, cooperative or farmer groups will remain pivotal to the transformation economics for rural producers, but we must also understand that cooperatives or farmer groups are highly vulnerable to collapse. This is because, deprival conditions such as poverty and large family expenditure pressure, most likely, will increase the vulnerability of those who lead a cooperative to financial mismanagement. This is neither an aberration unique to African societies nor are we apologists for such misdemeanour. Rather, individuals in vulnerable conditions can behave in "rationally irrational" ways. We must therefore constantly innovate creative structures that are well suited and adaptive to contextual conditions with systemic controls that limit the possibility of perverse behaviour potentially replete in developing contexts.

Second, harnessing digital technologies can be a powerful process for expanding transparency and accountability. This is particularly relevant as the government begins rolling out the Parish model. Farmers will be responsive to solutions that increase information flow, are trusted and that account for their effort. Such solutions increase social trust and cooperation and are considered fair and just.

Third, GoU and development partners may not always feel the strongest imperative to directly implement interventions, but they can play a significant role: signalling. As we have observed, USAID and other partners provided the required signal to Ibero Uganda needed to innovate solutions to deepen their business relationship with coffee farmers in regions where they operate. This is perhaps something they would not have done without the support from both national and local government or the development agencies that established the risk guarantee. This collaborative approach is especially important because those closest to farmers, who have better information about the farmers, who have the greatest interest to design something that works—because their business depends on it—should be given room and support to design solutions. When the government directly provides the same services to farmers, very often these interventions are politicised, undermining experimentation, refining and adaptation that often-characterises implementation of such unorthodox ideas. Instead of providing financing directly to smallholders, the government and development partners can play the vital role of de-risking through signalling, thus incentivising and supporting farmers and off-takers to innovate together.

Policy Directions: Collaborative efforts to ease financing constraints

Overcoming constraints to credit delivery will demand a much bolder role by the government and its agencies. The government places credit access at the forefront - ensuring increased access to credit by putting in place measures to reduce the cost of doing business (UBOS, 2020). Overcoming the binding constraints to financing smallholders will require creative financing and delivery mechanisms. Public institutions such as the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and BOU, together with commercial institutions must establish financial mechanisms that support farmers' access to credit. Tied with increased efforts in the delivery of advisory and extension services, such initiatives can go a long way in supporting agricultural productivity as a whole and coffee yields in particular.

Scale up innovative unsecured lending solutions backed by public funds. There is a need for interventions which allow credit provision to smallholder farmers without necessarily using their land as collateral. One such case is the ACF initiative in northern Uganda which involves organising loan beneficiaries in groups of 20 farmers (a system known as "block allocation". Under block allocation farmers can receive up to a maximum of UGX 20 million in loans based on alternative collateral such as chattel mortgages, cash flow-based financing and character-based loans (BoU, 2020). Indeed, the Agricultural Credit Finance report of 2020 reports that in a sample of 100 projects that accessed credit, over 24,000 jobs were created and nearly 209,000 outgrowers (Bank of Uganda, 2020). For greater impact, more initiatives such as this need to be further empowered to extend across the country, especially in rural areas.

Embed sensitisation on digital financial services into agricultural extension services. Past studies have indicated that smallholder farmers are more inclined to take up credit finance if they are close to credit institutions and are informed about the existence of credit facilities (Ssonko and Nakayaga, 2014). With the growth in access to digital services and mobile money platforms, farmers can access credit but there is still a knowledge gap when it comes to how to use new technologies. Increased awareness, for example, through agricultural extension services, will go a long way to mitigate these issues.

Support and incentivise commercial banks to extend their programmes to rural areas. This will allow them to be directly embedded in the rural economy but also to understand better the needs of the rural smallholder farmers and identify mutually reinforcing benefits.

Enable farmer cooperatives to adopt digital financing solutions. Integrating digital technology within the cooperative farmer group model can drive economies of scale, increase confidence among both farmers and service providers, and improve transparency and accountability among cooperatives. This enables the evolution of mutually beneficial business relationships, underpinned by well-aligned incentive structures to promote social capital, efficiency, productivity, fairness, and trust in the system. These values are quite central to the development of successful organisations that are service delivery oriented.

Scale up and ease smallholder access to the Agricultural Insurance Scheme. There is a need for more support to the Agricultural Insurance Scheme and especially strategies targeting the ease of access by smallholder rural farmers as this would inspire trust in banks thereby lowering interest rates but also offer confidence to farmers to apply for credit. The existing Uganda Agricultural Insurance Scheme is known by just a few and the application process requires guidance and a certain level of digital literacy which further complicates the application process for most smallholder farmers.

Leverage global financing initiatives supporting smallholder farmers. In 2015, it increased its financial commitment to ethical sourcing of coffee from an initial amount of USD 20 million in 2008 to USD 50 million. The reach of the loan partners extends to over 13 countries in three regions and loans were provided to both Starbucks suppliers and non-suppliers. In addition to credit, a form of technical assistance is offered to loan recipients to promote good agricultural practices, improved business planning and price risk management. The Global Warehousing Finance Program (GWFP) provides pre-export financing as well as post-import financing. In addition to support provided for export services, the program supports selective inventory financing for domestic sales for agricultural productivity in developing countries.

Foster financial product innovation and tailoring. GoU should work with the private sector to establish de-risking products compatible with the different crop value chain segments, combined with conditionalities to induce the private sector to innovate and tailor financial products to the needs of smallholders.

Provide risk guarantees to offtakers. Government can better leverage the support of the private sector in financing inputs to coffee farmers. Given that there are over 46 exporting companies[9] in the sector both local and international is testament to the willingness for these players to invest. What often discourages investment are the heightened risks underpinned by the sector's vulnerability to shocks. The GoU can provide credible signals that it is committed and serious about collaborative partnerships with reliable off-takers in the sector. Availing funds in the form of a credit risk guarantee, as was the case with Ibero and USAID, can be one useful signalling tool to use. Finding the best structure and management arrangement for these risk guarantees will require experimentation with creative, context-specific solutions.

Improve data collection and analytics systems. Data remains an inextricable element of effective project implementation, evaluation, and improvement. It should never be taken as something secondary. Data is central to the entire life cycle of a project and therefore needs as much investment (and in fact in many cases more investment) as the interventions itself.

In all these proposed approaches, experimentation, selection, refining and adaptation will remain the mantra that is promisingly reliable. Wholesale implementation of untested ideas can lead to disastrous failures. Experimentation therefore can help to identify effective solutions and weed out problematic ones. It also allows one to acquire information about the local context where the intervention is being implemented thereby allowing one to refine models that are well-suited for specific contexts. Indirectly, experimentation can also be a useful mechanism for mobilising communities to buy-in, embrace and gear towards supporting project implementation.

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9   UCDA (2021) Internal report on Coffee Exports Performance.

Conclusions

This paper has sought to understand the key challenges facing Uganda's smallholder coffee producers in accessing adequate financing for greater productivity and transformation of the wider sector. By assessing the state of underinvestment into the agricultural sector, especially in areas of productive financing to coffee smallholder farmers, we find systemic issues contributing to the constraints faced by smallholders that include a lack of information and know-how and poor processing technologies, as well as a lack of efficient markets and pricing and inadequate government policy coordination (Cheyns et al., 2006). Sustained fluctuating low productivity has often been worsened by the lack of microeconomic factors essential in boosting productivity. Critical among these is the absence of sufficient credit facilities at competitive rates for smallholders. This has profound implications for farm productivity and ultimately on the coffee roadmap target of producing 20 million 60kg bags by 2030.

Smallholders are often trapped in an unending cycle of low intensity agriculture, underwhelming yields and a lack of market access. Low productivity is the result of a lack of agronomic knowledge of best practices as well as constrained access to key inputs like fertilizers, resistant coffee seedling varieties, irrigation equipment against constraining land tenure systems and a general shortage of means to procure expansive land sizes. Despite resilience exhibited by smallholder farmers across Uganda, if the current scenario is maintained it will not only make it impossible to achieve the 20 million bags target by 2030, but it will slow down the growth of Uganda's top agricultural export and the country's wider economic growth along with it. Projections suggesting a potential 50% decline in Arabica and Robusta production by 2050 can be attributed to the rising vulnerability of smallholders, increasing climate variability and prevalence of crop disease, pests, and extreme weather events, resulting in USD 1.2 billion in lost revenue (Knapen et al., 2006; McDonnell, 2017).

These challenges require innovative solutions that must rely on the most accurate sector data, which is key in devising appropriate smallholder financing models critical to equipping farmers with the necessary tools that boost agricultural productivity. The data modelling detailed in this report highlights key disparities surrounding the total estimated number of farmers in Uganda that challenges the UCDA's long relied upon figure. Given that this helps to inform policy decisions to the sector there is a high imperative to get the basics right.

Despite these constraints to Uganda's coffee sector, the Ibero Uganda case study highlights how synergies between government, the private sector and donors can come together to form innovative solutions to problems faced by smallholder producers. The mobile money cash advance scheme, for example, considers issues around crop productivity but also food insecurity of farmers and concerns around their domestic consumption. The use of digitally based methods of coordination that suit the needs of VCOs and lead farmers convey a positive development in the traditional cooperative model and underline their pivotal role in the lives of rural coffee producers. It is the collaboration between the public and private sector, however, that has ensured positive outcomes in the Ibero case and points to the salience of collaborative efforts in easing the burdens of inadequate access to finance on millions of smallholder farmers and the integrity of Uganda's vital coffee sector.

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Annex 1: modelling data

Table 5: Simulation of Robusta Production by District Under Business-as-usual Scenario

N	DISTRICTS	UBOS 2021 ESTIMATED TOTAL HOUSEHOLD POPULATION PER DISTRICT	ESTIMATED TOTAL FARMING HOUSEHOLDS IN 2021	NET ESTIMATED FARMING HOUSEHOLDS IN COFFEE	ESTIMATED TOTAL TREE POPULATION PER DISTRICT	ESTIMATED CHERRY PRODUCTION PER DISTRICT	ESTIMATED KIBOKO (DRY CHERRY) PRODUCTOION PER DISTRICT	ESTIMATED GREEN BEAN PRODUCTION PER DISTRICT	ESTIMATED GREEN BEAN PRODUCTION (IN 60KG BAGS) PER DISTRICT	TYPE OF COFFEE GROWN	REGION
1	MUKONO	720,100	102,871	46,292	13,887,643	69,438,214	34,719,107	17,359,554	289,326	ROBUSTA	CENTRAL
2	ISINGIRO	616,700	88,100	39,645	11,893,500	59,467,500	29,733,750	14,866,875	247,781	ROBUSTA	WEST
3	MUBENDE	582,900	83,271	37,472	11,241,643	56,208,214	28,104,107	14,052,054	234,201	ROBUSTA	CENTRAL
4	NTUNGAMO	550,500	78,643	35,389	10,616,786	53,083,929	26,541,964	13,270,982	221,183	ROBUSTA	WEST
5	KYENJOJO	544,800	77,829	35,023	10,506,857	52,534,286	26,267,143	13,133,571	218,893	ROBUSTA	WEST
6	LUWERO	535,200	76,457	34,406	10,321,714	51,608,571	25,804,286	12,902,143	215,036	ROBUSTA	CENTRAL
7	KAKUMIRO	513,200	73,314	32,991	9,897,429	49,487,143	24,743,571	12,371,786	206,196	ROBUSTA	WEST
8	BUIKWE	482,900	68,986	31,044	9,313,071	46,565,357	23,282,679	11,641,339	194,022	ROBUSTA	CENTRAL
9	KYEGEGWA	475,600	67,943	30,574	9,172,286	45,861,429	22,930,714	11,465,357	191,089	ROBUSTA	WEST
10	KAGADI	444,900	63,557	28,601	8,580,214	42,901,071	21,450,536	10,725,268	178,754	ROBUSTA	WEST
11	KAYUNGA	414,300	59,186	26,634	7,990,071	39,950,357	19,975,179	9,987,589	166,460	ROBUSTA	CENTRAL
12	IGANGA	414,000	59,143	26,614	7,984,286	39,921,429	19,960,714	9,980,357	166,339	ROBUSTA	EAST
13	HOIMA	387,200	55,314	24,891	7,467,429	37,337,143	18,668,571	9,334,286	155,571	ROBUSTA	WEST
14	MITYANA	368,200	52,600	23,670	7,101,000	35,505,000	17,752,500	8,876,250	147,938	ROBUSTA	CENTRAL
15	KAMWENGE	347,400	49,629	22,333	6,699,857	33,499,286	16,749,643	8,374,821	139,580	ROBUSTA	WEST
16	MASAKA	342,300	48,900	22,005	6,601,500	33,007,500	16,503,750	8,251,875	137,531	ROBUSTA	CENTRAL
17	RUKUNGIRI	336,700	48,100	21,645	6,493,500	32,467,500	16,233,750	8,116,875	135,281	ROBUSTA	WEST
18	RAKAI	324,800	46,400	20,880	6,264,000	31,320,000	15,660,000	7,830,000	130,500	ROBUSTA	CENTRAL
19	KASSANDA	319,900	45,700	20,565	6,169,500	30,847,500	15,423,750	7,711,875	128,531	ROBUSTA	CENTRAL
20	SSEMBABULE	303,900	43,414	19,536	5,860,929	29,304,643	14,652,321	7,326,161	122,103	ROBUSTA	CENTRAL
21	KALIRO	298,200	42,600	19,170	5,751,000	28,755,000	14,377,500	7,188,750	119,813	ROBUSTA	EAST
22	KYAKWANZI	296,100	42,300	19,035	5,710,500	28,552,500	14,276,250	7,138,125	118,969	ROBUSTA	CENTRAL
23	MPIGI	292,900	41,843	18,829	5,648,786	28,243,929	14,121,964	7,060,982	117,683	ROBUSTA	CENTRAL
24	LWENGO	292,900	41,843	18,829	5,648,786	28,243,929	14,121,964	7,060,982	117,683	ROBUSTA	CENTRAL
25	IBANDA	281,900	40,271	18,122	5,436,643	27,183,214	13,591,607	6,795,804	113,263	ROBUSTA	WEST
26	LUUKA	272,000	38,857	17,486	5,245,714	26,228,571	13,114,286	6,557,143	109,286	ROBUSTA	EAST
27	KYOTERA	264,500	37,786	17,004	5,101,071	25,505,357	12,752,679	6,376,339	106,272	ROBUSTA	CENTRAL
28	BUSHENYI	250,400	35,771	16,097	4,829,143	24,145,714	12,072,857	6,036,429	100,607	ROBUSTA	WEST
29	NAKASEKE	241,400	34,486	15,519	4,655,571	23,277,857	11,638,929	5,819,464	96,991	ROBUSTA	CENTRAL
30	SHEEMA	222,600	31,800	14,310	4,293,000	21,465,000	10,732,500	5,366,250	89,438	ROBUSTA	WEST
31	RUBANDA	210,300	30,043	13,519	4,055,786	20,278,929	10,139,464	5,069,732	84,496	ROBUSTA	WEST
32	MITOOMA	195,900	27,986	12,594	3,778,071	18,890,357	9,445,179	4,722,589	78,710	ROBUSTA	WEST
33	KALUNGU	195,800	27,971	12,587	3,776,143	18,880,714	9,440,357	4,720,179	78,670	ROBUSTA	CENTRAL
34	KIRUHURA	192,200	27,457	12,356	3,706,714	18,533,571	9,266,786	4,633,393	77,223	ROBUSTA	WEST
35	KITAGWENDA	184,600	26,371	11,867	3,560,143	17,800,714	8,900,357	4,450,179	74,170	ROBUSTA	WEST
36	GOMBA	176,100	25,157	11,321	3,396,214	16,981,071	8,490,536	4,245,268	70,754	ROBUSTA	CENTRAL
37	KIBOGA	175,200	25,029	11,263	3,378,857	16,894,286	8,447,143	4,223,571	70,393	ROBUSTA	CENTRAL
38	BUKOMANSIMBI	157,300	22,471	10,112	3,033,643	15,168,214	7,584,107	3,792,054	63,201	ROBUSTA	CENTRAL
39	RUBIRIZI	146,600	20,943	9,424	2,827,286	14,136,429	7,068,214	3,534,107	58,902	ROBUSTA	WEST
40	BUTAMBALA	109,000	15,571	7,007	2,102,143	10,510,714	5,255,357	2,627,679	43,795	ROBUSTA	CENTRAL
41	RUKIGA	106,000	15,143	6,814	2,044,286	10,221,429	5,110,714	2,555,357	42,589	ROBUSTA	WEST
	TOTAL	13,587,400	1,941,057	873,476	262,042,714	1,310,213,571	655,106,786	327,553,393	5,459,223		

Table 6: Simulation of Arabica Production by District Under Business-as-usual Scenario

NO	DISTRICTS	UBOS 2021 ESTIMATED TOTAL HOUSEHOLD POPULATION PER DISTRICT	ESTIMATED TOTAL FARMING HOUSEHOLD IN 2021	NET ESTIMATED FARMING HOUSEOLDS IN COFFEE	ESTIMATED TOTAL TREE POPULATION PER DISTRICT	ESTIMATED TOTAL ANNUAL CHERRY PRODUCTION PER DISTRICT	ESTIMATED TOTAL PARCHMENT PRODUCTION PER DISTRICT	ESTIMATED TOTAL GREEN (IN KG) PRODUCTION PER DISTRICT	ESTIMATED TOTAL GREEN BEAN IN 60KG BAGS PER DISTRICT	TYPE OF COFFEE GROWN	REGION
1	KASESE	810,400	115,771	52,097	15,629,143	78,145,714	9,768,214	7,814,571	130,243	ARABICA	WEST
1	MBALE	604,100	67,122	26,849	8,054,667	40,273,333	5,034,167	4,027,333	67,122	ARABICA	EAST
2	KABAROLE	344,500	38,278	15,311	4,593,333	22,966,667	2,870,833	2,296,667	38,278	ARABICA	WEST
3	KISORO	321,100	35,678	14,271	4,281,333	21,406,667	2,675,833	2,140,667	35,678	ARABICA	WEST
4	ZOMBO	290,700	32,300	12,920	3,876,000	19,380,000	2,422,500	1,938,000	32,300	ARABICA	NORTH
5	BUDUDA	282,900	31,433	12,573	3,772,000	18,860,000	2,357,500	1,886,000	31,433	ARABICA	EAST
6	KANUNGU	281,400	31,267	12,507	3,752,000	18,760,000	2,345,000	1,876,000	31,267	ARABICA	WEST
7	SIRONKO	279,700	31,078	12,431	3,729,333	18,646,667	2,330,833	1,864,667	31,078	ARABICA	EAST
8	BUNDIBUGYO	270,800	30,089	12,036	3,610,667	18,053,333	2,256,667	1,805,333	30,089	ARABICA	WEST
9	KABALE	251,600	27,956	11,182	3,354,667	16,773,333	2,096,667	1,677,333	27,956	ARABICA	WEST
10	BULAMBULI	241,600	26,844	10,738	3,221,333	16,106,667	2,013,333	1,610,667	26,844	ARABICA	EAST
11	NAMISINDWA	237,000	26,333	10,533	3,160,000	15,800,000	1,975,000	1,580,000	26,333	ARABICA	EAST
12	KIBAALE	209,900	23,322	9,329	2,798,667	13,993,333	1,749,167	1,399,333	23,322	ARABICA	WEST
14	MANAFWA	179,000	19,889	7,956	2,386,667	11,933,333	1,491,667	1,193,333	19,889	ARABICA	EAST
15	BUHWEJU	148,300	16,478	6,591	1,977,333	9,886,667	1,235,833	988,667	16,478	ARABICA	WEST
16	KAPCHORWA	127,200	14,133	5,653	1,696,000	8,480,000	1,060,000	848,000	14,133	ARABICA	EAST
17	KWEEN	112,300	12,478	4,991	1,497,333	7,486,667	935,833	748,667	12,478	ARABICA	EAST
18	NTOROKO	77,700	8,633	3,453	1,036,000	5,180,000	647,500	518,000	8,633	ARABICA	WEST
	TOTAL	5,070,200	589,083	241,422	72,426,476	362,132,381	45,266,548	36,213,238	603,554		

Table 7: Simulation of Robusta Production by District Under Financing Assumption

NO	DISTRICTS	UBOS 2021 ESTIMATED TOTAL HOUSEHOLD POPULATION PER DISTRICT	ESTIMATED TOTAL FARMING HOUSEHOLDS IN 2021	NET ESTIMATED FARMING HOUSEHOLDS IN COFFEE	ESTIMATED TOTAL TREE POPULATION PER DISTRICT	ESTIMATED CHERRY PRODUCTION PER DISTRICT	ESTIMATED KIBOKO (DRY CHERRY) PRODUCTOION PER DISTRICT	ESTIMATED GREEN BEAN PRODUCTION PER DISTRICT	ESTIMATED GREEN BEAN PRODUCTION (IN 60KG BAGS) PER DISTRICT	TYPE OF COFFEE GROWN	REGION
1	MUKONO	720,100	102,871	46,292	13,887,643	416,629,286	208,314,643	104,157,321	1,735,955	ROBUSTA	CENTRAL
2	ISINGIRO	616,700	88,100	39,645	11,893,500	356,805,000	178,402,500	89,201,250	1,486,688	ROBUSTA	WEST
3	MUBENDE	582,900	83,271	37,472	11,241,643	337,249,286	168,624,643	84,312,321	1,405,205	ROBUSTA	CENTRAL
4	NTUNGAMO	550,500	78,643	35,389	10,616,786	318,503,571	159,251,786	79,625,893	1,327,098	ROBUSTA	WEST
5	KYENJOJO	544,800	77,829	35,023	10,506,857	315,205,714	157,602,857	78,801,429	1,313,357	ROBUSTA	WEST
6	LUWERO	535,200	76,457	34,406	10,321,714	309,651,429	154,825,714	77,412,857	1,290,214	ROBUSTA	CENTRAL
7	KAKUMIRO	513,200	73,314	32,991	9,897,429	296,922,857	148,461,429	74,230,714	1,237,179	ROBUSTA	WEST
8	BUIKWE	482,900	68,986	31,044	9,313,071	279,392,143	139,696,071	69,848,036	1,164,134	ROBUSTA	CENTRAL
9	KYEGEGWA	475,600	67,943	30,574	9,172,286	275,168,571	137,584,286	68,792,143	1,146,536	ROBUSTA	WEST
10	KAGADI	444,900	63,557	28,601	8,580,214	257,406,429	128,703,214	64,351,607	1,072,527	ROBUSTA	WEST
11	KAYUNGA	414,300	59,186	26,634	7,990,071	239,702,143	119,851,071	59,925,536	998,759	ROBUSTA	CENTRAL
12	IGANGA	414,000	59,143	26,614	7,984,286	239,528,571	119,764,286	59,882,143	998,036	ROBUSTA	EAST
13	HOIMA	387,200	55,314	24,891	7,467,429	224,022,857	112,011,429	56,005,714	933,429	ROBUSTA	WEST
14	MITYANA	368,200	52,600	23,670	7,101,000	213,030,000	106,515,000	53,257,500	887,625	ROBUSTA	CENTRAL
15	KAMWENGE	347,400	49,629	22,333	6,699,857	200,995,714	100,497,857	50,248,929	837,482	ROBUSTA	WEST
16	MASAKA	342,300	48,900	22,005	6,601,500	198,045,000	99,022,500	49,511,250	825,188	ROBUSTA	CENTRAL
17	RUKUNGIRI	336,700	48,100	21,645	6,493,500	194,805,000	97,402,500	48,701,250	811,688	ROBUSTA	WEST
18	RAKAI	324,800	46,400	20,880	6,264,000	187,920,000	93,960,000	46,980,000	783,000	ROBUSTA	CENTRAL
19	KASSANDA	319,900	45,700	20,565	6,169,500	185,085,000	92,542,500	46,271,250	771,188	ROBUSTA	CENTRAL
20	SSEMBABULE	303,900	43,414	19,536	5,860,929	175,827,857	87,913,929	43,956,964	732,616	ROBUSTA	CENTRAL
21	KALIRO	298,200	42,600	19,170	5,751,000	172,530,000	86,265,000	43,132,500	718,875	ROBUSTA	EAST
22	KYAKWANZI	296,100	42,300	19,035	5,710,500	171,315,000	85,657,500	42,828,750	713,813	ROBUSTA	CENTRAL
23	MPIGI	292,900	41,843	18,829	5,648,786	169,463,571	84,731,786	42,365,893	706,098	ROBUSTA	CENTRAL
24	LWENGO	292,900	41,843	18,829	5,648,786	169,463,571	84,731,786	42,365,893	706,098	ROBUSTA	CENTRAL
25	IBANDA	281,900	40,271	18,122	5,436,643	163,099,286	81,549,643	40,774,821	679,580	ROBUSTA	WEST
26	LUUKA	272,000	38,857	17,486	5,245,714	157,371,429	78,685,714	39,342,857	655,714	ROBUSTA	EAST
27	KYOTERA	264,500	37,786	17,004	5,101,071	153,032,143	76,516,071	38,258,036	637,634	ROBUSTA	CENTRAL
28	BUSHENYI	250,400	35,771	16,097	4,829,143	144,874,286	72,437,143	36,218,571	603,643	ROBUSTA	WEST
29	NAKASEKE	241,400	34,486	15,519	4,655,571	139,667,143	69,833,571	34,916,786	581,946	ROBUSTA	CENTRAL
30	SHEEMA	222,600	31,800	14,310	4,293,000	128,790,000	64,395,000	32,197,500	536,625	ROBUSTA	WEST
31	RUBANDA	210,300	30,043	13,519	4,055,786	121,673,571	60,836,786	30,418,393	506,973	ROBUSTA	WEST
32	MITOOMA	195,900	27,986	12,594	3,778,071	113,342,143	56,671,071	28,335,536	472,259	ROBUSTA	WEST
33	KALUNGU	195,800	27,971	12,587	3,776,143	113,284,286	56,642,143	28,321,071	472,018	ROBUSTA	CENTRAL
34	KIRUHURA	192,200	27,457	12,356	3,706,714	111,201,429	55,600,714	27,800,357	463,339	ROBUSTA	WEST
35	KITAGWENDA	184,600	26,371	11,867	3,560,143	106,804,286	53,402,143	26,701,071	445,018	ROBUSTA	WEST
36	GOMBA	176,100	25,157	11,321	3,396,214	101,886,429	50,943,214	25,471,607	424,527	ROBUSTA	CENTRAL
37	KIBOGA	175,200	25,029	11,263	3,378,857	101,365,714	50,682,857	25,341,429	422,357	ROBUSTA	CENTRAL
38	BUKOMANSIMBI	157,300	22,471	10,112	3,033,643	91,009,286	45,504,643	22,752,321	379,205	ROBUSTA	CENTRAL
39	RUBIRIZI	146,600	20,943	9,424	2,827,286	84,818,571	42,409,286	21,204,643	353,411	ROBUSTA	WEST
40	BUTAMBALA	109,000	15,571	7,007	2,102,143	63,064,286	31,532,143	15,766,071	262,768	ROBUSTA	CENTRAL
41	RUKIGA	106,000	15,143	6,814	2,044,286	61,328,571	30,664,286	15,332,143	255,536	ROBUSTA	WEST
	TOTAL	13,587,400	1,941,057	873,476	262,042,714	7,861,281,429	3,930,640,714	1,965,320,357	32,755,339		

Table 8: Simulation of Arabica Production Under Financing Assumption

NO	DISTRICTS	UBOS 2021 ESTIMATED TOTAL HOUSEHOLD POPULATION PER DISTRICT	ESTIMATED TOTAL FARMING HOUSEHOLD IN 2021	NET ESTIMATED FARMING HOUSEOLDS IN COFFEE	ESTIMATED TOTAL TREE POPULATION PER DISTRICT	ESTIMATED TOTAL ANNUAL CHERRY PRODUCTION PER DISTRICT	ESTIMATED TOTAL PARCHMENT PRODUCTION PER DISTRICT	ESTIMATED TOTAL GREEN (IN KG) PRODUCTION PER DISTRICT	ESTIMATED TOTAL GREEN BEAN IN 60KG BAGS PER DISTRICT	TYPE OF COFFEE GROWN	REGION
1	KASESE	810,400	115,771	52,097	15,629,143	468,874,286	58,609,286	46,887,429	781,457	ARABICA	WEST
1	MBALE	604,100	67,122	26,849	8,054,667	241,640,000	30,205,000	24,164,000	402,733	ARABICA	EAST
2	KABAROLE	344,500	38,278	15,311	4,593,333	137,800,000	17,225,000	13,780,000	229,667	ARABICA	WEST
3	KISORO	321,100	35,678	14,271	4,281,333	128,440,000	16,055,000	12,844,000	214,067	ARABICA	WEST
4	ZOMBO	290,700	32,300	12,920	3,876,000	116,280,000	14,535,000	11,628,000	193,800	ARABICA	NORTH
5	BUDUDA	282,900	31,433	12,573	3,772,000	113,160,000	14,145,000	11,316,000	188,600	ARABICA	EAST
6	KANUNGU	281,400	31,267	12,507	3,752,000	112,560,000	14,070,000	11,256,000	187,600	ARABICA	WEST
7	SIRONKO	279,700	31,078	12,431	3,729,333	111,880,000	13,985,000	11,188,000	186,467	ARABICA	EAST
8	BUNDIBUGYO	270,800	30,089	12,036	3,610,667	108,320,000	13,540,000	10,832,000	180,533	ARABICA	WEST
9	KABALE	251,600	27,956	11,182	3,354,667	100,640,000	12,580,000	10,064,000	167,733	ARABICA	WEST
10	BULAMBULI	241,600	26,844	10,738	3,221,333	96,640,000	12,080,000	9,664,000	161,067	ARABICA	EAST
11	NAMISINDWA	237,000	26,333	10,533	3,160,000	94,800,000	11,850,000	9,480,000	158,000	ARABICA	EAST
12	KIBAALE	209,900	23,322	9,329	2,798,667	83,960,000	10,495,000	8,396,000	139,933	ARABICA	WEST
14	MANAFWA	179,000	19,889	7,956	2,386,667	71,600,000	8,950,000	7,160,000	119,333	ARABICA	EAST
15	BUHWEJU	148,300	16,478	6,591	1,977,333	59,320,000	7,415,000	5,932,000	98,867	ARABICA	WEST
16	KAPCHORWA	127,200	14,133	5,653	1,696,000	50,880,000	6,360,000	5,088,000	84,800	ARABICA	EAST
17	KWEEN	112,300	12,478	4,991	1,497,333	44,920,000	5,615,000	4,492,000	74,867	ARABICA	EAST
18	NTOROKO	77,700	8,633	3,453	1,036,000	31,080,000	3,885,000	3,108,000	51,800	ARABICA	WEST
	TOTAL	5,070,200	589,083	241,422	72,426,476	2,172,794,286	271,599,286	217,279,429	3,621,324		

Table 9: Yearly coffee production costs by the three farmer categories (in UGX)

	Traditional	Improved	Recommended
Pruning		30,000	40,000
De-suckering			
Stumping		22,500	45,000
fertiliser		295,700	979,200
Fertiliser application		.	45,000
Weeding			90,000
Herbicides		30,000	
Herbicide application			
pesticide		50,000	210,000
Pesticide application		13,750	30,000
Fungicides		45,000	480,000
Fungicide Application		13,750	70,000
Mulching Materials		37,500	50,000
Mulching application		7,500	
Trenches		40,000	40,000
Shade management			
Harvesting		184,450	251,600
Transport home			
Sorting/Floating		29,580	50,320
Pulping		36,890	50,320
Tarpaulins	45,000	45000	40,000
Drying		14,790	25,160
Bags	14,994	39,882	60,384
Marketing Transport	16,029	42,257	71,886
Others			
Total Variable Cost	76,023	978,549	257,1178
Yield(Kgs)	179.9	472.7	805.1
Average Producer	7,200	7,200	7,500

Source: Mugoya (2018)

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CENTRE FOR
DEVELOPMENT
ALTERNATIVES

KONRAD
ADENAUER
STIFTUNG