FINANCIAL INCLUSION AND AGRICULTURAL COMMERCIALIZATION OF SMALLHOLDER RICE GROWERS IN KILOMBERO DISTRICT: THE MODERATING EFFECT OF INSTITUTIONAL SUPPORT

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CERTIFICATION

The undersigned certify that they have read and hereby recommends for acceptance by the Open University of Tanzania a thesis titled: ***"Financial Inclusion and Agricultural Commercialization of Smallholder Rice Growers in Kilombero District: The Moderating effect of Institutional Support"*** in fullfulment for the requirements of the Degree Doctor of Philosophy (PhD) of the Open University of Tanzania.

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DECLARATION

I, Francis William Mmari, declare that, the work presented in this dissertation is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in fulfillment of the requirement for the degree of Doctor of Philosophy (PhD).

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Signature

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Date

DEDICATION

This thesis is dedicated to my famliy which provided me with the moral and material support I needed to finish the work

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ABSTRACT

This survey study was conducted in Tanzania to assess the effect of financial inclusion on agriculture commercialization of smallholder rice growers in Kilombero district under the moderating effect of institutional support. Primary data were collected using structure questionnaires from ten villages in five wards of Kilombero district. Data were analyzed using multiple regression techniques with the help of IBM SPSS and Hayes PROCESS macro, while confirmatory factor analysis was done with the help of IBM Amos software. The results obtained suggest that financial services access and usage had a positive effect on commercialization while financial literacy had an insignificant positive effect. The result of the study also indicates that source of income (if agriculture) and farming experience had positive effect on commercialization while age had a negative effect. In case of moderating effect of institutional support, institutional law and regulation and institutional cultural cognitive show negative moderating effect on the relationship between financial inclusion and agriculture commercialization. So theoretical the study has proved that institutional theory construct affect the relationship between financial inclusion and agriculture commercialization. The study recommends that to improve the level of commercialization, policymakers and government are required to set policies which reduce the cost of accessing financial services such as high interest, bank fees, and collateral requirement. In addition financial service providers required to provide programs and activities intend to improve financial literacy and improve efficiency of rules and regulations governing financial services access and usage.

Keywords: *Financial inclusion, agriculture commercialization, institutional support, financial access, financial usage and financial literacy*

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LIST OF ABBREVIATIONS

AGC	Agriculture Commercialization
AMOS	Analysis of Moment Structure
ASDS	Agricultural Sector Development Strategy
ATM	Automatic Teller Machine
AVE	Average Variance Extracted
BOT	Bank of Tanzania
CC	Cultural Cognitive
CFA	Confirmatory Factor Analysis
DC	District
EA	East Africa
FA	Financial access
EFA	Exploratory Factor Analysis
FE	Farming Experience
FI	Financial Inclusion
FL	Financial Literacy
FU	Financial Service Usage
GDP	Gross Domestic Product
HCI	Household Commercialization Index
HSAG	Household engage in agriculture
HSRP	Household Engage In Rice Production
IFAD	International Fund for Agriculture Development
IMF	International Monetary Fund
IN	Institutional Norms

IRA	Irrigation Availability
IS	Institutional Support
IT	Institutional Theory
KYC	Know Your Customer
LDC	Least developed countries
LR	Law and Regulation
MMS	Mobile Money Services
NBS	National Bureau of Statistics
NFI	National Financial Inclusion
RMSEA	Root Mean Squire Error of Approximation
SI	Source of Income
SPSS	Statistical Package for Social Science
SSA	Sub Saharan Africa
TC	Transaction cost
TCT	Transaction Cost Theory
UFA	Universal Financial Access
URT	United Republic of Tanzania

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Overview

This chapter introduces the concept of financial inclusion by providing its rationale to different economic sectors. It also discusses the relationship between financial inclusion and agriculture commercialization, briefly points out the effect of institutional support on agricultural commercialization, identifies the research problem, develops the research objectives, sets the justification for the research and finally provides limits on the scope of the study.

1.2 Background to the Study

The agriculture sector is the economic backbone of the majority of Sub-Saharan Africa (SSA) countries (IFAD, 2017). The sector accounts for 21.42%, 34.12% and 26.9% of the GDP of Nigeria, Ethiopia and Tanzania, respectively (Central Bank of Nigeria, 2019; Janssen & Nonnenmann, 2017; BOT, 2021). Also, the sector contributes more than 80% of employment in SSA, while in Tanzania, it employs 70% of the country's population; and in Kilombero district, the sector provides more than 80.4% of the employment (IFAD, 2017, Lyanga, 2018, NBS, 2012). In terms of export earnings, the sector contributes 40% in SSA.

Despite its significant contribution to the economy, employment and earnings, the sector suffers from a chronic inability to access finance from financial institutions (Fowowe, 2020). For example, in Nigeria, the sector received only 4.2% of commercial bank lending in 2019, while in Tanzania, it received 8.7% in 2018/2019

financial year (National Bureau of statistics, 2019, BOT Report, 2019). This suggests that the sector faces difficulties in accessing formal finance.

A study by Okeye, et al., (2016) mentions high transaction cost (TC) as the main challenge that hinders smallholder commercialization efforts. TC incurred in accessing financial services include the cost associated with fees and minimum balance, lack of physical access, long loan processing time, strict documentation and collateral requirement (Bongomin et al., 2018). However, Studies suggest that presence of financial institutions like offices, branches and personnel can promote access to financial services, especial in rural areas where the majority of farmers dwell (Demirguc-Kunt, Klapper & Singer, 2018; Bongomin, et al., 2017). This is because the existence of a bank in a community reduces transaction costs in accessing bank services such as long distance from financial institutions; cost associated with opening accounts, savings and requesting for access to credit (Abu & Haruna, 2017). Thus, the reduction of these costs encourages individuals to access formal financial services.

According to institutional theory (IT), Institutions' structure, political, economic or social interactions (North, 1990). Institutions are made up of formal constraints (rules, laws and constitutions) and informal constraints (norms, convention and self-imposed code of conduct) and their enforcement characteristics (North, 1991). Financial institutions such as banks and microfinance institutions operate under certain rules and regulations. The rules and regulations may act as incentives or disincentives for access and use of financial services. Kodongo (2018) show that regulations such as agency banking improves financial inclusion but know your customer and capital and Liquidity macro-prudential regulation harm FI.

A study done in Uganda reported law access to formal financial services due to existing laws & regulations which did not support inclusive economic growth (Care International, 2014, as cited in Bongomin et al., 2018). Also, Naegels et al. (2017) show that female entrepreneurs in Tanzania mainly use informal sources because formal sources bear higher interest rates and require high collateral and personal guarantee, so they are more expensive compared to the informal source.

Also, financial institutions are driven by norms and cultural cognitive factors that prevail or are observed in the area to which the institutions belong. According to Seman (2016), institutions often take actions not only because of economic considerations but because they are expected to follow financial norms e.g. the norms of commercial bank is to charge interest, but for Islamic banks which operate under *sharia law*, interest is prohibited. Also, individual or society norms and cognitive factors affect access and usage of finance. According to Naegels et al. (2017), among the reasons women entrepreneurs do not access formal loans is the perception that access to formal loans is more difficult for women than for men. Other factors that constrain access to finance include lack of confidence with financial institutions, language barriers, and the perception that services are not suitable for poor people (Seman, 2016).

In addition another actor which, may affect financial inclusion (FI) is financial literacy (FL). According to FL theory by Ozili (2020), FI can be archived through education that increases the FL of the citizen. According to Ozili, FI programmes and activities directed at improving FL to members of the population will increase their willingness to participate in formal financial sectors. The idea by Ozili is supported by other early

scholars like Bongomin et al. (2020), Agyei et al. (2019), Lusardi et al. (2017) and Lusardi and Mitchell (2014), who argue that financial literacy equips individuals with knowledge and skills which enable them to evaluate sophisticated financial products offered by financial institutions. This is due to the fact that FL is linked with borrowing, saving and spending patterns among diverse sections of consumers of financial products.

Lack of access to financial services, especial credit, lead to farmers' inability to access essential agriculture input, hence lower their productivity and hinder their participation in the market (Kabit et al., 2016). Also, to engage in commercial farming requires availability of a market for agricultural products. According to transaction cost theory (TCET), markets are affected by transaction costs (TC) resulting from asymmetrical and incomplete or unequal access to information among economic argent (Williamson, 1979). Scholars such as Ochieng et al. (2015) and Okoye et al. (2016) also show that access to market information is a major determinant of access to the market.

Efforts have been made globally and at the country level to improve FI level as well as agricultural commercialization. In case of FI World Bank made a global call for universal financial access (UFA) to capture unbanked citizens into formal financial services by 2020 (Achugamonu et al., 2020). Tanzania also made some initiatives to improve FI by establishing a national financial inclusion framework (NFIF). The project covers the period from 2014-2022 and aims to enhance the level of access and usage of formal financial services (NFIF, 2018).

On the part of agricultural commercialization, various initiatives have been taken to increase food production for domestic consumption and exportation. Among the strategies include countries adopting new or current agriculture systems (Chandio et al., 2020). In Tanzania initiative taken by the government was the establishment of agriculture sector development strategy (ASDS) phase I & II (URT Report, 2015). ASDA-II covers the period of 2015-2025 and aims to achieve the agricultural growth rate of 6%, through adoption of yield enhancing technology such as fertilizers, best seeds, reduce on-farm and post-harvest losses, improve access to credit and transfer the sector into modern, commercial, highly productive and competitive at national and international market (URT Report, 2015).

Despite efforts being made to increase FI but Global FI report indicates that about 1.7 billion adults globally remain unbanked, with the majority living in developing countries like Tanzania (Demirguc-Kunt et al., 2018). In addition, the report indicates that account ownership is high in developed countries, where 94% of adults own an account, but less in developing countries, where the share is 63% and in Tanzania, adults with an account are 47%. Account ownership is a safe way to store money and build saving for future, make it easy to access credit, and send or receive remittances. Borrowing behaviour also reported to differ between developed and middle- or low-income economies. In developed countries, the most common sources of credit is formal sources, while in developing economies is family and friends (Global Findex, 2017).

Empirically number of studies has been done on commercialization and FI. Studies on commercialization include studies done in Kenya and Zimbabwe by Krause et al.

(2019) and Rubhara & Mudhara, (2019). Both studies look on determinant of commercializing and find that access to market and production information, extension service, access to finance, access to contract draft power and distance to market affect commercialization.

Other studies include Arymo, et al., (2019) looks at the drivers of commercialization and profitability of indigenous chicken producers in Uganda, Mwema & Crewett (2019) looks on social network and commercialization of vegetable producers in Kenya and Alexander et al. (2017) looks at commercializing smallholder production in Lao people democratic republic. However, majority of these studies looks on horticulture and cash crops commercialization. Studies look on food crops commercialization are very rare (Abu & Haruna, 2017, Ochieng et al., 2019).

Empirical studies on FI include study by Ghosh & Sahu (2020), which involves 26 Asian countries and aims to measure and compare countries' achievements in terms of degree of FI from 2013-2017. The study found difference in level of FI achievement between high and low income groups of countries where high ranked countries come from high and upper middle income group while low ranked come from low middle income. Another study by Evans, (2018) examines the relationship between internet, mobile phones and financial inclusion in Africa. The study finds that internet and mobile phones are associated with increased level of FI in Africa.

Studies done in East Africa (EA) include study by Bongomin et al. (2020), which examine the moderating effect of financial intermediaries in the relationship between FL and FI in Uganda. The study finds that financial intermediaries significantly moderate the relationship. Another study done in Kenya by Kodongo (2018) examines

the relationship between financial regulation and FI. The study finds that agency banking regulation and FL can improve financial access, and know your customer rule and capital & liquidity macro-prudential regulation can harm FI. Lastly, a study done in Tanzania by Lotto (2018) examines the determinant of FI in Tanzania. The study finds that gender, education, age, and income are the potential factors that affect FI in Tanzania. However, none of these studies looks at the link between FI and Commercialization.

Despite significant number of studies done, either on FI or agricultural commercialization, very rare studies, especial in Africa, look at the link between FI and agriculture commercialization. So far, there is one study in Ghana (Abu and Haruna, 2017), which examines the relationship between FI and agriculture commercialization of smallholder maize farmers. To the researcher's best knowledge, little is known about studies done in East Africa, which look on the link between FI and agriculture commercialization.

Also, for studies done using TCT on either FI (Hoang and VU, 2020; Sekyi et al., 2017; Nzie et al., 2017) or agricultural commercialization (Murith and Matz, 2014; Mwema and Crewett, 2019; Rubhara & Mudhara, 2019; Mbapila et al., 2019) none of these studies link FI and agricultural commercialization. In addition, none of them look on the moderating effect of institutional support in the relationship between FI and agriculture commercialization. So both studies indicate that TCT ignores the moderating role of institutional pillars of regulative, normative and cultural cognitive under IT, which guide contract enforceability and information sharing to lower TC in commercialization process. Therefore the purpose of this study is to examine the

moderating role of IS in the relationship between FI and agriculture commercialization.

1.3 Statement of the Research Problem

Many developing nations, including Tanzania, have put in place initiatives to improve financial access for their unbanked population (Asuming et al., 2018). The National Financial Inclusion Framework (NFIF) for Tanzania was established to cover the period from 2014-2022 (NFIF, 2018). The project has two phases; phase I cover the period from 2014-2016 and intends to increase financial service access, while phase II covers the period from 2018-2022 and intends to improve financial services usage.

Despite the effort taken by developing countries, little is known about how these programs have affected the degree of financial inclusion in SSA, particularly for the rural population (Asuming et al., 2018). Studies show that 40% of the poor population in Tanzania majority living in rural areas, had account ownership (Demigunce-Kunt et al., 2018). Also, the authors reported that 62% of the unbanked population worldwide has only completed elementary school. Still, the percentage is higher in some economies like Tanzania, where 86% of unbanked adults have elementary education (Demigunce-Kunt et al., 2018). In addition, the region of Tabora, Simiyu, Kagera and Morogoro have 31% of committed farmers in the county who are financial excluded (Jeckoniah et al., 2020).

Several studies have, however, demonstrated that access to financial services has a positive effect on farmers' market participation or commercialization (Rubhara & Mudhara, 2019; Abu & Haruna, 2017; Ochieng, et al., 2019; Narayanan, 2016;

Ogundeji et al., 2018). However, because of the different contexts and because these studies were carried outside Tanzania, they serve as the basis for conducting this study. The rationale of addressing the current contextual gap is supported by Kabit et al. (2016) and Mihreties (2020), who asserted that a low level of financial services access, especially credit, leads to farmers' inability to access essential agriculture input, so reduces farmers productivity and participation in market /commercialization.

In addition, Rice commercialization is an important and effective approach to tackle hunger in rural farming systems and reduce poverty since it can increase crop yield and raise income among family members (Jeckoniah et al., 2020). According to Mosha et al. (2018), rice production account for the majority of the household income in Kilombero district, making up 73% of the average total household income.

Moreover, although very few studies look at the link between financial inclusion and agriculture commercialization (Abu & Haruna, 2017), this study switched focus to institutional factors that moderate the relationship between financial inclusion and agriculture commercialization. Take into account that institutional structure political, economic and social interaction (North, 1990). Moreover, to the best of this review, no specific studies have attempted to address the moderating effect channelled through institutional support in such a relationship. Thus this study aims to show how institutional theory constructs moderate the link between financial inclusion and agriculture commercialization.

Additionally, a large number of studies have been done using commercialization index as a dependent variable, thus employing either Tobit or Logit regression

analysis and endogenous switch regression analysis to analyze factors influence commercialization and commercialization intensity (Abu & Haruna, 2017; Ayele et al., 2021; Kabit et al., 2016; Kissoly et al., 2020; Mihretie, 2020). However, Tobit or Logit model is recommended when the dependent variable is censored from below, above or both (Kissoly et al., 2020).

Since in this study dependent variable was not censored, the study switched from previous studies by employing multiple regression analysis and hierarchical regression analysis in analyzing the relationship between FI and AGC as well as the moderation effect of institutional support in the relationship between FI and AGC. Also, the study is the first to apply Hayes PROCESS macro with the help of Johnson-Neyman to assess the moderating effect of institutional pillars in the relationship between FI and AGC. The advantage of using Johnson Neyman is that it enables the researcher to identify the conditional effect of the moderator in the relationship between independent and dependent variables.

1.4 Research Objectives

1.4.1 General Research Objective

The study intends to examine the relationship between financial inclusion and agriculture commercialization of rice growers in Kilombero district moderated by institutional support.

1.4.2 Specific Research Objectives

Specifically, the study intends to:

(i) To examine the effects of financial services access on agriculture commercialization.

(ii) To examine the effect of financial service usage on agriculture commercialization.

(iii) To examine the effect of financial literacy on agriculture commercialization.

(iv) To examine the moderating role of institutional support on the relationship between financial inclusion and agricultural commercialization.

1.5 Scope of the Study

The scope of this study is confined to financial inclusion factors that influence agricultural commercialization and the moderating effect of institutional support on the relationship between financial inclusion and agricultural commercialization. The study was conducted in Kilombero district, Morogoro region. The region has been selected because by June 2019, it was the second region after Mwanza, with the largest population engaged in agriculture (URT, 2020).

In 2018/2019 season Morogoro was a leading region in rice production, where it produced 761,300 tons, followed by Mbeya 336,230 and Tabora 234,280 tons (URT, 2020). In addition, agriculture plays a vital role in the economy of Kilombero, where 80.4% of the district engages in agriculture activities (NBS, 2012). Also, some recent data show that by 2019 the district lead in a number of the population engaged in agriculture activities in Morogoro, followed by Mvomero and Morogoro distinct (URT, 2020).

Another rationale for selecting the study area is based on the fact that rice commercialization in Kilombero is believed to be a fundamental driver for economic growth, poverty alleviation, and improvement of the livelihood of men and women

(Jeckoniah et al., 2020). However, prior to that, a study by Mosha et al. (2018) found that small size of irrigation plots is among the factors that prevent farmers in Kilombero from transferring from subsistence farming to commercial farming. Another factor which may hamper farmers' effort to commercialize is lack of access to finance (Kabit et al., 2016; Mihreties, 2020).

Studies show that access to affordable finance, especial credit enables farmers to buy agricultural inputs and improve their production beyond what is needed to meet food security of the household and sale the surplus, thus increase farmers' income and reduce poverty (Abu & Haruna, 2017; Fowowe, 2020). Therefore in this study, it was important to study the relationship between financial inclusion and agricultural commercialization and examine the moderating effect of institutional support in such relationship.

1.6 Significance of the Study

Many nations are taking various actions, such as adopting new and modern agricultural systems and technologies in order to increase food production for both commercial and food security purposes (Chandio et al., 2020). Specifically, Tanzania established Agriculture Sector development strategy (ASDS), which had two phases. Phase II covers the period 2015-2025 and among its objectives is to achieve agriculture growth rate of 6% and improving access to credit in order to enhance commercialization (URT Report, 2015). Therefore, enhancing commercial farming is crucial for the agriculture sector in LDC nations including Tanzania. However, it is important to address the challenges facing smallholder farmers' transformation from subsistence farming to commercial farming. The alignment of financial inclusion and

institutional support is a strategic approach to improve commercialization. It is therefore important to identify factors that prevent agricultural commercialization of smallholders farmers in LDC particularly Tanzania in order to improve their participation in the market.

Moreover, the study aims to close a contextual gap because no similar research has ever been done in Tanzania. Additionally, there are few studies that examine the connection between financial inclusion and agriculture commercialization (Abu & Haruna, 2017). So this study will pave the way for other researchers from LDC and SSA to extend on financial inclusion and agriculture commercialization. The introduction of institutional theory as a moderating variable in this study filled a theoretical gap that improves a contribution to the theory.

Information obtained from this study is expected to inform policymakers and financial service providers on how to improve financial inclusion. Specifically, it will help policymakers to revise financial law and regulation so as to increase the level of financial service access and usage, especially for the poor and marginalized society. In addition, this study has advised financial service providers and the government to prepare financial literacy programs that aim to positively transform the thinking of poor and marginalized populations so that they can make better financial decisions and choices based on their existing frames without distortion.

Additionally, Findings from this study contribute to the debate on agricultural transformation and rural economic transformation as well as policy targeting increasing smallholder income and reducing rural poverty, especially in SSA like

Tanzania. The relationship between FI and AGC is expected to have an economic impact on smallholder farmers because inclusive financial services help to counter the poverty of low income consumer as it ensures financial services available at affordable cost (Abor et al., 2018). Since at the end, results show that financial inclusion promotes commercialization, then agriculture policy must prioritize financial inclusion in order to transform the agriculture sector into a modern and commercial farming sector as stipulated in ASDS phase II of 2015-2025.

1.7 Organization of the Thesis

The thesis report consists of six chapters. Chapter two provides conceptual definitions of key terms in the study, discusses theory relating to commercialization and institutional support, previous empirical research on financial inclusion and commercialization relationship and institutional support. Chapter three explains and critically evaluates this study's data, method and methodology. Chapter four discusses the study's data analysis and hypothesis testing, chapter five covers the discussion of the study's findings, and chapter six offers the study conclusion, recommendation, study limitations, and areas for future research. The list of referenced resources has been provided, along with the appendices.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter examines and analyzes literature related to financial inclusion and agriculture commercialization. Both theoretical and empirical evidence were critically reviewed, and knowledge gaps were identified for future studies. Also, conceptual definitions of the key terminologies used in this study are provided in this chapter.

2.2 Conceptual Definition

2.2.1 Financial Inclusion

Financial inclusion (FI): FI is defined as the "Provision of access to financial service to all members of the population, particularly the poor and excluded member of the population" (Ozil, 2020). Babajide, et al., (2020) define FI as the provision of cost effective, relevant, suitable and reliable financial services to the low-income group in society. Simply financial inclusion can be explained as a process of increasing access to financial services to majorities' especial poor and marginalized people.

2.2.2 Agriculture Commercialization

Agriculture commercialization (AGC): Is defined as a process of transforming agriculture from subsistence to commercial farming (Ochieng et al., 2016). Also, explained as a policy, which advocates transforming agriculture from subsistence to commercial farming (Hagos et al., 2019). Simply agriculture commercialization is a process that involves the transition from substance farming to increased market oriented production and aims to enable many smallholder farmers to get out of the poverty trap.

2.2.3 Institutional Support

Institutional support (IS): Refer to the financial and technical support from the government or its agencies and nongovernmental, which provide firm or individual with critical resources that they may use for innovation and development (Shu et al., 2019). In this study, Institutional support refers to the providers of both financial and non-financial resources to rice grower farmers in Kilombero districts.

2.3 Theoretical Review

2.3.1 Transaction Cost Economic Theory

Transaction cost economic theory (TCET) originated from the work of Coase in 1937, who build on Pigou's work to develop a powerful argument about the relationship between transaction cost and necessity of the legal system (Hovenkamp, 2009). The theory has its roots in neoclassic economics and has produced new subfield such as new institutional economics (Martins et al., 2010). TCET became well organized after Williamson's (1979) work on markets and hierarchies. According to Williamson markets are driven by transaction costs created by information asymmetry, opportunism, bounded reality and asset specificity.

The theory is normally used to explain firm choice over whether to make (i.e. producing a necessary good or service internally) or buy (purchase the good or service) from outside (Williamson, 1991). The main focus of this theory is cost minimization in selecting governance forms that are mechanism of exchange. Thus, firms adopt governance forms that minimize sum of transaction costs. Like firms Individual consumer also tends to optimize their spending to derive the greatest satisfaction from their scarce resource (Cannon et al., 2014). Thus, the same

framework can be used to study individual consumer behavior toward financial inclusion and agriculture commercialization.

In the financial sector, Bapat and Bhattacharyay (2016) suggest that a good financial inclusion system must ensure timely and adequate access to both financial services and credit to low income consumers at affordable cost. The argument is supported by Sithole et al. (2021) who observe that non banking financial service users are influenced by factors which lower transaction costs such as perceived ease of use, convenience access, physical proximity, affordability of the financial service cost and word of mouth. Additionally, Ulwodi and Muriu (2017) observe that the factors that lead to financial exclusion of poor financial consumers in African countries include lack of money resources, high cost of financial services and distance to the closest financial services. Also, Ayyagari and Beck (2015) find that most prevalent hurdles to financial inclusion in Asia were high expenses, limited geographic access, and a lack of identity. Eldomiaty et al. (2020) also find that lack of identification and cost of geographical access are the most reported barriers to financial inclusion.

Moreover, Agarwal and Hauswald (2010) observe that there is information asymmetry problem in financial service provision. According to the author, financial institutions do not know much about their client/borrowers; likewise, clients/borrowers may lack information about bank prospects. Thus, to complete the market require a mechanism that promotes information sharing and availability so as to lower transaction cost. Institutions arrangement, according to Dequech (2004) is a mechanism that can facilitate information sharing that would not be available otherwise and guide contract enforceability through the rules of the game or human devise constraints that

influence the way people think and act. However, this concept has not been addressed in TCET. According to North (1990), institutions can encourage or restrain a particular actor's behaviour or action in an economic exchange that is governed by formal regulations or informal norms. Thus, poor behaviour and actions to be financially included depend on institutional pillars that either promote or limit their financial decisions and choices in the financial market (Bongomin, et al., 2018).

Additionally, in the agriculture sector, access to information is essential for making agriculture decisions relating to production, marketing, and finance. Farmers who need to sell their products have to search for information concerning the right market, price and buyers. Nzie et al. (2017) claim that several factors, including transaction costs related to information and communication, contribute to agriculture's low level of commercialization. Thus lack of information may lead farmer's to end up getting loss or discourage farmer participate in commercial farming

In fact, as suggested by Dequech (2004), institutions encourage information sharing that would not otherwise be possible and provide guidelines for contract enforceability, which reduces transaction costs. Unfortunately, TCET have failed to integrate the role of institutional pillars in enabling information sharing and guide contract enforceability, which can lower transaction cost, especial in accessing and usage of financial services as well as commercialization.

The existing and constantly expanding body of research using transaction cost theory (TCET) has demonstrated how TCET has been successfully applied to various organizational phenomena. A meta-analysis study conducted by Zhao et al. (2004) on

firms' international entries strategy indicates that studies done using TCET were 38 out of these 19 studies were on manufacturing sector, 10 studies on service sector and the remaining 9 studies failed to report industrial type. Some recent studies in finance use the theory to explain consumer behaviour and to investigate the relationship between perceived TC and willingness to use the debit card (Hoang & Vu, 2020). Other studies done in Ghana and Cameroon examine farmers' access to credit, credit constraints and productivity, and effect of mobile phone use on transaction costs related to price information search among vegetable farmers (Sekyi et al., 2017; Nzie et al., 2016).

Despite the increasing application of TCET in various organizational phenomena, there are still unanswered conceptual, theoretical and empirical questions. Even the phrase 'transaction cost needs a more precise definition. The argument is not that TCET must be abandoned, but rather it needs to be greatly expanded to address some significant problems and omissions. Although the theory exclusively focuses on minimizing transaction cost as a sole way of achieving efficiency, it has ignored the role of institutional pillars of regulative, normative and cultural cognitive in reducing transaction cost in financial service access and usage. This study expands the adoption of TCET in explaining rice grower household behaviour by testing the moderating effect of institutional pillars in the relationship between FI and agriculture commercialization.

2.3.2 Institutional Theory

Institutional Theory (IT) is widely used in social science and economic research. The earliest version of the theory is associated with the work of Philp Selznick and his

student in 1957 (Scott, 1987). The second and third version of the theory is based on the work of Peter Berger in the sociology of knowledge (Scott, 1987). Berger's idea is found in work co-authored with Luckmann, in which the main question addressed is "what is the nature and origin of social order?" According to Berger and Luckmann (1966), social order exists as a result or product of human past activities. In other words, social order is based on shared reality, which in turn leads to the creation of social interaction.

North (1991) defines institutions as humanly devised constraints that structure human interaction in three spheres: political, economic, and social. According to North, institutions determine and structure human interactions by providing incentives and disincentives for people to behave in a certain way in political, economic and social activities. Scott (2001) elucidates three analytical elements, which are regarded as institutional pillars. According to Scott, regulative, normative and cultural cognitive pillars are central building block of institutions' structure, which provides elastic fibre that governs behaviour and actions. The three elements are defined by Scott as follows.

Regulative: This is a mechanism or process which allows firms to establish rules, inspect others' conformity to these rules and, when necessary, manipulate sanctions, rewards or punishment in attempts to influence future behaviour (Scott, 2014). Normative: Involves value and norms embedded within the social network (Scott, 2014). value refers to the conception of preferred or desirable standards to which existing structure or behaviour can be assessed, while norms are ways things should be done or simply a legitimate means to pursue valued ends (Scott, 2014).

Cultural cognitive: Are shared conceptions that constitute the nature of social reality and create frame through which meaning is made (Scott, 2014). It is characterized by interpretation and conceptions of meaning by actors. In addition, Scott (2014) point out that Sense making process is reinforced through symbols such as word, sign, gesture and habit. IT provides some tools to consider how organizations and actors within institutions interact and examines the roles of organizations and how they inform and support broad social institutions (Janssen &Nonnemann, 2017). The theory has become a dominant paradigm in studies of not just organizations but also other institutions, spheres in human society (economy, politics, and education) across several social science disciplines (Jeannettes and Drori, 2019).

Among the major weaknesses of IT is that the theory has developed no central set of standard variables, and there is no consensus on the definition of key concepts or measures. However, the key elements (Regulative, normative, and cultural cognitive) identified by Scott are regarded by various scholars as the main construct of the theory. Studies have concentrated on either regulative (e.g. Barnett & Carrol, 1993, Chen et al., 2017), normative (e.g. Leeuwis & Aarts, 2011, Eijdenberg et al., 2018) or cultural cognitive (e.g. Powell &Dimaggio, 1991) and combination of any two or both three elements (e.g. Delbridge& Edwards, 2013, Oftedal et al., 2018, Bongomin et al., 2018). However, Scott (2014) observes that each element is important, although sometimes one or another element will dominate, but in a robust institutional framework, they work in combination.

One of the institutional theory's main strengths is that it provided a thorough system of causal relationships between constructs and made directional predictions of the

constructs, which allows it to make scientific predictions. For that case, the theory has been applied to explain phenomena in diverse disciplines and contexts such as Sociology, Psychology, economics and marketing (Martins &Oshagan, 1997, Levin et al., 1998, Gabre-Madhin, 2009, Yang &Su, 2014). Some recent studies applied IT exists in entrepreneurship and procurement. For example, Eijenberg et al. (2018) use the theory to investigate how culture, politics, and economic institutions prohibit or enable entrepreneurship activities.

Few existing studies on finance using IT concentrate on financial deepening (World Bank, 2010), Financial literacy (Bongomin et al., 2017), barriers to venture capital financing (Shojaei et al., 2018), and financial inclusion (Bongomin et al., 2018; Seman, 2016). In case of studies on FI a study by Seman (2016) investigated the role of financial system and other determinants in shaping FI indicated that strength of legal rights and governance has a positive and increasing effect on the level of financial inclusion. This indicates that countries with higher level of FI are influenced by the role played by legal support.

Moreover, a study by Bongomin et al. (2018), which examine the moderating role of institutional pillars (regulative, normative and cultural cognitive) in the relationship between financial intermediary and FI found that institutional pillars significantly moderate the relationship. According to Bongomin, institution act as incentives or disincentives to human behaviour in the financial market. For example, regularity can improve the safety and soundness of the financial system; quality of financial service provision includes customer protection, social, economic development and access to financial services by financial excluded poor households (Bongomin et al., 2018).

However, none of these studies examined how institutional pillars of regulative, normative and cultural cognitive can moderate the TC channelled effect that results from financial services access, usage, and literacy. Yet it is evident that institutional pillars structure the behaviour and action of household farmers, which determine their financial decision and choice and affect their commercialization behaviour.

Human behaviour is shaped jointly by the constraints, incentives, and resources provided by both formal and informal institutions, which can be more or less compatible to each other (Stephen et al., 2014). This study argues that IT structures the way rice grower farmers in Kilombero district think about the alternative financial services sources available and the alternative course of action that might affect their commercialization behaviour. Therefore, farmers' behaviour and actions largely depend on institutional frames that either promote or limit their financial decision and choices, which determine their inclusion or exclusion from access as well as their commercialization behaviour.

2.4 Empirical Analysis of Relevant Studies

In this section, several empirical studies relating to the current study are examined. In this study, access to financial services, usage of financial services and financial literacy are used to examine the relationship between financial inclusion and agricultural commercialization.

Also, institutional laws and regulations, norms and cultural cognitive are used as a moderator for the relationship between financial inclusion and agricultural commercialization.

2.4.1 Financial Service Access and Agriculture Commercialization

Finance act as enabler for farmers in the purchase of different types of agricultural implements (Pandey et al., 2018). However, access to finance depends on the presence of financial intermediaries such as bank, fiancé houses, microfinance banks and other licensed institutions, which play a role of pulling funds from the surplus unit and lend it to the deficit unit on request for investment or other needs (Candiya et al., 2017). Abu & Haruna (2017) also observe that communities with Banks, public transport and motorable road are more likely to be financially included. This implies that a bank in a community not only stimulate participation but also reduce transaction cost in accessing bank services.

Among the major challenge facing smallholder farmers' productivity in LDC is access to credit (Hussein & Thapa, 2016). However, a study by Sekeyi et al. (2017) shows a negative relationship between credit and production but access to credit among farmers ensures use of improved inputs, thus result into increase in productions and farmers participation in commercial market so, lead to improvement in household welfare and poverty reduction (Twumasi et al., 2019).

Access to finance can also be made easy through use of technology. A study by Hoerning and Bourreau (2016) recognizes mobile money services as a tool to enhance financial inclusion. Mobile money services improve access to financial services for the un-banked population; thus, mobile banking is the extension of banking service delivery through a mobile phone (Hoerning & Bourreau, 2016, Gibney et al., 2015). Such services in Tanzania include M-Pesa, Tigo Pesa, Air tel money, T-Pesa and Hallowpesa.

Mobile money services facilitate cash storing and remittance over the phone, and the services are easily available for all kinds of people, from the poor to the rich. Thus, entering of new financial service providers, such as mobile money service providers and bank agency services providers in the market pave a way for provision of various financial products and services that may suit the economic status of the poor. Access to affordable financial services enables farmers to save and invest more, have alternative means of making and receiving payments and they can easily obtain credit to expand production hence promote commercialization (Abu and Haruna, 2017).

H1: *Financial services access positively affects agriculture commercialization*

2.4.2 Financial Service Usage and Agricultural Commercialization

Financial service usage refers to the use of different available financial services (Demirguc-Kunt & Klapper, 2012). Also, according to Sarma (2008), as cited in Pham et al. (2018), usage indicates whether those available and accessible financial services are in fact, utilized. The existence of a bank in a community is like an implicit and explicit advertisement strategy for farmers to participate in financial services such as opening bank accounts, saving, and requesting access to credit (Abu and Haruna, 2017). This implies that the existence of financial institutions affects commercialization by providing a chance to receive and save proceeds from sales and eventually encourage farmers to engage with the institution to access credit.

Credit availability enables farmers to purchase seeds of improved variety, high efficiency pesticides, and fertilizers (Akudugu, 2016). The use of improved agriculture inputs affects agriculture production yield per acre after controlling for other factors such as education, family size, gender etc. (Rahman et al., 2014,

Abdallah, 2016; Chandio et al., 2018). In addition, access and usage of financial services promote human capita and may encourage business set up by allow an individual to invest in different areas, including agriculture (Matekenya et al, 2020), thus encourage engage in commercial farming.

H2: *Financial service usage positively affects agriculture commercialization*

2.4.3 Financial Service Literacy and Agricultural Commercialization

Financial literacy (FL) combines knowledge, skills, attitude and behaviour necessary to make sound financial decisions (Kodongo, 2018). According to World Bank (2014), FL is correlated with consumer ability to make informed financial decisions and having a bank account, especially in low-income countries. FL has a relationship with the level of education of an individual. In the study of the relationship between money lenders and farmers, Balachandran and Dhal (2018) found a negative relationship between education level of a farmer and dependence on informal loans, i.e. highly educated farmers tend to be reluctant to depend on informal sources of finance. Another study by Kodongo, (2018) also shows that low FL is a significant inhibitor of formal financial service access.

Financial knowledge and awareness facilitate effective product use by helping poor households to develop skills to compare and select best financial products which suit their needs (Bongomin et al, 2016). Also, a study by Kodongo, (2018) found that agency banking and FL positively and significantly affect financial inclusion. The author concludes that low FL is one of the greatest enemies of consumption of financial services, whether formal or informal. A study by Babajide et al. (2020)

indicates that an individual without any formal education is less likely to own a bank account. Another study done by Jamison et al. (2014) indicates that FL increase level of saving in youth club in Uganda. Thus FL increases likelihood of farmers' access to financial services in general.

On the part of access to credit which can enable farmers to afford buying agricultural input so as to increase productivity and their income, studies done by Twumasi et al. (2020) and Sekyi et al. (2017) indicate that level of education has significant positive impact on access to credit. Sekyi (2017) conclude that literacy is the key to stimulating credit access. Thus unlike illiteracy farmers, literacy farmers are able to assimilate credit information, gather knowledge and better understanding of borrowing dynamics, thus improve their ability to access credit.

H3: *Financial literacy positively affects agriculture commercialization*

2.4.4 Moderating role of Institution Law & Regulation on the Relationship between Financial inclusion and Agricultural Commercialization

Financial institutions are financial intermediaries, which create link between the part with surplus funds and the part which face deficient (Candiya et al., 2017). However the institutions operate under certain rules and regulations set by international and national financial bodies, Government and financial institution themselves. The existing law and rules regarding financial market in a particular national environment promote certain types of behavior or restrict other for accessing and using financial services (Bongomin et al., 2015). World Bank, (2002) as cited in Bongomin et al. (2015), suggest that financial market can work efficiently if they have rules and laws which influence future behaviour

Know your customer (KYC) is one of the regulations governing financial institution operation set by IMF and World Bank (Mugarura, 2013). KYC require banks to identify who their customer are and continuously generate data about them (Mugarura, 2019). Among the factors mentioned to affect account ownership in Cameroon include too much requirement such as proof of identification and other document needed to open account (Ojong, 2017). Thus, KYC may be one of the barriers for financial access, and usage as people with no official government document tend to be discriminated or prevented from access to mainstream banking services (Mugarura, 2019; Kodongo, 2018).

Another factor caused by tight bank regulation is collateral requirement. According to Sekyi et al. (2017) lack of collateral in form of property and stable employment reduce the possibility of accessing and using bank credit facilities offered by financial institutions due to the fact that financial institutions are often reluctant to lend money in absence of collateral. However, collateral requirement is important for financial institutions because they utilize it to clear borrowers' defaulted loans (Twumasi et al., 2019). Thus, farmers with no collateral are considered as risk clients to financial institutions and lack access to credit.

Kodongo (2018) propose for simplification or exemption of regulation in certain category of financial services. For example, the legislative reform that permitted flexible agency banking in Kenya resulted in a notable expansion in supply of banking services, with the number of bank agents rising by 148.5% over the three years 2012 to 2015 (Kodongo, 2018). However, the increase in banking agency service has not promoted credit facilities access or encouraged the use of investment products

(Kodongo, 2018). According to Karikati et al. (2021), a national quality financial regulatory system helps to reduce opportunistic bank behaviour of profit-making, such as minimising deposit interest rates and maximising lending interest rates. Therefore regulations that allow a greater supply of financial services boost countries' formal financial inclusion efforts.

Lastly, a change in government law, regulation and policy may support certain economic sectors. Among the strategies used to ensure farmers market for their produce is contract farming. Contract farming is the institutional arrangement under which agribusiness firm contracts the production of agriculture commodities output to farmers (Bellemare & Novak, 2017). A study by Reardon et al. (2019) show that contract farming is a mechanism which helps farmers overcome pervasive market failure.

Studies also show that to reduce transaction cost, buyers of agriculture produce tend to sign contracts with formal or informal produces organization or group of farmers (Mugwagwa, 2020).

H4a: Institutions laws and regulations significantly moderate the relationship between financial access and agricultural commercialization.

H4b: Institutional laws and regulation significantly moderate the relationship between financial usage and agriculture commercialization.

H4c: Institutional laws and regulation significantly moderate the relationship between financial literacy and agricultural commercialization

2.4.5 Moderating Role of Institution Norms on the Relationship between Financial inclusion and Agricultural Commercialization

Norms refer to the beliefs, attitudes and behaviour that the members of the group or society abide to (Miller et al., 1992, as cited in Yoon, 2017). According to North (1990), individual choices in life is determined by norms embedded in belief system which guides individual behaviour and actions. A study by Raue et al. (2019) provides that social norms are powerful nudges for changing behaviour because people tend to follow the behaviour of others around them. For example, when people face uncertainty, they tend to acquire behavioural guidance through the response of other members (Wang et al., 2014). According to Raue et al. (2019), among the reasons make people not save enough is due to uncertainty about the future; however, making social comparison can reduce uncertainty and provide motivation for improvement. Thus, norms can be effective in sanctioning various behaviours, such as attitudes toward suitable products and financial decisions (Melnyk, et al., 2013).

Studies indicate that access and use of basic financial services by poor rural households are determined by their behaviour and actions, which either promote or limit their financial decision and choices (Bongomin et al., 2018). For example, although interest charged by informal sectors, like money lenders, is higher than the one charged by formal sector, smallholder farmers prefer to borrow money from informal sector due to non-requirement of collateral and flexibility in collateral arrangement (Balachandran & Dhal, 2018). In addition, informal sectors accept a wide range of flexible collaterals such as harvest produced, land, tractor etc. (Balachandran & Dhal, 2018).

Also, informal credits are mostly delivered in a timely manner to borrowers in a way that suit their socio- economic and cultural circumstance of poor borrowers (Akudugu, 2016). Institutional norms also enhance knowledge sharing and reduce transaction costs (Wang et al., 2014). A study by Sekyi et al. (2017) shows that group membership helps farmers to reduce transaction costs and overcome information asymmetry in credit market. According to Sekyi et al. (2017), credit institutions passive group membership as collateral from perspective of collective responsibility in case of default.

In addition, the authors show that being an active member of agricultural, credit or trade group reduce possibility of being credit constrained by 2%. Thus, a well function and vibrant farmer organization enable increase access to credit, reduce credit constraints, and increase productivity due to increased access to information on market availability, and other farming information

H5a: Institutional norms significantly moderate the relationship between financial access and agricultural commercialization

H5b: Institutional norms significantly moderate the relationship between financial usage and agricultural commercialization.

H5c: Institutional norms significantly moderate the relationship between financial literacy and agricultural commercialization.

2.4.6 Moderating role of Institution Cultural Cognitive on the Relationship between Financial inclusion and Agricultural Commercialization

Cultures cognitive are regarded as shared conceptions that constitute the frames through which meaning is made (Scott, 2001). They are characterized by

interpretation and conception of meaning by actors, which are considered to be a significant factor in influencing societal attitude and behaviour (Bongomin et al., 2015; De mooij & Hofsted, 2010). Additionally, Scott (2001) emphasizes how external cultural frames influence internal interpretive processes. The cultural cognitive aspect of institutional, according to Scott (2001), aids individuals such as poor in creating meaning based on cultural guided shared conception. Thus it shapes individual beliefs, decisions and actions through implicit rules regarding what is right and what is wrong in the community (Suchman, 1995, as cited in Kazumi and Kawi, 2017).

Bongomin et al. (2015), citing World Bank (2001), provide that poor household behavior and actions toward financial inclusion depend largely on cultural institution frames that either promote or limit their financial decision and choice making, which determines their inclusion or exclusion from access and use of basic financial services. In a study of lender borrowing behaviour in over 70 countries, Kanagaretnam et al. (2014) found that culture influence lender risk-taking propensity. According to Kanagaretnam, a society with high uncertainty avoidance attitude have low tolerance for ambiguity because they feel threatened and unsecure by life uncertainties. Thus when it comes to revealing information about their business or other generating activities to lenders, borrowers tend to be less transparent and secretive (Asare et al., 2020).

However, financial transparency is essential in the credit market because lenders want as much information as possible about the borrowers to whom they extend credit. Therefore, lenders view borrowers who disclose more information as more

transparent, while those who disclose less information are seen as information opaque and unfavourable in the financial contract (Dong and Men, 2014).

Culture also creates social relationship that depicts how financial institutions operate (Onjong, 2017). A study done in Asian counties by Pham and Talavera (2018) reported severe gender discrimination in credit access due to the culture of masculinity in many of the countries in Asian region. The argument is supported by Hoang Le & Stefanczyk (2018) who found that female led business have a 34% higher likelihood of loans denied than men led business. Thus women who lack access to credit have less money to invest in various industries, including agriculture

Culture helps to build trust through cultural value and belief (Ojong, 2017), It enables formation of social relationship such as formation of farm group which act as instrumental in tackling problem of asymmetries of information which creates uncertainties and increase TC such as cost of searching for market and credit information (Bolariwa, 2020; Ojong, 2017). According to TCE some farming household have manage to reduce the cost and participate in commercialization through cooperative or farming groups (Coase, 1937 as cited in Bolariwa, 2020).

Studies also show that group membership is a significant determinant on access to credit (Twumasi et al., 2019, Sekyi et al., 2017). According to Sekyi et al. (2017), farmers who are active members of agriculture, credit or trade group are more likely to access credit. Thus easy access to credit enables farmers to increase productivity and participate in commercial farming.

H6a: Institutional cultural cognitive significantly moderate relationship between financial access and agricultural commercialization

H6b: Institutional cultural cognitive significantly moderate the relationship between financial usage and agricultural commercialization

H6c: Institutional cultural cognitive significantly moderate the relationship between financial literacy and agricultural cognitive.

2.4.7 Empirical Review of Control Variables on Agriculture Commercialization

Farming experience refers to the number of years a farmer had spent in farming activities (Mariyomo, 2018). According to Mariyomo (2018), the level of farming experience of the household head reflect human capital and high level of human capital leads to more rational decision on economic actives to be undertaken by the family. Studies indicate that increase in knowledge on farming technology result to increase in household output commercialization (Kabiti et al., 2016). Also, a study by Ademe et al. (2017) found that household decision to involve in crop output commercialization is influenced by farming experience and on-farm income.

However, Mariyomo (2018) found that farming experience had a significant negative impact on vegetable commercialization. This could be because they may have had prior negative experience in commercial farming, which led them to reduce the intensity of their farming activities. So farming experience can have positive or negative effect on agriculture commercialization. Another factor, which may have impact on commercialization is age of the household farmers. According to Mariyono (2018) age of the household, head represent maturity, emotional adulthood and physical ability. According to Adbullah (2019), age plays a significant role in commercialization because market participants' decisions are often based on one position in the family hierarchy, where senior members typically make the bulk of the

decisions. However, according to Maroyono (2018), a positive impact of household age occurs at certain ages and become negative after critical point when farmer are getting older.

Also, a study by Kidane and Zegeye (2018) found that as people grow older; their main concern for production may shift from profit maximization to risk mitigation or ensuring sustainable household food security. The argument was supported by Sekyi et al. (2021) who find negative relationship between ages and commercialization. According to Sekyi and others young farmers tend to see farming as a business intend to support their family so they are more likely to commercialize. However, Mariyano (2018) suggest that getting older has significant positive impact on commercialization when farmer start farming at young age as they have more time to learn.

Inadequacy irrigation facilities and unpredictable rainfall are among the challenges face farmers in Africa countries (Amfo et al., 2021). However, a number of studies have shown that irrigation availability is among the factor, which has impact on agriculture commercialization. A study done in Ethiopia by Tufa et al. (2014) using truncated regression analysis finds that irrigation availability is one of the factors with significant positive effect on commercialization. Also, a study by Kabiti et al. (2016) found that household commercialization is influenced by irrigation availability and farming experience. Rice production under irrigation systems, according to Amfo et al. (2021), significantly boosts farm productivity and profitability. Additionally, a study by Bidzakin et al. (2018) discovered that the availability of irrigation increased rice productivity to meet demand due to a consistent water supply. Finally, another factor, which may also have impact on commercialization is income.

According to Rabbi et al. (2019), the ultimate goal of commercialization is poverty reduction and economic development through growth of income from farming activities. According to Moriyono (2018), switching from subsistence to commercial agriculture is expected to boost farmers' income because commercial agriculture can produce higher profits than subsistence agriculture. Bolariwa et al. (2020) also observed that agriculture commercialization has a potential to increase household income and ensure food security. Additionally, Tufa et al. (2014) found that commercialization is positively related with income. I.e. the more the income from commercial farming the more likely farmer tend to commercialize.

2.5 Research Gap

The intention of conducting research is to find more knowledge from existing research gaps and to contribute to the existing body of knowledge. Following the above intensive theoretical and empirical literature review, the following new research gaps were identified: contextual, theoretical and methodological gaps in relation to financial inclusion and agriculture commercialization of smallholder rice growers in Kilombero district and the moderating role of institutional support.

Contextual Gap: From the empirical literature review above it shows that a significant number of empirical studies have been done on commercialization (Krause et al., 2019; Rubhara & Mudhara, 2019; Mwema & Crewett, 2019; Mbapila et al., 2019, Murithi and Matz, 2014). However, most of these studies looked at commercialization of horticulture and cash crops. There are rare studies, which look on commercialization of food crops (Abu &Haruna, 2017).

In addition, number of studies done on financial inclusion in East Africa (Ali, 2017; Bongomin et al., 2018a, Bongomin et al., 2018b; Bongomin et al., 2020; Lotto, 2020). However none of these studies look at the relationship between FI and Agriculture commercialization in the region. Therefore the current study provides the missing knowledge of the effect of financial inclusion on agriculture commercialization in EA. Also the study adds more knowledge on the relationship by introducing moderating effect of institutional support in such relationship.

Theoretical Gap: The study applies institutional theory as a moderating variable of which to the researcher best knowledge has never been applied in the relationship between financial inclusion and agriculture commercialization before hence filling a theoretical gap. Second TC channel effect running from financial service access, usage and literacy toward agriculture commercialization but to the researcher best knowledge no specific study have attempted to address this. So this study aims to show how TCs are moderated by institutional pillars in the relationship between FI and agriculture commercialization.

Methodological Gap: After a thorough empirical literature review, it reveals that most studies used various analytical model dependents on the nature of the data set used. Most studies on either commercialization and or smallholder farmers access to finance use either Tobit model, Probit model and or combination of Tobit and Probit model (Chandio et al., 2017; Rubhara & Mudhara, 2019; Mihretie, 2020; Twumasi et al., 2020; Ayele et al., 2021). Other studies on commercialization and or access to finance apply endogenous switch regression model (ESR), Heckman treatment effect

model and combination of ESR, ordinary least squire model (OLS) and Probit model (Abu & Haruna, 2017; Rahaman & Abdulai, 2020; Diamountene & Jatoe, 2021).

Also, Majority of the studies mentioned above use categorical dichotomous independent and dependent variables. In addition, majority of the studies on commercialization measure commercialization by using commercialization index (Abu & Haruna, 2017; Rubhara & Mudhara, 2019; Kabit et al., 2016). However, this study use same variable but modify the variables into a Likert-type scale. In addition, unlike previous studies, this study looks on the moderating effect of institutional support in the link between FI and AGC. It employed multiple regression analysis with modern analytical tools and software that had not been used in previous studies. So this study employed Hayes PROCESS macro V 4.1 and applied 5,000 bootstrapping confidence interval and Jonson-Neyman simple slope analysis to identify the level at which the moderator will have a moderating effect.

2.6 Conceptual Framework

A conceptual framework normally contains variables or key factors, which indicate the presumed relationship between them. Conceptual framework is presented either in graphical or narrative form (Saunders et al., 2019). The conceptual framework in Figure 2 below is developed based on the theoretical and empirical literature reviewed above. The model suggests that financial inclusion, which is independent variable and involves financial service access, usage and literacy, affects agriculture commercialization (dependent variable) of smallholder rice growers' farms in Kilombero districts. The framework also shows the effect of control variables, which include farming experience, age, irrigation availability, and farm income on

agriculture commercialization. In addition, the framework indicates that the relationship between financial inclusion and agriculture commercialization is moderated by institutional support.

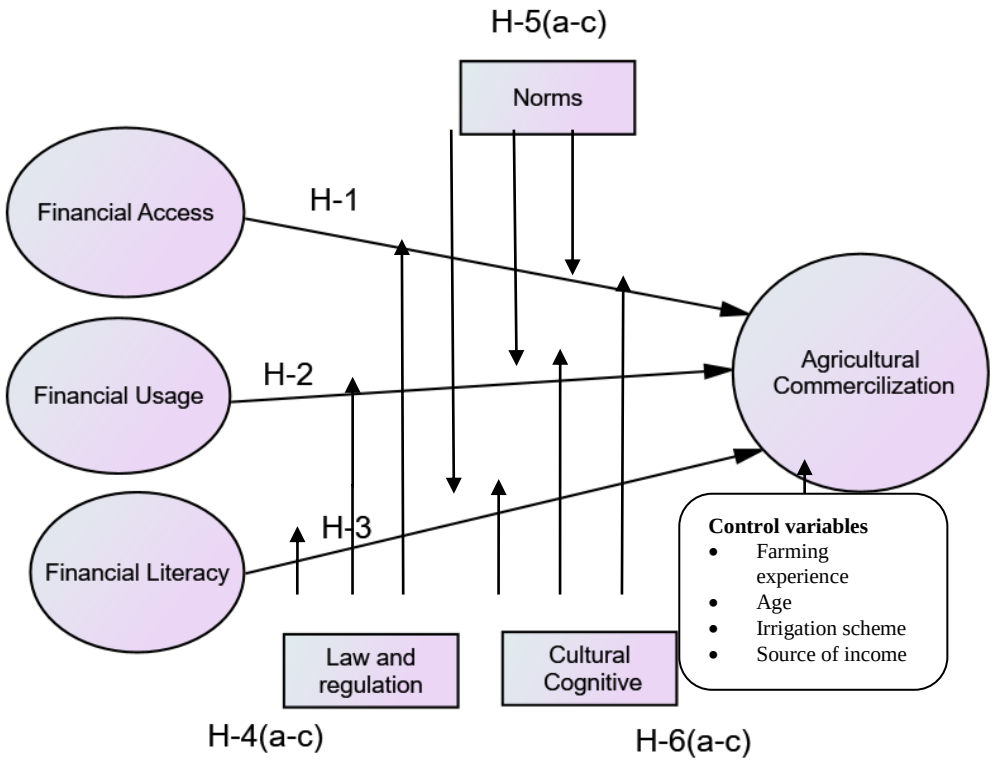


Figure 2.1: **Conceptual Frameworks for the Study**

Source: Synthesis of Literature Review (2022)

2.7 Chapter Summary

This chapter reviewed theoretical and empirical literature related to financial inclusion and agriculture commercialization as well as the moderating effect of institutional support in the relationship between financial inclusion and agriculture commercialization. The chapter begins with the definition of the key term of the study in order to obtain conceived meaning. Then followed by theoretical literature review

where two theories were reviewed i.e. transaction cost economic theory and institutional theory. Then extensive review of existing relevant empirical studies was done to establish conceptual framework and testable hypotheses. Finally theoretical, contextual and methodological research gap were identified.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter explains the methodology used to conduct this study. It starts with a discussion of the research paradigm that served as the study's direction for the researcher, followed by a description of the research design and research area. Thereafter, follows description on sample size, data sources, and statistical methods used in data collection and analysis. It also presents the methodology adopted in this study and the measurements of both dependent and independent variables.

3.2 Research Paradigm

A research paradigm is a set of beliefs that guide a researcher to decide what should be started and how result should be interpreted (Kuhn, 1970 as cited in Geener & Marteli, 2018). In other words, it is a fundamental perspective carrying a set of assumptions that guide the research process (Leavy, 2017). Thus a paradigm adopted in a particular research project has enormous importance for the research methodology. This study adopted a post-positivism research paradigm, which searches for observable facts using a deductive or theory-testing approach.

3.2.1 Post-positivism Research Paradigm

According to Leavy (2017), the paradigm is rooted in natural science and advocates an objective, patterned and knowledge reality. It’s a refined version of positivism that assume truth exists independently of the research process and can be evaluated objectively using scientific methods (Leavy, 2017). Unlike positivism, which insists that science or knowledge creation should be restricted to what can be observed and

measured and relay on theories that can be directly tested (Bhattacherjee, 2012; Greener &Mertelli, 2018). Post positivism is more sophisticated as it assert that a researcher can rationally understand even irrational human behaviour (Rubin & Babbie, 2011).

Thus the researcher was able to make a reasonable inference about the phenomena by combining empirical observation with logical reasoning (Bhattacherjee, 2012). The paradigm is commonly used in social and behavioural science. It employs a deductive approach to predict what a researcher expects to find regarding how certain variables relate to each other (Leavy, 2017). In addition, the paradigm was adopted because it sees research as never ending process, so other researchers can judge the validity of the findings of this study by testing it in later studies (Rubin & Babbie, 2011).

3.3 Research Approach

Deductive research methodology was used in this study with regard to research approach. According to Saunders et al. (2019), the deductive approach is one where theory-based hypotheses are developed, and a research strategy is created to test them. The approach is more relevant to positivism and post-positivism paradigms as it aim at theory testing (Rubin & Babbie, 2011; Sounder et al., 2019). In addition, a deductive approach, according to Scotland (2012), frequently incorporates empirical testing, random sampling methods, and controlled variables like independent, dependent, moderators, and control groups.

3.4 Research Design and Stragey

In an empirical research project, research design refers to a comprehensive data collection plan that aims to answer specific research questions or test hypotheses

(Bhattacherjee, 2012). The designed adopted in this study was explanatory design which seek to explain the observed phenomena, problem or behavior (Leavy, 2017).

The design adopted because it is relevant for survey studies, involve hypotheses testing, appropriate for quantitative studies and probabilistic sample design (Leavy, 2017; Rubin and Babbie, 2011).

Strategy adopted was cross-sectional research survey. The approach was adopted because it enables the researcher to measure both independent and dependent variables at the same point in time using single questionnaire (Bhattacherjee, 2012). Moreover, the advantages of this approach include its ability to capture and control for a large number of variables, to study the problem from multiple perspectives or using multiple theories, it is appropriate for studies involving quantitative data, and it associates with deductive approach (Bhattacherjee, 2012; Leavy, 2017). Lastly, data collected using a survey can be analyzed using descriptive and inferential statistics (Sounder et al., 2009).

3.4.1 Research Area

The study was conducted in Kilombero district in Morogoro region. The 14,918 km2 Kilombero district is located between latitudes 70°40' and 9°21' S and between longitudes 35°20' and 37°48' E. The majority of the district's land is along the Kilombero Valley, a wetland that supports both small-scale and large-scale farming. The dry season is from June to October, and the temperature varies from 25oC to 28oC.

The district was selected out of seven district of Morogoro region because the district leads in rice cultivation and production. According to data from Ministry of agriculture in Tanzania for 2019, out of 750,900 metric tons of rice produced in Morogoro region, kilombero district produces 431,200 tons, equivalent to 57.4% of total regional production (URT, 2019).

Also, out of 189,200 hectors used for rice growing in 2019 in Morogoro region 87,300 hectors came from Kilombero DC, which is equivalent to 46.2% of total regional area. Another reason according to Ministry of agriculture report Morogoro was the largest rice producer in the country with annual production of 761,300 metric tons, followed by Mbeya 336,230 tons and Tabora 234,280 tons for the 2019 season (URT, 2019). Thus the researcher thought that the area was prominent for this study.

Moreover, Morogoro is one of the SAGGOT regions, along with Dodoma, Geita, Kagera, and Mtwara, with a higher concentration of committed farmers than other areas in the country (FinScope, 2017). The regions account for 27% of the dedicated farmers in the country. Additionally, it is thought that rice commercialization in Kilombero is the primary force behind economic growth, reduction of poverty, and the improvement of both men's and women's standard of living in the study area (Jeckoniah et al., 2020). According to Mosha et al. (2018), rice production accounts for 73% of the average total household income in Kilombero district.

3.4.2 Study Population

The population for this study included household rice growers in Kilombero district. Given the challenge involved in obtaining the current data on the actual number of

rice growers in Kilombero district, the researcher relied on data from the 2012 population and household census statistics from NBS and agriculture routine data from the ministry of agriculture in Tanzania (URT, 2020). The numbers of households engaged in agriculture (HSAG) in Morogoro region by 2012 were 375,838 and by 2019 was 460,302.

Thus increase in HSAG from 2012 to 2019 is 22.47% [(460,302-375,838)/375,838] x 100. Then the percentage increase in population of HSAG, together with the number of households engaged in rice production (HSRP) by 2012, which were 205,924 used to estimate HSRP by district for 2019/2020 season as shown in Table 3.1 below. However, Gairo was excluded in estimation of HSRP for 2019/2020 session because they do not grow rice. Thus the population of HSRP in Kilombero district by 2019/2020 was 55,484.

Table 3.1: Number of Households Engage in Agriculture (HSAG) in 2012 and 2019 and Estimated Number of Households Engaged in Rice Growing (HSRG) by 2019 by District in Morogoro Region

District Name	Hsag By 2012	% Increase In Hsag By 2019	Hsag By 2019	% Of Hsag By District In 2019	% Of Hsrg By 2019	Estimated Hsrg By 2019
Gairo Dc	32,491	1.224735125	39,793	8.6	0	0
Kilombero Dc	75,047	1.224735125	91,913	20	22	55,484
Kilosa Dc	80,772	1.224735125	98,924	21.5	23.35	58,889
Morogoro Mc	27,949	1.224735125	34,230	7.4	8.04	20,277
Morogoro Dc	56,675	1.224735125	69,412	15.1	16.4	41,361
Mvomero Dc	57,806	1.224735125	70,797	15.4	16.72	42,168
Ulanga Dc	45,098	1.224735125	55,233	12	13.04	32,862
Total	**375,838**		**460,302**	**100**	**100**	**251,041**

Source: Adopted from NBS 2012 with Modification

3.4.3 Sampling Design and Procedure

Sampling techniques is a process of selecting number of individuals or cases from a large population (Leavy, 2017). According to Sounder et al. (2019), selecting the sample from the population is normally used because of resource limitations to cover the whole population. In this study, the researcher applied probability sampling, including multistage and random sampling in order to get a representative sample so as to allow generalization of the findings. The study employed four stage multistage cluster sampling techniques to get the sample.

According to Leavy (2017) and Bryman & Bell (2019), multistage cluster sampling is a probability technique which involves random selection of preexisting cluster from a population. Then each element in a cluster is sampled using random sampling. The population of this study consists of all smallholder rice growers in Kilombero district. The first stage was guided by Town agriculture irrigation cooperative officer (TYCO) in Kilombero district office. At this stage secondary data obtained from district agriculture office enables the researcher to select randomly two divisions from the list of divisions with large number of smallholder rice grower farmers in the district. The two chosen divisions were Mangula and Kidatu.

Based on the same assumption mentioned above, a list of wards with large number of smallholder rice growers obtained from the division office enables the researcher to select randomly three wards from Mangula division and two wards from Kidatu division. The wards selected from Mangula were Kiberege, Mkula and Mangula, while the chosen wards from Kidatu division were Kidatu and Sanje. In the third stage

and with the help of ward extension officers, two villages were selected from every ward selected to make a total of ten (10) villages i.e. six villages from Mangula division and four villages from Kidatu division. Last stage involved selection of around 35 to 47 smallholder respondents from each village, resulting in total sample of 397 households, as indicated in Table 3.2.

3.3.5 Sample Size

Yamane (1973) provide a simplified formula for computing sample size. This formula was also adopted by other researchers such as Midra & Moyo (2017), Mbapila et al. (2019) and Bongomin et al. (2020) in their studies while computing sample size. In this study, the same formula was used to calculate sample size for rice growers' household farmers in Kilombero district.

According to Yamane sample size is given as follows

$$n = \frac{N}{1 + Ne^2}$$

Where n= sample size (rice grower household)

N =Targeted population (rice grower at Kilombero district)

e= Tolerance error (5% or 95%)

Thus by using the estimated population of household rice producers in part 3.4.2 above, the sample size for this study would be.

$$n = \frac{55{,}484}{1 + 55{,}484\,([0.05)]^2} = 397$$

This sample size was obtained as shown in table 3.2 below.

Table 3.2: **Sample Size for Kilombero District**

		Ward sampled	**No of villages**	**Village sampled**	**Total household rice growers farmers**	**Smallholder rice farmers sampled**
No of Division	2					
No of wards	5					
Division sampled	Mangula	Kiberege	2	Mkasu	2,560	47
				Nyamwezi	1,950	33
		Mkula	2	Mkula	2,180	43
				Magombera	2,650	38
		Mangula	2	Mpanga	1,327	44
				Kisawasawa	759	35
	Kidatu	Kidatu	2	Kidatu B	2,390	42
				Chikago	2,425	40
		Sanje	2	Msolwa Ujamaa	1,080	38
				Miwangani	1,267	37
Total			**10**		**18,588**	**397**

3.5 Data Collection Method

In this study, primary data were collected through a cross-sectional field survey in Kilombero district, Morogoro region. The study applied a multistage random sampling technique to select ward, village and household surveyed. Structured questionnaires designed for household survey were used to collect primary data. The information gathered using the questionnaires includes demographic characteristics, financial service access, usage, financial services literacy and institutional support.

The information was collected with the help of 10 extension officers,' i.e. one from each village and questionnaires were distributed to household rice growers farmers who grew rice in 2019/2020 agricultural seasons, which was the session with the highest region rice production. The survey was conducted in 10 villages in Kilombero district as shown in Table 3.2.

3.6 Variables and Measurement Procedures

The exogenous variables examined in this study were FA, FU and FL. various scholars used similar or bit different variables to measure FI. Midra & Moya (2017) used financial service access, usage and quality to measure FI, while Abu & Haruna (2017) used access to credit, ownership of bank account and saving account, Mohamed et al. (2019) measured it using access and usage of financial services and Fowowe, (2020) measure FI using Access, borrowing and saving as indicators for FI. The current study adopted access and usage from other scholars and adds financial literacy as new variable for FI.

Financial service access (FA): Refer to depth of outreach of financial services such as bank penetration in terms of branch or point of sale devices in rural areas demand side barriers that customer face to access financial institutions such as cost and information (Midra& Moya, 2017). To measure extent of FA among rice grower household in Kilombero six access indicators were used, which include (i) Availability of financial institutions (ii) credit availability (iii) mobile money service availability, (IV) formal credit accessibility (V) informal credit accessibility (VI) accessibility road to nearby financial institution (Mindra& Moya, 2019).

Financial service usage (FU): refers to how client use available financial services and frequency or extent of use of the available service (Midra& Moya, 2017, Mohamed et al., 2019). In order to measure FU, three indicators were identified, which are (i) Account ownership (ii) Account usage (iii) source of borrowing (i.e. formal or informal).

Financial literacy (FL): Refer to individual knowledge or understanding of financial matters or criteria used by an individual for making financial decisions and using financial products and services. In order to measure FL, three indicators were used; namely, (i) knowledge about financial matters (ii) criteria for selecting financial product/service (iii) follow up of financial matters/target (Bongomin et al, 2017a).

The endogenous variable in this study is agriculture commercialization. Other scholars measured agricultural commercialization using commercialization index proposed by Govereh et al. (1999). The index is given as a proportional of total crop output sold to the total output crop produced. Scholars such as Ochieng et al. (2016), Abu & Haruna (2017), and Rubhara & Mudhara (2019) used this index in their studies to measure level of commercialization.

Moreover, scholars such as Yaseen et al. (2018) use a different approach while studying commercialization behaviour in production agriculture among SSA smallholder farms. The authors use household characteristics, endowment of crop production and household market participation characteristic. Also, study by Rabbi et al. (2019) used market participation indicators to measure commercialization.

According to Rabbi et al. (2019), a farmer is said to commercialize if he sells part of his output in the market. Difficulty in obtaining data on the amount of rice produced and sold from some farmers led the researcher to adopt market participation indicators. The indicators adopted include reasons for participating in cereal crop production and the proportion of cereal crops produced versus the amount stored for household food security, also used by Rabbi et al. (2019) and Yaseen et al. (2018).

Table 3.3: Measurement Items of Variables

Variable	No of items	Code	Measurement items	Measurement	Source
Control variables	4	AGE	Age of household head	Years	Abu & Haruna, (2017) Rubhara&Mudhara, (2019)
		FE	Farming experience	Years spend in rice farming	
		SI	Main source of income is agriculture	Nominal Yes=1, No= 0	
		IRR	Irrigation availability	Nominal Yes =1, No= 0	
Financial service access	6	FA1	Presence of financial institution	Ordinal scale 1= strongly disagree 2=Disagree 3= Not sure 4= Agree 5=Strongly Agree	Kodongo (2018) Sekyi et al, (2017) Rubhara, (2019
		FA2	Credit availability		
		FA3	MMS availability		
		FA4-FA5	Formal and informal credit accessibility		
		FA6	Accessible road		
Financial service Usage	6	FU1&FU2	Account ownership	Ordinal scale 1= strongly disagree 2= Disagree 3= Not sure 4= Agree 5=Strongly Agree	Fowowe (2020) Babajide et al (2020) Eldomiaty et al, (2020)
		FU3&FU4	Account usage		
		FU5&FU6	Source of borrowing		
Financial literacy	5	FL1	To have knowledge about financial matters	Ordinal scale 1= strongly disagree 2= Disagree 3= Not sure 4= Agree 5=Strongly Agree	Bongomin et al, (2017a)
		FL2-FL3	Having criteria for choosing financial services		
		FL4-FL5	To have financial targets		
Institutional support	19	LR1-LR6	Regulative barriers/incentives for accessing and usage of financial services	Ordinal scale 1= strongly disagree 2 = Disagree 3= Not sure 4 = Agree 5=Strongly Agree	Bongomin et al (2018) Kodongo (2018) Mugwagwa (2020)
		LR7-LR9	Law & regulation support commercialization/irrigation		
		IN1-IN4	Household borrowing behavior		
		CC1	Household perception on serving		
		CC2-CC3	Household perception on credit accessibility		
		CC4-CC6	Group membership and involvement in commercial farming		
Commercialization	3	RC	Having reason for involving in rice production	Ordinal scale 1= strongly disagree 2 = Disagree 3= Not sure 4 = Agree 5=Strongly Agree	Rabbi et al. (2019); Yaseen et al (2018)

Source: Researcher's computation from Literature, 2021

The moderating effect of institutional support was measured by using moderating variables of regulatory, normative and cultural cognitive variables. The variables were

proposed by Scott (2001) and adopted by other scholars such as Bongomin et al (2018). Indicative measures used for moderating variables include (i) institutional regulative barriers or incentives for accessing credit and other financial services 6 items (ii) institutional law & regulative supporting commercialization and irrigation availability 3 items (iii) Household borrowing behaviour 4 items (iii) household perception on saving (iv) group membership and involvement in rice commercial farming 3 items.

3.7 Data Collection Instruments

A survey questionnaire was used to gather primary data. The technique gives the researcher the chance to clarify any issues with respondents, so encourage them to respond to all of the questions (Fowler, 2014). The first part of the questionnaire comprises questions on respondent demographic information covers issues like age, household head sex, education level, farming experience, family size, irrigation availability, source of income (agriculture or not), and farm size. The second part of the questionnaire comprises information on independent variables, including financial service access, usage and financial literacy indicators. The third part of the questionnaire includes moderating variable measures such as institutional law and regulation, institutional norms and cultural cognitive indicators. The final part includes agricultural commercialization indicators.

3.8 Data Processing and Analysis

Before conducting the actual data analysis in this study, the collected data were virtually checked for incompleteness, data entry errors, and missing data. This was done to make sure the data were accurate. Then collected data were tabulated and

analyzed using IBM SPSS version 23 software and IBM Amos software Version 23. Descriptive statistics analysis, exploratory factors analysis and regression analysis were done using SPSS version 23 while confirmatory factor analysis was done using Amos version 23.

3.9 Missing Data and Outliers

Missing data in survey research can occur for various reasons, such as respondents ignoring some or all questions, questions being irrelevant to the respondent's situation, or data collectors being unable to locate the respondent (Cheema, 2014). Rhoads (2012) emphasize that the conclusions drawn from the study are significantly influenced by the method used to handle missing data. Therefore, understanding how missing data were handled is essential to comprehending the study's implications. List-wise deletion was used in this study to deal with missing data.

The researcher also looks for outliers after taking care of any missing data. This step was necessary because outliers in multivariate data analysis can be compounded across several variables to create substantial effect (Hair et al., 2014). In this study box plot of residual was used to check values with outliers existing in the data set. According to Keith (2019), residuals are used for diagnosing issues with outliers and extreme values in regression analysis.

3.10 Descriptive Statistics

In this study, the descriptive part of the data analysis followed frequency and percentage in order to profile and ease understanding of various characteristics of household rice grower farmers in the study area, such as respondents' age, sex,

education level, farming experience, irrigation availability, and source of income and farm size. Moreover, the data gave a broad overview of the sample representative in general, which supports the discussion of the results. Descriptive statistics was presented in form of table, histogram and curves depends on the nature of the information required.

3.11 Inferential Statistics

The inferential statistics was conducted to examine the research question and hypothesis so as to make inference about the population from which the sample was drawn i.e. household rice growers in Kilombero district by using multiple regression analysis. In this case statistical significance tests were done to test the null hypothesis. The hypothesis test based on P-value ≤ 0.05 was done using multiple regression analysis technique (MRA) with the support of IBM SPSS version 23 software. Lastly, in order to examine the effect of moderating variables in the relationship between FI and agriculture commercialization, hierarchical regression of independent variables and moderating or interaction variables on dependent variables was performed.

Hayes PROCESS macro V 4.1 with Johnson-Neyman technique was also used to confirm the moderation result and the extent of moderation effect of the moderator on the predictor. According to Hayes (2022), Johnson Neyman technique enables the researcher to identify the range of value(s) on which point(s) the slope of the predictor is significant Vs not significant at a specified alpha level.

Moreover, confirmatory factor analysis was used in this study to test whether measure of the construct are consistent with the researcher's understanding of the nature of the

construct through theoretical and empirical evidence. More specifically, CFA was used for scale validation, reliability and validity testing using AMOS version 23. The ratio of chi-squire to degree of freedom, P-value, comparative fit index (CFI), Tucker-Lewis index (TLI), Root mean squire of approximation (RMSEA) and standardized root mean squire residual (SRMR) were used to assess how well the hypothesized model fit the data. Although, according to Hooper et al. (2008), there are no rules of thumb for determining the model fit, but all fit indices were within the range suggested by Awang (2011) and Hair et al. (2014),

3.12 Validity and Reliability Measurement

3.12.1 Validity

According to Hair et al. (2014), validity refers to the extent to which scale or set of measures accurately represents the concept of interest. It means that the instrument gives actual result of what it was supposed to measure (Evans, 2017). Participants' error, participant bias, observers' error, and observers' bias can all have an impact on the validity of the data that was collected (Greener and Martelli, 2015). In this study, with the help of CFA analysis, unidimensionality, validity and reliability were determined. Before regression analysis three types of validity, namely convergent, construct and discriminate validity, were conducted.

3.12.1.1 Convergent Validity

According to Hair et al. (2014), convergent validity refers to extent to which indicators of a specific construct converge or share a high proportional of variance in common. It is measured by using different approach but the common ones are factors loading and average variance extracted. In the first approach to achieve convergent

validity, high loading on a factor is an indication for convergent validity. Using this approach a factor loading of 0.5 or higher suggesting convergent validity (Hair et al., 2014). In this study the second approach, average variance extracted (AVE) was used to test for convergent validity. To achieve convergent validity the mean AVE of each construct should 0.5 (Kong et al., 2014).

3.12.1.2 Discriminate Validity

Discriminate validity refer to the degree to which a construct is truly distinct from other constructs in terms of how much it correlates with other constructs and how distinctly measured variables represent only a single construct (Bhattacherje, 2012; Hair et al., 2014). It can be established through exploratory factor analysis (Bhattacherje, 2012). According to Bhattacherje (2012), each extracted factor to should have eigen value greater than 1.0 and factor loading between item of different constructs should have factor loading of 0.3 or less.

However the more rigorous test for discriminate validity is to compare AVE value with the squire of correlation estimates between the construct. Thus in this study, Fornell and Lacker criteria were used to compare the squire root of AVE of the construct with the correlation between the constructs. Fornell and Lacker (1981) require that AVE value should be greater than the squared correlation the requirement which was met.

3.12.1.3 Construct Validity

Construct validity refers to the extent to which a set of measured items reflect the theoretical latent construct those items are designed to measure (Hair et al., 2014). In

this study, construct validity was measured with the help of CFA analysis. Construct validity is archived when model fit indices of the CFA model meat the required level (Hair et al., 2014).

3.12.2 Reliability

Reliability refers to the degree of consistency between multiple measurements of the variable (Bongomin et al., 2018). It is simply referred to as a measure of stability of the proposed measure(s) to be used for a given research. Reliability of the instrument was tested using Cronbach alpha. If computed Cronbach alpha is equal to or greater than 0.7, then the instrument used is reliable.

3.13 Model Specification

Although the majority of studies on commercialization use commercialization index as a measure of level or intensity of commercialization (Abu & Haruna, 2017; Rubhara & Mudhara, 2019) but unlike previous studies which use categorical dichotomous variables this study deviate by using categorical continues variables. Thus instead of using binary regression, this study applied multiple regression analysis in data analysis. One of the main advantages of multiple regression analysis is that it can be used to analyze both continuous and categorical variables (Keith, 2019).

According to Keith (2019), the multiple regression model is given by the following Econometric model

$$Y = B_o + B_1X_1 + \cdots + B_nX_n + \varepsilon \quad \ldots\ldots 1$$

Where

Y= Predicted value of dependent variable

B= vector of parameter to be estimated

Xi = Set of explanatory variables

ε= Error term

From the above regression model the researcher developed three equations. The first one looks on the effect of independent variables i.e. financial service access (FA), financial service usage (FU) and financial literacy on agricultural commercialization (AGC).

$$AGC = B_O + B_1FA + B_2FU + B_3FL + \varepsilon \quad \text{.....2}$$

In the second equation, the researcher introduces control variables i.e. age, farming experience (FE), source of income (IS) and irrigation availability and assesses their effect on the relationship between financial inclusion and agricultural commercialization. Then the second equation was rewritten as follows.

$$AGC = B_O + B_1FA + B_2FU + B_3FL + B_4FE + B_5Age + B_6SI + B_7IRS + \varepsilon \quad \text{.....3}$$

3.13.1 Moderating Model

In the third equation, the researcher introduces the moderating variable in equation 3 above to test the moderating effect of institutional support, i.e. regulative, normative and cultural cognitive, on the relationship between financial inclusion and agriculture commercialization. The moderating model was given as shown below.

$$AGC = B_O + \sum_{i=1}^{3} B_iF_i + \sum_{i=1}^{4} \varphi_iC_i + \sum_{i=1}^{3} \delta_iI_i + \sum_{i=1}^{9} \gamma_i(F * I)_i + \varepsilon \quad \text{.....4}$$

Were

$\sum B_i F_i$ = represent sum of the independent variable i.e. financial access, financial service usage and financial literacy.

$\sum \delta_i I_i$ = Represent sum of moderating variables i.e. regulative, normative and cultural cognitive.

$\sum \gamma_i (F.I)_i$ = Represent moderating effect of financial inclusion and institution support.

$\sum \varphi_i C_i$ = Represent sum of control variable i.e. Age, farming experience (FE), source of income (SI), and irrigation availability.

ε_i =Error term

AGC_i = Household commercialization of an individual household.

3.13.2 Testing For Multiple Regression Assumptions

Since multiple regressions were used in this study for data analysis, it was necessary to test the assumptions involved in regression analysis, which include linearity, normality, multicollinearity and homoscedastic.

3.13.2.1 Linearity Testing

Linear connection between dependent and independent variable represents the degree to which a change in the dependent variable is connected with change in the independent (Keith, 2019). This implies that the mean value of dependent variable to each increment in independent variable lies along a straight line. According to Evans (2017), linearity can be tested using scatter diagram or residual plot. This study used

P-P plot as linearity test to check whether the values of predictors fall along a diagonal. Detailed discussion is provided in section 4.4.2.

3.13.2.2 Normality Testing

To test for normality the researcher use both graphical and non graphical method. In the first part the researcher use two graphical approaches to test for normality. The graphical approach used include P-P plot of standardized residual and standardized predicted value. When residual show no substantial or systematic departure from the diagonal then the residual are considered to present normal probability distribution. Apart from P-P plot the researcher also use histogram plot of residuals. According to Tenachnick and Fidell, (2007) for the data to be normally distributed then residuals value must lay within the cut off value of ±3.

Apart from the graphical approach the researcher also employ non-graphical method. In this case the researcher looked at the value of kurtosis and skewness. In order for the data to be normally distributed the value of kurtosis and skewness should be in the range of ±1 (Keith, 2019). Thus the values of kurtosis and skewness should be ≤ negative one or ≥ positive one. Detailed discussion is provided in section 4.4.1.

3.13.2.3 Homoscedasticity Testing

Homoscedasticity is a multiple regression statistical test that presupposes residuals are normally distributed and have uniform variance across all levels of predictors (Kline, 2011). This study uses a scatter plot of the standardized residuals against the standardized predicted value to test for homoscedasticity. A detailed discussion is provided in section 4.4.3.

3.13.2.4 Multicollinearity Test

According to Greener &Martelli (2018), Multicollinearity refers to the amount of correlation between the independent variables. According to Greener &Martelli, predictors or independent variables are supposed to be individually related to dependent variables but relatively unrelated to each other. This is due to the fact that when you have significant multicollinearity, it is difficult to isolate the effect of the independent variables on the dependent variable. In this study, multicollinearity was tested by using variance inflation factor (VIF) and tolerance values. Scholars suggest VIF value exceeding 5 and tolerance value <0.2 may indicate multicollinearity (Hair et al., 2014; Bongomin et al., 2018). Detailed discussion is provided in section 4.4.4

3.14 Ethical Consideration

A range of ethical issues in research was taken into consideration in this study throughout the study period. The following are some of the key issues which was taken into account. First, participants were made aware of the study objectives through the questionnaires. Second, as Saunders et al. (2019) suggested, anonymity and confidentiality were highly observed in this study. Also, the decision to participate in the study was left up to each participant and they provided the information at their own discretion.

In order to get permission to access data from the study area, the researcher obtained the research clearance letter from the directorate of postgraduate studies of the Open University of Tanzania, which was sent to the Regional Administrative Secretary (RAS) of Morogoro region. Then from RAS, a researcher got a letter sent to District

Administrative Secretary (DAS) Kilombero. From DAS, the researcher got letters which were sent to all responsible officers in the wards as per attached (appendix II).In addition, the researcher recognizes that plagiarism is unethical and unprofessional so by using proper citation and referencing, the problem of plagiarism was greatly addressed in this study. Lastly, the study has not tolerated data fabrication or falsification at any point.

CHAPTER FOUR

FINDINGS OF THE STUDY

4.1 Overview

This chapter intends to present the finding obtained in this study. Specifically, the chapter indicates the results about questions asked on the respondents' demographic characteristics and measurement variables. Also, it shows the results of EFA, CFA, reliability and validity and finally, the multiple regression analysis of independent variable on dependent variable and the moderation effect of moderator variable in the relationship between independent and dependent variable.

4.2 Data Cleaning

The total of 400 questionnaires was distributed to respondents' in ten villages, six villages from Mangula division and four villages from Kidatu division. Out of 400 hundred questionnaires, 385 (96.25%) were returned by respondents. Analysis of the returned questionnaires was conducted to check for missing data and identification of the outliers.

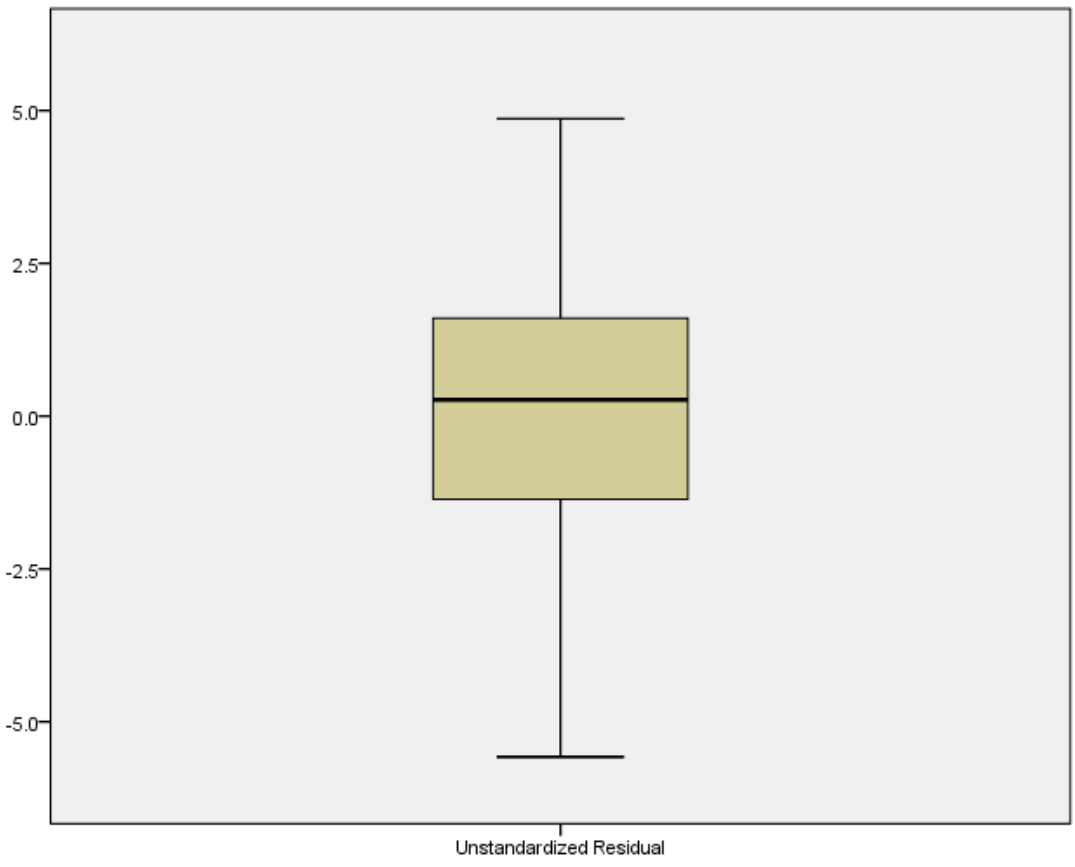
4.2.1 Results from Missing Data

The collected data were examined for missing values by means of frequency analysis through IBM SPSS version 23. In this study, 14 questionnaires were found to have between 1 to 7 missing values. When data is missing totally at random, according to Cheema (2014), it is safe to eliminate it from the data set. Thus in this study, list wise deletion method was used to remove all 14 questionnaires that had missing values and remain with 371 questionnaires or respondents.

4.2.3 Testing for Outliers

According to Evans (2017), outliers are extreme values that differ from the rest of the data. Checking for outliers was necessary because, in multivariate analysis, data can be compounded across several variables to create a substantial effect (Hair et al., 2014). In this study box plot of residuals was used to check whether values with outliers existed in the data set.

According to Keith (2019), residuals are used for diagnosing problems in regression analysis such as outliers and extreme values. In the first case, 13 questionnaires were deleted, leaving 358 respondents. The data was then rerun, and the box plot findings in Figure 4.0 below show no more outliers in the data set.



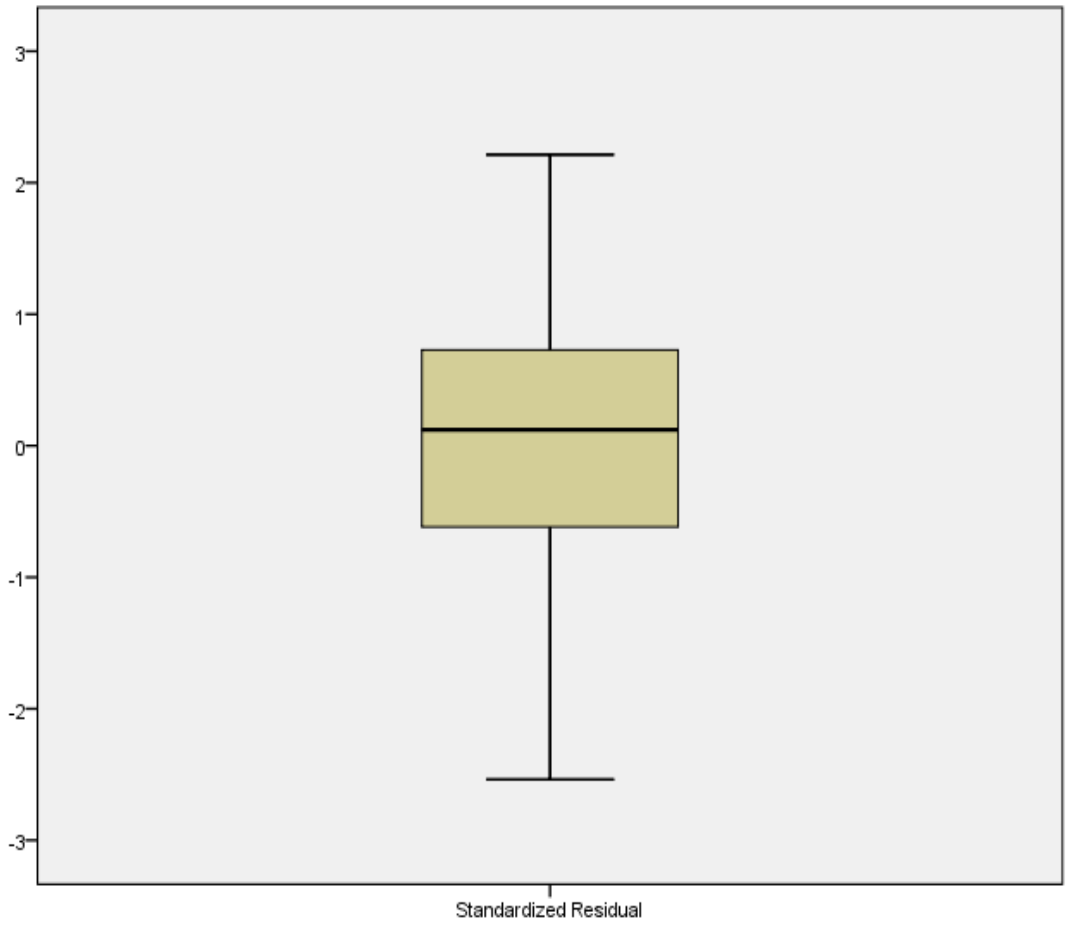


Figure 4.1: Testing for Outliers

Source: Data Analysis 2022

4.3 Respondent Demographic Characteristics

This section involves analysis of individuals' demographic characteristics and interpretation in terms of respondent age, sex, education level, farming experience, household gender, involvement in the irrigation scheme, source of income and farm size. The researcher gathered information about the respondent profile in the study area in order to get insight into the nature and characteristics of the respondent involved in this study. To accomplish the task there were a total of 8 questions used to analyze the profile of small holder farmers involved in rice farming at Kilombero district which was the study area.

4.3.1 Respondent Distribution by Age

The age distribution of research participants is shown in Table 4.1. The result indicates that (38.3%) of the respondents were above 46 years old, while (25.1%) were in the age bracket of 37-46 years. In addition, the finding indicates that (19.5%) of respondents were in the age bracket of 28-36 and finally (17.3%) were in age bracket of 18 to 27. These results indicate that majority of the farmers, 63.4% (i.e. 38.3% + 25.1%), are found in middle age (37-46 years) and old age (above 46 years). The remaining 36.6% (i.e. 17.3% + 19.3%) represent the minority group of young farmers (18-36 years).

The results suggest that older and middle age people participate more in farming activities compared to young people. This could be due to the fact that, limited employment options in rural area are available in agriculture sector, but the sector has low potential wages, which force young people living in rural area tend to move to urban areas searching for employment and livelihood opportunities (UN population fund, 2011 as cited in Gasparri and Munoz, 2019).

Table 4.1: Respondents Age

		Frequency	Percent
Valid	18-27	62	17.3
	28-36	69	19.3
	37-46	90	25.1
	Above 46	137	38.3
	Total	**358**	**100.0**

Source: Data analysis 2022

The results are consistent with the theory that the young population are less involved in agriculture activities and tends to migrate to urban areas for activities other than

agriculture (Alene et al., 2008). Also, the result is similar to the findings of Martey (2014), who find that older farmers are more experience and, therefore, more likely to commercialize. This could be due to the fact that young farmers might not be capable to generate surplus to grow and sell more crops because they lack farming expertise and resources (Rubhara and Mudhara, 2019).

4.3.2 Respondent Distribution by Sex

Table 4.2's findings reveal the sex distribution among respondents. It shows that males made up the majority of the respondents (66.2%) while females made up the remaining (33.8%). The results suggest that males are more likely to deal with rice farming activities than females. This could be due to the fact that, Kilombero district leads in rice production in Morogoro region, so it is among the main economic activities in the study area (URT, 2019). Thus, male participants are expected to be more than their counterpart female because they are more market-oriented in economic activities than female participants (Osmani and Hossain, 2015).

Table 4.2: Respondents Sex Distribution

		Frequency	Percent
Valid	Male	237	66.2
	Female	121	33.8
	Total	**358**	**100.0**

Source: Research Data

4.3.3 Respondent Level of Education

Table 4.3 shows the educational distribution of study participants. It shows that 10.9 percent of those polled had never attended school, majority 73.2 percent had completed primary school, 15.1 percent had completed secondary school and minority

8 percent had completed certificate or diploma programs. The result suggests that rice cultivation in the study area is managed by people with low level of education although they have some knowledge of reading and writing. This could be due to the fact that higher education offer opportunities for employment in formal sector and highly educated people consider farming as a secondary activity thus affects their participation in agriculture (Abu and Haruna, 2017). The result are consistent with the finding of Fowowe (2020), who found that higher level of education of a household limit agricultural productivity and in turn limit commercialization.

Table 4.3: Respondent Level of Education

		Frequency	Percent
Valid	Never attended school	39	10.9
	Primary school	262	73.2
	Secondary school	54	15.1
	Certificate & Diploma	3	.8
	Total	**358**	**100.0**

Source: Research Data, 2022

4.3.4 Respondent Distribution by Farming Experience

Table 4.4's findings reveal farming experience distribution of respondents. It shows that 18.2% of respondents had farming experience between 1-3 years, 14.5% had farming experience between 4-6 years, 7.8% had farming experience between 7-9 years, and 59.5% had farming experience above 10 years. Thus, the result suggests that most respondents (59.5%) had sufficient rice farming experience of 10 years or more. The results are consistent with the findings of Kabit et al. (2016), who found that the average farming experience of smallholder farmers in Munyati, Zimbabwe, was 9.81 years. The author concluded that farming experience had positive effect on household commercialization. Thus increase in farming experience lead to increase in

commercial farming. A detailed discussion of this finding is provided in section 5.2 in chapter five.

Table 4.4: Respondent Farming Experience

	Valid				
Years	1-3	4-6	7-9	10+	Total
Frequency	65	52	28	213	358
Percent	18.2	14.5	7.8	59.5	100.0

Source: Research Data, 2022

4.3.5 Respondent's Distribution by Household Gender

The statistics in Table 4.5 reflect the gender distribution of respondents' households. Male-headed households accounted for the majority of respondents (78.8%), while female-headed households accounted for the remainder (21.2%). Males appear to be the primary decision makers in the majority of households, according to the findings. As a result, they decide on the quantity of land, labour, and financial resources to be employed in farming activity (Bolarinwa et al., 2020). The results are consistent with those of Ayele et al. (2021) and Rubhara and Mudhara (2019), who found household sex has a significant positive effect on commercialization. The results are supported with Osmani and Hossain (2015), who find that in comparison to females, males are more likely to be commercialized.

Table 4.5: Respondent Distribution by Household Sex

		Frequency	**Percent**
Valid	Male	282	78.8
	Female	76	21.2
	Total	**358**	**100.0**

Source: Research Data 2022

4.3.6 Respondent Distribution by Involvement in Irrigation Scheme

The involvement in irrigation scheme distribution among respondents is revealed by Table 4.6's findings. It shows households involved in either traditional or developed irrigation schemes made up the majority of the respondents (61.5%), while those who are not involved in either traditional or developed irrigation scheme made up the remaining (38.5%). The results suggest that majority of respondents or household in the study area does not depend on rainfall in their rice farming activities. So they can easily perform commercial rice farming. A detailed discussion of this finding is provided in section 5.2 in chapter 5.

Table 4.6: Respondent Involvement in Irrigation Scheme

		Frequency	Percent
Valid	Involved	220	61.5
	No Involved	138	38.5
	Total	**358**	**100.0**

Source: Research Data 2022

4.3.7 Respondents Distribution by Source of Income

The data in Table 4.7 demonstrate respondents' main source of income whether its agriculture or they have other main sources. It reveals that majority of household (95.8%) main source of income is through agriculture and very few (4.2%) relay on other source as main source of income. The results suggest that agriculture is the dominant source of income for most rural communities (Chandio, et al., 2019). So the majority of respondent household in the study area cultivate rice for commercial purpose as well as to meet the food requirement of their family. A detailed discussion of this finding is provided in s. 5.2 Chapter Five.

Table 4.7: Respondents Source of Income

		Frequency	Percent
Main Source of income	Agriculture	343	95.8
	Other sources	15	4.2
	Total	**358**	**100.0**

Source: Research Data 2022

4.3.8 Respondent distribution by Farm Size

Tables 4.8 show the distribution of respondent farm size. It found that 39.4% of respondents cultivated between 0-1 hector of rice, 55% cultivated 2-5 hectors and very few 5.6% cultivated between 5-10 hectors. The result suggests that most respondents in the study area are smallholder farms who cultivate between 1-5 hectares, which is in line with the objective of this study to study the commercialization of smallholder rice growers in Kilombero district.

Table 4.8: Respondent Farm Size

	Area planted rice in Hectors 2019/2020 season			
	0-1	2-5	5-10	Total
Frequency	141	197	20	358
Percent	39.4	55.0	5.6	100.0

Source: Research Data 2022

4.4 Result of Multiple Regression Assumption Test

This section deals with testing statistical significance assumptions test for normality, linearity, homoscedasticity and multicollinearity

4.4.1 Result from Normality Test

Normality test is one of the regression analysis assumptions, which shows whether the residual behaves normally or not. In order to test for normality, the researcher used both graphical and non-graphical methods. The first approach, which was graphical method, involved normality test by using P-P plot of standardized residual and standardized predicted values. The result in Figure 4.2 below indicates that all the dots on the normal P-P plot were very close, falling along the diagonal.

According to Keith (2019) and Hair et al. (2014), when residuals show no substantial or systematic departure from the diagonal, the residual should be considered to represent normal probability distribution. So based on P-P plot the data were normally distributed. In addition to P-P plot, the researcher also uses a histogram plot of residuals. The histogram in Figure 4.3 below shows that all the residual values lie within the recommended cut-off value of ±3 (Tebachnick and Fidell, 2007). Also, the histogram was bell-shaped, indicating that the data met the normality assumption.

The second approach for normality testing, which was non-graphical, involves using descriptive analysis of standardized residual value and standardized predicted value. The analysis involves looking at the value of Kurtosis and Skewness. According to Keith (2019), Kurtosis and Skewness should range between ±1. That means the two values should not be less than negative one or greater than positive one. The result obtained as indicated in appendix (IV) indicate that the value of Kurtosis was -0.215 and Skewness was -0.456. Since the two figures obtained are within the required range, the researcher concluded that the data for this study were normally distributed.

Thus all tests performed to check for normality in the data confirmed the assumption was met.

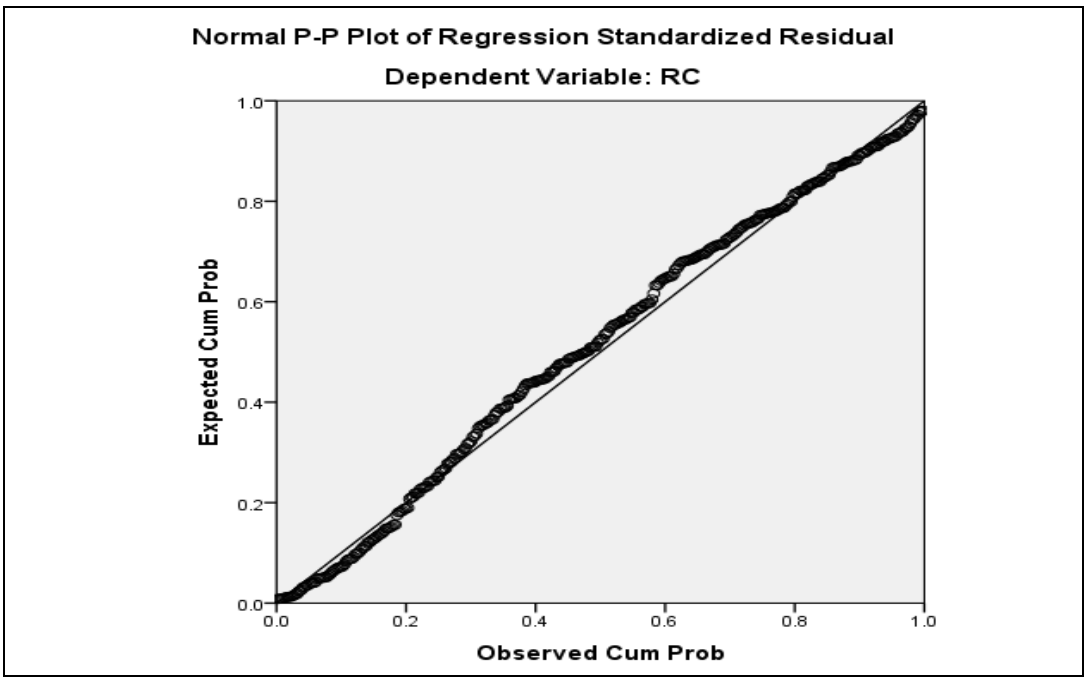


Figure 4.2: Normal P-P Plots

Source: Data Analysis 2022

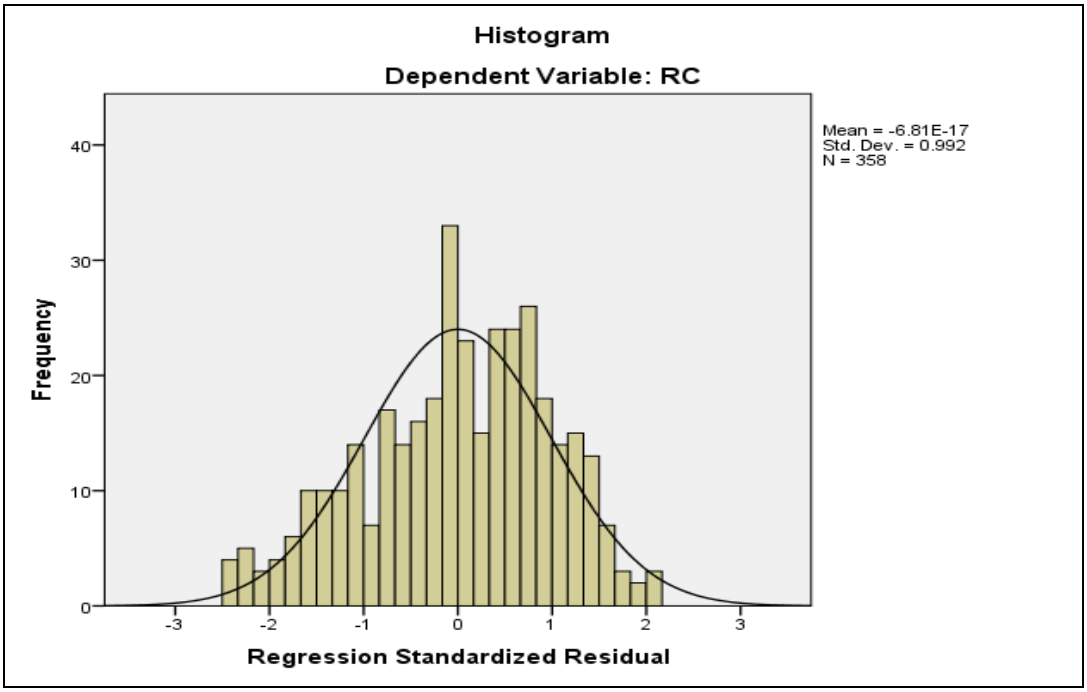


Figure 4.3: Histogram Plot

Source: Data Analysis 2022

4.4.2 Result from Linearity

Regression analysis require that the relationship between the dependent variable (DV) and independent variable (IV) to be linear (Keith, 2019). According to Hair et al. (2014), linear connection between DV and IV represent the degree to which a change in the DV is connected with a change in the IV i.e. the mean value of DV to each increment of IV lies along the straight line. Linearity is one of the essential regression assumptions. If violated, all the estimates we get from regression, such as R squire, regression coefficients, standard error and tests of statistical significance, may be biased (Keith, 2019).

In regression analysis linearity can be examined by using scatter diagram of data or by examining the residual plot (Evans, 2017). In this study, to test for linearity, the assumption was checked using P-P plots to examine how predictors values lie along the diagonal line. The result obtained in Figure 4.2 above suggest that there are no issues of linearity as all values lie very close to the diagonal.

4.4.3 Result from Homoscedasticity

According to Kline (2011), homoscedasticity is a multiple regression statistical test that assumes residuals are normally distributed and have uniform variance across all levels of predictors. If this assumption violated it might lead to significant non normality, affect validity, or lead to greater measurement error (Keith, 2019, Hayes, 2022). To test for homoscedasticity, the research used scatter plot of standardized residuals against the standardized predicted value. The result obtained in Figure 4.4 below shows no serious heteroscedasticity issues as only two points fall outside the threshold range of ±3; thus, the assumption of homoscedasticity was archived.

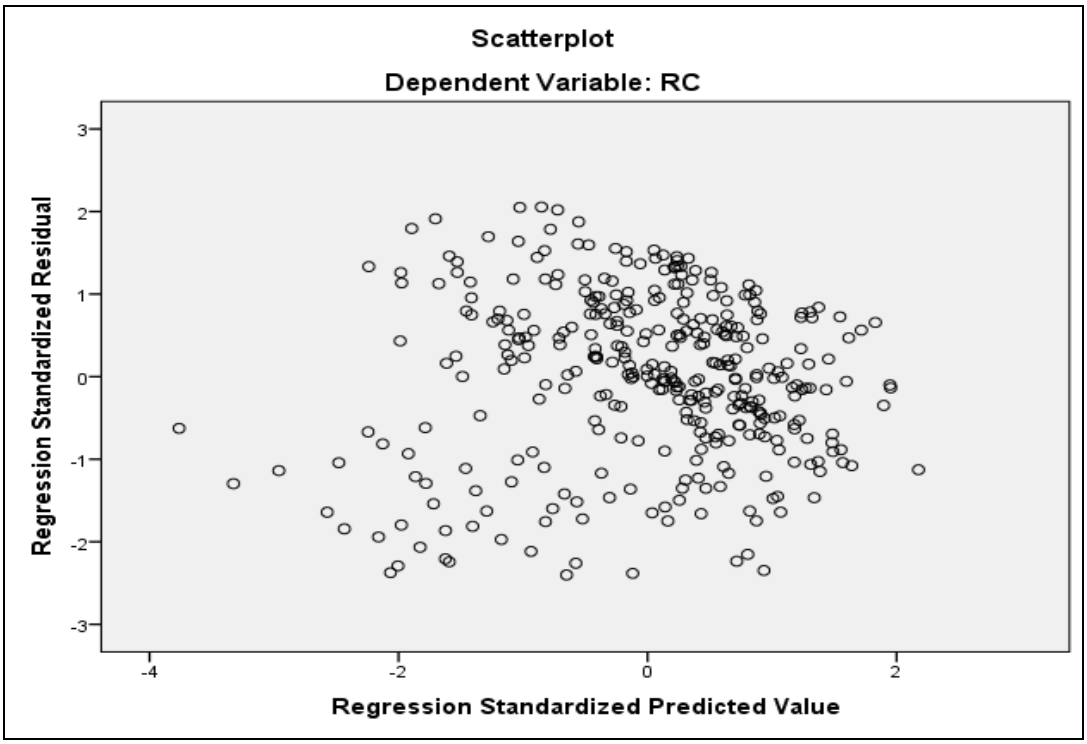


Figure 4.4: Homoscedasticity Test

Source: Data Analysis 2022

4.4.4 Result from Multicollinearity

Multicollinearity is a situation arises when two or more predictor variables are so highly correlated in a sense that they both represent the same underlying construct (Byrne, 2016). Multicollinearity may result in strange coefficients and large standard errors and make interpretation difficult, so it is important for the researcher to control its effect (Keith, 2019). This study examined multicollinearity using tolerance value (TV) and variance inflation factor (VIF). TV is a degree to which each IV is independent of other IV (Keith, 2019). Its value range from 0 to 1 but large value for TV is desired. VIF is simply computed as the inverse of TV. Scholars recommend cut-off value for VIF < 5 and TV > 0.2 to indicate absence of multicollinearity (Field, 2005; Hair et al, 2014; Bongomin et al, 2018). The result obtained in Table 4.13

revealed that multicollinearity was not a problem in the data since the TV (>0.2) and VIF value was less than 5, so multicollinearity were achieved and tenable as recommended by Hair et al. (2014).

Table 4.9: Colineraity Diagnoses

		Collinearity Statistics	
Model		**Tolerance**	**VIF**
1	FA	.900	1.111
	FU	.976	1.024
	FL	.905	1.105
	LR	.962	1.040
	IN	.931	1.074
	CC	.966	1.035

a. Dependent Variable: RC

Source: Research Data 2022

4.5 Model Formulation and Validation

This section intends to ensure that the proposed factor structure match the data collected in the field. The significance of this section stems from the fact that the researcher created the conceptual framework based on review of theories and literatures. With this in mind, it's critical to perform a factor analysis to see how well the proposed factor structure fits the collected data before proceeding with regression analysis. To ensure that the constructs is aligned with their indicator variables, the researcher used both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

4.5.1 Exploratory Factor Analysis

Exploratory factor analysis (EFA) is a statistical method for determining interrelationship between multiple variables and explains them in terms of their

underlying dimensions (Hair et al, 2014). According to Tu et al, (2019) the goal of EFA is to establish the relationship between the factors and observed variables through theoretical or empirical evidence reviewed by the researcher. It allows a researcher to determine which variables load on a particular factor and how many factors are appropriate to best represent the data (Hair et al., 2014).

EFA is normally preceded by test such as Kaiser-Meyer Olkin (KMO) and Bartlett's test of sphericity to ensure that data meets the minimum requirement for EFA analysis. KMO is used to test for sample adequacy in order to check whether the data are suitable for factor analysis (Awang, 2011). According to Kaiser (1974), as cited in Abdullahi et al. (2021) KMO value of 0.6 or above warrant the application of EFA. On the other hand, Bartlett's test of sphericity is used to check if the correlation matrix is not identical matrix. According to Hair et al. (2014), Bartlett's test chi-squire value (Significance < 0.05) indicates that the matrix is not an identical matrix.

Table 4.10: Summary of EFA Statistical Requirement

S/N	Item	Requirement	Result obtained
1	KMO	>0.60	0.837
2	Bartlett's test	Significant @ 0.05	Significant @ 0.01(p = 0.000)
3	Communalities matrix	>0.60, but >0.50 is acceptable	All value are> 0.5
4	Rotated matrix explained	>0.40	All value > 0.40
5	Proportional of variance explained (PVE)	>60%	Cumulative % = 73.454%

Source: Data Analysis 2022

As indicated in Table 4.10 of the statistical requirement for EFA, KMO and Bartlett's test of sphericity were performed where KMO of sampling adequacy of 0.837 and Bartlett's test of sphericity that was highly significant (P< 0.001) was obtained, and

they were above the general accepted level recommended by Hair et al. (2014). These results suggest that the sample size was adequate and data were appropriate for applying EFA.

Other criteria like eigenvalue, scree plot and proportional variance explained were also considered, as indicated in Table 4.11 and Figure 4.5. In order to select number of factors to be retained, a researcher used a combination of methods as Field (2009) recommended. In the first place, a researcher used eigenvalue where all factors with eigenvalue greater than 1.0 were retained, as recommended by Hair et al. (2014). Secondly, scree test (plot) was used to ascertain appropriateness of factors to be retained, where all factors above the cut-off point of 1.0 are retained and those below the cut-off are ignored (Hair et al., 2014).

Table 4.11: Total Variance Explained

Factors	Initial Eigenvalues			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative	Total
1.	6.698	19.136	19.136	6.433
2.	5.434	15.525	34.661	5.039
3.	4.001	11.431	46.092	3.892
4.	3.098	8.852	54.944	3.620
5.	2.696	7.703	62.646	3.164
6.	2.457	7.019	69.666	3.286
7.	1.326	3.788	73.454	3.175

Extraction Method: Principal Component Analysis.
Source: Research Data 2022

As indicated in Figure 4.5, the scree plot produces 7 factors above the cut-off point similar to Kaiser Criterion (eigenvalue >1) hence indicate that EFA results were

reliable. Finally, proportion of variance explained was examined to see whether the factor meet the recommended percentage of variance explained, which is 60% or higher (Hair et al., 2014; Abdullahi et al., 2021). The result shows that more than 60% .i.e. 73.454%, was explained. Thus, both Table 4.10 and Table 4.11 above show that the variables met the entire statistical requirement for exploratory factor analysis (EFA).

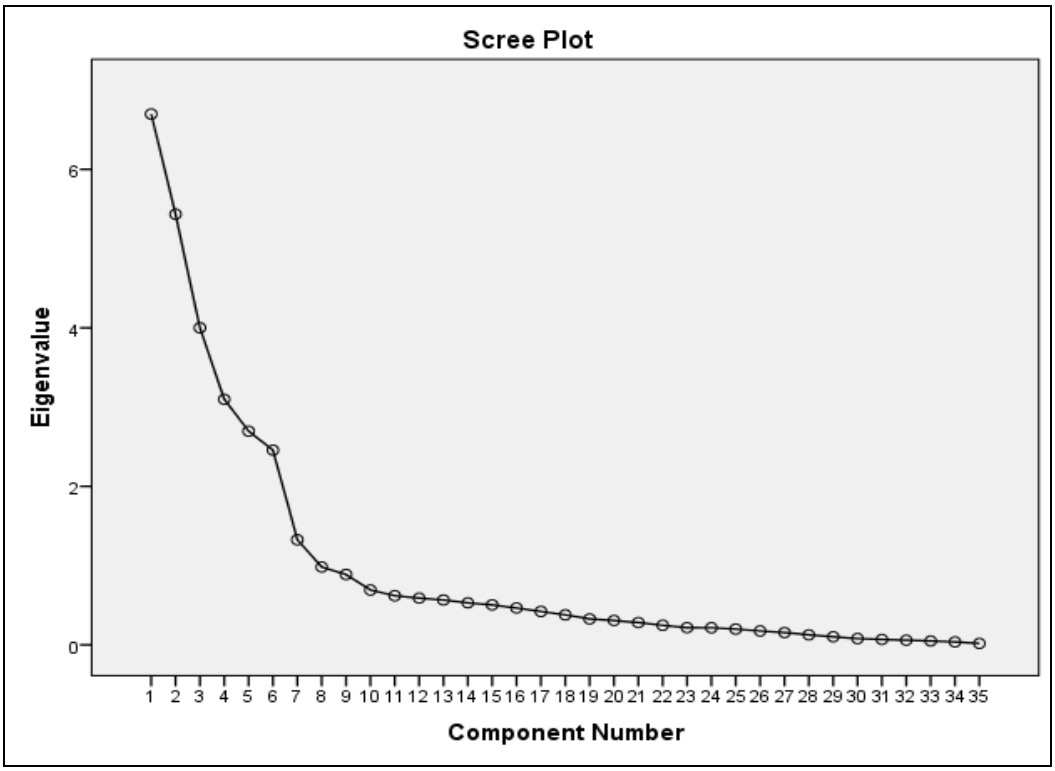


Figure 4.5: Screen Plot

Source: Research Data 2022

After the assessment of criteria for conducting EFA then EFA analysis was applied using principal component analysis and Promix with Kaiser Normalization rotation by using SPSS version 23. Promix rotation is considered appropriate factor rotation for this study because it assumes factors are orthogonal and relax the rotation by allowing factors to correlate (Russel, 2002, as cited in Saeed et al., 2022). So it gives room for

nice compromise. 40 observed variables were used in the EFA analysis in order to derive factors for the study. In this case, variables were selected based on factor loading, which simply is the correlation of variables with the factors (Hair et al., 2014). Scholars suggest that the higher the absolute size of the factor loading the more important is the loading (Babajide et al., 2020; Bagozzi and Yi, 1988, as cited in Jensen and Kristensen, 2021). However, Yong and Pease (2013) suggest retaining all factors with factor loading ≥ 0.32 but Hair et al. (2014) and Hoang and Huy Vu (2019) recommend a loading of 0.4 as a minimum acceptable level, but loading of ≥ ± 0.5 are considered as practical significant loading.

The EFA analysis resulted in extraction of 7 factors with 35 respective items, but 5 items with cross loading and lower loading below 0.4 were dropped from the analysis as suggested by Hair et al. (2014) and Hoag and Huy Vu (2019). The first IV FA had six items. Both six items were adopted since they have significant loading range from 0.554 to 0.945. The second IV FU had six items; however, two items i.e. FU2 and FU3 were deleted due to cross loading. The remaining four items had significant loading range from 0.847 to 0.882. The last IV FL had five items and all five items were adopted as they had a loading range from 0.490 to 0.947. In addition, the moderator institutional support had three sub indicators which are LR, IN and CC.

The first sub-indicator LR had 9 items, but one item LR1 was dropped due to low loading and remained with 8 items with sufficient loading range from 0.576 to 0.967. The second one IN had four 4 items, but 1 item was dropped due to cross loading and remained with 3 items with a significant loading range from 0.972 to 0.988. The last sub-indicator CC had 6 items and both 6 items were adopted as they had sufficient

loading ranging from 0.723 to 0.846. Finally, in the case of dependent variable, rice commercialization had three items, and both items were adopted with loading range from 0.719 to 0.860, which was significant. Table 4.12 below shows a summary of 35 items extracted in EFA analysis. Appendix V show detailed pattern matrix of the factors extracted together with their loading value.

Table 4.12: Summary of Item extracted in EFA Analysis

S/No	Construct	Type	No of items extracted
1	Rice commercialization (RC)	DV	3
2	Financial Service access (FA)	IV	6
3	Financial service usage (FU)	IV	4
4	Financial literacy (FL)	IV	5
5	Law and regulation (LR)	MV	8
6	Institutional norms (IN)	MV	3
7	Cultural cognitive (CC)	MV	6
	Total		**35**

Source: Data Analysis 2022

4.5.2 Confirmatory Factor Analysis (CFA)

According to Hair et al. (2014), CFA is a means or a technique of testing how well measured variables represent a small number of constructs. It's a tool that enables researchers to either confirm or reject a preconceived theory as it provides a picture of how well the researcher's theoretical specification of the factor matches the actual data. Thus by using CFA, a researcher can analyze contribution of each scale item as well as the scales reliability and validity in measuring the underlying latent dimension (Abdullahi et al, 2021; Nandru et al., 2021; Hair et al., 2014;). As a result, CFA is utilized in this study to evaluate the scale dimensionality, reliability, and validity of all

components used in this study. The researcher's goal is to reduce the discrepancy between the estimated and observed matrices as much as possible.

Also, to utilize the measurement model to see the covariation between the latent constructs. However, in the cause of carrying out CFA analysis, the researcher is advised to use number of criteria to establish model consistency or model fit with the empirical data (Hoope et al., 2008; Nandru, 2021). Path coefficient is one of the requirements, and according to Hair et al. (2014), the path regression weight should be at least 0.50 to be considered important for discussion. Low factor loadings can be caused by various factors, according to Awang (2011), including ambiguous statements, double-meaning statements, sensitive statements, and biased statements.

4.5.2.1 Model Fit Evaluation in CFA

There are myriad fit indices to choose from depending on the data type, sensitivity to the sample, and statistical power. The fit indices are categorized into three categories, namely absolute fit indices, incremental fit and parsimony fit indices (Byrne, 2016; Hair et al., 2014). Absolute fit indices include indices such as goodness of fit index (GFI), root mean squire error of approximation (RMSEA), standardized root mean squire of residual (SRMR) and chi-squire (Hashmi et al., 2021; Hair et al., 2014).

Incremental fit indices include indices such as Tucker-Lewis index (TLI), incremental fit index (IFI) and comparative fit index (CFI) (Byrne, 2016; Nandru et al., 2021). Although both indices range from 0 to 1, a value close to one indicates a good model fit (Byrne, 2016; Hair et al., 2014; Hashmi et al., 2021). Parsimony fit measures the overall goodness of fit and includes indices such as normed chi-square index

(CMIN/DF) and adjusted goodness of fit index (AGFI) (Hair et al., 2014; Kline, 2011).

Although there is no clear criterion for distinguishing good models from bad models, various basic principles for determining the acceptability of a model's fit have been devised. Hair et al. (2014) advise that in addition to the chi-square value and degrees of freedom, a model should report three or four fit indices, including at least one incremental index and one absolute index. In this study, the chi-square statistics (CMIN) and related degrees of freedom (DF), normed chi-squire (CMIN/DF), CFI, TLI, IFI, RMSEA and SRMR of the measurement and structural models were presented in accordance with Hair et al. (2014) recommendations.

The statistical significance of associations represented by the model was determined using normed chi-squire, which is the ratio of CMIN values relative to degrees of freedom (CMIN/DF), and a P-value. CMIN/DF ratio of ≤ 3 and a p-value of ≥ 0.05 indicate a well-fitting model (Byrne, 2016; Hair et al., 2014; Hoe, 2008; Wuensch, 2017). The Comparative Fit Index (CFI), which compares the sample covariance matrix to the null model and assumes that all latent variables are uncorrelated, was also utilized in this study. To ensure that miss specified models are not accepted, a cut-off criterion of 0.95 or more is recommended (Byrne, 2016; Hair et al., 2014).

Also, Tucker Lewis Fit Index (TLI) was used to calculate the proportionate improvement in fit from baseline to target per degree of freedom (Tabachnick & Fidell, 2007). Cut-off values of 0.95 or higher are generally considered to represent well-fitting models (Hair et al., 2014).

To see how well the model matches the population, the RMSEA index was utilized. The RMSEA calculates the difference in covariance matrices between observed and estimated values per degree of freedom. Most current research shows that RMSEA value of 0.05 or 0.08 indicates a good model fit (Abdullah et al., 2021; Bongomin et al., 2020; Nandru et al., 2021). Also, SRMR was used to compare fit across the model. Scholars suggest that the lower value of SRMR (value ≤ 1) represents better fit while a higher value > 1 represents worse fit. The indicators are summarized in Table 4.13

Table 4.13: Summary of Criteria for Acceptance of Model Fit

Type	Index	Acceptance level	Literature
Absolute Fit	Chi-Square	$P \geq 0.05$	Awang, (2011)
	RMSEA	0.05 to 0.08	Awang (2011) & Hair et al, (2014)
	SRMR	≤ 0.8 or 0.5	Hair et al (2014)
Incremental Fit	CFI	≥ 0.95	Byrne, (2016)
	TLI	≥ 0.95	Hair et al, (2014)
	IFI	≥ 0.95	Nandru et al (2021)
Parsimonious Fit	CMIN/DF	≤ 3 is good	Kline, (2011) & Hoe, (2008)

Source: Literature

4.5.2.2 Overall CFA Model

In this part, the aim was to develop the overall CFA model that fit the seven constructs for this study i.e. three constructs for independent variable (IV), three for moderating variable (MV) and one for dependent variable (DV). CFA was conducted after the researcher established the relationship between the factors and observed variables through theoretical and empirical evidence. Specifically, CFA was used for scale validation, reliability and validity analysis using AMOS version 23 were 7 factors and

35 variables extracted during EFA were analyzed. In the first case the model was identified with a chi-squire of 1056.72 and 535 degrees of freedom. Normed chi-squire of 1.98 was obtained, which satisfies the recommended cut-off boundary of ≤ 3 (Hoe, 2008; Kline, 2011). The model was also significant at 1% with a p-value of 0.000. In addition other fit index such as comparative fit index (CFI) = 0.95, TLI = 0.95, IFI = 0.96 were within the recommended threshold of 0.95 (Hair et al, 2014; Byrne, 2016; Nandru, et al, 2021).

Also, root mean squire error of approximation (RMSEA) = 0.052 and standardized root mean squire residual (SRMR) =0.053, which also indicates a good model fit (Awang, 2011; Hair et al., 2014). However, one variable, namely, I keep close personal watch on my financial affairs (FL4) got deleted due to low regression weight. Hair et al. (2014) suggest a variable to have regression weight of at least 0.5. However, the researcher decided to keep two variables FA2 and FL3, which had regression weights closely approach to 0.5 see Table 4.14

The CFA analysis was rerun for the second time after deleting FL4. The CFA analysis results reveal that all significant variables loaded well in the measurement model as model fit statistics show some improvement and were all within the recommended level. The final model was identified with Chi-squire of 958.077 and 502 degrees of freedom. The normed chi-squire of 1.91 was obtained, which is much better than the first. Other fit indices such as CFI = 0.96, IFI = 0.96, TLI =0.96, RMSEA = 0.05, and SRMR = 0.049 show more improvement and suggest good model fit as well as adequacy of the sample size in the study as shown in Figure 4.6.

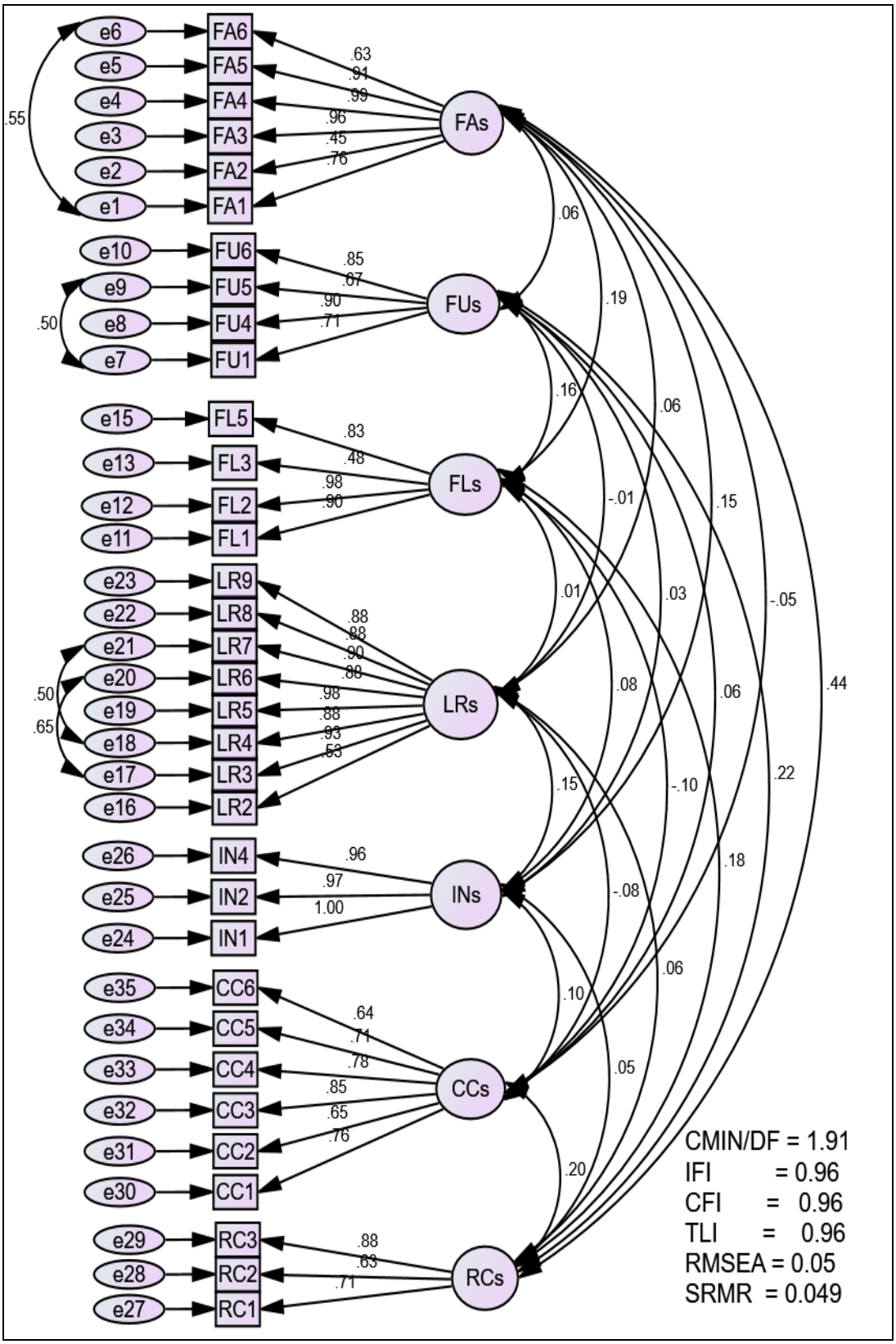


Figure 4.6: Standardized Overall CFA Model

Source: Research Findings 2022

Table 4.14: Measurement Model Regression Weights and Standardized Regression Weight

			S.E.	C.R.	P	Standardized Regression weight
FA1	<---	FAs				.757
FA2	<---	FAs	.070	8.603	***	.467
FA3	<---	FAs	.063	20.425	***	.955
FA4	<---	FAs	.062	21.263	***	.989
FA5	<---	FAs	.066	19.283	***	.913
FA6	<---	FAs	.048	17.808	***	.628
FU1	<---	FUs				.709
FU4	<---	FUs	.089	14.716	***	.896
FU5	<---	FUs	.057	16.550	***	.666
FU6	<---	FUs	.088	14.579	***	.852
FL1	<---	FLs				.904
FL2	<---	FLs	.035	31.048	***	.978
FL3	<---	FLs	.058	9.925	***	.484
FL5	<---	FLs	.042	22.363	***	.828
LR2	<---	LRs				.528
LR3	<---	LRs	.140	11.251	***	.927
LR4	<---	LRs	.129	11.009	***	.882
LR5	<---	LRs	.135	11.493	***	.978
LR6	<---	LRs	.135	11.004	***	.881
LR7	<---	LRs	.131	11.123	***	.902
LR8	<---	LRs	.124	11.014	***	.882
LR9	<---	LRs	.124	10.987	***	.878
IN1	<---	INs				1.000
IN2	<---	INs	.012	77.760	***	.973
IN4	<---	INs	.015	60.403	***	.956
RC1	<---	RCs				.707
RC2	<---	RCs	.064	10.535	***	.629
RC3	<---	RCs	.096	11.978	***	.875
CC1	<---	CCs				.756
CC2	<---	CCs	.068	12.094	***	.654
CC3	<---	CCs	.066	15.893	***	.848
CC4	<---	CCs	.072	14.545	***	.776
CC5	<---	CCs	.071	13.207	***	.710
CC6	<---	CCs	.072	11.747	***	.636

Source: Data Analysis 2022

4.6 Validity and Reliability

Prior to conducting a regression analysis and hypothesis testing, the researcher addresses issues of reliability and validity in this section. CFA, according to Awang (2011), can help determine the unidimensionality, validity, and reliability of latent constructs. To achieve unidimensionality, the researcher must first ensure that all measuring items have a factor loading of at least 0.5 for their respective latent construct and that all factor loading is positive, as suggested by Hair et al. (2014). In this study, both conditions were met, indicating that unidimensionality was achieved, thus opening the door for validity and reliability test.

4.6.1 Result from Validity Measures

Validity, according to Hair et al. (2014), is the extent to which scale or set of measures accurately represents the concept of interest or what it is supposed to represent. It means that the instrument gives the actual result of what it is supposed to measure (Evans, 2017). Before conducting regression analysis, three types of validity namely convergent, construct and discriminate validity was conducted.

4.6.1.1 Results from Convergent Validity

Convergent validity was conducted to ensure that indicators of a specific construct converge or share a high proportional of variance in common. It was evaluated by using average variance extracted (AVE) and Reliability (Saeed et al., 2021). In order to achieve convergent validity, the minimum AVE for each construct should be 0.5 (Hair et al., 2014; Kong et al., 2014). Computation of AVE was conducted using the following formulae proposed by Awang (2011).

$$AVE = \sum \lambda^2 /_n$$

Where λ = Factor loading of every item and

n = number of item in the model.

The results indicated in Table 4.15 and Table 4.14 suggest that convergent validity was achieved since all values of AVE obtained exceeded the threshold value of 0.5 and were statistically significant (Ahmed et al., 2016; Koang et al., 2014).

Table 4.15: Summary of Reliability and Validity Test

Construct	***AVE***	***Construct reliability(CR)***	***Cronbanch Alpha (α)***
Financial Access (FAs)	0.6485	0.91247	0.917
Financial Usage (FUs)	0.6187	0.86479	0.888
Financial Literacy (FLs)	0.6734	0.88647	0.864
Law and regulations (LRs)	0.7514	0.95943	0.917
Institutional norms (INs)	0.9536	0.98402	0.984
Cultural cognitive (CCs)	0.5382	0.87379	0.872
Rice commercialization (RCs)	0.5537	0.78500	0.770

Source: Data Analysis 2022

4.6.1.2 Result from Construct Validity

According to Hair et al. (2014), one of primary objectives of CFA is to access construct validity of the proposed measurement theory. In CFA, when the model Fit Indices for a construct meet the required level, construct validity is established. The model fit indices show how well the items fit their respective latent constructs when measuring them. Table 4.13 lists the fitness indices, as well as their respective categories and levels of acceptance. Since the result shown in Figure 4.6 above indicate, all fitness indices in the overall measurement model met the required levels, then in this study construct validity was declared to be attained.

4.6.1.3 Result from Discriminant Validity

Discriminant validity was conducted to ensure that all constructs were statistically distinct from each other. In the discriminant validity assessment, the researcher uses Fornell and Larcker (1981) criterion. According to Fornell and Larcker (1981), as cited in Kong et al. (2014), the AVE values should be greater than squared correlation estimates. The result obtained in Table 4.16 below indicates that the criteria provided by Fornell and Larcker and cited by number of scholars (Hair et al., 2014; Kong et al., 2014; Adomoko et al., 2016; Saeed, et al., 2021) were met hence the construct were distinct from each other.

Table 4.16: Fornell and Lacker- Criteria for Discriminant Validity

	FA	FU	FL	LR	IN	CC	RC
FA	**0.8053**						
FU	0.061	**0.7866**					
FL	0.189	0.156	**0.8206**				
LR	0.057	-0.012	0.012	**0.8668**			
IN	0.151	0.032	0.083	0.15	**0.9765**		
CC	0.051	0.058	-0.104	-0.079	0.102	**0.7336**	
RC	0.436	0.218	0.184	0.065	0.047	0.199	**0.7441**

Source: Data Analysis 2022

4.6.2 Result from Reliability

Reliability test refers to assessment of the degree of consistency between multiple of the variables (Bongomin et al., 2018). It is the extent to which a set of variables is consistent with what it is intended to measure (Hair et al, 2016). According to Awang (2011) two criteria can be used to assess the reliability of a measurement model: internal reliability and composite reliability. The internal reliability of the instruments concerns with homogeneity of the item within a scale and is measured by using Cronbanch alpha coefficient (Cronbanch, 1951). Internal consistency is archived when

value of Cronbach alpha (ά) exceed 0.7 (Bongomin et al., 2017; Abdullahi, et al., 2021; Jensen & Kristensen, 2021).

The second criteria used for reliability and internal consistence measure were Construct/Composite reliability (CR). According to Hair et al. (2014), the value of CR should be 0.7 or higher to indicate adequacy internal consistency. Composite reliability was computed using the following formulae adopted from Awang (2011).

$$CR = \left(\sum_{i=1}^{n} \lambda_i\right)^2 \Big/ \left(\sum_{i=1}^{n} \lambda_i\right)^2 + \left(\sum_{i=1}^{n} e_i\right)$$

Where λ_i = Factor loading and

e_i= error variance

The result obtained in Table 4.15 indicates that Cronbach alpha (ά) of > 0.7 and Construct reliability (CR) of > 0.7 was attained for all latent variables in this study. Thus confirming that the internal reliability and construct reliability of the measures were archived in this study as recommended by scholars (Hair et al., 2014; Abdullahi et al., 2021; Jensen & Kristensen, 2021).

4.7 Regression Analysis

This study aims to investigate the relationship between three dimensions of financial inclusion (Financial access, usage and literacy) with agriculture commercialization (Rice commercialization). The study also determines the moderating effect of institutional support on this relationship. The following section presents the regression analysis results between rice commercialization (RC) and financial inclusion variables (FA, FU and FL). While taking farming experience, source of income, being in irrigation scheme and Age (FE, SI, IRS and Age) as control variables sought to have

impact on agricultural commercialization (Mihretie, 2020; Bolawariwa, et al., 2020; Ayele et al., 2021)**.**

Two regression analyses were conducted, first by incorporating only independent variables presented in model 1. In the second model, the researcher incorporated the study's control variable presented in model 2. In the first model, the researcher intends to examine how financial inclusion variables (FA, FU, and FL) influence agricultural commercialization. The IV variables were loaded simultaneously, and the result obtained in Table 4.17 presents the information on the fitness and usefulness of the model.

The value of R^2 obtained shows how much the fluctuation in rice commercialization (DV) change with change in unit of FI variables. The coefficient of determination R^2 is presented to indicate how variation in rice commercialization level will respond to financial access, usage and literacy without any moderation factors. In this first model R^2 is 21.6% indicating that 21.6% of the variation in agricultural commercialization of rice grower farmers in Kilombero is explained by variation in financial service access, usage, and literacy, so other factors can explain the remaining 78.4% variation. Although the value of R^2 seems less, in social science research, R^2's are often less than 0.5 or 50% of the variance explained (Keith, 2019).

In addition, a high R^2 does not necessarily mean a good model, but it depends on the DV to be explained. In some studies on FI and or AGC, the value of R^2 obtained ranges between 11.3% and 32.4% (Adomako et al., 2016; Abu and Haruna, 2017; Bongomin et al., 2017; Bongomin et al., 2018a; Rubhara and Mudhara, 2019). So the

value of R^2 obtained in this study is considered to be sufficient enough to explain the variation of agricultural commercialization with FI variables.

Table 4.17: Model Summary

					Change Statistics	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R squire Change	Sig. F Change
1	.464[a]	.216	.209	.73250	.216	.000

a. Predictors: (Constant), FL, FU, FA

Table 4.18 presents the analysis of variance for F-statistics, which provides the statistical test for the overall model fit in terms of F ratio (Hair et al., 2014). The result shows that the total sums of the squire (52.211+189.939=242.149) is the squired error that would occur if the researcher uses only the mean of Y to predict the dependant variable. Using the value of FA, FU and FL reduces the error by 27.5% (52.211÷189.939). The reduction is deemed statistical significance with the F (3, 354) =32.436, which is significant at P< 0.001. In addition, the result indicates that taken together, financial access, usage and literacy explain agriculture commercialization to a statistical significant degree.

Table 4.18: ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	F	Sig.
1	Regression	52.211	3	17.404	32.436	.000[b]
	Residual	189.939	354	.537		
	Total	**242.149**	**357**			

a. Dependent Variable: RC

b. Predictors: (Constant), FL, FU, FA

The results obtained in Table 4.19 indicate that not all the variables are important in explaining agricultural commercialization. In fact financial service access, had significant effect on commercialization (b= 0.359, B = 0.397, P<0.001) followed by financial service usage (b =0.120, B=0.168, P< 0.001). In contrast, the effect of financial literacy on commercialization was low to moderate and not statistically significant (b = 0.059; B=0.073, P<0.142). These results support hypothesis H1 which states that financial service access positively affects agriculture commercialization, and H2, which states that financial services usage positively affects agricultural commercialization.

Table 4.19: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
		B	Std. Error	Beta	Sig.	Tolerance	VIF
1	(Constant)	2.045	.206		.000		
	FA	.359	.044	.397	.000	.925	1.081
	FU	.120	.034	.168	.000	.985	1.016
	FL	.059	.040	.073	.142	.912	1.096

a. Dependent Variable: RC

Source: Data Analysis 2022

However, the result rejects hypothesis H3, which states that financial literacy positively affects agricultural commercialization. In addition, the results show low level of standard error for FA, FU and FL to be 0.044, 0.034 and 0.040, respectively. Also, results show no multicollinearity issues as the tolerance value was >0.2 and VIF was less than 5 (Hair et al., 2014). A detailed discussion of the findings in multiple linear regression output of IV on DV is done in sections 5.2 -5.4 of chapter 5.

Multiple linear regressions equation was derived from a table as follows.

$$RC = B_o + \sum B_i F_i + \sum \delta_i I_i + \sum \gamma_i (F * I)_i + \varepsilon$$

$$\mathrm{RC} = 2.045 + 0.359\mathrm{FA} + 0.120\mathrm{FU} + 0.059\mathrm{FL} + \sum \delta_i \mathrm{I}_i + \sum \gamma_i (\mathrm{F} * \mathrm{I})_i + \varepsilon$$

4.8 Multiple Regressions with some Background Information

In this subsection, the researcher incorporates some background information variables which sought to have impact in the relationship between financial inclusion and agricultural commercialization. The background information loaded in the second model to test their influence on the overall fitness of the statistical output. The background variables loaded in the model include farming experience (FE), source of income (SI), age, and being in Irrigation scheme (IRS).

Table 4.20: Model Summary

					Change Statistics	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Sig. F Change
1	.547[a]	.299	.285	.69653	.299	.000

a. Predictors: (Constant), IRS, FU, Age, FA, SI, FL, FE

Coefficient of determination R^2 obtained is presented to check how the variation in rice commercialization level will respond to financial access, usage and literacy upon inclusion of the background information. In this second model, R^2 is 29.9% indicating an increase of 8.3% in the variance explained by financial service access, usage and literacy to rice commercialization upon inclusion of background information. This means that the remaining 70.1% variation can be explained by other factors not included in the thesis model.

Table 4.21: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
		B	Std. Error	Beta	Sig.	Tolerance	VIF
1	(Constant)	1.811	.227		.000		
	FE	.134	.036	.187	.000	.777	1.288
	Age	-.122	.037	-.166	.001	.813	1.230
	SI	.503	.126	.188	.000	.897	1.115
	FA	.330	.043	.364	.000	.879	1.137
	FU	.080	.033	.112	.016	.940	1.064
	FL	.035	.039	.043	.371	.878	1.139
	IRS	.085	.077	.050	.268	.974	1.027

a. Dependent Variable: RC

In order to confirm that a linear relationship exists between agricultural commercialization and financial inclusion with some background information introduced, Table 4.21 above show that out of the four variables included, three variables significantly correlated with agricultural commercialization. Source of income had significant positive effect on commercialization (b=0.503, B =0.188, P< 0.001) followed by farming experience, which had significant positive impact on commercialization (b=0.134, B=0.187, P< 0.001). The third variable age show significant negative effect on agricultural commercialization (b= -0.122, B= -0.166, P< 0.01).

In contrast the fourth variable being in irrigation scheme show moderate insignificant effect on commercialization (b=0.085, B= 0.050, P =0.268). On the other hand, IV financial access had significant positive effect on commercialization (b=0.330, B=0.364, P<0.001), followed by financial service usage, which had a significant moderate effect on commercialization (b=0.080, B=0.122, P <0.05). However, the third IV financial literacy shows a tiny insignificant effect on commercialization

(b=0.035, B=0.043, P=0.371). Thus the result still supports hypothesis H1 and H2 but reject hypothesis H3. Also, the result still shows no multicollinearity issues as tolerance value was > 0.2 and VIF value was less than 5. Multiple regression equation after inclusion of background information was derived from the table above as shown in the equation below. A detailed discussion of the effect of the control variable in FI and AGC is done in chapter 5, section 5.5

$$RC = B_o + \sum B_i F_i + \sum \varphi_i C_i + \sum \delta_i I_i + \sum \gamma_i (F * I)_i + \varepsilon$$

$$RC=1.811+0.33FA+0.08FU+0.035FL+0.134FE-0.122Age+0.503SI+0.085IRS+\sum \delta_i I_i + \sum \gamma_i (F*I)_i + \varepsilon$$

4.9 Testing for Moderation

A moderating variable, according to Allen (2017), is one that can strengthen, diminish, negate, or otherwise change the association between an independent variable and a dependent variable. Moderation in multiple regression analysis is tested by creating cross-product variables and testing whether these cross-product terms are statistically significant or not when added to the regression equation (Keith, 2019). According to Cohen (1978), as cited in Keith (2019), cross-product/interaction terms are created by multiplying two variables of interest. In this study, cross-product variables were created by multiplying each independent variable (Financial access, financial usage, and financial literacy) with each moderating variable (Law and regulation, Institutional norms, and cultural cognitive).

To reduce unnecessary collinearity and easy interpretation of the entire regression coefficient, the variables of interest were centered first before computation of cross product as recommended by scholars (Jose, 2008; Keith, 2019). Centering involves

subtracting the variable's mean score and resulting to a new variable with mean zero and standard deviation equal to the original standard deviation. Then the centered variable and interaction term were entered into a regression equation to test for moderation. According to Jose (2008), if the beta coefficient of the interaction term is significant, then there is proof of the existence of interaction in the model. In addition, for interaction to exist, the effect of IV on DV should vary as a function of change in the moderator variable (Bongomin et al., 2018a).

4.9.1 Testing for Moderation Effect of Law and Regulation on FI and AGC Relationship

In order to test for statistical significance of the interaction effect between FI and LR, rice commercialization was first regressed on centered FA, FU, FL and LR together with the background information Age, FE, IRS, and SI since they appear to have effect on agriculture commercialization. In the first step of hierarchical regression, the result shown in Table 4.22, model 1 below, shows that the variable accounted for 31.3% of the variance explained in rice commercialization, which is higher than the one indicated in Table 4.20 above.

In addition, the result was significant with (F [8,349] =19.890, P<0.001). Also the introduced moderator variable LR had significant positive effect on commercialization (B= 0.104, P < 0.01). In the second step, the interaction variable between FA and LR was added in the equation. As shown in same Table 4.22 (model 2), the addition of the interaction term did not lead to a significant increase in R^2 (ΔR^2 = 0.005, F [1,348] = 2.385, P=0.123); thus, the interaction term has no impact in the relationship between FI and AGC, so H_4a was not supported.

In the third step, refer to model 3 in the same table; the interaction term between FU and LR was introduced and led to a significant increase in R^2 ($\Delta R^2 = 0.021$, F [1, 347] =11.281, $P<0.01$). In addition, the result indicates that the interaction term between FU and LR leads to significant negative impact in the relationship between FI and AGC, which support hypothesis H_4b. Lastly, the interaction variable between centered FL and centered LR was added to the equation also, as shown in the same table in model4, the addition of the cross product led to statistical significant increase in R^2 ($\Delta R^2 = 0.009$, F [1, 346] = 4.701, $p<0.05$). In addition, the results indicate that the interaction between FL and LR leads to statistical positive effect in the relationship between FI and AGC thus support hypothesis H_4c. A detailed discussion of these findings is provided in section 5.6.

Table 4.22: Hierarchical Regression Analysis testing moderating effect of LR

Variable	Model 1	Model 2	Model 3	Model 4
Constant	3.433	3.443	3.559	3.474
Age	-0.104**	-0.101**	-0.095**	-0.095**
FE	0.125**	0.126**	0.117**	0.121**
IRS	0.089	0.084	0.052	0.036
SI	0.440**	0.431**	0.337**	0.349**
FA/	0.314***	0.298***	0.323***	0.333***
FU	0.084*	0.093**	0.104**	0.098**
FL	0.032	0.031	0.023	0.008
LR	0.104**	0.094*	0.115**	0.149***
FAXLR		-0.057	-0.062	-0.082*
FUXLR			-0.117**	-0.118**
FLXLR				0.075*
R^2	0.313	0.318	0.339	0.348
ΔR^2		0.005	0.021**	0.009*

Source: Research Findings 2022

4.9.2 Testing for Moderation effect of Institutional Norms on FI and AGC Relationship

To test for statistical significance of the interaction between FI and IN, on rice commercialization same approach hierarchical regression analysis was used. As

shown in Table 4.23 below, in the first module (model1), rice commercialization was regressed on same background information and centered IV plus the moderator institutional norms (IN). The result show that the variable accounted for 30.2% of the variance explained in commercialization. Also the result was significant with (F [8,349] =18.861, P< 0.001). However, in model 2 up to model 4 the sequential introduction of interaction variables between FA and IN, FU and IN, and FL and IN both produced insignificant results. This implies that institutional norm does not moderate the relationship between FI and AGC through FA, FU or FL. This led to rejected of hypothesis H_5a- H_5c. Detailed discussion is provided in section 5.7.

Table 4.23: Hierarchical Regression Analysis Testing Moderating effect of IN

Variable	Model 1	Model 2	Model 3	Model 4
Constant	3.408	3.407	3.402	3.399
Age	-0.123**	-0.124**	-0.123**	-0.121**
FE	0.136***	0.136***	0.136***	0.135***
IRS	0.078	0.078	0.076	0.081
SI	0.501***	0.502***	0.509***	0.510***
FA/	0.337***	0.337***	0.337***	0.336***
FU	0.081*	0.080*	0.080*	0.080*
FL	0.038	0.038	0.038	0.040
IN	-0.038	-0.038	-0.038	-0.036
FAXIN		0.003	0.003	0.010
FUXIN			0.009	0.013
FLXIN				-0.038
R^2	0.302	0.302	0.302	0.305
ΔR^2		0.000	0.000	0.003

Source: Data Analysis 2022

Note: IN', centered Institutional norms; FAXIN interaction of FA' and IN'; FUXIN, interaction of FU' and IN'; FLXIN interaction term of FL' and IN'; **P<0.05, **P< 0.01; ***P<0.001*

4.9.3 Testing for Moderation effect of Institutional Cultural Cognitive on FI and AGC Relationship

To test for statistical significance of the interaction between FI and CC, on rice commercialization same approach i.e. hierarchical regression analysis, was used as shown in Table 4.24. In the first step, rice commercialization was regressed on the same background information and centered FA, FU and FL plus the moderator centered CC. The result in Table 4.24 (model1) shows that the variables account for 32.2% of the variance explained in commercialization. The result was significant, with F (8, 349) = 22.149 and $P< 0.001$. The introduced moderator CC also had a significant positive effect on commercialization (B= 0.158, $P< 0.001$).

In the second step, the interaction between FA and CC was introduced in the equation, and it shows that the interaction between FA and CC had significant negative effect on the relation between FI and ACG with ΔR^2 of 2.4% and F (1,348) = 12.861, $P<0.001$, so lead to support H_6a. In a third step, the interaction between FU and CC was introduced, but the interaction term did not lead to significant increase in ΔR^2 i.e. F (1,347) = 0.099, P = 0.753; thus, hypothesis H_6b was not supported.

Finally the interaction between FL and CC was introduced in step 4 and lead to statistically significant increase in R^2 ($\Delta R^2 = 0.008$, F [1, 346] = 4.512, $p< 0.05$). This indicates that the interaction between FL and CC significantly affect the relationship between FI and AGC; thus, it supports H6C, which states that cultural cognitive moderate the relationship between financial inclusion and commercialization through financial literacy. A detailed discussion of the findings is provided in chapter 5, Section 5.8.

Table 4.24: Hierarchical Regression Analysis testing moderating effect of CC

Variable	Model 1	Model 2	Model 3	Model 4
Constant	3.484	3.535	3.537	3.527
Age	-.109**	-0.113**	-0.114**	-0.108**
FE	.127***	0.124***	0.125***	0.128***
IRS	.015	0.029	0.029	0.017
SI	.442***	0.392**	0.390**	0.378**
FA/	.325***	0.339***	0.339***	0.325***
FU	.068*	0.063*	0.063*	0.056
FL	.052	0.042	0.041	0.052
CC	.158***	0.161***	0.161***	0.170***
FAXCC		-0.130***	-0.129***	-0.109**
FUXCC			-0.009	0.004
FLXCC				-0.076*
R^2	0.322	0.344	0.342	0.349
ΔR^2		0.024***	.000	0.008*

Source: Data Analysis 2022

Note: CC', centered cultural cognitive; FAXCC interaction of FA' and CC'; FUXCC, interaction of FU' and CC'; FLXCC interaction term of FL'and CC'; **P<0.05, **P< 0.01; ***P<0.001*

Table 4.25 summarizes the moderation effect of institutional support on financial inclusion and agricultural commercialization relationship. The results in the summary table show that institutional supports moderate the relationship between FI and AGC through the interaction of law and regulation with financial service usage and financial literacy. Another moderation effect arises through the interaction between cultural cognitive and financial services access and with cultural cognitive and financial literacy.

Table 4.25: Summary of Hypothesis Test for the Moderation Effect

Moderator	Hypothesis	R-Squire	ΔR-squire	P-Value	Comment
Law and Regulation (LR)	H_4a	0.318	0.005	0.123	Not supported
	H_4b	0.339	0.021	0.001	Supported
	H_4c	0.348	0.009	0.031	Supported
Institutional Norms (IN)	H_5a	0.302	0.000	0.933	Not supported
	H_5b	0.302	0.000	0.742	Not supported
	H_5c	0.305	0.003	0.227	Not supported
Cultural cognitive (CC)	H_6a	0.344	0.024	0.000	Supported
	H_6b	0.342	0.000	0.753	Not supported
	H_6c	0.349	0.008	0.034	supported

Source: Data Analysis 2022

4.10 Further Analysis of the Moderation effect of IS on FI and AGC Relationship

In this section, the researcher intends to confirm the moderation result obtain above. To accomplish that objective, the researcher applied Hayes' PROCESS macro V 4.1 techniques for SPSS (version 23 and above) to examine the moderation effect of law and regulation on the relationship between financial service usage and financial literacy on agricultural commercialization.

Also, the same approach was used to examine the moderation effect of cultural cognitive on the relationship between financial service access and financial literacy on agricultural commercialization. According to Hayes (2022), PROCESS is a tool for SPSS, which makes it easier to analyze hypothesized moderation models by providing a relatively simple way to analyze relative complex models using bootstrapping confidence intervals (CIs). Thus in this study, the researcher used a standardized estimation of 5,000 bootstrap samples for 95% CI.

Results

Table 4.26: The Interaction effect of LR and FU

	Coeff	se	t	P	LLCI	ULCI
Constant	3.96	0.0409	96.7697	0.0000	3.8795	4.0405
FU	0.1389	0.0355	3.918	0.0001	0.0692	0.2087
LR	0.2267	0.0412	5.4976	0.0000	0.1456	0.3078
Int_1	-0.1095	0.0377	-2.9052	0.0039	-0.1837	-0.0354

Source: Data Analysis 2022

The result found in Table 4.26 shows that the interaction variable between FU and LR was statistically significant with $P < 0.05$. In addition, there was no zero between the upper-level confidence interval (ULCI) and lower-level confidence interval (LLCI), indicating that the interaction term was significant and negatively moderated the relationship between FU and AGC. This means that the relationship between FU and AGC is weakened by law and regulation i.e. the higher level of law and regulation leads to a weaker relationship between financial service usage and agricultural commercialization.

Table 4.27: Conditional effect of the Predictor (FU) at Value of Moderator (LR)

LR	Effect	se	t	p	LLCI	ULCI
-1.0035	0.2488	0.0528	4.7111	0.000	0.145	0.3527
0.000	0.1389	0.0355	3.918	0.0001	0.0692	0.2087
1.0035	0.029	0.0509	0.571	0.5683	-0.071	0.1291

Source: Data Analysis 2022

The results in Table 4.27 show the conditional effect of the focal predictor FU at value of the moderator LR. According to Hayes (2022) Johnson-Neyman simple slope analysis technique, which used in this study provide a certain level up to which your moderator will have a moderating effect. The results obtained in Table 4.27 show that, at the law level of the moderator LR (-1.0035) result to high effect of predictor FU

(0.2488) on agricultural commercialization. However, as law and regulation increases to positive (1.0035) the effect of FU on agriculture commercialization decreases to 0.029.

In addition, Jonson-Neyman identifies the range values of the moderator variable in which the slope of the predictor is significant vs not significant at a specified alpha level (Hayes, 2022). So the result provided in appendix VI shows that the impact of LR on ACG is moderated until when LR is up to 0.5449, but beyond this point, the effect of FU on AGC is no longer moderated. The result is also supported by Figure 4.7, which shows that the interaction effect of LR on FU and AGC relationship increases as LR reduces and vice versa.

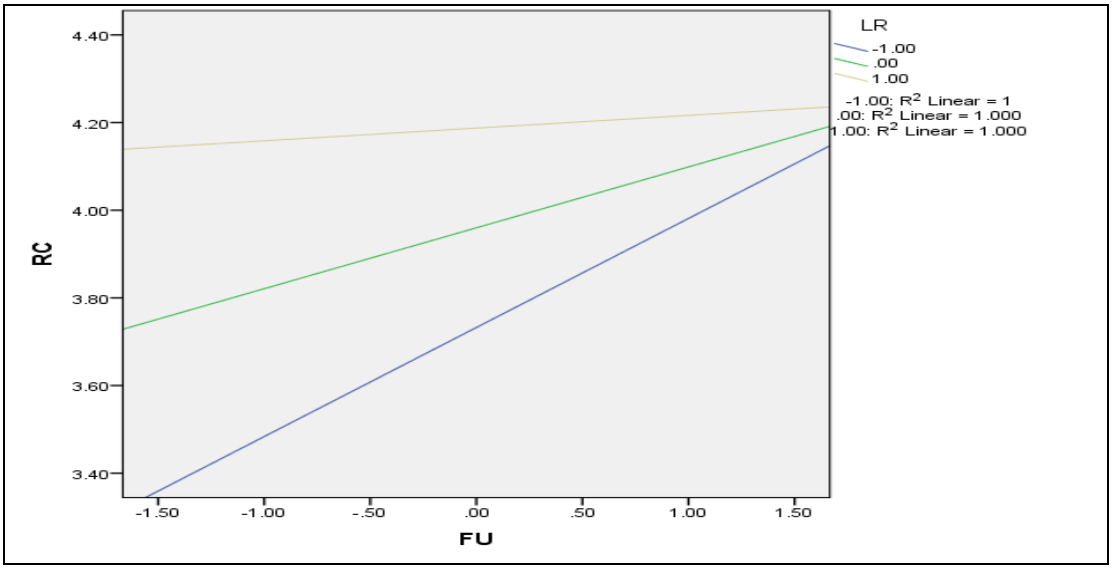


Figure 4.7: Interaction Effect between FU and LR

Table 4.28: The Interaction Effect of FL and LR

	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
Constant	3.9731	0.0407	97.5383	0.0000	3.893	4.0532
FL	0.1414	0.0403	3.5085	0.0005	0.0621	0.2207
LR	0.2186	0.0409	5.3445	0.0000	0.1382	0.2991
Int_1	-0.1703	0.0423	-4.0203	0.0001	-0.2535	-0.087

Source: Data Analysis 2022

The result found in Table 4.28 shows that the interaction variable between FL and LR was statistical significant with P < 0.01. Also, there was no zero in columns of LLCI and ULCI, which indicates that the interaction term was significant, and it does negatively moderate the relationship between FL and AGC. In other words, it indicates that the relationship between FL and AGC is weakened by law and regulation i.e. the higher level of law and regulation leads to a weaker relationship between financial literacy and agricultural commercialization. Contrary, lower level of LR will lead to stronger relationship between FL and AGC.

Table 4.29: Conditional Effect of the Predictor at FL at Value of Moderator LR

LR	Effect	se	t	p	LLCI	ULCI
-1.0035	0.3123	0.0575	5.4339	0.0000	0.1992	0.4253
0	0.1414	0.0403	3.5085	0.0005	0.0621	0.2207
1.0035	-0.0294	0.0597	-0.4935	0.622	-0.1468	0.0879

Source: Data Analysis 2022

The results obtained in Table 4.29 shows the conditional effect of the predictor FL at value of the moderator LR. The results show that at low level of the moderator LR (-1.0035) there is high effect of predictor FL (0.3123) on agricultural commercialization. However, as law and regulation increase to positive (1.0035), the effect of FL on agriculture commercialization decreases to 0.0294. In addition, the result provided by appendix VII show that the impact of FL on ACG is moderated until when LR is up to 0.3318 and beyond this point the effect of FL on AGC is no longer moderated. This is also supported by Figure 4.5 below which show as LR increase the effect of FL on ACG is reduced. Detailed discussion is provided S. 5.6.

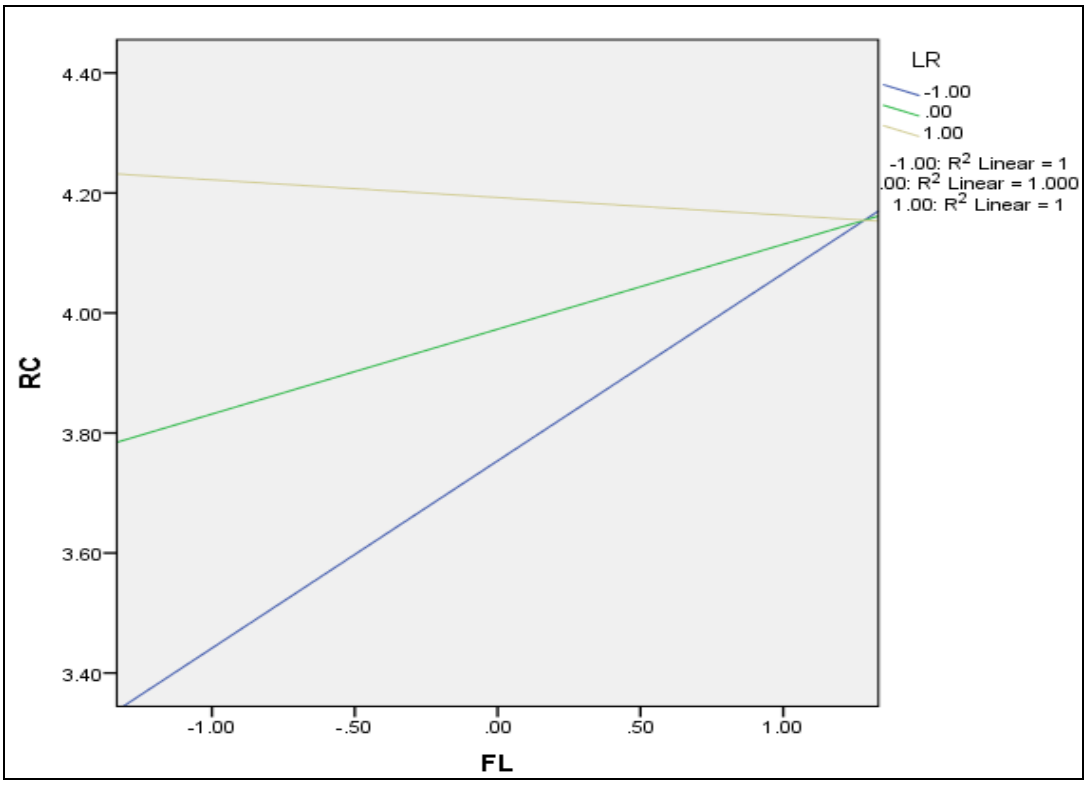


Figure 4.8: Interaction effect between LR& FL

Table 4.30: The interaction effect of FA and CC

	coeff	se	t	p	LLCI	ULCI
Constant	3.9576	0.0365	108.484	0.000	3.8859	4.0294
FA	0.3833	0.0401	9.5495	0.000	0.3044	0.4623
CC	0.1908	0.0345	5.5321	0.000	0.1229	0.2586
Int_1	-0.2024	0.0365	-5.543	0.000	-0.2742	-0.1306

Source: Data analysis 2022

The result found in Table 4.30 shows that the interaction variable between FA and CC was statistically significant with $P < 0.001$. Also, there was no zero in LLCI and ULCI columns, indicating that the interaction term was significant and negatively moderated the relationship between FA and AGC. In other words, it indicates that the relationship between FA and AGC is weakened by cultural cognitive i.e. the higher level of cultural cognitive leads to a weaker relationship between financial service access and agricultural commercialization.

Table 4.31: Conditional effect of the Predictor FA at value of Moderator CC

CC	Effect	se	t	p	LLCI	ULCI
-1.0598	0.5978	0.0557	10.7411	0.000	0.4884	0.7073
0.000	0.3833	0.0401	9.5495	0.000	0.3044	0.4623
1.0598	0.1688	0.0559	3.0225	0.0027	0.059	0.2787

Source: Data analysis 2022

The results obtained in Table 4.31 show the conditional effect of the predictor FA at value of the moderator CC. The results show that at a low level of the moderator CC (-1.0598), predictor FA (0.5978) has a high effect on agricultural commercialization. However, as cultural cognitive increases to positive (1.0598), the effect of FA on agriculture commercialization is reduced to 0.1688. In addition, the result provided by appendix VIII show that the impact of FA on AGC is moderated by CC within the range of CC= -2.223 up to 1.2912 and beyond this point the effect of FA on AGC is no longer moderated. This is also supported by Figure 4.9 below, which shows as CC increases, the effect of FA on AGC is reduced.

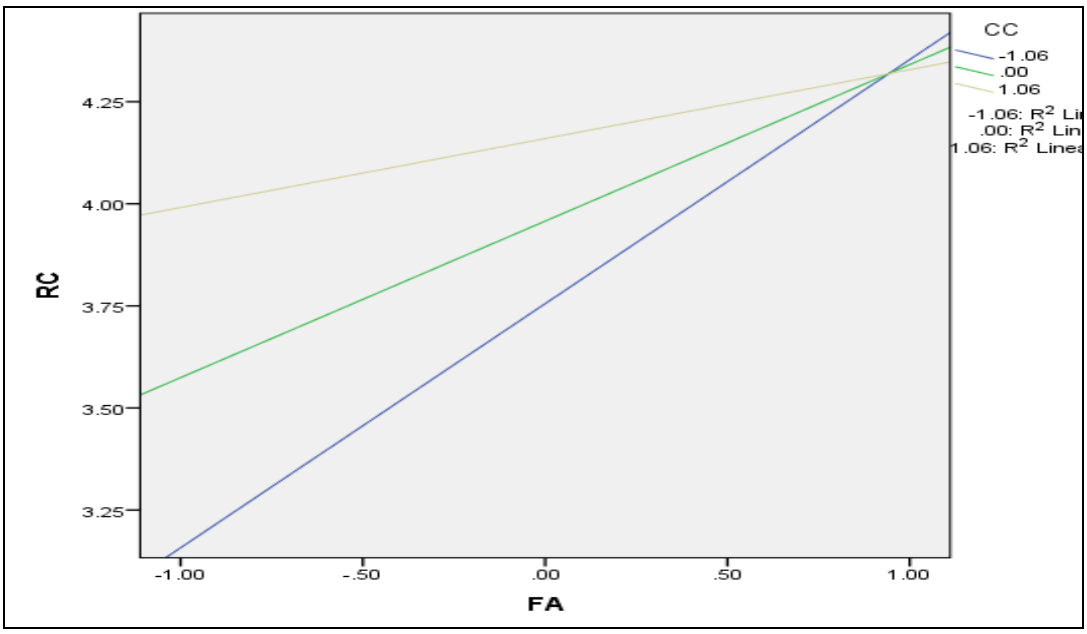


Figure 4.9: Interaction effect of FA and CC

Table 4.32: The interaction of FL and CC

	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
Constant	3.9501	0.0404	97.8942	0.000	3.8707	4.0294
FL	0.1819	0.04	4.5527	0.000	0.1033	0.2605
CC	0.2162	0.0383	5.651	0.000	0.141	0.2915
Int_1	-0.1557	0.0377	-4.1274	0.000	-0.2299	-0.0815

Source: Data analysis 2022

The result found in Table 4.32 shows that the interaction effect between FL and CC was statistically significant with $P < 0.001$. Also, there was no zero in LLCI and ULCI columns, indicating that the interaction term was statistically significant and negatively moderated the relationship between FL and AGC. In other words, it suggests that the relationship between FL and AGC is weakened by cultural cognitive i.e. the higher level of cultural cognitive leads to a weaker relationship between financial service literacy and agricultural commercialization.

Table 4.33: Conditional effect of the Predictor FL at value of the Moderator CC

CC	Effect	se	t	p	LLCI	ULCI
-1.0598	0.3469	0.0577	6.0116	0.000	0.2334	0.4604
0	0.1819	0.04	4.5527	0.000	0.1033	0.2605
1.0598	0.0168	0.0553	0.3045	0.761	-0.0919	0.1256

Source: Data Analysis 2022

The results obtained in Table 4.33 above show the conditional effect of the predictor FL at value of the moderator CC. The results show that at a low level of the moderator CC (-1.0598), predictor FL has a high effect (0.3469) on agricultural commercialization. However, as cultural cognitive increases to positive (1.0598), the effect of FL on agriculture commercialization decreases to 0.0168. In addition, the

result provided by appendix IX shows that the impact of FL on AGC is moderated until when CC is up to 0.5989 and beyond this point i.e. 0.777, the effect of FL on AGC is no longer moderated. This is also supported by Figure 4.10 below which show as CC increase the effect of FL on AGC is reduced. Detailed discussion is provided in section 5.8.

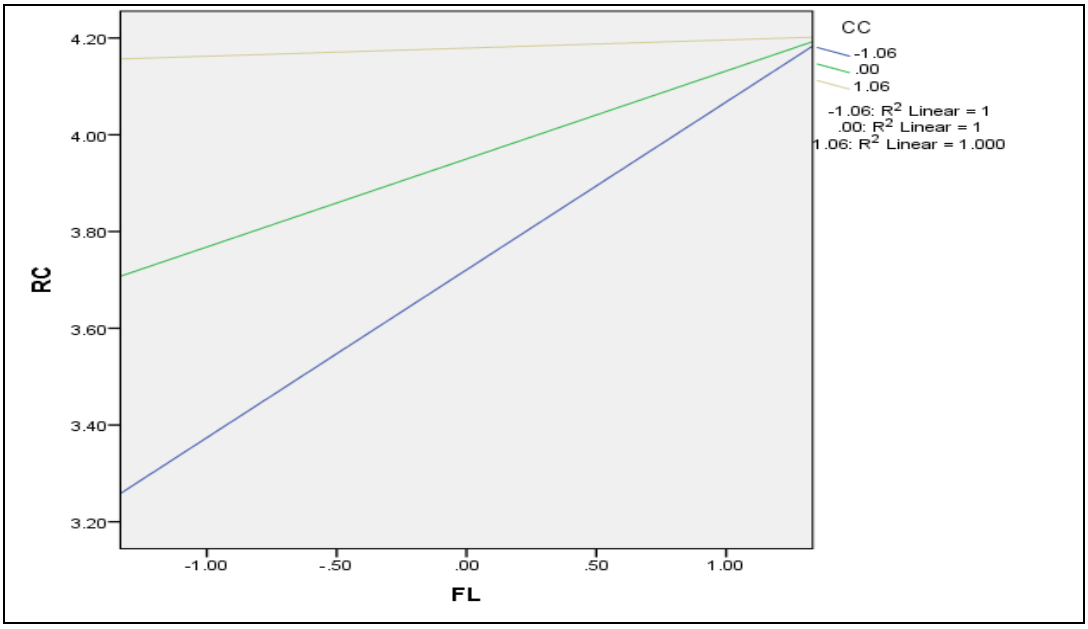


Figure 4.10: Interaction effect between CC and FL

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Overview

This section discusses the finding of the study. It also compares and contrasts the results from this study with those of previous studies conducted in different countries so as to point out the contribution of this study. This help to develop an in-depth understanding of the direct effect of financial inclusion on agriculture commercialization as well as the associated moderation effect of institutional support on the relationship between financial inclusion and agriculture commercialization.

5.2 The Influence of Financial Service Access on Agricultural Commercialization

This study examined whether financial service access could have a positive effect on agricultural commercialization, as stated in hypothesis one. The results found in chapter four (Table 4.19) confirm that financial service access has a significant and positive effect on agricultural commercialization (b=0.359, $P<0.001$), thus support the first hypothesis. These results suggest that financial service access support agricultural commercialization. The results are consistent with previous empirical findings, including Rubhara and Mudhara (2019), who found that farmers with greater access to finance are more likely to commercialize than those failing to access financial services.

A further finding from Abu and Haruna (2017), while investigating the link between FI and agriculture commercialization of smallholder maize producers in Ghana, show that excluded household would have sold 5.04% more of their crops if they had access

to financial services. According to Abu and Haruna (2017), availability of financial institutions such as a bank in a community not only stimulates participation but also reduces transaction costs in accessing bank services in different communities. Famers who have access to banks in their community can use financial services like opening accounts, saving money and applying for credit.

Similar findings on the effect of financial services access on commercialization were obtained by other scholars, such as Ochieng et al. (2019), who found that access to credit has positive effect on household income for commercialized farmers compared to non-commercialized. Additional, studies indicate that having access to formal credit boost productivity and net farm income (Khandker and Koolwal, 2016; Narayanan, 2016; Ogundeji et al., 2018). This is due to the fact that farmers who have access to credit can adopt contemporary technology, which increase their marketable surplus and in turn, their participation in the market (Bhattarai et al., 2013; Martey et al., 2012). Therefore, low level of credit availability May posse challenge to smallholder farmers to achieve optimal commercialization (Mihretie, 2020).

Additionally, while assessing the effect of commercialization on farmers' income for vegetable farmers in Indonesia, Mariyono (2018) found that ownership of mobile phones was among the most important factor which determines market participation of smallholder vegetable farmers. The argument is also supported by Abu and Haruna (2017) who revealed that mobile phone network in the community was one of the significant determinants of FI in the community. Bresnyan (2008) find that mobile phone uses reduce cost of rural financial transactions. Also, according to a recent study by Kurjaluoto et al. (2021), access to mobile money services significantly

changed the social and economic circumstances of many underprivileged and unbanked population segments in non-western countries. Thus financial service access in terms of availability of financial institutions, credit and mobile money services has a positive effect on commercialization, as suggested by hypothesis one.

5.3 The Influence of Financial Service usage on Agricultural Commercialization

The second objective of this study was to examine whether financial service usage could have a positive effect on agriculture commercialization, as stated in hypothesis two. Finding from this study obtained in chapter four (Table 4.19) supported the relationship between financial service usage and agriculture commercialization (b= 0.120, $P< 0.001$). These findings suggest that financial service usage in commercial farming is an important ingredient for facilitating agriculture commercialization or farmers participation in the market.

The findings of this study are consistent with the findings of other several previous studies, such as Ayele et al. (2021), who find that credit use by farmers have significant positive effect on commercialization. Another study by Agbodji and Johnson (2019) examined the impact of agricultural credit on maize, sorghum and paddy productivity in Togo, find that credit use had significant positive impact on these crops productivity and farmers participation in the market than for those with no access to credit. The argument is also supported by Abu and Haruna (2017), who observed that usage of credit and other funding avenues enable farmers to increase production beyond what is needed to meet food security requirements of the household, thus sale the surplus. This is due to the fact that availability of credit and better credit system help smallholder farmers to build assets that enhance level of

adoption of new technology and price risk, thus contribute to increase production and farmers participation in the market by easing the liquidity of household farmers (Abafita et al., 2016; Twumasi et al., 2019).

5.4 The influence of Financial Literacy on Agricultural Commercialization

This study also intended to determine the influence of financial service literacy on agriculture commercialization, as stated in hypothesis three. However, the finding obtained in Table 4.19 did not support the relationship between financial literacy and agricultural commercialization. The results show that there is positive non-significant relationship between the level of financial literacy and agricultural commercialization (b= 0.059, P = 0.142), so hypothesis three was not accepted. The findings make sense on the account that; the sample for this study was drawn from rural area in a least developed country, Tanzania. So it is important to take into account the low level of financial literacy among rice growers' farmers in the study area. The findings obtained in chapter four (Table 4.3) show that majority of the respondents 84.1% had primary school level of education or lesser.

Some studies have linked the level of education of an individual with financial literacy. A study by Balachandran and Dhal (2018) find a negative relationship between education level of a farmer and dependence on informal loans; where by highly educated farmers tend to be reluctant to dependent on informal source of finance compared to less educated farmers. Twumasi et al. (2019) also show that level of education has significant positive impact on access to credit. A very recent study by Amrago and Mensah (2022) shows that cabbage producers in Ghana with no formal education had higher (56.22%) usage of trade credit relative to producers with

basic level of education 36.87%. A possible reason is that the less they become educated, the more they become conscious of other informal relative means of financing their business. Thus they are frightened by the complex process of formal financing institutions in advancing loans and the need for collateral (Amrago and Mensah, 2022).

Additionally, contrary to formal financial institutions, credit from informal institutions, such as trade credit from agrochemical suppliers, is convenient and does not require collateral like bank loans (Lin and Chou, 2015; Yazdanfar and Ohman, 2016, Amrago and Mensah, 2022). Thus trade credits reduce transaction costs, especial in terms of collateral. So to increase formal financial services access and usage among farmers, an outreach program could be developed to provide farmers with information regarding where they can access, how to interact with and how to manage their activities with formal financial institutions efficiently so as to improve their level of commercialization.

5.5 The Influence of Control Variable on Agricultural Commercialization

Apart from the main independent variables for this study, the study also examines the influence of control variables on agriculture commercialization. The results obtained in chapter four (Table 4.21) revealed that farming experience which is the number of years a household has been involved in rice cultivation had significant positive relationship with rice commercialization with b= 0.134, and $P<0.001$. The results are consistent with the finding of other empirical studies, such as Kabiti et al. (2016) and Mihretie (2020) who find that farming experience is among the factors which had a significant positive effect on the level of household commercialization. In addition,

Abu (2015) indicates that increase in experience increase perfection. Thus the more farming experience the household possess, the more trading partner they can attract at a relatively low cost. However, the result is inconsistent with the findings of Mariyono (2018) who find a negative relationship between farming experience and commercialization.

In addition, the source of income which test whether on-farm income or rice farming income had effect on commercialization, showed a significant positive impact of source of income on rice commercialization with b= 0.503 and P< 0.001. The results are consistent with the finding of Abdullah et al. (2017), which shows that income from rice and farming experience positively affects the welfare of small holder farmers. Moreover, a study by Rios et al. (2008) finds negative relationship between off-farm income and agricultural commercialization. The authors contend that if more time is spent on non-farm activities, less time will be spent on agriculture production, which will result in less commercialization.

Furthermore, this study found that the age of the respond had a significant negative relationship with agriculture commercialization with b= -0.122 and P < 0.01. This result supports what has been reported in the literature by other scholars. For instance, Rubhara and Mudhara (2019) reported that age and off-farm income were negatively associated with commercialization level. Similarly, Abafite et al. (2016) were using Heckman estimation model find that age had negative effect on commercialization. Also, Abu and Haruna (2017) confirmed that advanced age reduces the quantity of crops sold. This could be due to the fact that older people might be more risk averse than younger people so they may not be willing to venture into food crops selling to

guard against the volatility of food prices, thus creating a negative relationship with commercialization. However, the results were inconsistent with the findings of Adinya (2013); Kabiti et al. (2016); and Mariyono (2018) who finds household age had a significant positive effect on commercialization. This could be due to the fact that farm age and farming experience might be related in a sense that farmer may have easier access to market information as they gain more experience. So that is why age can positively affect commercialization decisions (Kabiti, et al., 2016).

Lastly, the last variable being in irrigation scheme show insignificant positive relationship with commercialization as shown in Table 4.21 with b= 0.085 and *P* = 0.268. The results suggest that being in irrigation scheme or irrigation availability has no effect on rice commercialization. This could be due to the fact that irrigation water in the study area is supplied by rainfall and in the event of draught; benefit from ownership of irrigation facility may not be achieved. Unlike the current study, previous studies by Ayele et al. (2021) and Aman et al. (2014) find that irrigation availability is one of the factors with a significant positive effect on the level of horticulture commercialization.

However, a study by Kabiti, et al., (2016) finds that irrigation availability had a negative significant effect on output commercialization. The authors connote that when a household moves from non-irrigator to irrigator the output commercialization level is expected to decrease. This can be the result of high installation and maintenance costs of irrigation facilities which use part of the production capital, which would, otherwise used to increase crop production, thus fostering commercialization.

5.6 The Moderation effect of Law and Regulation in the link between Financial inclusion and Agricultural Commercialization

The study also intends to examine the moderating effect of institutional law and regulation in the relationship between FI and AGC, as stated in hypotheses H_4a to H_4c. The analysis was done in two steps. In the first step, the researcher used hierarchical regression analysis. The result obtained in chapter four (Table 4.22) shows that law and regulation moderate the relationship through financial service usage and financial literacy but not through financial service access. Thus leads to accepting hypotheses H_4b and H_4c while rejecting H_4a.

In the second step, the researcher employed Hayes PROCESS with Johnson-Neyman simple slope analysis technique. The results obtained in chapter four Table 4.26 and Table 4.28 shows that there is significant negative interaction effect between LR and FU (b=-0.1095, $P< 0.05$) and significant negative effect between LR and FL (b = -0.1703, $P<0.01$). In addition, the result from the Johnson-Neyman simple slope analysis obtained in Table 4.27 and Table 4.29, as well as appendix VI and VII show the range of value at which the moderator (LR) will have moderating effect on the relationship between FU and AGC and FL and AGC. The result suggests that as the LR level is reduced, the effect of FU on AGC and FL on AGC will be increased.

The current results are consistent with earlier empirical findings made by other scholars, such as Mariyono (2018), who noted that easing the requirements for obtaining microcredit can benefit farmers who choose to engage in commercial agribusiness that involves the cultivation of high-value crops. The author proposes that in coordination with rural cooperatives, the government and commercial sector

give farmers simple access to finance. In addition, Ogundeji et al. (2018) recommend that higher interest rates lessen farmers' chances of getting credit from a financial institution. Also, according to Demirgüç-Kunt et al. (2018), accessing credit from formal financial institutions is significantly hampered by not having the proper documentation.

Moreover, a study by Mohamed et al. (2019) revealed that 56.4% of Ghanaians' agricultural households use informal financial services, even though agriculture is a source of employment for nearly half of the Ghanaians' labour force. This could be due to the fact that the majority of the farmers are poor, and lacking collateral to access credit provided by commercial banks (Raifu and Aminu, 2019). Thus if financial institution law and regulation, can be relaxed then, farms' usage and literacy on financial matter will be increased.

On the other hand, the results of this study are inconsistent with those of Seman (2016) who find that strength of legal rights and government has positive effect on level of financial inclusion. Rojas-Suarez (2016) also finds that Latin America had large financial inclusion gap in terms of account ownership due to institutional weakness.

According to Rojas-Suarez, low level of institutional quality and lack of enforcement of the rule of law reduce investors' incentive to entrust their funds to formal financial institutions. This implies that strong and strict regulation can improve safety and soundness of the financial system and quality of the service provided by financial institution to its users including smallholder farmers.

5.7 The Moderating effect of Institutional Norms in the Link between Financial Inclusion and Agricultural Commercialization

The study also intended to examine the moderating effect of institutional norms in the relationship between FI and AGC, as stated in hypotheses H_5a to H_5c. The result obtained in chapter four (Table 4.23) reveled that institutional norms does not moderate the relationship between FI and AGC neither through FA, FU or FL. Thus hypothesis H_5a to H_5c was rejected.

This could be due to the fact that most respondents in the study area were men (66.2%) compared to females (33.8%) refer to section 4.3.2. Existing studies show that both males and females tend to follow their pear group and consider suggestions given by the pear group or friends in deciding to make an investment and have profit in the future (Adil et al., 2021).

However, compared to females, male investors are too much about intuition in their self towards the investments they make (Adil et al., 2021). The overconfidence of male investors believes that their knowledge and skill of investment are better than the others. So based on this fact, it might be difficult for males in the study area to be involved in saving or credit groups compared to their counterparts females and to imitate what others are doing.

In addition, the study by Mashingo and Schoeman (2010) pointed out that most Africans, especially women prefer Saving/credit group because it is the mechanism that deepens relationship and enhance financial experience. Indigenous saving/credit groups are formed bolstered and kept together by social norms and the knowledge

people have on one another (Mashingo and Schoeman, 2010). As a result, social capital is built through an emphasis on trust, honesty, human dignity, sharing, discipline, working collectively and community values. Moreover, a study by Sithole et al. (2021) shows that by being in saving and credit groups such as Vikoba, women have been economically empowered and able to buy or do things that their communities believed only men or employed people should be able to afford. Also, Sithole et al. (2021) reveal that women prefer to form or join saving/credit groups because it is the place where they gain self-confidence since they can share their problems with other group members and receive support from group members.

On the other hand, the results were inconsistent with those of Bongomin et al. (2016), who found that prevalence of normative institutional frame among poor households positively affected FI. Also, Manning (1999) observes that “everyone doing it” can lead to increasing likely hood that poor individuals will engage in a particular behaviour within that social setting. World Bank (2001) observes that normative institutions play a primary role in determining poor households' financial decisions and choices.

5.8 The Moderation effect of Institutional Cultural Cognitive in the link between Financial inclusion and Agricultural Commercialization

The study also intended to examine the moderating effect of institutional cultural cognitive in the relationship between FI and AGC, as stated in hypotheses H6a to H6c. The analysis for the moderation effect was done using the same techniques i.e. hierarchal regression analysis followed by Hayes PROCESS with Johnson-Neyman simple slope analysis.

The findings from hierarchical regression analysis obtained in chapter four (Table 4.24) show that institutional cultural cognitive moderates the relationship between FI and AGC through financial service access and financial literacy. However, the interaction effect between cultural cognitive and financial service usage had an insignificant effect on commercialization. Thus it leads to accepting H_6a and H_6c while rejecting H_6b.

The findings from the second approach i.e. Hayes PROCESS obtained in chapter four Table 4.30 and Table 4.32 also show that there is a significant negative interactive effect between CC and FA (b=-0.2024, P<0.001) and a significant negative interactive effect between CC and FL (b= -0.1557, *P*<0.001). In addition, the result from the Johnson-Neyman simple slope analysis obtained in Table 4.31 and Table 4.33, as well as appendix VIII and appendix IX, show the range of value at which the moderator (CC) will have a moderating effect on the relationship between FA and AGC and FL and AGC. The result suggests that as the level of CC is reduced, the effect of FA on AGC and FL on AGC will be increased.

The results are consistent with some previous empirical study, such as a study by Mohamed et al. (2019) while measure the extent and determinant of financial inclusion in terms of usage of financial service among agriculture household in Ghana, find that most traditionalist, especial those in a rural area, hold on traditional and indigenous activities that are hesitant to seek formal education or activities, thus this could be a potential hindrance to their use of formal financial services.

Moreover, poor action are guided by cultural cognitive frames and cultural assumptions which enable them to develop habit and skills of sense making such as

accessing and using of financial services (Scott, 2001). The reason why most agriculture producers prefer or have a tendency to use informal financial services regardless of high risk associated with the service, according to Mohamed et al. (2019), is because transactions are straightforward, simple and streamed line to the needs and situation of most marginalized groups.

Akudungu (2016) also confirm that informal source plays a vital role in providing credit, especial to those who have reluctance to access credit from formal sources. Additionally, a recent study by Sithole et al. (2021) finds that compared to the drawn-out process involved in obtaining bank financial services, saving/credit groups offer its member quick access to finance.

However, Silong and Gadanakis (2019) reveal that belonging to a farm group, or saving/credit group does not guarantee accessing credit from formal credit providers. Still, the authors confirmed that majority of the farmer access credit from the support group they belong. This could be due to the fact that by using saving/credit groups, finance members can avoid standing in long lines at banks and not having to pay for transport while also avoiding need to provide variety of documents (Sithole et al., 2021). Thus if wrong perception and belief the poor or marginalized individual have on formal financial services can be reduced then access and literacy on formal financial services can be increased.

The concluding model of the current study is shown in Figure 5.1 and is based on the discussion of the results and the significance level of each relationship.

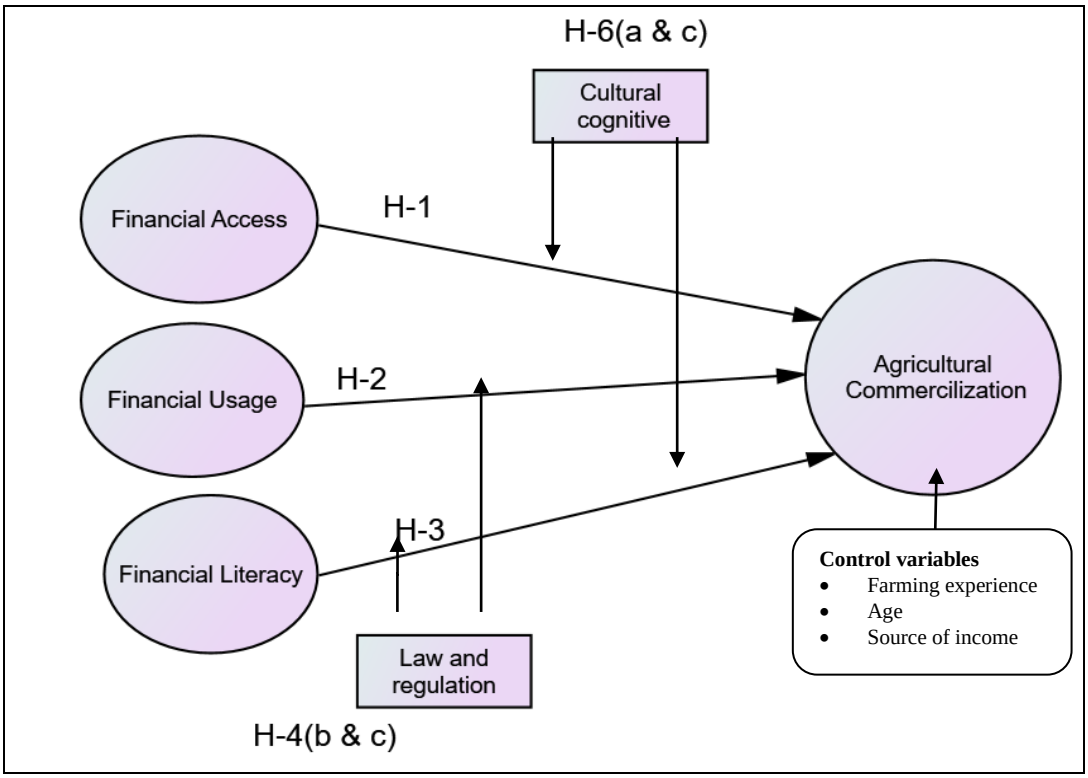


Figure 5.1: Final Model of the Current Study

5.9 Chapter Summary

The findings of this study have made a significant contribution to academic literature as other scholars have not explored the moderation effect of institutional support in the link between financial inclusion and agricultural commercialization. Farmer studies on commercialization focus on the determinant of commercialization (Kabiti et al., 2016; Abdullah et al., 2017; Rubhara and Mudhara, 2019; Mihretie, 2020; Ayele et al., 2021), commercialization and food security (Radchenko and Corral, 2018; Bolariwa, et al., 2020). Other focus on commercialization behaviour and productivity (Yaseen et al., 2017) or social network and commercialization (Mwema and Crewatt, 2019). Only one study focuses on financial inclusion and commercialization (Abu and Haruna, 2017); however, this study does not discuss the moderating effect of institutional support in such a relationship.

The current study has found that financial services access and financial service usage have significant effect on rice commercialization, but financial literacy has insignificant positive effect on commercialization. Thus financial access and usage promote agriculture commercialization. In addition, the study has found that institutional law and regulation, as well as institutional cultural cognitive, had a negative moderation effect on the relationship between FI and AGC. Thus if rules and regulations and cultural cognitive are reduced, then it fosters the relationship between FI and AGC.

In addition to the main variable of the study the current study also assess the effect of control variables on agriculture commercialization. The variables include farming experience, source of income, age of the farmer and irrigation availability. The result reveled that farming experience and source of income if it is rice cultivation has significant positive effect on commercialization. The results suggest that increase in farming experience and when the main source of income is agriculture then it leads to increase commercialization. However age showed significant negative effect on commercialization, which suggest that older people are more risk averse than young people so they may not be willing to commercialize.

CHAPTER SIX

CONCLUSION, RECOMMENDATIONS AND AREAS FOR FUTURE RESEARCH

6.1 Overview

The study makes a connection between financial inclusion and agricultural commercialization and investigates it. It also examines the role that institutional support plays in influencing the link between financial inclusion and agriculture commercialization. More specifically, the study aimed at determine the effect of financial service access on agriculture commercialization, financial service usage on agriculture commercialization, financial literacy on agriculture commercialization and moderating effect of institutional support in the link between financial inclusion and agriculture commercialization.

The results of this study based on 358 samples obtained from smallholders' rice grower farmers' in Kilombero District. IBM SPSS and IBM Amos version 23 together with Hayes PROCESS macro version 4.1 were employed for data analysis. The key findings conclusion, recommendations, and ideas for further research are presented in this chapter. The study's implications are also discussed in the same chapter, along with the results' theoretical and practical ramifications and the study's contribution to the body of knowledge. Finally, the study's limitations are emphasized.

6.2 Research main Findings and Conclusion

6.2.1 Financial Service Access and Agricultural Commercialization

The study examined the effect of financial service access on agriculture commercialization. The study revealed that financial service access has significant

positive impact on agricultural commercialization. The result suggests that farmers with greater access to finance are more likely to commercialize than those failing to access financial services. The result was consistent with other scholars findings who found that access or availability of financial services in the community had significant positive effect on commercialization (Ochieng et al., 2019; Khandker and Koolwal, 2016; Ogundeji et al., 2018; Mariyano, 2018; Kurjaluoto et al., 2021).

Moreover, availability of financial institutions or services in the community, such as banks, bank agents, and mobile money services, help to reduce transaction cost in accessing financial services such as account ownership, saving money, receiving agricultural remittance and pay for agriculture inputs. In addition, farmer with access to credit have the opportunity to adopt new and modern agricultural farming technology thus increase productivity, market participation and net income of a farmer. So the study concludes that availability of financial institutions or services in the community stimulate agricultural commercialization

6.2.2 Financial Service usage and Agricultural Commercialization

The study examined the effect of financial service usage on agriculture commercialization. The study revealed that financial service usage has significant and positive impact on agricultural commercialization of rice grower farmers' in Kilombero district. The results were consistent with previous findings, suggesting that usage of financial services such as credit facilities, bank accounting and mobile money services has a significant effect on commercialization (Abu and Haruna, 2017; Agbodji and Johnson, 2019; Ayele et al., 2021).

Therefore the study concluded that using financial services for commercial farming is a crucial component for facilitating farmers' market participation. In addition, in order to combat rural household poverty and backwardness, more credit should be available and used especial in agricultural sector which employ majority of rural population. Instead farmers' household should be restricted in their ability to invest thus become less able to produce goods, earn money and produce surplus that can be sold.

6.2.3 Financial Literacy and Agricultural Commercialization

The study also examined the effect of financial literacy on agriculture commercialization. The results obtained show that there is positive insignificant relationship between financial literacy and agricultural commercialization. This indicates that the agricultural commercialization in the study area is not affected by the level of financial literacy.

The study suggested that since the sample was drawn from a rural area where there is low level of education then it was important to take into account the low level of financial literacy in the study area. The suggestion based on the fact that some previous and recent studies tried to link level of education and dependence on informal loans (Balachandran and Dhal, 2018; Amrago and Mensah, 2022). Both studies show a negative relationship, suggesting that highly educated farmers rely less on informal loans than less educated farmers do.

Therefore, this study highlights the significance of creating outreach programs to educate farmers about financial products and services in order to increase the use of those products and services.

6.2.4 Moderation effect of Institutional Support on FI and AGC Relationship

The main objective of the current study was to ascertain how institutional support affected the relationship between financial inclusion and agriculture commercialization. The results obtained shows that institutional law and regulations had negative significant moderation effect in the relationship between financial inclusion and agricultural commercialization through financial service usage and financial literacy.

The result suggests that if we reduce the level of law and regulation then the rate of financial service usage and financial literacy will be increased. This implies that high level of law and regulation in accessing and using financial services hinder the usage of financial services as well as financial literacy among prospective users of financial services.

Furthermore, the results obtained on moderating effect of institutional cultural cognitive on the same relationship show that institutional cultural cognitive had negative significant moderation effect in the relationship between FI and AGC through financial service access and financial literacy. The results suggest that as we reduce the level of cultural cognitive the effect of financial access and financial literacy on agricultural commercialization will be increased.

This implies that if traditional and indigenous activities of poor household farmers can be reduced then the rate of formal financial services access as well as financial literacy on formal financial services can be increased.

Table 6.1: Summary of the Main Research Findings and Conclusion

S/No	Study objective	Major findings	Conclusion
1.	To examine the effect of financial service access on agricultural commercialization	Financial service access positively affect agriculture commercialization	Financial service access promote agriculture commercialization for smallholder rice producers in Tanzania
2.	To examine the effect of financial service usage on agriculture commercialization	Financial service usage positively affect agriculture commercialization	Financial service usage foster agricultural commercialization for smallholder rice farmers in Tanzania
3.	To examine the effect of financial literacy on agriculture commercialization	Financial literacy does not have effect on agriculture commercialization	Lack of financial knowledge has no impact on rice commercialization
4.	To examine the role of institutional support in moderating the relationship between financial inclusion and agricultural commercialization.	-Institutional law and regulation had negative moderation effect on FI and AGC relationship through FU & FL but no effect through FA. -Institutional cultural cognitive had negative moderation effect on FI and AGC relationship through FA and FL but no effect through FU. -Institutional norms had no moderation effect on FI and AGC relationship.	-Financial law and regulation should be reduced or revised so as to increase financial usage and literacy. Also if cultural cognitive such as traditional and indigenous activities reduced then it may result into increase in financial service access and literacy.

Source: researcher, (2022)

6.3 Implication of the Study

The study's implications are presented in this section. As described in the following sections, the implications are based on theory, methodology, contextual implications, and practical implications.

6.3.1 Theoretical Implication

This is one of the most crucial contributions that academic research, especially doctoral research, needs. A theory is a statement of concepts and their

interrelationships that explains how and/or why a phenomenon occurs (Corley and Gioia, 2011). Therefore, according to Agerfalk (2014), a theoretical contribution is something that improves our comprehension of a particular concept and its relationships. Theoretical contributions to business and society studies according to Crane et al. (2016), are divided into three groups: (i) theory generation, (ii) theory application, and (iii) theory testing and refinement. Most research in the fields of business and society has employed the second approach in their studies in a way that is somewhat at odds with testing and refining (Crane et al., 2016).

According to Crane and others, theoretical contribution by theory application involves applying theory to a phenomenon that has yet to be adequately understood and explained theoretically. However, the approach requires a researcher to show how the application of the theory lead to better understanding and explain the phenomenon compared to how was initially explained (Crane et al., 2016). In this study, the researcher has applied institutional theory to study the relationship between financial inclusion and agricultural commercialization. The study's findings have shown that institutional law and regulation and institutional cultural cognitive affect the relationship between financial inclusion and agriculture commercialization. This is one of the significant theoretical contributions of the current study.

Previous scholars have studied either the relationship between financial literacy and financial inclusion, institutional framing and financial inclusion and barriers to venture capital financing (Bongomin et al., 2017a; Bongomin et al., 2018; Shojael et al., 2018). To the researcher's best knowledge, none of the studies has studied the moderating effect of institutional support in the link between financial inclusion and

agriculture commercialization. Thus, the current study has provided insight into the moderating role of institutional support in the link between financial inclusion and agriculture commercialization.

Moreover, Whetten (1989) asserts that theoretical contribution can be made through adding or subtracting factors from existing model. However, addition or deletion of factors is not sufficient to substantially alter the core logic of existing model but what is important to the researcher is to be able to identify how this change affect the acceptable relationship between the variables. The current study show how, institutional law and regulations as well as institutional cultural cognitive affect the relationship between financial inclusion and agriculture commercialization. In addition, the findings show that if institutional law and regulation and institutional cultural cognitive can be reduced, then it lead to the improved relationship between financial services usage, access and financial literacy with agriculture commercialization.

Finally, Whetten's (1989) assert that the mission of a theory contribution /development is to challenge and extend existing knowledge, something which was done in this study by extending the knowledge existing on the relationship between financial inclusion and agriculture commercialization by adding the moderating effect of institutional support in such relationship.

6.3.2 Contextual Implication

Contextually the current study contributes on the understanding of the relationship of financial service access, financial service usage and financial literacy in the

agricultural commercialization of smallholder farmers in Africa particular Tanzania. This adds knowledge to existing few studies on how financial inclusion influence agriculture commercialization in Africa. Majority of studies about agriculture commercialization have concentrated on the determinant of commercialization (Abdullah et al., 2017; Krause et al., 2019; Rubhara & Mudhara, 2019; Ayele et al., 2021). Other studies have looks on drivers of commercialization and producer profitability also social networking and commercialization (Arymo et al., 2019; Mwema & Crewett, 2019).

However, most of these studies look on horticulture commercialization and very rear studies look at cereal crop commercialization (Abu & Haruna, 2017; Ochieng et al., 2019). So the current study strengthens the contextual understanding of the relationship between financial inclusion and agricultural commercialization of smallholder farmers in rural areas. In addition to the researcher's best knowledge, none of the studies has tried to understand the role of institutional support in the link between financial inclusion and agriculture commercialization.

6.3.3 Practical Implication

This study has a number of practical implications in the literature of the relationship between financial inclusion and agriculture commercialization. The findings of this study are important to smallholders' rice growers' farmers in Tanzania, both formal and informal financial service providers and the government of Tanzania. The findings from this study indicate that financial services access and usage has a significant positive effect on agriculture commercialization. The results imply that availability of financial services such as financial institutions, credit facilities, mobile

money services and accessible roads to nearby financial institutions contribute to agriculture commercialization. This is due to the fact that availability of these services in the community reduce transactions cost in accessing and using the financial services. In addition usage of the financial service such credit facility lead to farmers ability to access basic agriculture inputs, hence increases their productivity thus boost their participation in the market.

6.3.4 Policy Implication

The findings of this study have number of policy implication to the government of Tanzania and other countries in Africa as well as financial service providers. The findings from this study show that if institutional law and regulation and cultural cognitive will be reduced then it lead to the improved relationship between financial services usage, access and financial literacy with agriculture commercialization. So it is up to the government and financial service providers to create enabling environment for financial inclusion and agriculture commercialization by providing efficiency and simple rules and regulation, which will promote easy access and usage of financial services.

6.4 Recommendation from the Study

The current study has demonstrated empirically that financial services access and usage positively and significantly affect agricultural commercialization. Also the study has confirmed that institutional law and regulation and cultural cognitive has significant negative effect in the relationship between FI and AGC. Based on these findings this study makes a number of recommendations to the government, financial service providers and smallholder farmers.

To the Government: The government in collaboration with financial service providers and telecommunication companies is advised to put in place policy that should reduce transaction cost in accessing and using financial services such as put in place infrastructures which supporting financial inclusion such as accessible road, banks, mobile money services and information and communication technologies facilities in rural areas. In addition the government should create enabling environment for FI and AGC by improving the efficiency of rules and regulations governing financial access and usage.

Additionally, one of the main objectives of URT Agricultural Sector Development Strategy (ASDS) phase two which cover the period 2015-2025 is transforming the agriculture sector from subsistence farming to modern commercial farming (URT Report, 2015). To achieve this objective the government and policy makers are advised to formulate policies, which concentrate on ensuring accessibility, availability, affordability and usage of financial services so as to promote commercial farming.

Financial Service Providers: In order to increase usage of financial service especially credit both formal and informal financial institutions are advised to provide cheap credit facilities so as to promote financial inclusion as well as agricultural commercialization of smallholder farmers. In addition financial service providers should also be aware of how smallholder farmers in rural areas feel about the current financial services and products. Therefore, focus on redesigning products and raising awareness in order to alter the predetermined poor household mindset and attitude toward consuming financial products and services.

Moreover, financial services providers in collaboration with policy maker should concentrate on providing financial inclusion programs and activities that intending to improve financial literacy for marginalized smallholders' farmers as it found to be not statistical significant. Increase financial education is expected to increase financial inclusion (Ozil, 2020), thus lead to increased commercialization. Also FL program should aim toward positive transformation of the thinking of poor household so that they can make better financial decision and choices based on their existing frames.

To the Farmers: Since financial services access and usage show positive effect on commercialization farmers are advised to seek financial service such as credit from financial institution so that they can acquire modern agriculture equipment and improve their productivity as well as their level of commercialization.

6.5 Limitations and Areas for Future Researches

Despite the current study's significant contribution to our knowledge of how institutional support contributes to the link between financial inclusion and agriculture commercialization, it has a methodological limitation. The current study was complex as it employed different analytical software including Amos for CFA analysis, SPSS for multivariate data analysis and Hayes PROCESS macro with Johnson-Neyman for cementing the moderation analysis in SPSS. The study suggests future studies to use one soft ware like PLS-SEM to corroborate the findings of this study.

Also the current study use cross-sectional research survey. The study suggests future studies to use longitudinal approach with national representative sample to better understand the moderating effect of institutional support on the relationship between

financial inclusion and agriculture commercialization across multiple time points. Furthermore, the same research may be replicated to other countries in the agriculture sector and compare the results. This is because experience encounter by smallholder farmers varies according to culture and norms. For that case experience of smallholder farmers in Tanzania may not be the same as those of North Africa countries and West Africa countries.

Final majority of previous studies has look on commercialization of cash crops and horticulture commercialization and few studies look on cereal crops commercialization. Future studies should try to understand how financial inclusion affects livestock commercialization.

REFERENCES

Abafita, J., Atkinson, J., & Kim, C. S. (2016). Smallholder commercialization in Ethiopia: market orientation and participation. *International Food Research Journal*, *23*(4).

Abdullahi, A., Othman, A. H. A., & Kassim, S. (2021). Financial inclusion enhancement through the adoption of Islamic microfinance in Nigeria. *International Journal of Ethics and Systems*.

Abdul-Rahaman, A., & Abdulai, A. (2020). Farmer groups, collective marketing and smallholder farm performance in rural Ghana. *Journal of Agribusiness in Developing and Emerging Economies*.

Abu, B. M.&Haruna, I. (2017). Financial inclusion and agricultural commercialization in Ghana: an empirical investigation. *Agricultural Finance Review*, 77(4), 524-544.

Achugamonu, U. B., Adetiloye, K. A., Adegbite, E. O., Babajide, A. A., &Akintola, F. A. (2020). Financial exclusion of bankable adults: implication on financial inclusive growth among twenty-seven SSA countries. *Cogent Social Sciences*, *6*(1), 1730046.

Ademe, A., Legesse, B., Haji, J., & Goshu, D. (2017). Smallholder farmers' crop commercialization in the highlands of Eastern Ethiopia. *Review of Agricultural and Applied Economics*, *20*(2), 30–37. https://doi.org/ 10.15414/raae. 2017.20.02.30-37

Adil, M., Singh, Y., & Ansari, M. S. (2021). How financial literacy moderate the association between behaviour biases and investment decision?. *Asian Journal of Accounting Research*.

Agyei, S. K., Adam, A. M., & Agyemang, O. S. (2019). Financial Literacy, Cultural Dominance, and Financial Well‐Being of SME Owners in Ghana. *Poverty & Public Policy*, *11*(3), 222-237.

Alene, A. D., Manyong, V. M., Omanya, G., Mignouna, H. D., Bokanga, M., & Odhiambo, G. (2008). Smallholder Market Participation under Transactions Costs. Maize Supply and Fertilizer Demand in Kenya, 33, 318–328. doi:10.1016/j. foodpol.2007.12.001.

Alexander, K., Case, P., Jones, M., &Connell, J., (2017), Commercializing Smallholder agriculture production in Lao people's Democratic Republic, *Development in practice*, 27(7), 965-980

Alinaghi, N. (2019). Mobile money, risk sharing, and transaction costs: a replication study of evidence from Kenya's mobile money revolution. *Journal of Development Effectiveness*, *11*(4), 342-359.

Aman, T., Adam, B., & Lemma, Z. (2014). Determinants of smallholder commercialization of horticultural crops in Gemechis District, West Hararghe Zone, Ethiopia. *African journal of agricultural research*, *9*(3), 310-319.

Amfo, B., Abdul-Rahaman, A., & Issaka, Y. B. (2021). Rice planting technologies and farm performance under different production systems in Ghana. *International Journal of Productivity and Performance Management*.

Aryemo, I. P., Akite, I., Kule, E. K., Kugonza, D. R., Okot, M. W., &Mugonola, B. (2019). Drivers of commercialization: A case of indigenous chicken production in northern Uganda. *African Journal of Science, Technology, Innovation and Development*, *11*(6), 739-748.

Asare, E. K., Beldona, S., & Nketia, J. (2020). The principal, the agent, and the culture: Potential impacts of culture on financing contracts. *The International Trade Journal*, *34*(1), 30-54.

Asuming, P. O., Osei-Agyei, L. G., & Mohammed, J. I. (2018). Financial inclusion in sub-Saharan Africa: Recent trends and determinants. *Journal of African Business*, *20*(1), 112-134.

Aterido, R., Beck, T., & Iacovone, L. (2013). Access to finance in Sub-Saharan Africa: Is there a gender gap?World Development, 47, 102–120.

Ayyagari, M. and Beck, T. (2015), "Financial inclusion in Asia: an Overview, Asian development bankeconomics", Working Paper Series, p. 449.

Balachandran, R. P., & Dhal, S. C. (2018). Relationship between money lenders and farmers: Theoretical perspective and evidence from potato farmers of West Bengal, India. Agricultural Finance Review, 78(3), 330-347

Bank of Tanzania, (2019). Annual Report 2018/2019

Bapat, D. and Bhattacharyay, B.N. (2016). Determinants of financial inclusion of Urban Poor in India: an empirical analysis. CESifo Group Munich, working Paper, 6096, pp. 1-31.

Bhattarai, S., Lyne, M.C. and Martin, S.K. (2013), "Assessing the performance of a supply chain for organic vegetables from a smallholder perspective", Journal of Agribusiness in Developing and Emerging Economies, Vol. 3 No. 2, pp. 101-118.

Bidzakin, J. K., Fialor, S. C., Awunyo-Vitor, D., & Yahaya, I. (2018). Impact of irrigation ecology on rice production efficiency in Ghana. *Advances in Agriculture*, *2018*.

Bolarinwa, O. D., Oehmke, J. F., & Moss, C. B. (2020). Agricultural commercialization and food security: an ex-ante approach. *Journal of Agribusiness in Developing and Emerging Economies*.

Bongomin, G. O. C., Munene, J. C., &Yourougou, P. (2020). Examining the role of financial intermediaries in promoting financial literacy and financial inclusion among the poor in developing countries: Lessons from rural Uganda. *Cogent Economics & Finance*, *8*(1), 1761274.

Bongomin, G. O. C., Munene, J. C., Ntayi, J. M., and Malinga, C. A., (2018). Financial intermediation and Financial Inclusion of the poor: Testing the moderating role of institutional pillars in rural Uganda, *International Journal of ethics and systems*, 34(2), 146-165.

Bongomin, G. O. C., Munene, J. C., Ntayi, J. M., &Malinga, C. A. (2017b). Financial literacy in emerging economies: Do all components matter for financial inclusion of poor households in rural Uganda? *Managerial Finance*, 43(12), 1310-1331.

Bongomin, G. O. C., Ntayi, J. M., & Munene, J. C. (2017a). Institutional framing and financial inclusion: Testing the mediating effect of financial literacy using SEM bootstrap approach. *International Journal of Social Economics*, 44(12), 1727-1744

CARE international in Uganda. (2014). *Voluntary serving and Loan association Management information system Data, Care Uganda project on financial inclusion*, Kampala.

Central Bank of Nigeria, (2019). *Statistical Bulletin,* Abuja: Central Bank of Nigeria

Chandio, A. A., Jiang, Y., Rehman, A., & Rauf, A. (2020). Short and long-run

impacts of climate change on agriculture: an empirical evidence from China. *International Journal of Climate Change Strategies and Management*, *12(2), 201-221*

Das, A., Senapati, M., & John, J. (2009). Impact of agricultural credit on agriculture production: an empirical analysis in India. *Reserve Bank of India Occasional Papers*, *30*(2), 75-107

Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. The World Bank publication

Demirguc-Kunt, A., & Klapper, L. (2012). *Measuring financial inclusion: The global findex database*. The World Bank Publication

Dequech, D. (2004), "Uncertainty: individuals, institutions and technology", Cambridge Journal of Economics, Vol. 28 No. 3, pp. 365-378.

Ele, I. E., Omini, G. E., & Adinya, B. I. (2013). Assessing the extent of commercialization of smallholding farming households in Cross River State, Nigeria. *Journal of Agriculture and veterinary Science*, *4*(3), 49-55.

Eldomiaty, T., Hammam, R., & El Bakry, R. (2020). Institutional determinants of financial inclusion: evidence from world economies. *International journal of development issues*, *19*(2), 217-228.

Evans, O. (2018). Connecting the poor: the internet, mobile phones and financial inclusion in Africa. *Digital Policy, Regulation and Governance*, 20(6), 568-581

FinScope. (2018). Topline findings report. Financial Sector Deepening Uganda (FSDU) and Ukaid, Kampala Uganda.

Fowler, F. J. (2014). *Survey Research Methods.* Los Angeles, CA: Sage.

Fowowe, B. (2020). The effects of financial inclusion on agricultural productivity in Nigeria. *Journal of Economics and Development*, 22(1), 61-79

Ghosh, S., &Sahu, T. N. (2020). How financially inclusive the Asian's are–an empirical analysis. *Rajagiri Management Journal*, 14(1), 49-69

Hagos, A., Dibaba, R., Bekele, A., &Alemu, D. (2019). Determinants of market participation among smallholder mango producers in Assosa Zone of BenishangulGumuz Region in Ethiopia. *International Journal of Fruit Science*, *20*(3), 323-349.

Hussein, A., &Thapa, G. B. (2016). Fungibility of smallholder agricultural credit: empirical evidence from Pakistan. *The European Journal of Development Research*, *28*(5), 826-846.

Hovenkamp, H. (2009). The Coase Theorem and Arthur Cecil Pigou. *Ariz. L. Rev.*, *51*, 633.

Isaga, N. (2018). Access to bank credit by smallholder farmers in Tanzania: a case study. *Afrika focus*, *31*(1). 241-256

Janssen, B., and Nonnenmann, M.W. (2017). New institutional theory and Culture of safety in agriculture. *Journal of agromedicine, 22(1*), 47-55

Jose, E.P. (2008), Welcome to the Moderation/Mediation Help Centre, Version 3.0, School of Psychology, Victoria University of Wellington, Wellington.

Kabiti, H.M., Raidimi, N.E., Pfumayaramba, T.K., and Chauke, P. K., (2016). Determinant of Agriculture Commercialization among smallholders Farmers in Munyati Resettlement Area, Chikomba District, Zimbabwe, *Journal of Human Ecology, 53(1),* 10-19.

Karikari, N. K., Gyan, K. K., Khan, M. A. H., &Kusi, B. A. (2021). Institutional quality and social cost of intermediation in Africa: Does the level of financial market development matter? *International Journal of Finance & Economics,* No.2021, pp. 1-12

Keith, T. Z. (2019). *Multiple regressions and beyond: An introduction to multiple regressions and structural equation modeling*. Routledge.

Khandker, S. R., &Koolwal, G. B. (2016). How has microcredit supported agriculture? Evidence using panel data from Bangladesh. *Agricultural Economics, 47*(2), 157-168.

Kodongo, O. (2018). Financial regulations, financial literacy, and financial inclusion: Insights from Kenya. *Emerging Markets Finance and Trade, 54*(12), 2851-2873.

Krause, H., Faße, A., & Grote, U. (2019). Welfare and food security effects of commercializing African indigenous vegetables in Kenya. *Cogent Food & Agriculture*, *5*(1), 1700031.

Lal, T. (2019). Measuring impact of financial inclusion on rural development through Cooperatives. *International Journal of Social Economics, 46*(3), 352-376.

Lawal, J. O., Omonona, B. T., Ajani, O. I. Y. and Oni, O. A. (2009). "Determinants of constraints to credit access among cocoa farming households in Osun State". *Pakistan Journal of Social Sciences, 6(3),* 159-163.

Leavy, P. (2017). *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches*. Guilford Publications.

Leeuwis, C., &Aarts, N. (2011). Rethinking communication in innovation processes: creating space for change in complex systems. *Journal of agricultural education and extension*, *17*(1), 21-36.

Lotto, J. (2018). Examination of the status of financial inclusion and its determinants in Tanzania. *Sustainability*, *10*(8), 2873, doi: 10.3390/su10082873.

Lotto, J. (2020). Understanding financial inclusion in East Africa: How does Tanzania compare?.*International Journal of Finance & Economics*, doi: 10.1002/ijfe.2201

Lusardi, A., Michaud, P. C., & Mitchell, O. S. (2017). Optimal financial knowledge and wealth inequality. *Journal of Political Economy*, *125*(2), 431-477.

Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of economic literature*, *52*(1), 5-44

Manning, R. E. (1999). *Studies in outdoor recreation: search and research for satisfaction. 2nd ed.* Corvallis: Oregon State University Press.

Mashigo, P. and Schoeman, C. (2010), "Stokvels as an instrument and channel to extend credit to poor households in SA: an inquiry", Policy paper, 19, 49-62.

Mariyono, J. (2019). Stepping up to market participation of smallholder agriculture in rural areas of Indonesia. *Agricultural Finance Review*.

Mbapila, S. J., Karantininis, K., & Lazaro, E. A. (2019). Institutions, production and transaction costs in the value chain of organic tomatoes and sweet peppers in tourist hotels, Unguja and Arusha. *Cogent Food & Agriculture*, 5(1), 1631581.

Mindra, R., & Moya, M. (2017). Financial self-efficacy: a mediator in advancing financial inclusion. *Equality, Diversity and Inclusion: An International Journal*.

Misati, R., Osoro, J., Odongo, M., & Abdul, F. (2022). Does digital financial innovation enhance financial deepening and growth in Kenya?. *International Journal of Emerging Markets*, (ahead-of-print).

Mosha, D. B., Vedeld, P., Katani, J. Z., Kajembe, G. C., & Tarimo, A. K. (2018). Contribution of Paddy Production to Household Income in Farmer-Managed Irrigation Scheme Communities in Iringa Rural and Kilombero Districts, Tanzania.

Mugarura, N. (2013). Scoping the regulatory environment for harnessing normative anti-money laundering laws in LDCs. *Journal of Money Laundering Control*, *16*(4), 333-352

Mugarura, N. (2019). The Use of 'Mobile Phones' in Changing the Banking Regulatory Landscape in Africa. *African Journal of International and Comparative Law*, *27*(2), 308-330.

Mugwagwa, I., Bijman, J., &Trienekens, J. (2020). Typology of contract farming arrangements: a transaction cost perspective. *Agrekon*, 59(2), 169-187

Mutami, C. (2015). "Smallholder Production in Zimbabwe: A Survey." The Journal of Sustainable Development 14 (2): 140–157.

Mwema, C &Crewett, W. (2019). Social network and commercialization of African indigenous Vegetable in Kenya: A Cragg's Double Hurdle Approach. *Cogent Economics & Finance*, *7*(1), 1642173.

Naegels, V., Mori, N., &D'Espallier, B. (2017). An institutional view on access to finance by Tanzanian women-owned enterprises. *Venture Capital*, *20*(2), 191-210.

Nanziri, E.L. (2016), “Financial inclusion and welfare in South Africa: is there a gender gap?”, Journal of African Development, Vol. 18 No. 2, pp. 109-134.

Narayanan, S. 2016. The productivity of agricultural credit in India. Agricultural Economics 47 (4):399–409. doi:10.1111/agec.2016.47.issue-4.

National Bureau of Statistics. (2019). *Selected Banking Sector Data Q 2019*.

North, D.C. (1990). Institutions, institutional change and Economic Performance. *Cambridge University Press, Cambridge.*

North, D. C. (1991). Institutions. *Journal of economic perspectives*, *5*(1), 97-112.

Ochieng, J., Knerr, B., Owuor, G., &Ouma, E. (2019). Food crops commercialization and household livelihoods: Evidence from rural regions in Central Africa. *Agribusiness*, *36*(2), 318-338.

Ochieng, J., Knerr, B., Owuor, G., &Ouma, E. (2016). Commercialisation of food crops and farm productivity: Evidence from smallholders in Central Africa. *Agrekon*, *55*(4), 458-482.

Okoye, B. C., Abass, A., Bachwenkizi, B., Asumugha, G., Alenkhe, B., Ranaivoson, R., & Ralimanana, I. (2016). Effect of transaction costs on market participation among smallholder cassava farmers in Central Madagascar. *Cogent Economics & Finance*, *4*(1), 1143597

Osmani, A. G., and E. Hossain. 2015. “Market Participation Decision of Smallholder Farmers and its Determinants in Bangladesh.” Journal of Economics of Agriculture 62 (1): 163–179.

Ozili, P. K. (2020). Theories of financial inclusion. In *Uncertainty and Challenges in Contemporary Economic Behaviour*. Emerald Publishing Limited, doi:10.1108/978-1-80043-095-220201008

Pandey, B., Bandyopadhyay, P., Kadam, S., & Singh, M. (2018). Bibliometric study on relationship of agricultural credit with farmer distress. *Management of Environmental Quality: An International Journal*, *29*(2), 278-288.

Radchenko, N., & Corral, P. (2018). Agricultural commercialisation and food security in rural economies: Malawian experience. *The Journal of Development Studies*, *54*(2), 256-270.

Rabbi, F., Ahamad, R., Ali, S., Chandio, A. A., Ahmad, W., Ilyas, A., & Din, I. U. (2019). Determinants of commercialization and its impact on the welfare of smallholder rice farmers by using Heckman's two-stage approach. *Journal of the Saudi Society of Agricultural Sciences*, *18*(2), 224-233.

Rios, A. R., Masters, W. A., & Shively, G. E. (2008). Linkages between market participation and productivity: Results from a multi-country farm household sample (No. 382-2016-22647).

Rojas-Suarez, L. (2016), "Financial inclusion in Latin America: facts and obstacles", Center for Global Development Working Paper No. 439.

Rubhara, T., &Mudhara, M. (2019). Commercialization and its determinants among smallholder farmers in Zimbabwe. A case of Shamva District, Mashonaland Central Province. *African Journal of Science, Technology, Innovation and Development*, *11*(6), 711-718.

Sekyi, S., Abu, B. M., &Nkegbe, P. K. (2017). Farm credit access, credit constraint and productivity in Ghana: Empirical evidence from Northern Savannah ecological zone. *Agricultural Finance Review*, *77*(4), 446-462.

Scott, R. W. (2001). *Institutions and Organizations* (2nd Ed.). Sage, Thousand Oacks, CA.

Scotland, J. (2012). Exploring the philosophical underpinnings of research: relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms. *English Language Teaching;* 5(9), 9-16.

Sethi, D. & Acharya, D. (2018). Financial Inclusion and economic growth linkage: Some cross country. *Journal of Financial Economic Policy*, 10(3), 369-385.

Sithole, N., Mort, G. S., & D'Souza, C. (2021). Building blocks of financial inclusion through customer experience value at financial touchpoints in Southern Africa. *International Journal of Bank Marketing*, *39*(3), 360-380.

Smith, I. (2018). Promoting Commercial Agriculture in Nigeria through a Reform of the Legal and Institutional Frameworks. *African Journal of International and Comparative Law*, *26*(1), 64-83

Shu, C., De Clercq, D., Zhou, Y., & Liu, C. (2019). Government institutional support, entrepreneurial orientation, strategic renewal, and firm performance in transitional China. *International Journal of Entrepreneurial Behavior& Research*, 25(3), 433-456.

Tadesse, G., &Bahiigwa, G. (2015). Mobile phones and farmers' marketing decisions in Ethiopia. *World development*, *68*, 296-307.

Tang, L., Liu, Q., Yang, W., & Wang, J. (2018). Do agricultural services contribute to cost saving? Evidence from Chinese rice farmers. *China Agricultural Economic Review*, *10*(2), 323-337.

Tufa, A., Bekele, A., & Zemedu, L. (2014). Determinants of smallholder commercialization of horticultural crops in Gemechis district, West Hararghe Zone, Ethiopia. African Journal of Agricultural Research, 9(3), 310–319.

Twumasi, M. A., Jiang, Y., Danquah, F. O., Chandio, A. A., & Agbenyo, W. (2020). The role of savings mobilization on access to credit: a case study of smallholder farmers in Ghana. *Agricultural Finance Review*, 80(2), 275-290.

Ulwodi, D. W., & Muriu, P. W. (2017), "Barriers of financial inclusion in sub-Saharan Africa", Journal of Economics and Sustainable Development, Vol. 8 No. 14, pp. 66-81.

United Republic of Tanzania Report, (2015). Agriculture Sector Development Strategy-II. (2015/2016-2024/2025).

Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. *The journal of Law and Economics*, *22*(2), 233-261.

World Bank, (2017). *The Global Findex Database.* New York: World Bank.

World Bank (2014), "Global financial development report 2014: financial inclusion", World Bank, Washington, DC.

Yaseen, A., Bryceson, K., & Mungai, A. N. (2018). Commercialization behaviour in production agriculture: The overlooked role of market orientation. *Journal of Agribusiness in Developing and Emerging Economies*.

APPENDICES

Appendix I: Questionnaires

My Name is Francis William Mmari. I am carrying out a research titled "**Financial Inclusion and Agricultural Commercialization of rice growers in Kilombero district: The role of institutional support"** In partial fulfillment of the award of PhD degree of the open university of Tanzania.

The questionnaire is prepared solely for collecting information partnering to the above named study. Collected information will provide major input in this study and it is purely for academic purpose. Therefore respondent is requested to provide his/her valid response to the set of questions. Note that information you provide will be kept confidential and will only be used for the purpose of this study and otherwise.

Thanks in advance for you're for your cooperation.

Part 1: Respondent Personal Information (Demographic Characteristics)

Part 1: Personal Information (Demographic Characteristics)

1. Identification number of small holder farmer …….....
2. Name of the division …….
3. Name of the ward ……..
4. Name of the Village …….
5. Age of the respondent : 18-27 years ☐ 28-36 years ☐ 37-46 years☐ Above 46☐
6. Sex of the respondent: Male ☐ Female☐

7. Highest level of education attained by a respondent: Never attended school ☐ Primary school ☐ Secondary School ☐ Certificate & Diploma ☐ Degree and above ☐

8. For how long have you engage in rice production: 1-3 years ☐ 4-6 years☐7-9 years ☐ above 10 Years☐

9. Family size of the rice grower household: 1-3 people ☐ 4-6 people☐7-9 people ☐ Above 10 people ☐

10. Are you the head of the household? ☐ Yes ☐ No

11. Sex of the household head ☐ Male ☐ Female

12. Are you in an irrigation scheme? ☐ Yes ☐ No

13. Is agriculture the main source of income for your household? ☐ Yes ☐ No

14. What was the area planned for rice growing during 2019/2020? Tick in the appropriate box

Session	0-1 Hector	2-5 hector	5-10 hector
2019/2020			

Part 2: Independent Variable (Financial inclusion)

Circle the appropriate number where 1= strongly disagree, 2= disagree, 3= Not sure, 4= Agree and 5= strongly agree**.**

S/No	**Financial service access**	Scale				
1	Financial institutional are easily available in our area	1	2	3	4	5
2	Credit facilities are easily available in our area	1	2	3	4	5
3	Mobile money services are easily available in our area	1	2	3	4	5
4	It is easily to access credit from formal financial institutions like banks, and cooperative union	1	2	3	4	5
5	It is easily to access credit from informal institutions such as input traders, individuals, relatives and friends.	1	2	3	4	5
6	There is an easy accessible road to nearby formal financial	1	2	3	4	5

	institution such as a bank					
	Financial service usage					
1	I do not have a bank account because of high cost of maintain an account such as monthly payment, ATM fees and other expenses	1	2	3	4	5
2	I do not have a bank account because my income is low	1	2	3	4	5
3	Often I use formal financial services like banks to save, borrow, send or receive money use	1	2	3	4	5
4	I use my mobile money account to save, send and receive money.	1	2	3	4	5
5	When applying for loan normally I consider borrowing from formal sources such as bank and microfinance institutions	1	2	3	4	5
6	Borrowing from informal sources such as friend, relatives, money lenders and traders of agriculture input is much easier	1	2	3	4	5
	Financial Literacy					
1	I have some knowledge about service offered by financial institutions such as bank (e.g. Saving, loans and transactions)	1	2	3	4	5
2	I choose financial products after gathering some information	1	2	3	4	5
3	When applying for a loan I consider financial institution which offer less cost financial service	1	2	3	4	5
4	I keep a close personal watch on my financial affairs	1	2	3	4	5
5	I set long term financial goals and strive to achieve it	1	2	3	4	5

Part 3: Moderating Variables (Institutional Support)

Circle the appropriate number where 1= strongly disagree, 2= disagree, 3= Not sure, 4= Agree and 5= strongly agree.

S/N	**Law and regulation**					
1	Normally I borrow money from lenders, input dealers or friends because of flexibility in collateral arrangement.	1	2	3	4	5
2	Interest rates charges by bank and cooperative union discourage us in taking credit from such institutions	1	2	3	4	5
3	There are tight and tedious regulation for obtaining loan from banks and cooperative union.	1	2	3	4	5
4	I cannot access bank loans because of lack of collateral	1	2	3	4	5
5	I cannot access bank services because in order to get a service I have to show national ID, or Voter ID or passport, which not all villagers have.					
6	Availability of agency banking services in our area has simplified accessibility of formal financial services	1	2	3	4	5

7	My involvement in rice production is due to availability of contract farming	1	2	3	4	5
8	There are friendly law governing the acquisition, ownership and lease of land in the irrigation scheme	1	2	3	4	5
9	There are friendly law governing the use of water in the irrigation scheme	1	2	3	4	5
	Institutional norms					
1	I prefer to borrow money from lenders and input dealers because my fellow rice growers farmer tend to borrow from these sources	1	2	3	4	5
2	I prefer to borrow from Saccoss, Vikoba and Cooperative because other rice growers farmer also borrow from this sources	1	2	3	4	5
3	I prefer borrowing from informal sources because unlike formal sources there is no bureaucracy and take short processing time	1	2	3	4	5
4	It become more easily to get loan from financial institution where I have an account	1	2	3	4	5
	Cultural cognitive					
1	I use my saving account to save for future expenses	1	2	3	4	5
2	I do not prefer to borrow money from financial institutions because they require too much information	1	2	3	4	5
3	It is more easily to get credit when you belong to farm group, Saccoss, cooperative or credit union.	1	2	3	4	5
4	Being in farm group help me to get market and agricultural information.	1	2	3	4	5
5	Being in farming group help me to become involved in rice farming.	1	2	3	4	5
6	We normally get training and support from village officers and or non government organizations	1	2	3	4	5

Part 4: Dependent Variable (Commercialization)

Circle the appropriate number where 1= strongly disagree, 2= disagree, 3= Not sure,

4= Agree and 5= strongly agree.

S/N	**Rice commercialization**					
1	My involvement in rice production is for commercial purpose	1	2	3	4	5
2	My involvement in rice production is both for food security and commercial purpose	1	2	3	4	5
3	I usually sell more of the rice I produce than the amount I store for food.	1	2	3	4	5

Thank you for your Participations

Appendix II: DODOSO

Jina langu ni Francis William Mmari. Ninafanya utafiti kuhusu "**Upatikanaji wa huduma za kifedha shirikishi na Kilimo biashara cha wakulima wa mpunga katika wilaya ya Kilombero: Jukumu la Taasisi wezeshi"** ikiwani sehemu ya kutimiza masharti ya Kutunukiwa Shahada ya Uzamivu (PhD) ya Chuo Kikuu Huria cha Tanzania.

Dodoso hili limeandaliwa kwa ajili ya kukusanya taarifa zinazohusiana na mada tajwa. Unaombwa kushiriki kwa uhuru katika utafiti huu kutokana na maarifa na uzoefu wako katika mada hii. Kuwa huru kutoa majibu yako kwa kuwa taarifa utakazozitoa zitatumika kuwezesha kukidhi madhumuni ya utafiti huu na si kwa lengo lingene lolote. Pia na kuhakikishia ya kuwa taarifa utakazo zitoa zitabaki kuwa siri baini yako na mtatifiti.

SEHEMU A: Taarifa binafsi na muhumu za mkulima

1. Namba ya utambulisho ya mkulima .....
2. Jina la Tarafa .....
3. Jina la Kata .....
4. Jina la Kijiji .....
5. Umri: Miaka 18-27 ☐Miaka 28-36 ☐Miaka 37-46☐ Zaidi yamiaka 46☐
   [Tafadhari weka alama ya vema√]
6. Jinsia: Mwanaume☐Mwanamke☐**[Tafadhari weka alama ya vema √]**
7. Elimu: Sijasoma☐Shule ya msingi☐Sekondari☐Cheti/Stashahada☐
   Shahada ya kwanza au zaidi☐**[Tafadhari weka alama ya vema√]**

8. Uzoefu (Jumla ya miaka uliojuhusisha katika kilimo cha mpunga): 1-3 Miaka ☐ 4-6 Miaka☐7-9 Miaka☐ Zaidi miaka 10☐**[Tafadhari weka alamaya vema√]**
9. Ukubwawa kaya: 1-3 watu☐ 4-6 watu☐7-9 watu☐ Zaidi ya watu10☐
10. Je kilimo ni chanzo kikuu cha mapato katika kaya yako?☐ Yes ☐ No
11. Je upo kwenye skim ya umwagiliaji? ☐ Yes ☐ No
12. Ukubwa wa eneo ulilopanga ku panda mpunga 2019/2020? **[Tafadhari weka alama ya vema √ kwenye kiboksi husika]**

Msimu	0-1 Ekari	2-5 Ekari	5-10 Ekari
2019/2020			

Part 2: Independent Variable (financial inclusion)

Zungushia nambari inayofaa ambapo 1= Sikubaliani kabisa, 2= Sikubaliani, 3= Sijui, 4= Nakubaliana and 5= Nakubaliana sana**.**

S/N	**Upatikanaji/ufikiaji wa huduma ya kifedha**	**Scale**				
1	Taasisi za fedha zinapatikana kwa urahi katika Kijiji chetu	1	2	3	4	5
2	Huduma za mikopo hupatikana kwa urahisi katika Kijiji chetu	1	2	3	4	5
3	Huduma za pesa za mtandao/rununu zinapatikana kwa urahisi Kijijini kwetu	1	2	3	4	5
4	Nirahisi kupata mkopo kutoka kwa taasisi rasmi za kifedha kama benki na vyama vya ushirika	1	2	3	4	5
5	Ni rahisi kupata mkpo kutoka kwa taasisi zisizo rasmi kama wakopeshaji pesa, wafanyabishara za pembejeo, jamaa na marafiki	1	2	3	4	5
6	Ipo barabara inayopitika kirahisi kuelekea kwenye taasisi rasmi ya fedha kama benk.	1	2	3	4	5
	Matumizi ya huduma za fedha					
1	Sina akaunti ya benki kwa sababu ya gharama kubwa ya kudumisha akaunti kama malipo ya kila mwezi ya benki, ada ya ATM, na amana ya chini	1	2	3	4	5
2	Sina account bank kwa sababu ya kipato kidogo	1	2	3	4	5
3	Mara kwa mara hutumia taasisi rasmi za fedha kama bank kutunza, kukopa,kutuma na kupokea fedha.	1	2	3	4	5
4	Hutumia akaunti yangu ya simu pesa kutunza, kutuma na kupokea pesa	1	2	3	4	5

5	Ninapo omba mkopo kawaida hupendelea kukopa toka taasisi rasmi za fedha kama benk.	1	2	3	4	5
6	Kukopa kutoka taasisi zisizo rasmi kama marafiki, ndugu, wakopeshaji pesa na wauza pembejeo ni rahisi zaidi	1	2	3	4	5
	Elimu/Uelewa wa kifedha					
1	Nina uelewa kiasi juu ya huduma zinanazotolewa na taasisi za fedha	1	2	3	4	5
2	Ninachagua bidhaa za kifedha baada ya kukusanya habari	1	2	3	4	5
3	Wakati wa kuomba mkopo nazingatia taasisi ya kifedha ambayo hutoa huduma ya kifedha ya gharama nafuu	1	2	3	4	5
4	Nafuatilia kwa karibu sana mambo yangu ya kifedha	1	2	3	4	5
5	Ninaweka malengo ya fedha ya muda mrefu na kujitahidi kuyafikia	1	2	3	4	5

Part 3: Moderating variables (Taasisiwedheshi)

Zungushianambariinayofaaambapo 1= Sikubalianikabisa, 2= Sikubaliani, 3= Sijui, 4= Nakubaliana and 5= Nakubalianasana**.**

	Law and regulations					
1	Kawaida mimi hukopa pesa toka kwa wakopeshaji, wafanyabiashara wa pembejeo au marafiki kwa sababu ya mpangilo rahisi wa dhamana	1	2	3	4	5
2	Viwango vya riba vinavyodaiwa na benki na vyama vya ushirika vinatuvunja moyo kuchukua mikopo kutoka kwa taasisi hizo	1	2	3	4	5
3	Kuna kanuni kali na ngumu za kupata mkopo kutoka benki na vyama vya ushirika.	1	2	3	4	5
4	Siwezi kupata mikopo ya benki kwa sababu ya ukosefu wa dhamana	1	2	3	4	5
5	Siwezi kupata huduma za benki kwa sababu ili kupata huduma lazima nionyeshe kitambulisho cha kitaifa, au cha mpiga kura au pasipoti ambayo sio wanakijiji wote walio nayo.	1	2	3	4	5
6	Upatikanaji wa huduma za kibenki za wakala katika kijiji chetu kumerahisisha upatikaji wa huduma rasmi za kifedha	1	2	3	4	5
7	Kuhusika kwangu katika uzalishaji wa mpunga ni kwa sababu ya uwepo wa kilimo cha mkataba	1	2	3	4	5
8	Zipo sheria rafiki zinazo simamia upatikaji, umiliki, na ukidishaji wa aridhi katika skim za umwailiaji.	1	2	3	4	5
9	Zipo sheria rafiki zinazosimamia matumizi ya maji katika skim za umwagiliaji	1	2	3	4	5
	Institutional norms					
1	Ninapendelea kukopa pesa toka kwa wakopeshaji na wafanyabiashara wa pembejeo kwa sababu wakulima wenzangu huwa wanakopa toka kwenye vyanzo hivi.	1	2	3	4	5
2	Napendelea kukopa toka Saccoss, vyama vya ushirika na Vikoba kwa sababu wakulima wenzangu hukopa kutoka	1	2	3	4	5

	kwa vyanzo hivi					
3	Napendelea kukopa kutoka kwa vyanzo visivyo rasmi kwa sababu tofauti na vyanzo rasmi hakuna urasimu na huchukua muda mfupi.	1	2	3	4	5
4	Inakuwa rahisi kupata mkopo kutoka taasisi ya kifedha ambapo nina akaunti	1	2	3	4	5
	Cultural cognitive					
1	Hutumia akaunti yangu kuweka akiba kwa ajili ya gharama za baadaye.	1	2	3	4	5
2	Sipendi kukopa pesa toka kwenye taasisi za fedha kwa sababu zinahitaji taarifa nyingi.	1	2	3	4	5
3	Ni rahisi kupata mkopo unapokuwa kwenye kikundi cha kilimo, Saccos, ushirika au vikoba.					
4	Kuwa katika kikundi cha kilimo huniwezesha kupata taarifa za kilimo na masoko.	1	2	3	4	5
5	Kuhusika kwangu katika kilimo cha mpunga ni kwa sababu ya kuwa mwanachama katika kikundi cha kilimo.	1	2	3	4	5
6	Kawaida huwa tunapata mafunzo na msaada kutoka kwa maafisa kilimo wa vijiji na au mashirika yasiyo ya kiserakali	1	2	3	4	5

Part 4: Dependent Variable (KilimoBiashara)

Zungushia nambari inayofaa ambapo 1= Sikubaliani kabisa, 2= Sikubaliani, 3= Sijui, 4= Nakubaliana and 5= Nakubaliana sana**.**

	Rice commercialization					
1	Kuhusika kwangu katika uzalishaji wa mpunga ni kwa sababu ya kibiashara	1	2	3	4	5
2	Kuhusika kwangu katika uzalishaji wa mpunga ni kwa sababu ya chakula na biashara	1	2	3	4	5
3	Kawaida huuza sehemu kubwa ya mpunga ninaozalisha kuliko kiasi ninachoweka akiba kwa ajili ya chakula	1	2	3	4	5

ASANTE SANA KWA USHIRIKI WAKO

Appendix IV: Descriptive Analysis

Descriptive Analysis				
			Statistic	Std. Error
Unstandardized Residual	Mean		.0000000	.11571014
	95% Confidence Interval for Mean	Lower Bound	-.2275592	
		Upper Bound	.2275592	
	5% Trimmed Mean		.0590496	
	Median		.2675934	
	Variance		4.793	
	Std. Deviation		2.18933868	
	Minimum		-5.57617	
	Maximum		4.86622	
	Range		10.44239	
	Interquartile Range		2.96742	
	Skewness		-.456	.129
	Kurtosis		-.215	.257
Standardized Residual	Mean		.0000000	.05262911
	95% Confidence Interval for Mean	Lower Bound	-.1035020	
		Upper Bound	.1035020	
	5% Trimmed Mean		.0268578	
	Median		.1217111	
	Variance		.992	
	Std. Deviation		.99578945	
	Minimum		-2.53624	
	Maximum		2.21333	
	Range		4.74957	
	Interquartile Range		1.34969	
	Skewness		-.456	.129
	Kurtosis		-.215	.257

Appendix V: Pattern Matrixa

Pattern Matrixa							
	Component						
	1	2	3	4	5	6	7
LR5	.966						
LR3	.941						
LR7	.934						
LR6	.905						
LR8	.902						
LR4	.900						
LR9	.896						
LR2	.576						
FA3		.949					
FA4		.947					
FA5		.908					
FA1		.868					
FA6		.754					
FA2		.554					
CC3			.846				
CC4			.841				
CC5			.765				
CC6			.752				
CC1			.748				
CC2			.723				
FL2				.947			
FL1				.923			
FL5				.877			
FL3				.606			
FL4				.490			
FU1					.882		
FU4					.862		
FU6					.862		
FU5					.847		
IN1						.989	
IN2						.979	
IN4						.972	
RC1							.860
RC3							.856
RC2							.719

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.[a]
a. Rotation converged in 6 iterations.

Source: Data analysis 2022

Appendix VI: Johnson Neyman Interval and Simple Slope Analysis

The interaction effect of FU and LR

LR	Effect	SE	T	P	LLCI	ULCI
-2.6735	0.4317	0.1081	3.994	0.0001	0.2191	0.6443
-2.4735	0.4098	0.101	4.0576	0.0001	0.2112	0.6085
-2.2735	0.3879	0.094	4.1277	0.0000	0.2031	0.5728
-2.0735	0.366	0.087	4.205	0.0000	0.1948	0.5372
-1.8735	0.3441	0.0802	4.2899	0.0000	0.1864	0.5019
-1.6735	0.3222	0.0735	4.3822	0.0000	0.1776	0.4668
-1.4735	0.3003	0.067	4.4809	0.0000	0.1685	0.4321
-1.2735	0.2784	0.0608	4.5827	0.0000	0.1589	0.3979
-1.0735	0.2565	0.0548	4.6803	0.0000	0.1487	0.3643
-0.8735	0.2346	0.0493	4.7591	0.0000	0.1377	0.3316
-0.6735	0.2127	0.0444	4.7919	0.0000	0.1254	0.3000
-0.4735	0.1908	0.0403	4.7345	0.0000	0.1115	0.2701
-0.2735	0.1689	0.0373	4.5277	0.0000	0.0955	0.2423
-0.0735	0.147	0.0357	4.1204	0.0000	0.0768	0.2172
0.1265	0.1251	0.0356	3.5136	0.0005	0.0551	0.1951
0.3265	0.1032	0.0371	2.7818	0.0057	0.0302	0.1761
0.5265	0.0813	0.04	2.0333	0.0428	0.0027	0.1599
0.5449	0.0793	0.0403	1.9667	0.0500	0.0000	0.1585
0.7265	0.0594	0.044	1.3503	0.1778	-0.0271	0.1459
0.9265	0.0375	0.0488	0.7677	0.4432	-0.0585	0.1335
1.1265	0.0156	0.0543	0.287	0.7743	-0.0912	0.1223
1.3265	-0.0063	0.0602	-0.105	0.9164	-0.1247	0.1121

Appendix VII: Johnson Neyman Interval and Simple Slope Analysis

The interaction effect FL and LR

LR	Effect	se	t	p	LLCI	ULCI
-2.6735	0.5966	0.1188	5.0239	0.0000	0.3631	0.8301
-2.4735	0.5625	0.1108	5.0762	0.0000	0.3446	0.7805
-2.2735	0.5285	0.103	5.1322	0.0000	0.326	0.731
-2.0735	0.4944	0.0952	5.1916	0.0000	0.3071	0.6817
-1.8735	0.4604	0.0876	5.2534	0.0000	0.288	0.6327
-1.6735	0.4263	0.0802	5.3154	0.0000	0.2686	0.5841
-1.4735	0.3923	0.073	5.3732	0.0000	0.2487	0.5359
-1.2735	0.3582	0.0661	5.4188	0.0000	0.2282	0.4883
-1.0735	0.3242	0.0596	5.4378	0.0000	0.2069	0.4414
-0.8735	0.2901	0.0537	5.405	0.0000	0.1846	0.3957
-0.6735	0.2561	0.0485	5.2803	0.0000	0.1607	0.3515
-0.4735	0.222	0.0443	5.0073	0.0000	0.1348	0.3092
-0.2735	0.188	0.0415	4.5276	0.0000	0.1063	0.2696
-0.0735	0.1539	0.0403	3.8187	0.0002	0.0747	0.2332
0.1265	0.1199	0.0409	2.934	0.0036	0.0395	0.2002
0.3265	0.0858	0.0431	1.9915	0.0472	0.0011	0.1706
0.3318	0.0849	0.0432	1.9667	0.0500	0.0000	0.1698
0.5265	0.0518	0.0468	1.1067	0.2692	-0.0402	0.1438
0.7265	0.0177	0.0516	0.3435	0.7314	-0.0838	0.1192
0.9265	-0.0163	0.0573	-0.2849	0.7759	-0.129	0.0964
1.1265	-0.0504	0.0636	-0.7921	0.4288	-0.1754	0.0747
1.3265	-0.0844	0.0704	-1.2	0.2309	-0.2228	0.0539

Appendix VIII: Johnson Neyman Interval and Simple Slope Analysis

The interaction effect of FA and CC

CC	Effect	se	t	p	LLCI	ULCI
-2.223	0.8333	0.0904	9.2149	0.0000	0.6554	1.0111
-2.023	0.7928	0.0839	9.4441	0.0000	0.6277	0.9579
-1.823	0.7523	0.0776	9.6934	0.0000	0.5997	0.9049
-1.623	0.7118	0.0715	9.9612	0.0000	0.5713	0.8524
-1.423	0.6713	0.0655	10.2423	0.0000	0.5424	0.8002
-1.223	0.6309	0.0599	10.5249	0.0000	0.513	0.7487
-1.023	0.5904	0.0547	10.786	0.0000	0.4827	0.698
-0.823	0.5499	0.0501	10.9852	0.0000	0.4515	0.6483
-0.623	0.5094	0.0461	11.0578	0.0000	0.4188	0.6
-0.423	0.4689	0.043	10.916	0.0000	0.3845	0.5534
-0.223	0.4285	0.0409	10.468	0.0000	0.348	0.509
-0.023	0.388	0.0401	9.664	0.0000	0.309	0.4669
0.177	0.3475	0.0407	8.5422	0.0000	0.2675	0.4275
0.377	0.307	0.0425	7.2272	0.0000	0.2235	0.3906
0.577	0.2665	0.0454	5.871	0.0000	0.1773	0.3558
0.777	0.2261	0.0492	4.5914	0.0000	0.1292	0.3229
0.977	0.1856	0.0538	3.4498	0.0006	0.0798	0.2914
1.177	0.1451	0.0589	2.4632	0.0142	0.0293	0.261
1.2912	0.122	0.062	1.9667	0.0500	0.0000	0.244
1.377	0.1046	0.0644	1.6235	0.1054	-0.0221	0.2314
1.577	0.0642	0.0703	0.9125	0.3622	-0.0741	0.2024
1.777	0.0237	0.0764	0.3098	0.7569	-0.1266	0.174

Appendix IX: Johnson Neyman Interval and Simple Slope Analysis

The interaction effect of FL and CC

CC	Effect	se	t	p	LLCI	ULCI
-2.223	0.5281	0.0944	5.5928	0.0000	0.3424	0.7138
-2.023	0.4969	0.0876	5.6701	0.0000	0.3246	0.6693
-1.823	0.4658	0.081	5.7508	0.0000	0.3065	0.6251
-1.623	0.4346	0.0745	5.8324	0.0000	0.2881	0.5812
-1.423	0.4035	0.0683	5.9103	0.0000	0.2692	0.5378
-1.223	0.3723	0.0623	5.9763	0.0000	0.2498	0.4949
-1.023	0.3412	0.0567	6.016	0.0000	0.2297	0.4527
-0.823	0.3101	0.0516	6.0055	0.0000	0.2085	0.4116
-0.623	0.2789	0.0472	5.9085	0.0000	0.1861	0.3717
-0.423	0.2478	0.0436	5.6767	0.0000	0.1619	0.3336
-0.223	0.2166	0.0412	5.2608	0.0000	0.1356	0.2976
-0.023	0.1855	0.04	4.637	0.0000	0.1068	0.2641
0.177	0.1543	0.0402	3.8364	0.0001	0.0752	0.2334
0.377	0.1232	0.0418	2.9443	0.0035	0.0409	0.2055
0.577	0.092	0.0447	2.0598	0.0402	0.0042	0.1799
0.5989	0.0886	0.0451	1.9667	0.05	0	0.1772
0.777	0.0609	0.0485	1.2543	0.2106	-0.0346	0.1564
0.977	0.0297	0.0532	0.559	0.5765	-0.0749	0.1344
1.177	-0.0014	0.0585	-0.024	0.9808	-0.1164	0.1136
1.377	-0.0326	0.0642	-0.5071	0.6124	-0.1588	0.0937
1.577	-0.0637	0.0703	-0.9067	0.3652	-0.2019	0.0745
1.777	-0.0948	0.0766	-1.2385	0.2164	-0.2455	0.0558

Appendix X: Research Clearance Letters

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

P.O. Box 23409
Dar es Salaam, Tanzania
http://www.openuniversity.ac.tz

Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201705108

26th August 2021

Regional Administrative Secretary (RAS),

Morogoro Region,

P.O.Box.650,

MOROGORO.

RE: RESEARCH CLEARANCE

The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you Mr. Francis W. Mmari, Reg No: PG201705108 pursuing PhD. We here by grant this clearance to conduct a research titled "Financial Inclusion and Agricultural Commercialization of Rice Growers in Kilombero District: The Role of Institutional Support". He will collect his data at Ifakara Town Council from 1st October 2021 to 30th September 2022.

In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam.Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours,
THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth S.Bushesha
DIRECTOR OF POSTGRADUATE STUDIES.

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

Telegraphic Address: "REGCOM"
Phones: 2934306/2934305
Fax No: 2601308/2604988
Website: www.morogoro.go.tz
Email: ras.morogoro@tamisemi.go.tz
In Reply please quote:
Ref. No: AB. 175/245/01/179

Regional Commissioner's Office,
Boma Road
P. O. Box 650,
67117 MOROGORO

20th September, 2021

District Administrative Secretary,
Kilombero.

Re: RESEARCH PERMIT

Please refer to the above mentioned subject.

2. I am introducing to you **Mr. Francis W. Mmari, Reg. No: PG201705108** a student of the Open University of Tanzania, who is at the moment required to conduct a research.

3. The title of the research is **"Financial Inclusion and Agricultural Commercialization of Rice Growers in Kilombero District".**

4. The research permit is valid from **October, 2021** to **September, 2022** and will cover Ifakara Town Council.

5. Please provide necessary assistance to enable the accomplishment of the research.

6. Thank you for your cooperation.

Emmanuel P. Mwangu
For: **Regional Administrative Secretary**

Copy: Director,
Postgraduate Studies,
Open University of Tanzania,
Dar es Salaam.

" ***Mr. Francis W. Mmari*** - **Researcher.**

JAMHURI YA MUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Anuani ya simu: **MKUU WA WILAYA**
Simu Namba#: 023-2931511/2931525
Fax Number: 2931511/2931525
Barua pepe: das.kilombero@morogoro.go.tz
Unapojibu tafadhali taja:

Ofisi ya Mkuu wa Wilaya Kilombero
S.L.P 34,
IFAKARA

Kumb. Na.AB. 23/367/01B/228 — 11/10/2021

Afisa tarafa
Kidatu na Mang'ula
WILAYA YA KILOMBERO

Yah: **KIBALI CHA KUFANYA UTAFITI**

Tafadhali husika na somo tajwa hapo juu

2. Ofisi ya Mkuu wa Wilaya Kilombero imepokea barua kutoka Ofisi ya Mkuu wa Mkoa Morogoro yenye Kumb. Na. AB.175/245/01/179 inayomtambulisha ***Ndugu Francis William Mmari mwenye Namba ya usajili PG201705108*** ambaye ni mwanafunzi wa Chuo Kikuu Huria Tanzania. Mtajwa ameruhusiwa kufanya utafiti katika Tarafa ya Mang'ula Kata ya Kisawasawa,Kiberege na Mkula; Kijiji cha Mpanga, Kisawasawa, Mkasu, Nyamwezi, Mkula na Magombela. Aidha kwa Tarafa ya Kidatu atafanya utafiti Kata ya Kidatu na Sanje; Kijiji cha Chikago, Kidatu , Msolwa na Mwangani.

3. Kiini cha utafiti wake ni "***Huduma Shirikishi za kifedha na Kilimo Biashara cha zao la Mpunga kwa Wakulima wa Wilaya ya Kilombero: Jukumu la Taasisi wezeshi***".

4. Kibali cha utafiti kitaanza mwezi **Oktoba, 2021** hadi mwezi **Septemba, 2022**

5. Tafadhali mpatie ushirikiano wa kutosha katika utafiti wake.

Magesa I.M.
Kny: **KATIBU TAWALA WILAYA**
KILOMBERO

KATIBU TAWALA WILAYA
S. L. P. 34
IFAKARA - KILOMBERO

Nakala:
Katibu Tawala Mkoa
MOROGORO

Mkuu wa Wilaya
KILOMBERO. - Aione ndani ya jalada

Mkurugenzi
Halmashauri ya Mji
IFAKARA

Mtafiti
Bw. Francis W. Mmari