

Full Length Research Paper

Financial inclusion: Is it a precursor to agricultural commercialization amongst smallholder farmers in Uganda? A comparative analysis between Lango and Buganda sub-regions

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This study examines the contributions of financial inclusion in supporting agricultural commercialization amongst smallholder farmers in Uganda in Lango and Buganda sub-regions. The researcher adopted a comparative study and cross-sectional survey design where descriptive, bivariate and multivariate data analysis was used. Chi square procedure was run to test the hypothesis that financial inclusion does not affect agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions. Regression analysis was specifically used to predict the level of change in agricultural commercialization due to changes in financial inclusion. The study identified financial inclusion as one variable that can predict the success of agricultural commercialization, though it varies from one region to another. In Lango, efforts by government to increase financial access is a positive factor to agricultural commercialization while in Buganda, it is a negative factor. In Lango, land is communal and not individually owned. Therefore, smallholder farmers need to access finances to purchase land for commercial farming. In Buganda, however, land is freehold, which makes smallholder farmers to own chunks of land from their parents. The study has established some common factors that limit agricultural commercialization in both Lango and Buganda, that is, expensive equipment and fluctuating prices while poor infrastructure is no longer a big worry. This paper recommends that, financial service providers should revise their lending terms downwards to reach smallholder farmers, some of whom lack collateral security to pledge for credit. While the government takes credit for improving infrastructure, government, through her policy organs like ministry of agriculture, should provide buffer prices against price fluctuations.

Key words: Financial inclusion, agricultural commercialization, smallholder farmers.

INTRODUCTION

Many agencies, development partners and governments the world over have adopted financial inclusion as having the ability to support inclusive transformation in the

community and rural areas (IFAD, 2016). Financial inclusion is a cross cutting issue where the policy makers need to develop policies that are linked to those

operating in the financial sector. Demirguc-kunt et al. (2015) note that adequate progress has been achieved in raising financial inclusion levels globally where the unbanked people have drastically reduced by 20% to two billion in the period 2011-2015. In Uganda, the number of adults who could access formal financial services rose from 28% in 2009 to 54% in 2013 (CARE International, 2014). Mobile money brought about a sharp rise in financial inclusion. This report further reveals that about 15% of the adults have no access to formal financial services. In 2018, financial inclusion in Uganda stood at 58%, which is almost double of what it was in 2009. The introduction of Agent Banking in 2016 and shared agent platform/switch to facilitate access to bank agents in 2018 account for the notable rise in financial inclusion (Alliance for Financial Inclusion, 2019). However, the position remains low if compared to the global position of 69% in 2017 and 63% in Sub Saharan Africa. The same report establishes that 77% of the adults in rural areas have formal financial inclusion, majority of who are men (63%). These statistics imply potential contributions of financial inclusion to the agricultural sector in Uganda, where 43% of household-based enterprises belong (Uganda Bureau of Statistics, 2016).

Uganda's economy predominantly depends on agriculture since the 1920s, where cotton and coffee accounted for 90% of the total exports (Goobi et al., 2017). Around the years of independence, economic growth and development in Uganda was impressive, growing at an average annual rate of 6.7%. Around the same period, agriculture contributed more than one-third of the country's GDP. The expansion in the food processing industries at that time gave rise to this historical rate of economic growth and development (Uganda Bureau of Statistics, 2016). From mid-1960s, Uganda implemented agricultural and lending schemes that resulted in the establishment of two public sector banks (Uganda Commercial Bank and Cooperative Bank) to serve as a conduit for government lending schemes. These banks made losses for failure to follow commercial practices (Kilimani, 2007). However, political instability, poor governance and economic mismanagement that swept the country in the 1970s and early 1980s saw Uganda's persistent decline in the economy, casting it among the world's poorest and least developed countries. The real decline in GDP stood at 38%, with a greater effect on agriculture and trade sectors. The increasing insecurity at the time and the unattractive prices paid to farmers affected coffee prices significantly (Ministry of Finance, Planning and Economic Development, 2010; Brownbridge, 1996; Goobi et al., 2017). According to Uganda Bureau of Statistics (2016), agriculture contributed 24.0% to Uganda's GDP in 2014/

2015 year and 80% of Uganda's exports, with coffee alone contributing 20% (Goobi et al., 2017).

The integration of smallholder farmers into agricultural commercialization is significant to agriculture's contribution to economic growth thus enhancing financial inclusiveness. Dehaas (2016) states that Uganda registered 12 percent of smallholder farmers as the sellers of farms products and the net buyers stood at 66 percent; therefore, accessibility to the market and transiting from subsistence farming to commercial farming can lead to economic growth. Uganda Bureau of Statistics (UBOS) (2015) observes that agricultural sector had grown faster by contributing 26 percent from 24 percent to the GDP of Uganda, which is commendable as after embracing value addition. The importance of agricultural commercialization has significantly grown with the development of various strategies, which shifted from subsistence to commercial (FAO, 2013). Agriculture provides the primary source of income for the world economy and supporting agricultural commercialization may lead to an inclusive model for economic growth. Gashu et al. (2019) justifiably assert that a significant investment and creativity in agriculture is highly needed to achieve a sustainable economic growth. One way towards sustainable economic growth and development is agricultural commercialization and stimulating household incomes. Agriculture commercialization is the process of transition from subsistence farming to production-oriented marketing (Pradhan et al., 2010). The concentrations of commercial agriculture in Uganda consist of the following: Livestock farming, crop farming, fishing, forestry and recently horticulture, which have gained prominence. Majority of the population in Uganda depend on agriculture for their livelihood. They thus need an inclusive financial system to accelerate economic transaction, manage daily resources, improve lifestyle, and make investment to support growth. The Government of Uganda has supported agriculture by providing special incentives which included duty free tax on importation of plant and machinery, research and development expenditures are exempt, training and capital allowances on plant and machinery between 50-70% are exempted (Uganda Investment Authority (UIA), 2015). Agricultural modernization in Uganda may support change from subsistence agricultural system to a modern and commercialized system, though it calls for adoption of adequate interventions.

Agricultural industry is significant to the society especially where it accounts for a larger share of the economic output. Most importantly, financial inclusiveness has not been emphasized in support to small holder commercialization of agriculture. Insufficient amount of commercialization of agriculture. Insufficient amount of

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money has always been exerted to promote agricultural sustainability and development and majority of smallholder farmers and entrepreneurs focus on production and technology which has not been consistent (Seidel et al., 2013). Agricultural financial sector has also been associated to the land rush growing globally. Fairbairn (2014) argues that financial investors intending to acquire land for large scale farming is on the rise and this is a major challenge facing commercial farmers. These challenges are unique to smallholder commercial agriculturalist and financial institution face similar hurdles, which may include but not limited to high transaction costs, regulatory framework and unfavorable climatic environment (IFC, 2012). The market dynamics currently faced by smallholder farmers does not support market access for the rural dwellers thus undermining agricultural commercialization.

Economists and agriculturalist have linked the challenges in adopting innovation and technology in agricultural sector to access to credit. FAO (2015) establishes that inadequate infrastructure in the rural areas has made it difficult to support processing of agricultural produce for value addition, and other produces are perishable like vegetables, fruits, dairy products and others. Barnett et al. (2008) link the inadequate agricultural finance, which re-enforces poverty traps, and in essence, advocates for the risk-based finance programs. Despite the increasing attention and efforts by many developing countries where Uganda falls, environmental issues notwithstanding delays in the adoption of technology affects smallholder agricultural commercialization (World Bank, 2016). Much emphasis on investing resources in domestic or smallholder agriculture is evident, Uganda's spending on agriculture has continuously declined despite its key role in the economy. In this respect, the low budget on this sector has negatively affected it and this affects the research on value addition, quality and regulation standards. The challenges the two regions face in agricultural commercialization amongst small holder farmers are not any different from other region. This study will help to identify key institutional issues that may support the transformation of smallholder farmers into large scale and modern agro-processing markets to achieve economic growth.

Objectives

- (i) To establish the relationships between financial inclusion and agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions
- (ii) To assess the role of financial inclusion in supporting Agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions.
- (iii) To examine the factors hindering the growth of agricultural commercialization amongst the smallholder

farmers in of Lango and Buganda sub-regions.

Hypothesis

Financial inclusion does not affect agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions.

LITERATURE REVIEW

Conceptualizing financial inclusion

Financial inclusion (FI) is the provision of affordable, timely and appropriately regulated access to financial services and products to all categories of people with the aim of improving and promoting the well-being of the population (OECD/INFE, 2012).The usage, adequacy, convenience, product knowledge, affordability and accessibility are some of the factors brought forward by many authors in describing financial inclusion (Aro-Gordon, 2016).Financial inclusion (FI) emerged as a major player in delivering financial services to the community and the disadvantaged poor at an affordable terms and conditions (Iqbal and Sami, 2017). It is important that the regulators, financial sectors and government create a conducive and enabling environment that supports the capacity of financial service providers through identification of the market demands by designing affordable products and services, which support financial inclusion (Arnold and Rhyne, 2016). Uganda has adopted the usage of mobile money services and technology that has significantly strengthened financial inclusion amongst the farmers in the rural and peri-urban areas. Digital cash transfers are most cost-effective methods of transferring money to small-scale farmers, which are scattered in rural areas. Finscope (2018) argues that mobile money services have driven financial inclusiveness to Ugandans. Out of the 58% of the population who have access to formal financial services, only 56% conduct their transaction through mobile money services.

Accessibility to digital financing is critical for the transformation of smallholder agricultural sector. Finscope (2018) states that 22% of Ugandan adults are using informal channels in accessing financial services whereas 22% are excluded financially therefore meaning that 44% of Ugandan adults are not getting the deserved services from the financial sector. Just like other developing countries in the world, Uganda has adopted the usage of telephone banking, whose penetration stands at 10% (Bruhn and Love, 2014). This is still low; however, the usage is likely to increase if most Ugandans are continuously sensitized. Callen et al. (2014) note that technology can improve savings; this can be done by using mobile point service centers to collect weekly deposits and this increases higher saving rates and

increases household income. Kast and Pomeranz (2014) argue that the reduction in the barriers to a formal saving by individuals offering free bank accounts may result in a decrease in short term debt and increased ability of coping with consumption shocks. Serrao et al. (2013) state that inequality amongst the community is widening and believed that limited access to financial services is seen as a factor responsible for the persistent and widening income inequality and slow economic growth. UNCDF (2015) notes that policy makers hope that the rising level of financial inclusiveness would reduce inequality and raise growth. Kotler and Keller (2015) observes that there are non-financial institutions legally operating in the community offering financial products and services to clients without a regulatory framework given by a financial authority.

Tania and Adalbert (2018) point out the challenges associated to financial inclusion that are linked to unfavorable business environment and ever rising transaction cost, which makes it very difficult for the sustainability of formal financial institution. DeOlloqui et al. (2015) argue that the challenges that limit financial inclusion are especially those population who are excluded, and majority are in the rural areas. The rural environment faces multiple risks such as lower rates for formal property ownership, which may lead to reduction in the range of collateral security and these affect the coverage and the quality of the availability of the infrastructure (Valenzuela and Cruz, 2017). Access to financial service providers and bank branches has proved to be problematic especially to smallholder farmers and agriculturalist who are based in rural areas where banking services are not easily available; whereas urban dwellers can access these financial services as and when they need them (World Bank, 2015). Credit services, saving and member's deposits remain the basic financial services, which can be accessible while others are outreach like networks and retail location (World Bank, 2014). Financial experts argue that access to a reasonable credit, at affordable rates to the poor will increase financial inclusiveness to the disadvantaged poor (Abdulkareem, 2019). It is significant to note that financial exclusion in developing countries affects mostly the rural dwellers and therefore it is important to applause the contribution of informal financial lenders in filling this gap. Therefore the concerned authority should provide a monitoring and supervisory role to protect the borrowers (Eton et al., 2019). Similarly, Akinlo (2014) establishes that access to financial services is a major role in the development of the rural poor by increasing income and facilitating investment in various sectors creates an opportunity for employment therefore reducing the vulnerability of the poor. Tambi (2018) states that development partners, private sector especially formal financial institution and governments should sensitize the smallholder farmers on the availability and existence of financial services.

Conceptualizing agricultural commercialization

Agricultural development economics establishes ways of breakthrough from semi-subsistence methods (in which smallholders are trapped) to the modern ways of farming which is commercial in nature (Muamba, 2011). The process involving transforming agricultural practices from the rudimentary subsistence farming to commercial farming is agricultural commercialization (Justus et al., 2016). Smallholder farmers can engage in agricultural commercialization if given all the necessary support thus, contributing to economic growth of the economy. Agricultural commercialization operates in two folds: the one, which includes food crops and the one of cash crops, which allows for production diversity (Jennifer and Tina, 2014). The current agricultural commercialization or enterprise requires investing heavily on the equipment and guard against risk associated with uncertainties from natural disasters like droughts and floods. IPCC (2012) argues that farmers in sub-Saharan Africa, Uganda inclusive suffer climatic change that affects agricultural production capacity. Importantly, agriculture in Uganda is largely rainfed therefore farmers are vulnerable to drought and floods. Climatic change has proved to be a global phenomenon that greatly affects agricultural production by causing variation in weather patterns, drought and alterations in pests and diseases and the extent of its adversity would depend on the adaptability capacity of the farmers (Gornall et al., 2010). To increase the income of smallholder farmers in developing countries, agricultural commercialization should focus on developing better policies that supports commercialization of smallholder agriculture (Muriithi and Matz, 2015).

Smallholder agricultural commercialization faces various challenges, which among others include inadequate financing for long-term growth. This is a serious challenge in the agricultural growth sector where agriculture has turned to be capital-intensive industry (Eraskine, 2014). Limited farmlands and variation in climatic conditions are some of the major challenges faced by smallholder farmers who are involved in commercial agriculture (Tambi, 2018). Technological barriers have posed as a challenge to agricultural commercialization that may prevent smallholder farmer's access to credit, thus limiting productivity and income generation (Levine, 2005). Whereas technologies effectively support agricultural commercialization, inability to access capital especially among the underprivileged rural dwellers hinders smallholder farmers in developing countries from adopting them (Shiferaw et al., 2015). Smallholder farmers with smaller plots are often constrained by their inability to invest in modern inputs, which affects their income. EKN (2015) observes that small-scale farmers cannot use tractors since farmers cannot afford the technology. As an intervention, the adoption of technology has helped link the smallholder farmers and markets and this has enhanced the

productivity by different farmers (GOP, 2015). Innovations in the agricultural sector is significant in lowering per unit cost, reduces hunger and therefore boosting the income of the rural dwellers (Maertens and Barrett, 2013). Access to usage of technology, land, infrastructure and adequate amount of rainfall significantly affects the decision of farmers in agricultural commercialization (Olwande et al., 2015). The continuous usages of poor technology, poor quality seeds, pesticides and fertilizers by smallholder farmers have greatly affected the production and markets prices. Herrmann (2017) argues that using modern farming techniques and technology can lead to production of good quality products with high demand in the market and these increase their income levels. This therefore changes the conditions of input and output prices, marketing systems, transaction cost and the risks that farmers anticipate.

Gebremedhin and Jaleta (2010) state that agricultural production has been hit by falling prices of agricultural products, inadequate technology, lack of infrastructure and inefficient marketing institutions that cause a high risk to household income. Woolverton et al. (2014) observe that smallholder farmers have continued to engage in subsistence agriculture, which is less profitable, and therefore cannot reap from the benefits arising from agricultural commercialization. Gashu et al. (2019) note that new initiatives, reforms in policies and initiatives should be supported while appropriate investments needed to be developed which supports agricultural innovation and growth. AGRA (2016) argues that a number of interventions have been made by various bodies that led to the transformation of smallholder farmers into a major source of income, employment and food for consumption. Smallholder farmers lack links to the markets locally and internationally, making them more prone to exploitation by intermediaries. The public and private sector ought to contribute towards agricultural commercialization through offering financial incentives and training (Kabiti et al., 2016). It is important to note that formation of agricultural cooperatives or partnership by farmers with already established farmers supports markets commercialization (Bitzernd and Bijman, 2014) although poor and smallholder farmers could be left out on the argument that their relevance is not felt. Olwande et al. (2015) argue that improving markets accessibility and reduction of costs affects positively the smallholder farmers market participation which my lead to marketable surplus of their produce. The approach of improving smallholder farming methods and improved accessibility to the market transforms the household economic status (Yusuf et al., 2018). The integration of cash generating crops to the line of various crops produced by smallholder farmers will increase their level of income and this motivates them (Ruhara and Mudhara, 2019). There is much support still needed for sustainability and transformation of agricultural processes in the sub-Saharan Africa to meet

the sustainable development goals.

Financial inclusion and agricultural commercialization

The recent trends in developing nations have seen farmers engage in agricultural commercialization, and adoption of financial flows into less risky industries and corporations indicates that farmers are highly indebted and therefore creating avenues for financial partnerships (Sippel et al., 2017). Better financial services should improve financial accessibility to the poor, which provides support for a sound and safe spread of better modes of financial service delivery that can easily reach the poor and upscale the successful models for poor households to embrace agricultural commercialization. Soederberg (2013) notes that financialization is expanding into areas beyond traditional agricultural export nation as international organizations are promoting financial inclusiveness in most of the developing nations as a tool for development of agriculture and growth. Most development agencies and banks encourage private financing to support smallholder agricultural commercialization (Aitken, 2013). The government of Uganda, its agencies and private sector have developed strategies to aid the poor improve on agricultural commercialization in both rural and peri urban areas and this has increased incomes for the poor. The World Bank (2014) notes the critical areas where governments have to focus on lowering credit exposure to the agricultural sector and the supply chain and much concentration should be in the geographical disadvantaged areas, financial infrastructures and inadequate training amongst the smallholder commercial farmers regarding financial products and services. By lowering transaction cost in the agricultural sectors, money transfers and mobile money, users ought to protect farmers against any risks (Jack and Suri, 2014). The usage of mobile money services by smallholder farmers is associated with increased farm profits, household income and increased input usage, which supports agricultural commercialization (Kikulwe et al., 2014). The provision of payments, insurance, credits and savings to the financially disadvantaged and poor at a reasonable cost remain basic to accessing formal financial services. Agricultural insurance products helps commercial farmers address the constraints affecting them such as limited land for cultivation, inadequate inputs for investment and risk associated to production (Norton et al., 2014). The agricultural sector globally suffers from inadequate financing, which reduces the potential of the agriculturalist in utilizing agricultural resources adequately and effectively (Gupta, 2012). Households can improve their well-being through additional income from sales of foodstuff for consumption (Beaman et al., 2014). Investing in farm inputs will eventually lead to increase in production sales.

Sanfo and Gerard (2012) state that various interventions can mitigate the adverse effects of poor climatic conditions. Such initiatives increase access to financial services at household level, and enhance the adaptability capacity, which would improve agricultural commercialization. The rural poor communities have inadequate access and insecure access to natural resources due to degradation, land fragmentation; continuous competition for the limited available resources and unfavorable government policies, which increase income inequality and financial exclusion among rural dwellers (Prato and Longo, 2012). The high demands for collateral by formal financial institutions, high-perceived risks associated lending to farmers and inadequate capacity in developing friendly credit instruments for farmers have led to under capitalization in the agricultural sector. Financial credit will be a necessity for smallholder farmers to increase their income and agricultural productivity although they are facing a challenge to access credit due to lack of collateral (World Bank, 2015). Subsistence farmers and smallholder farmers if given extensive and financial support are most likely to adopt commercialization of agriculture (Rubbaha and Mudhara, 2019). Most clients have stated that high transaction cost has been a major challenge faced by households in obtaining credits from formal financial institution such as loan applications while evaluating collateral security, monitoring servicing of the loans and these eventually delays farmers which affects the planting periods (Ali et al., 2014). Banks assess loan applications for agricultural commercial farmers by taking into consideration the cash flow streams and availability of sources of income (ABA, 2014). The reduction to barriers to formal savings by offering free accounts to individuals would decrease the short-term debt and increase ability to comply with the consumption shocks and well-being of the households (Kast and Pomeranz, 2014). Subsidization of savings by elimination of minimum balances for the customers will provide a temporary interest bonus to increase bank account opening and household income (Schaefer, 2015). Informal financial services have proved to be costly, restricted farmers in a particular value chain, lack diversity and this affects the processors and traders who may be operating at small scale (FAOAcademic de Centro_America, 2016).

METHODOLOGY

The researchers adopted a comparative study and cross-sectional survey design. The opinions, trends and attitudes of the participants were collected at one point in time on financial inclusion and agricultural commercialization. This study adopted the qualitative approach to obtain naturalistic experiences of commercial farmers in both Lango and Buganda sub-regions. The study adopted the quantitative approaches to obtain quantifiable information on commercial farmers that would easily be analyzed and generalized. Primary and secondary data collection methods were also used in the study. Secondary data were majorly from government and private institutions reports.

Close-ended self-administered questionnaires were developed to provide uniformity of measurement. Bird (2009) states that a closed-ended question is easily admissible, easy to code and analyze and therefore produces a complete question that avoids irrelevant responses. The instrument was pretested on commercial farmers in some Kayunga district in Buganda sub-region. The instrument indicated a reliability coefficient of ($\alpha = .749$). This was above 0.7, which is acceptable. Therefore, the instrument used was internally stable. The instrument had 11 items measuring financial inclusion, 13 items measuring agricultural commercialization, and 11 items describing challenges in agricultural commercialization. Open-ended questions were developed and administered to commercial farmers that show excellence in National Agricultural and Research Organization (NARO) demonstration projects in Lango and Buganda sub-regions. This study identified these farmers from district reports, which constituted secondary information for this study.

The study was conducted in the districts of Dokolo, Apac, and Lira in Lango sub-region while in Buganda sub-region, the study was conducted in the districts of Luwero, Masaka and Wakiso, respectively. The choice of the districts under study was due to the fact that the promotion of agricultural commercialization had taken shape as a result of the availability of market, land and increase in the number of prominent entrepreneurs engaging in smallholder agriculture for commercialization. Agricultural commercialization in Lango is characteristic of annual crops (millet, maize, simsim, groundnuts, and maize). On the other hand, agricultural commercialization in Buganda is characteristic of perennial crops (banana, pineapples, coffee, and sugarcane).

A target population of 1700 was sought for in the study and 313 respondents were considered against the total population of 6320 from which the target was drawn (Uganda Bureau of Statistics (UBOS), 2018). The sample size of the respondents was from the selected districts which included Dokolo 44, Apac 55 and Lira 60 from Lango sub-region while from Buganda sub-region Luwero 44, Wakiso 54 and Masaka. 58 districts were considered and it is from these districts where the sample size was determined using Krejcie and Morgan 1970 Table. The varying sample size per district was based on the premise that the population size of each district varied and the number of smallholder farmers dealing in commercial agriculture was also not the same. To identify the right participants, the researchers visited the office of the District Agricultural Officers, who availed lists of potential commercial farmers. Using simple random sampling procedures, sample sizes proportional to the targeted populations were drawn from each district. Creswell (2013) believes that simple random sampling eliminates potential selection bias that is likely to occur in the process of selecting participants. This procedure of sample selection was used because the population appeared finite (Amin, 2005). Numerical data collected through questionnaires were cleaned and validated to ensure accuracy and consistency. Descriptive, bivariate and multivariate data analysis techniques were applied. Chi square procedure was run to test the hypothesis that financial inclusion does not affect agricultural commercialization amongst smallholder in Lango and Buganda sub-region. Regression analysis was adopted to predict the level of change in agricultural commercialization due to changes in financial inclusion. Verbatim statements from key informants supported quantitative data analysis.

RESULTS AND DISCUSSION

In both Lango, and Buganda, most of the participants were male constituting 51.4% and 48.6% were female respectively. In most part of Uganda, productive resource like land is majorly owned by men. Therefore, it comes as

Table 1. Correlation test.

Variable list	Output	Agricultural commercialization (Lango)	Agricultural commercialization (Buganda)
Financial Inclusion	Correlation	0.314	-0.340
	p-value	0.000	0.003
	N	183	73

**Correlation is significant at the 0.01 level (2-tailed).

no surprise that men dominate commercial agriculture. Even though women might have access to financial services, they lack securities to pledge to financial services providers. The lack of collateral security needed by formal financial institutions before extending credit supports Ali et al. (2014). These authors showed that the high cost of transacting loans affects households from obtaining credit, of which women are most affected. In terms of age, most of the participants from Lango were of 35-49 (44.3%) while in Buganda, most of the participants were of age 18-34 (45.2%). The difference in participation according to age suggests differences in land tenure systems. In Lango, land is communally owned. Therefore, the adults and the old are likely to own land. In Buganda, land is freehold and highly inheritable, which has seen young people owning large chunks of land. Though ownership of land may not imply participation in commercial agriculture, those with land have high chances of engaging in commercial agriculture. In both Lango and Buganda, most of the participants had attained a university degree constituting 34.4% and 39.7% respectively. In the past, participation in agriculture was an activity left to the rural poor and uneducated. With the increasing number of university graduates that are unemployed, many are turning to commercial agriculture as a source of employment. The educated are likely to transfer knowledge, and adopt improved technologies easily than the less educated. Secondly, the educated are likely to exploit the increasing opportunities of access to financial services than the less educated. In both Lango and Buganda, most of the participants used mobile money services between 5 to 9 times a week constituting 38.8% and 50.7% respectively. Though participants do not use mobile money services for commercializing agricultural practices, the mere fact that the service is available enhances commercial agriculture. This coincides with the findings on financial services commonly used by commercial farmers. In both Lango and Buganda, mobile money constituting 66.1% and 80.8% were the most used financial services. Commercial agriculture is commonly practiced in rural area where mobile money services are more common than other financial services. Though village banking might be accessible in rural areas, they are not attractive to educated farmers. Food crop constitute agricultural commercialization in Lango and Buganda, constituting

(66.1%) and 54.8% respectively. In Uganda, there is a thin line between food crops and cash crops since almost all food crops are marketable. Secondly, it is cheaper to cultivate food crops on small farmland than cash crops.

The relationships between financial inclusion and agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions

The study employed a correlation test to establish the relationship between financial inclusion and agricultural commercialization amongst smallholder farmers. Correlation coefficient ranges from zero (no relationship) to one (perfect relationship). Correlation coefficients very close to zero indicate weak relationships while those very close to one indicate very strong relationships. Positive correlation coefficients indicate that the two variables change in the same direction while negative correlation coefficients indicate that the two variables change in opposite directions. The findings are based on a response rate of 81.8% (256 out of 313) (Table 1).

In Lango, the relationship between financial inclusion and agricultural commercialization ($r = 0.314$; $p\text{-value} = 0.000$) was weak. The statistics imply government's effort to promote financial inclusion is associated to a weak change to commercialization. However, the $p\text{-value}$ shows that financial inclusion and agricultural commercialization are linearly related with 99% confidence. In Buganda, the relationship between financial inclusion and agricultural commercialization amongst small holder famers ($r = -0.340$; $p\text{-value} = 0.003$) was weak and negative. The statistics imply that an effort by government to promote financial access is associated with a reduction in commercialization in Buganda. However, the $p\text{-value}$ shows that financial inclusion and agricultural commercialization in Buganda are linearly related with 99% confidence. The findings support The World Bank (2014), which recommends that governments should focus on lowering credit exposure to geographically disadvantaged areas where commercial farmers have inadequate training in financial products and services. The report suggests that commercial farmers are not educated enough on financial products to take advantage of them. In Uganda, not all commercial farmers have enough information on agricultural financing

Table 2. Regression coefficients.

Model summary	Lango	Buganda
R	0.314(a)	-0.340(a)
R square	0.099	0.115
Adjusted R square	0.094	0.103
Std. error of the estimate	6.8653	8.42049

^aPredictors: (Constant), Financial Inclusion, ^bDependent Variable: Agricultural Commercialization

in commercial banks, except in Buganda, where the practice is gradually penetrating among the educated. However, the experience seems to disagree with (Kikulwe et al., 2014) who established that using mobile money services is associated with increased farm profits, household income, and input usage. These related benefits of financial inclusion to agriculture take shape in an environment that has less barriers to agricultural production than financial access. Otherwise, this study shows that a number of factors limit agricultural commercialization beyond finances. The present findings disagree with Norton et al. (2014) who draw findings from developed economics regarding agricultural insurance. In Uganda, very few commercial farmers have insured their farms against natural factors. One key informant observed:

"...our effort to take a living out of agriculture is very constrained...the loans are available but tagged with exorbitant interest rates...this coupled with the unpredictable weather may lead to complete losses at times..." The study observes that agricultural commercialization in Uganda is growing under tides of nature and the volatile economy. When the season is bumper, prices drop drastically making it difficult to repay agricultural loans. When weather conditions threaten crop performance, the loss is severe that repaying agricultural loans is very difficult.

The role of financial inclusion in supporting agricultural commercialization amongst smallholder farmer's in Lango and Buganda sub-regions

To assess the role that financial inclusion plays in supporting agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions, the study adopted regression analysis. Regression is a mathematical relationship between the independent and dependent variables. The model uses R Square to assess the variation in the dependent variable accountable to the independent variable (Table 2).

Financial inclusion explains only 10% ($R^2 = 0.099$) of the variation of agricultural commercialization in Lango. In Buganda, financial inclusion explains only 11.5% ($R^2 = 0.115$) of the variation of agricultural

commercialization. The statistics imply absence of significant differences in the effect of financial inclusion on agricultural commercialization amongst small holder farmers in the two sub-regions. Secondly, the effect of financial inclusion on agricultural commercialization amongst small holder farmers is low, which suggests the interplay of other factors in both regions. It should be noted that though the effects of financial inclusion appear to be low in both communities, financial inclusion increases agricultural commercialization in Lango and decreases in Buganda. These findings seem to agree with Rubhara and Mudhara (2019) who established that subsistence farmers are likely to adopt commercial agriculture if given financial support. While it is true that inadequate financial support is one limiting factor to commercial agriculture amongst small holder farmers, it is just a microcosm to the many barriers to agriculture development in Uganda. The findings further support Prato and Longo (2012) who identified inadequate and insecure access to natural resources as responsible for the increasing income inequality and financial exclusion among rural dwellers. Not to suggest that commercialized agriculture is an activity of the rural poor, financial exclusion affects mostly the poor. The negative relationship between financial inclusion and agricultural commercialization amongst smallholder farmers in Buganda supports FAOAcademic de Centro-America (2016) who observed that informal financial services tend to be costly, lack diversity, and affects borrowers on small scale. The costs associated with transacting credit tend to inch on the profits commercial farmers are likely to get. However, whether informal or formal financial services, accessing credit in Uganda is still costly, especially among the low-income earners.

Factors hindering the growth of agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions

To assess the factors affecting agricultural commercialization amongst the smallholder farmers, the study subjected descriptive measures on a set of factors drawn from the Ugandan environment. The study used 'arithmetic mean' to show where participants' views clustered mostly, and 'standard deviation' to show where

Table 3. Factors affecting agricultural commercialization.

Variable List	Lango, N = 183		Buganda, N = 73	
	Mean	Std.	Mean	Std.
Expensive equipment	4.5	0.718	4.44	0.957
Weather changes	4.19	0.851	4.41	0.955
Droughts	3.85	1.042	3.84	1.269
Floods	3.9	1.003	3.82	1.358
Pests and diseases	4.45	0.738	4.36	0.903
Inadequate financing for long-term growth	4.27	0.75	4.41	0.879
Limited farmland	3.97	1.141	3.79	1.354
Inadequate technology	4.27	0.755	4.15	0.923
Inability to access capital	4.04	0.997	4.23	0.993
Inability to invest in modern inputs	4.11	0.811	4.11	1.061
Fluctuating prices	4.31	0.918	4.48	0.818
Inefficient marketing institutions	3.73	1.186	3.85	1.232
Poor infrastructure	3.97	1.266	3.81	1.478

Source: Field data (2020).

participants' opinions deviated mostly (Table 3). These scores were computed from a 5-point likert scale.

In Lango, the high mean scores point to expensive equipment (mean = 4.5; Std. =0.718), pests and diseases (mean = 4.45; Std. =0.738), and fluctuating prices (mean = 4.31; Std. =0.918) as key among the limiting factors to agricultural commercialization. In Buganda, high mean scores point to fluctuating prices (mean = 4.48; Std. =0.818), expensive equipment (mean = 4.44; Std. =0.957), weather changes (mean = 4.41; Std. =0.955), and inadequate financing for long-term growth (mean = 4.41; Std. =0.878) as key among the limiting factors to agricultural commercialization. The factors limiting agricultural commercialization in both communities, based on mean scores are expensive equipment, and fluctuating prices. While the mean scores do not reveal unique patterns of concentration of opinions, a comparison of standard deviations shows fluctuating prices as the most important factor limiting agricultural commercialization in both communities. In both communities, standard deviations indicate that poor infrastructure is not a worrying problem to agricultural commercialization. The findings seem to disagree with IPCC (2012) and Tambi (2018) who argued that climatic change has the greatest effect on agricultural production. Climatic change affects agricultural productivity contextually. For instance, farmers who cultivate in wetlands are least likely to be affected by climatic changes since wetlands do not dry completely. Similarly, farmers in mountainous areas are least likely to be hit by climatic changes, especially those that are situated on the windward side of the mountain. The findings in Buganda region agree with Levine (2005) and Shiferaw et al. (2015) who relate agricultural productivity to access to credit. Buganda region is near Uganda's capital city,

Kampala, where financial services are easily available. However, there are isolated pockets of commercial agriculture in Luwero and Masaka, which are known for pineapples, and coffee production respectively. Wakiso for example is a city suburb with very small pockets of commercial agriculture on limited farmland. Therefore, access to finance in this region is negatively associated to agricultural commercialization.

Hypothesis testing on financial inclusion and agricultural commercialization

The study adopted Chi-Square results under cross tabulation procedure to test whether financial inclusion and agricultural commercialization are independent. As a guide to interpretation, an asymptotic significant value (Asymp. Sig. <0.05) indicates that the variables are related while Asymp. Sig. >0.05 indicates that the variables are independent (Table 4).

In Lango, Asymp. Sig. <0.05, therefore rejecting the null hypothesis, which indicates that financial inclusion and agricultural commercialization are related. In Buganda, Asymp. Sig. <0.05, which also leads to the rejection of the null hypothesis, indicating that financial inclusion and agricultural commercialization are related. Based on the asymptotic significant values of the cross tabulation, financial inclusion and agricultural commercialization are related in both Lango and Buganda. The study rejected the null hypothesis that financial inclusion does not affect agricultural commercialization amongst smallholder farmers in both Lango and Buganda sub-regions; and accepted the alternative hypothesis that financial inclusion affects agricultural commercialization amongst small holder

Table 4. Chi-Square results.

	Lango	Buganda
	Asymp. Sig. (2-sided)	Asymp. Sig. (2-sided)
Pearson Chi-square	0.000	0.000
Likelihood ratio	0.774	1.000
Linear-by-linear association	0.000	0.003
Number of valid cases	183	73

The study set H_0 : = Null hypothesis, and H_A : = Alternative hypothesis. H_0 : Financial inclusion does not affect agricultural commercialization amongst smallholder farmers in Lango and Buganda sub-regions; H_A : Financial inclusion affects agricultural commercialization amongst smallholder's farmers in Lango and Buganda sub-regions.

Source: Field data (2020)

farmers in both Lango and Buganda sub-regions. The study is likely to obtain the same conclusion from over 95% of the sampled objects. Notwithstanding, directional measures indicate that financial inclusion positively affects agricultural commercialization in Lango, and not in Buganda.

CONCLUSION AND POLICY IMPLICATIONS

Agricultural commercialization is one step forward to poverty alleviation in a developing country like Uganda but its success will persistently lean on a set of economic and natural variables. This study has identified financial inclusion as one variable that can predict the success of agricultural commercialization amongst smallholder farmers, though it varies from one region to another. In Lango, government has a positive effect on financial inclusion in agricultural commercialization; while in Buganda, it is a negative factor. In Lango, land is communal and therefore smallholder farmers need to access finances to purchase or rent land for commercial farming. In Buganda, however, land is freehold, which makes smallholder farmers to inherit chunks of land from their parents. They need financial assistance to boost productivity than acquiring land. Nevertheless, these are relative positions in both Lango and Buganda because the overall input of financial access to agricultural commercialization is generally low. Of course, in Lango, farmers do not have collateral security to pledge before financial service providers while in Buganda, especially in Wakiso, land is expensive for commercial farming due to rapid urbanization. The study has established some common factors that limit agricultural commercialization amongst smallholder farmers in both Lango and Buganda that is expensive equipment and fluctuating prices while poor infrastructure is no longer a big worry. The existence of these factors and some shadows in financial access gave a strong ground to reject the null hypothesis that financial access does not affect agricultural commercialization amongst smallholder farmers in both Lango and Buganda sub-regions. We therefore recommend that, financial service providers should

continue revising their lending terms downwards to reach smallholder farmers, many of whom lack collateral security to pledge for credit. While the government takes credit for improving infrastructure, government, through her policy organs like Ministry of Agriculture, should provide buffer prices against price fluctuations. This study contributes a unique relationship between financial inclusion and agricultural commercialization amongst smallholder farmers by drawing from a plethora of a comparative analysis. Future researchers should consider examining how price fluctuation could be handled to support smallholder farmers to increase productivity.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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