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**ASSESSING THE EFFECT OF FINANCIAL INCLUSION INTERVENTIONS ON THE  
DEVELOPMENT OF AGROECOLOGICAL INNOVATIONS BY FARMER  
INNOVATORS IN CENTRAL UGANDA.**

A dissertation presented to

**FACULTY OF AGRICULTURE**

in partial fulfillment of the requirements for the award of the degree

**Master of Science in Agro-ecology**

UGANDA MARTYRS UNIVERSITY

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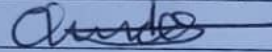
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**SCHOOL OF POSTGRADUATE STUDIES AND RESEARCH**  
**Master's Dissertation**  
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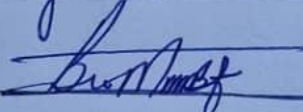
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## **DEDICATION**

This thesis is dedicated to my beloved parents, Esther Machemba, Stephano Chawanda, and Sphiwe Thembulembu and to my uncle, Mr. Machemba, whose unwavering love, support, and faith in me have been the cornerstone of my academic journey. I also extend my heartfelt gratitude to my Centre Head, Dr. Jude Ssebuufu, and my supervisor, Dr. Marius Murongo, for their exceptional guidance, encouragement, and mentorship throughout this process. To the Inter-University Council for East Africa Education (IUCEA) scholarship team, whose kindness made this accomplishment possible. And to all of my family members and friends, for their unwavering support and encouragement. Having you in my life has given me courage and motivation.

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## LIST OF ACRONYMS

ADB	African Development Bank
ABI FINANCE	Agricultural Business Initiative Finance
AFYB	Agricultural Finance Year Book
AFI	Alliance for Financial Inclusion
DFID	Department for International Development.
EPRC	Economic Policy Research Centre
FAO	Food and Agriculture Organization
GDP	Gross domestic product
HLPE	High Level Panel of Experts on Food Security and Nutrition
IFAD	International Fund for Agricultural Development.
IFDC	International Fertilizer Development Center
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MFLs	Microfinance institutions
MIT D-Lab	Massachusetts Institute of Technology Development Lab
RVO	Netherlands Enterprise Agency
UBOS	Uganda Bureau of Standards

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## ABSTRACT

This study investigated the effects of financial inclusion interventions on the development of agroecological innovations in Central Uganda, with a focus on farmer innovators engaged in creating organic agricultural inputs. Recognizing agroecology as a sustainable pathway for agricultural development, the study examines how access to and quality of financial services, such as credit, savings, insurance, and financial literacy, shape innovation processes and advancement. Despite increasing global recognition of financial inclusion as a catalyst for rural transformation, the specific linkages between financial access and agroecological innovation remain underexplored, particularly in Uganda's smallholder farming context.

A mixed-methods design was employed, involving 192 purposively and snowball-sampled agroecology innovators. Data were collected through structured questionnaires administered via Kobo Toolbox. Quantitative data were analysed using descriptive statistics and the Mann-Whitney U test to assess differences between innovators with and without access to financial services. Qualitative responses were thematically analysed to capture experiential insights into financial access and innovation dynamics.

Findings revealed that although over 80% of respondents had applied for and accessed financial services, the interventions were widely perceived as misaligned with their innovation needs. Notably, 77.7% found the services unsuitable, and nearly 60% considered them unaffordable. Key issues included high interest rates, poor affordability, institutional inefficiencies, and product mismatch (18.2%), along with limited access points (15.2%) and inadequate loan sizes (14.1%). The Mann-Whitney U test showed no statistically significant differences in the number ( $p = 0.650$ ), type ( $p = 0.814$ ), or certification ( $p = 0.355$ ) of innovations between those who accessed financial services and those who did not, suggesting a limited measurable impact of current financial interventions on innovation outcomes. Additionally, barriers such as limited financial literacy and the high cost of innovation certification further hindered implementation and scalability.

The study concludes that while financial inclusion is recognized as essential to supporting agroecological innovation, the current interventions are neither affordable nor adequately tailored to innovators' needs. Consequently, their effect on innovation development, implementation, and certification remains minimal. The research underscores the need for more context-sensitive, accessible, and affordable financial products designed specifically for agroecological practices. It also calls for complementary policy and institutional reforms, capacity building, and infrastructure investment to facilitate innovation adoption and sustainable agriculture development. These findings offer critical insights for policymakers, financial institutions, and development partners aiming to enhance inclusive finance frameworks that truly empower farmer innovators in agroecology.

**Keywords:** Financial Inclusion, Agroecological Innovation, Farmer innovators, Organic

Agricultural Inputs, Uganda

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of study

#### 1.1.1 Financial inclusion interventions

In the majority of economies, financial inclusion has been viewed as a growth engine. As a result, it now dominates conversations and debates in developing and emerging nations. This is not surprising as effective investments in environmentally conscious practices and sustainable food production are made possible by a financially inclusive economy. Therefore, the lack of price or non-price obstacles to using financial services is referred to as financial inclusion (Abbas *et al.*, 2024). Stated differently, financial inclusion encompasses all programs that address hurdles, including geographic, economic, regulatory, and social-cultural barriers, while making formal financial services available, inexpensive, and accessible to all facets of the population (Demirgüç-Kunt *et al.*, 2013). Conversely, the financial inclusion services such as loans, savings, training, etc. are known as intervention services.

In order to improve economic opportunities and lessen vulnerability for marginalized groups, such as smallholder farmers, financial inclusion interventions are strategies or actions that give people who are not able to access formal financial services timely, affordable, and adequate financial products and services. More significantly, financial inclusion has a multiplier effect on other economic sectors, resulting in significant environmental and economic benefits for people, businesses, and governments (Fayyad and Al-Sinnawi, 2024).

#### 1.1.2 Innovations in agroecology

An innovative method in the social sciences, economics, and politics is agroecology. By transforming food systems from the farm to the table, it seeks to achieve sustainability (Andrieu *et al.*, 2025). (Castle *et al.*, 2022) claims that this action leads to the exploration of new fields of knowledge at the interdisciplinary intersections concerning the agronomic consequences of social ecological systems and biological laws. Agroecological innovations include sustainable farming practices and sustainable agricultural technology, such as agro-

forestry, cover crops, and the development of organic farm inputs from Food Agriculture Organization (F. A.O, 2012).

However, agroecological innovations that maximize interactions between plants, animals, humans, and the environment present a promising solution to a sustainable global food system that is safe for both human health and the environment. However, financial inclusion issues are impeding its implementation, which results in fewer innovations, lower productivity, and a slower adoption of sustainable practices, all of which eventually affect agricultural resilience and environmental sustainability (Zeng, Li and Wanger, 2023). According to the Uganda Bureau of Statistics (UBOS, 2024) 1.78 million men and 2.4 million women in Uganda lack access to financial services, which is a major barrier to economic growth and the ability of people to escape poverty through creativity and innovation. This is because financial services make it more difficult to turn new ideas into tangible products that can address the environmental and personal economic issues of a nation. Significant obstacles that are both supply-side and demand-side in nature stand in the way of Uganda's efforts to expand formal financial inclusion.

### **1.1.3 Financial inclusion and innovation development in agroecology**

A healthy and inclusive financial system is associated with more rapid and equitable growth, according to a number of studies. While a substantial portion of the population (rural) still lacks access to the most basic financial services, there are many personal finance solutions available to those with higher and upper-middle incomes in the shape of innovative and financially planned products. This is known as "financial exclusion," and it subsequently results in social exclusion. Low organic exports have plateaued over the past three years due to a lack of financial access, which has hampered the growth of organic farming (Arun and Kamath, 2015).

However, agroecological innovations that promote collaborative action, locally relevant technologies, and participatory techniques in research and extension have been impacted by this funding exclusion. Interventions aimed at promoting financial inclusion, however, may be able to remove barriers to investment in sustainable agricultural practices 2019. These include scientific research, product development, and certification, which can lead to more innovations and productivity, as well as the potential advantages that agroecological innovations may offer to farmers and the environment (Madsen *et al.*, 2025). Therefore, it is essential to make easy and affordable institutional financial products or services available to

people, particularly those who live in rural areas. This is known as "financial inclusion." It is also a well-known fact that financial inclusion aims to extend the area of the functioning of the organized financial system to include individuals with low incomes (Rahming, 2021).

To improve the productivity, livelihood, and food security of the smallholders and promote better agricultural outputs, there is a high need to streamline access to money and other financial services. Insurance and saving plans are the other financial products that can help farmers operate their farms as a successful business with the aim of smoothing their periodic cash flows and reducing the vulnerability of their farms to externalities.

## **1.2 Problem statement**

Innovations in Agroecology in Uganda have gained a burgeoning interest in recent years, with efforts focused on developing sustainable alternatives to conventional agricultural practices through the production of organic products and Agroecology-based farming systems (Fiore *et al.*, 2024). However, the development of these innovations in agroecology has faced significant financial inclusion barriers (Akanbi, 2020). Studies by (Kyeyune and Ntayi, 2025) have shown that access to credit, savings and financial literacy training positively contribute to the development of various innovations. The availability and accessibility of these services provide necessary resources and create enabling environment for enhancing financial inclusion.

Despite these interventions, innovators in Agroecology field in Uganda continue to face financial inclusion challenges that hinder the development of innovations in Agroecology (Marus *et al.*, 2021b). The study aimed to understand the current status of financial inclusion in central Uganda and assess its effect on the development of innovations in agroecology. The study sought to provide insights into the availability of financial services, identify existing gaps, highlighting the needs of agroecology innovators and analyze factors hindering development of these innovations in Agroecology (Demirguc-Kunt, Klapper and Singer, 2017).

## **1.3 Objectives**

### **1.3.1 Aim of the study**

The main aim of the study was to assess the effect of financial inclusion interventions on the development of innovations in Agroecology in Central Uganda

### **1.3.2 Specific objectives**

The following specific objectives guided the study.

1. To determine the status of financial inclusion interventions among farmer innovators
2. To assess the effect of financial inclusion interventions on the development of innovations in agroecology.
3. To assess challenges affecting the development of innovations in agroecology and explore strategies for addressing them.

### **1.4 Research questions**

The study sought to answer the following questions

1. What is the current status of financial inclusion interventions among Agroecology innovators?
2. How do financial inclusion interventions affect the development of innovations in Agroecology?
3. What challenges do farmer innovators face in developing and proposing strategies to these innovations?

### **1.5 Justification**

Financial inclusion has a multiplier effect on various economic sectors, resulting in significant financial gains for people, businesses, and governments. On the other hand, a community that is financially excluded may encounter a notable disparity in income (Omar and Inaba, 2020). Without tackling the obstacles to financial inclusion, agroecology cannot fully reap the benefits of innovations like increased productivity, better environmental sustainability, improved human health, and strengthened food security. This study looked at the difficulties faced by agroecology innovators, highlighted gaps in financial inclusion, and suggested ways to improve the efficiency of financial interventions in fostering agroecology innovations.

### **1.6 Scope of the study**

#### **1.6.1 Content scope**

Three primary goals were addressed by the study. Using a survey questionnaire, the study first evaluated the state of financial inclusion interventions, focusing on their availability, affordability, accessibility, and responsiveness to the needs of farmer innovators.

Second, with the help of qualitative and quantitative measurements of outcomes, the research examined the influences of the current level of financial inclusion on the development and certification of agroecological innovations.

Lastly, the study identified barriers to adoption of agroecology innovations such as some that are associated with finances, technology, infrastructure and policy by surveying the innovators of agroecology innovations.

### **1.6.2 Time frame and time scope**

The period **1995 to 2024** was selected to capture the evolution of financial inclusion and agroecology in Uganda. In the mid-1990s, economic liberalization and policy reforms emphasized rural finance, microcredit, and poverty reduction strategies (World Bank, 1999), alongside the rise of community-based savings groups and microfinance institutions that laid the groundwork for financial inclusion (Ledgerwood, 1999). From the 2000s onward, microfinance, village savings and loan associations (VSLAs), and later mobile money platforms expanded access to financial services, particularly in rural areas (Ssonko, 2010). In parallel, agroecology gained prominence as a sustainable farming approach, strengthened by Uganda's commitments to global and regional frameworks such as the **2014 FAO International Symposium on Agroecology** and the **2019 Kampala Declaration on Agroecology**

### **1.6.3 Time frame**

The study has been limited to more than 10 months so as to give enough time to gather data, analyze and report about them to give a proper and detailed evaluation.

### **1.7 The study significance**

This research explored the role of financial inclusion in fostering the development of agroecological innovations, while also identifying the challenges encountered by agroecology innovators. It provides a comprehensive understanding of how access to financial services influences the ability of farmer innovators to generate organic agricultural solutions. By highlighting these linkages, the study contributes to closing the knowledge gap on the intersection between financial inclusion and agroecology in Uganda's smallholder context, which has been underexplored (FAO, 2018; Mpiira et al., 2021).

Based on the findings, the research proposed practical solutions to overcome barriers to financial inclusion, with the aim of motivating farmer innovators to generate and scale their ideas. This aligns with the view that financial inclusion acts as a catalyst for rural innovation and resilience, improving not only productivity but also sustainability and equity in agricultural systems (Demirgüç-Kunt et al., 2018; Omar & Inaba, 2020).

The study also offers evidence-based recommendations for policymakers on strengthening financial inclusion frameworks to support agroecological transitions, thereby enhancing sustainable agriculture and food system resilience in Uganda (HLPE, 2019). Furthermore, financial institutions can utilize the findings to design and deliver more effective financial products and services tailored to the needs of farmer innovators, thus promoting innovation diffusion and inclusive rural development (Beck et al., 2007; Trivelli & Venero, 2022).

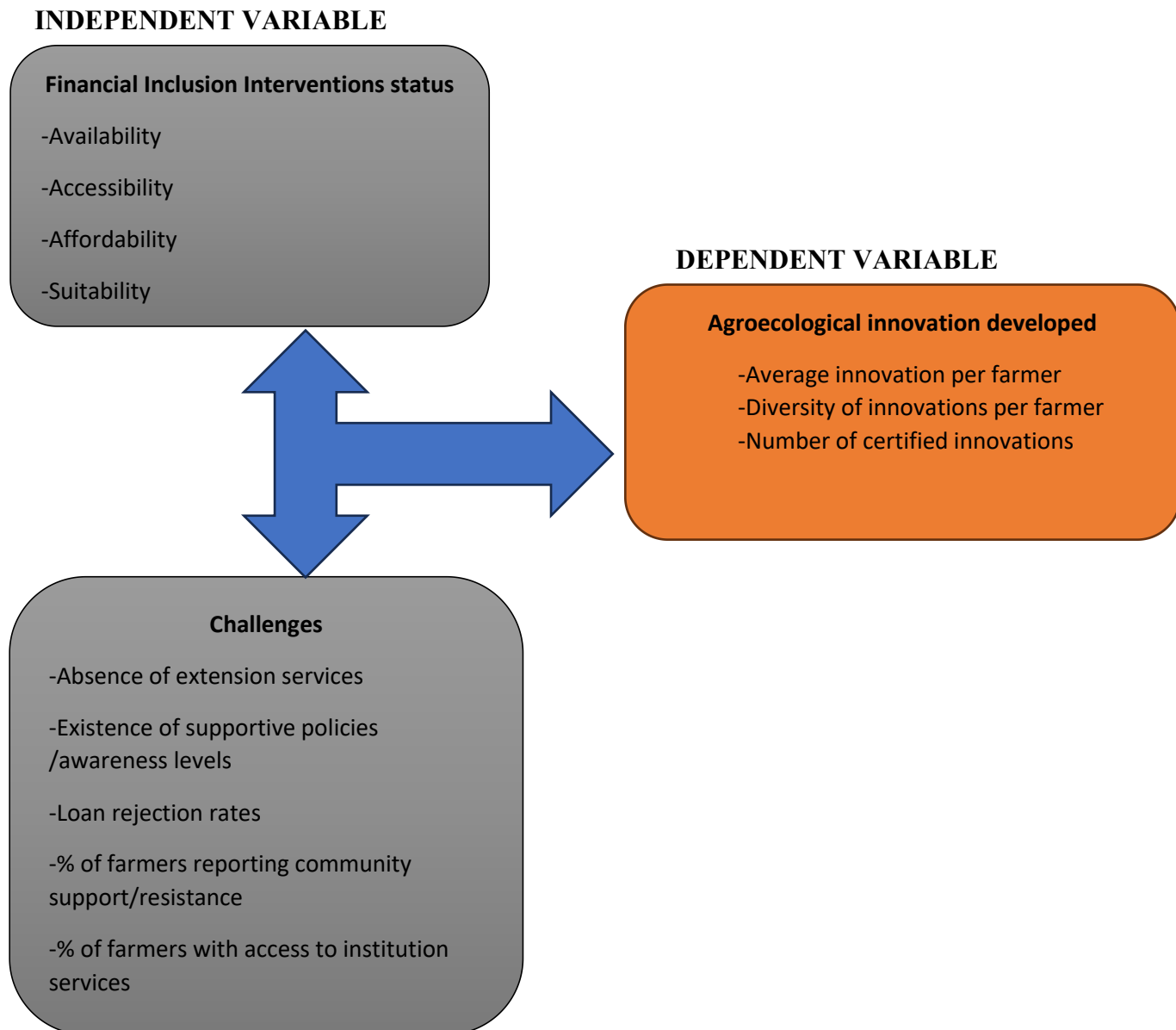
### **1.8 Conceptual framework.**

In this subsection, the key issues of discussion in the conceptual review and the examples of the conceptual framework as the guideline of the study are suggested. It aims at showing the significant and observable relation that exists between the production of innovation and financial inclusion programs. Lastly, the outline presented an overview of the points stressed in the study and the explored aspects.

The idea behind the conceptual framework developed in the context of the current research was the fact that it facilitated the ease of understanding the relation between the independent, dependent and the moderating variables. The conceptual framework aimed to demonstrate the influence of the financial inclusion interventions on development of the agroecological innovations and the moderation of the link through several obstacles, which the relationship has been determined.

Examples of the independent variables (financial inclusion interventions) in this study are the cost/moderation, accessibility, availability and suitability (fit to use) of financial services (i.e. savings accounts, loans and financial literacy training). (Deshpande and Koning, 2023) states that these interventions equip the producers of agroecology innovation with the knowledge and capabilities that they need to practice and embrace innovative agricultural techniques. According to some researchers, financial inclusion increases access to capital and the financial decision-making abilities of people and both of these attributes generate innovation (Persaud and Thaffe, 2023).

The term availability means that there are financial products that exist in the location of agroecology innovators. Accessibility means that these products should be made easily accessible, and this is more so in rural areas. Affordability entails the aspect of cost effectiveness of these services, so that the innovators can be able to make use of these services without straining them hugely in terms of finance. Suitability is the ability of financial services to meet the needs of innovators.



**Figure1.1** Conceptual framework

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Introduction

This literature review discusses the gap existing in the literature on the innovations concerning agroecology, financial inclusion, and challenges confronting the agroecology innovators. This chapter aimed to give a theoretical basis for the inquiry and the analysis of the findings. The review has come up with a conceptual framework through which the research was able to study the impacts that the financial inclusion initiatives have made on innovations within agroecology because it relied on the relevant concepts of implementation limits, sustainable development, diffusion of innovation, and financial inclusion.

#### 2.1 Financial inclusion theories

Financial inclusion is defined by the provision of financial services and the ability of every section of the population, most importantly the poor and other disadvantaged categories, to have access to such services (Ozili, 2018). Another definition of financial inclusion consists in providing banking services to a significant part of the underprivileged and low-income populations at an affordable price (Arun and Kamath, 2015). Another definition of financial inclusion is using and gaining access to formal financial services (Basnayake *et al.*, 2024).

Moreover, one of the aspects listed when considering the scope of financial inclusion was the concept of utilization, adequacy, convenience, product knowledge, affordability and accessibility by (Marus *et al.*, 2021a). The major similarity of these definitions is the fact that they all focus on the premise that every representative of the population ought to be able to reach available financial services. There exist important concepts that can be used to explain the ways that access to finance has the effect of influencing economic and innovative activity.

### **2.1.1 Theory of financial access**

Financial access theory states that the broader the access to financial products and services, such as credit, savings, insurance and financial literacy, the more powerful and prosperous people and communities become enabling them to invest in gainful activities, which subsequently can lead to innovation and economic growth (Sarpong and Nketiah-Amponsah, 2022). This conception is particularly relevant within the framework of rural farming, as agricultural funds may allow the producers of agroecology innovation apply environmentally-friendly strategies. What it means is that financial inclusion provides the farmers with information and funds to integrate new practices and technology that without the funds, may not be possible to get hold of through a lack of money.

### **2.1.2 Theory on Inclusive Finance**

Inclusive finance theory broadens the financial access theory by focusing on affordability, appropriateness, and usability of financial services to low-income and marginalized individuals (Persaud and Thaffe, 2023). Unlike other typical models of financial access, this strategy focuses on the accessibility of on-demand financial products and services tailored to the needs of marginalized groups. This hypothesis provided pertinent facts in explaining how customized financial services have impacted the uptake of innovations in the area of agroecology. The implications of the results of the study are that availability of financial services might influence innovation.

## **2.2 Theories of innovation in Agroecology**

As (Sahin, 2006) perceived an innovation to be an idea, practice, or object that is new to a person or any other adoption unit. In innovation-dependent systems-based strategy of agroecology, which is the combination of sustainable agriculture with ecological principles that aims to deliver resilient food and healthy ecosystems (Ewert, Baatz and Finger, 2023). The important role of innovation here is to work out and realize new approaches to cultivation, use of resources, and land exploitation. The theoretical concepts about sustainable innovation and diffusion of innovation provide significant clues about how these techniques can be adopted and used.

### **2.2.1 Diffusion of innovation theory**

The diffusion of the innovation theory developed by (Sahin, 2006) explains that the poor, the ignorant, and the slow are always the first to receive an innovation and that they are slowly absorbed by the social system. Diffusion is a process through which an innovation is

transferred across time by way of channels through the members of the social system by (Rogers, 1983). The theory emphasizes five important factors, which are relative benefit, compatibility, trialability, complexity and observability, that affect the acceptance of innovations. Through this theory, it is possible to explain the introduction and adoption of sustainable practices and technology in the same way of agroecology. Financial inclusion by availing financial services, on the other hand, enhances trialability of an innovation idea, which eventually enhances the acceptance or implementation aspect.

### **2.2.2 Sustainable innovation theory**

It has been observed that sustainable innovation theory has great focus on generating and adopting the innovations that are ecologically friendly in a way that facilitates sustainability in the long-term (Afeltra *et al.*, 2022). The concept is specifically relevant to agroecology as it lays stress on the importance of cultivating inventions that enhance ecological and social goals. The theory has contributed to the creation of an understanding of how financial inclusion can be established to support the establishment of sustainable innovation in the scenario of agroecology by providing the financial services that answer the requirements of innovations.

## **2.3 Theories on challenges in implementation of innovations**

Low levels of financial, social, and institutional resources are the obstacles that accompany the development of innovations in agroecology rather frequently. The resource dependence and adoption constraint theories are illuminating in shoving light into these issues.

### **2.3.1 Resources dependence theory**

The resource dependence theory suggests that organizations cannot exist without external resources and this influences their prospects of innovating and taking strategic decisions (Hillman, Withers and Collins, 2009). Such a conception becomes even more relevant to the case of agro-ecology as a great number of farmer-innovators have to be highly dependent on external resources, technologies, and knowledge to initiate and sustain agroecological farming. The study findings prove these theoretical perspectives. Respondents gave answers that their ability to generate and certify their ideas suffered because they did not get access to financial services comprehensively.

### **2.3.2 Theory of adopting constraints**

The concept of adoption restraints examines the various those restraints that hinder the adoption of innovations, which include institutional, financial and informational ones (Campuzano *et al.*, 2023). Adoption restraints have an important influence on the ability of farmer innovators to develop and use ideas within the agricultural sector of agroecology.

Those may consist in insufficiency of finance, lack of familiarity with new processes, limited access to markets, and poor governmental support. This theoretical paradigm gets on well with the beliefs of the study. According to the farmer innovators of the sample, there were some barriers they experienced in the course of developing the inventions, such as those related to untailored financial services, shortage of awareness and training opportunities, and policy vacuums.

## **2.4 Empirical studies review**

### **2.4.1 Financial inclusion interventions status in the agroecology context.**

To assess financial inclusion interventions' efficacy and applicability in fostering innovations within agroecological systems, it is essential to comprehend their status and features. By providing services that are available, accessible, affordable, and suitable for users' requirements, financial inclusion seeks to integrate people and communities, particularly under served ones to engage in the formal financial system. empower. The importance of financial inclusion in strengthening communities economically has been highlighted in previous research.

These theoretical and empirical viewpoints served as the foundation for the current study's evaluation of financial inclusion interventions among central Ugandan agroecology innovators. The results verified that although financial services are available, outreach was restricted by affordability concerns, and there are still major obstacles due to the mismatch of customers' demands. This section examines earlier research on financial inclusion to contextualize, highlight, and assess strengths and weaknesses in connection to availability, affordability, responsiveness, and accessibility characteristics.

#### **2.4.1.1 Availability of financial inclusion interventions.**

The availability concept in financial inclusion, ensures that financial services such as credit, savings accounts, insurance and digital payments are a physically accessible and suitable for under-served populations especially in rural areas. In the context of agroecology, which emphasize sustainable farming practices, the availability of financial services is critical for supporting innovations such as organic farming and Agroforestry and climate resilient agriculture.

Two dimensions of availability are particularly relevant: Geographic availability and product availability. Geographical availability relates to whether financial institutions, through physical branches or digital platforms, are reachable in rural farming communities (Arun and Kamath, 2015). Product availability involves offering tailored financial products like microloans, crop insurance and green bonds that meet the specific needs of farmers adopting agroecological practices. Digital platforms, such as mobile banking and mobile money services, have improved availability by enabling farmers in remote regions to access financial services without physical infrastructure. (Salami, Kamara and Brixiova, 2010) Findings showed that smallholder farmers perceived financial services as readily available, which means that service reach has improved despite persistent gaps in remote or underserved areas.

Findings from this study support these conceptual perspectives. Some respondents indicated access to financial services through mobile money platforms and village agents significantly enhanced access to basic financial services even in areas lacking formal banking infrastructure. However, geographical disparities persist, with innovators in more remote districts still facing difficulties in accessing a wide range of financial products (Nagaaba *et al.*, 2025). Moreover, while digital services are available, product availability remains limited, as it has been reported that most financial products are generic and not specifically designed to support innovations developed in agroecology.

These findings align with Previous studies found that geographic availability of financial institutions correlates with great financial inclusion, facilitating access to capital for rural populations. Similarly,(Abdulai and Issahaku, 2024)highlighted the role of digital services in enhancing rural financial inclusion, a trend which also partially observed, which is particularly important for farmers adopting agroecology. Furthermore,(Ozili, 2018) highlighted the importance of specialised financial products such as green loans or crime and insurance, which respondents in this study noted as lacking.

From the theoretical standpoint, financial inclusion theory reinforces that the availability of financial services, both geographical and product-based based is a key enabler of financial inclusion.

#### **2.4.1.2 Accessibility of financial inclusion interventions.**

Accessibility is a core dimension of financial inclusion. It refers to the ease with which individuals can access financial services, both in terms of physical proximity and digital reach. Studies have highlighted the importance of accessible financial services in driving social economic development, particularly in rural areas.(Al Rifai and AlBaker, 2025), found that access to credit and secure savings services are essential for investments, supporting this,(Kurdyś-Kujawska *et al.*, 2025) highlighted that farmers often view capital as a tool for initiating or scaling up innovation. However, there perceived factors that affect accessibility of these financial inclusion interventions.(Simatele and Maciko, 2022)emphasise that geographical barriers, limited infrastructure, and lack of digital literacy significantly affect the financial inclusion in low-income regions, where physical access to banks or ATMs is often limited. Mobile banking and digital financial services have improved accessibility in many areas by providing remote access to financial services via mobile devices, reducing the need for physical bank branches (Hamdan, Lehmann-Uchner and Menkhoff, 2022). It has been observed that limited trust in financial institutions and lack of proper documentation or credit history often discourage people from seeking financial services (Sarfo *et al.*, 2023) respectively, despite availability of financial services.

Other studies found that financial inclusion interventions, when accessible can significantly enhanced the adoption of sustainable agriculture practises, such as those promoted by agroecology, by providing farmers with the capital, risk management tools, and market access necessary to innovate and improve livelihood (Mapanje *et al.*, 2023). The accessibility concept of financial inclusion interventions emphasizes the multifaceted nature of accessibility, which includes physical, economic, function, and social dimensions. Physical accessibility refers to the availability of financial services in remote or rural areas, often through bank mobile banking and digital platforms, which mitigate the geographical barriers faced by small holder farmers (Mishra *et al.*, 2024). Economic accessibility on other hand, involves ensuring that financial products such as loans, insurance and savings are affordable for low-income individuals, with Micro finance offering flexible terms and low interest rates as critical tools (Wanzala and Obokoh, 2025), but findings from this study suggests that such offerings are still inadequately tailored to the needs of agroecology innovators despite majority accessed the services. in addition, Functional accessibility underscores the importance of financial literacy and digital literacy to ensure that farmers can effectively use financial services(Olabanji and Chitakira, 2025). Cultural and social accessibility focuses on

overcoming gender and social barriers, such as discrimination against women and marginalised groups, to ensure equitable access to financial services (Gobezie, 2013)

Accessibility still a key tenet of the financial access theory. Despite financial inclusion interventions gained accessibility perception in this study, generally it is not inclusive due to reported challenges such as high cost of services and service mismatch.

#### **2.4 .1.3 Affordability of financial inclusion interventions**

Affordability is another crucial characteristic of effective financial inclusion interventions. studies have shown that high transaction costs, interest rates, and fees can be prohibitive, particularly for low-income users who often cannot afford standard financial products. The study findings align with (Shirono, 2024), who identified high transaction costs as significant barriers to financial inclusion in developing countries. Many respondents in this study reported that high-interest rates charged by service providers posed a major obstacle when attempting to access credit or other financial services. Conversely,(Akanbi, 2020) found that most smallholder farmers considered financial services offered affordable, unlike Financial Inclusion Strategy (2023) confirmed that high service costs remain a barrier, particularly for rural and low-income groups.

The comprehensive financial theory advances the idea that affordability must be upheld as much as access. financial products are needed to make financial services advantageous to people with low incomes. Based on this theory, the delivery of financial services is not supposed to be accessible only, but also affordable to marginalized communities (Abdulai and Issahaku, 2024). Based on the findings of the research, it can be seen that ensuring that there is no barrier to financial services taken care of on the affordability which on the other hand has limited impact on accessing the financial services especially among farmer innovators who tend to have low capital especially to affect the innovation of the same and they require a flexible, low-cost financial solution to achieve this.

#### **2.4.1.4 Ability to meet user needs.**

Another important dimension of financial inclusion is the aspect of responsiveness, which focuses on the intervention that should be customized to suit the needs of the users in the specific area covered. According to (Ben Naceur *et al.*, 2020)Interventions that address specific agricultural needs, such as season loans or insurance indexed to weather patterns, have shown promising results in supporting sustainable agriculture. However, Agricultural

Finance Year Book highlighted that current products are mostly geared toward conventional agriculture and fail to support the dynamic needs of agricultural innovators, highlighting poor financial suitability, echoing the conclusion that current inclusion mechanisms are quantitatively impressive but qualitatively weak (Mishra *et al.*, 2024).

Concerning this, the findings of the current study revealed a misalignment between the financial products offered and the actual needs of farmer innovators, which negatively impacts financial inclusion in the agroecology context. This finding supports the argument of who highlighted that financial services should be designed to meet users' specific economic and social conditions (Fiore *et al.*, 2024)

#### **2.4.2 Effect of financial inclusion interventions on innovation implementation**

Financial inclusion intervention can significantly impact the adoption and implementation of innovations in agroecology. This objective examined how financial inclusion interventions in their current level influenced the types, number, and certification of innovations adopted in the study area. The insights from diffusion of innovation theory provided valuable information on how financial resources accelerate or hinder the diffusion of innovation implementation.

Agroecology, by definition, is a sustainable alternative to conventional agriculture, seeking to balance the interaction of the environment-plant-animal-man complex in an equitable way. Different players in the food system are engaging in the practice and promotion of agroecology across the world. Their experience serves as input for agroecology innovation hubs, thus assisting and accelerating the adoption of agroecological practices. Agroecology is described as the integrative study of the ecology of the entire food system, encompassing ecological, economic, and social dimensions. Some other studies defined agroecology as a science, comprising a set of practices and a social movement. The Food and Agriculture Organization of the United Nations (FAO) defines agroecology as an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems that aims to optimise the interactions between plants, animals, humans and the environment while taking into account the social aspects that must be addressed for a sustainable and equitable food system. There is a strong theoretical basis and empirical evidence that agroecology results in increasing yields compared to conventional alternatives. However, it is important to note that organic agriculture is only one

component of agroecology that intends to limit the dependence on external inputs, not necessarily to exclude them. For instance, a recent study by (Von Cossel *et al.*, 2025) indicates the positive impact of agroecology on yields. In this context, Agroecology challenges monocropping systems and farming practices that rely heavily on standardized approaches and high external input use. Innovations in agroecology are focused on liberating the agricultural environment by promoting biodiversity and more sustainable methods of production.

In terms of innovation, Agroecology promotes practices that increase farmers' control over their productive resources and broader access to food grown in environmentally friendly ways (Iyabano *et al.*, 2022). These practices also facilitate optimal management of biodiversity of agroecology systems have noted developing such practices is highly knowledge-intensive, and this requires a combination of farmer's traditional knowledge with scientific knowledge (Yeleliere *et al.*, 2022).

#### **2.4.2.1 Financial inclusion intervention on development and certification innovations**

Financial inclusion interventions like micro credit programmes and mobile banking services have the potential to increase the number and diversity of innovations by providing the capital required to conduct experiments necessary for innovation development. Studies have shown that access to affordable credit positively influences the adoption of innovations, such as organic farming and crop diversification, and product development (Persaud and Thaffe, 2023). For instance, a case study in Kenya, on mobile banking facilitated by M-Pesa enabled smallholder farmers to access micro-loans, leading to a substantial increase in the production and use of organic fertilizers and permaculture practices (Kikulwe, Fischer and Qaim, 2014) in absence of physical banking infrastructure thus promoting wider adoption of agroecological innovation. However, (Marus *et al.*, 2021a), noted a weak and even negative relationship between financial inclusion and agricultural commercialization in the Buganda region amongst smallholder farmers ( $r = -0.340$ ;  $p\text{-value} = 0.003$ ) simply to say that that financial access does not necessarily lead to enhanced outcomes in another context.

Investments in compliance, quality assurance, and documentation are frequently necessary for the certification of the goods and services. According to (Gbongli *et al.*, 2020) research, grants or low-interest loans facilitate the certification process, allowing innovators to reach a wider audience and have better access to markets. The results of this study, however, showed

that the type, quantity, and certification of innovations have not been positively impacted by the existing financial inclusion in the studied area. The number of innovations generated has increased, according to only a small percentage of respondents, while the difference in this rise among respondents is negligible. According to the study, the results were impacted by product mismatch and unaffordability.

The Diffusion of Innovation Theory, proposed by (Campuzano *et al.*, 2023), explains that financial resources enable early adopters to introduce and diffuse innovations more rapidly, which is crucial for the success of agroecology as a movement. According to the theory, innovations spread through populations based on several factors, including access to resources and perceived benefits. Access to resources includes financial capital for product development, research, or certification, as well as access to knowledge, infrastructure, and training, all of which were cited by respondents as crucial for innovation implementation. The perceived benefits side consists of the value or the advantages that an individual or an organisation believes they will gain by adopting the innovation. The perceived benefits can be economic through cost savings, functional if it provides efficiency improvements, social by improving or changing status or prestige, or emotional if it increases satisfaction or pleasure.

About the diffusion of innovation theory by (Rogers, 1983), the study found that financial inclusion interventions such as micro-credit, savings, etc, somehow played a crucial role in supporting the innovation development process by providing farmer innovators with capital to conduct trials, acquire knowledge, and market innovations developed. Some respondents noted an increase in innovation production; however, this increase was not uniform. The implementation and scaling of innovations were hindered by persistent financial, institutional, and technical constraints. This aligns with the adoption constraints theory (Balana and Oyeyemi, 2020) highlighted that financial, social, and logistical constraints can limit the rate at which innovations are developed, especially in resource-limited settings such as rigid financial structures and lack of adaptive credit models.

### **2.4.3 Major challenges to innovation implementation in agroecology**

The use of the innovations with regard to the agroecology approach can be recognized as one of the most significant paths to achieving sustainable agricultural practices. Agroecology limits its functions to ensuring social justice, ecosystem provisions, and biodiversity through the integration of ecology into agricultural systems (Madsen *et al.*, 2025). The number of

challenges to the fruitful evolution of innovations, many of which are evident in the developing countries, however, can be proved as a result of a combination of logistical, social, and financial constraints.

Agroecological practices are however slow in being adopted although they are known to have numerous benefits that include, making them more resistant to climate change, reduced application of pesticides and greater soil fertility (Araya *et al.*, 2024).

#### **2.4.3.1 Financial constraints**

A survey conducted indicates that money is among the greatest barriers to application of technologies. (Autio *et al.*, 2021) state that there is insufficient money to invest into the equipment, seeds, knowledge and skills necessary to launch the innovation. The findings made in the research are in line with (Kuhn, 2024) findings which were that most farmers and particularly those located in the rural and less developed regions find it hard to access loans in formal banking operations as they have minimal collateral or credit record. Financial institutions tend to exhibit a high level of risk aversion when considering the idea of making their investment in agroecology.

Unlike traditional agriculture that has managed to implement financial structures that render it more attractive to investors, agroecology is most often perceived as a risk-laden venture due to its diversified aspect and its long-range accretion (Mouratiadou *et al.*, 2024). Consequently, most financial institutions do not want to extend credit products, which are suitable to the operations of smallholder farmers (Fiore *et al.*, 2024). Nonetheless, the transition towards an agroecological approach is often associated with advance costs such as the purchase of organic inputs or new ways of farming which farmers with scarce financial resources cannot afford. Thus, use external sources of financing.

#### **2.4.3.2 Social constraints**

Social constraints are also a major hindrance to adopting the agro ecological advances such as gender differences where some groups do not get to benefit on the new discoveries, the cultural resistance towards new changes and lack of access to education and training. The roots of traditional agricultural experience and their doubts in the efficacies of the new technologies are often the major background of cultural barriers to implementing the practice of agroecology (Madsen *et al.*, 2025). In most rural communities, where generations have a certain experience of traditional agricultural practice, farmers might not be ready to abandon them, especially when benefits of the pursuit of agroecology may not be realized directly and confirmed immediately.

In addition to this, there is usually a mismatch between knowledge and technical abilities necessary in adopting agroecological practices and often demands customized extension services so that farmers are well-served (Barooah *et al.*, 2023). The research results concluded that social constraint was among the least reported challenges therefore implying weak cultural resistance by farmer innovators in the field of agroecology

#### **2.4.3.3 Constraints of logistics**

Moreover, the lack of infrastructure is another problem often facing rural regions, including an insufficient road infrastructure and the access to electricity or internet that makes both knowledge transfer and the supply of agroecological goods difficult. The (Abate *et al.*, 2023) notes that ineffective infrastructure hinders any movement of goods and services not to mention provision of agricultural inputs and availability of markets, which are key to success of innovatively established farming activities.

The most powerful impediment that is often pointed out is financial constraints, and the severity and frequency of such complications differ. Study assert that the innovation is restrained by the absence of funding and investment to support agroecology and discourage small-scale farmers to use a sustainable farming approach. Farmers cannot get the necessary training because they do not have resources to do it; certification of their innovations cannot be received, either (Muhie, 2022). The findings of this research point out that insufficient infrastructure also affected farmer-innovators because only a few of the respondents could reach financial services through digital platforms meaning a low connection to the internet. It is sound against the background of the World Bank.

#### **2.4.4 Theories explaining the challenges in development of innovations**

Both of the theories, the Resource Dependence Theory (RDT) and the adoption constraints theory, gave some insight into the external and the internal factors that affected the development of innovation found in this research.

##### **2.4.4.1 Resources Dependence Theory (RDT)**

The resource dependence theory had the following distinctiveness: Organizations or in our present case, smallholder farmers all use external resources to operate and realize their missions, and these external resources are usually under the possession of other parties i.e. financial institutions, governments or even large agribusiness (Leeman *et al.*, 2022). One of the most important aspects of the resource dependence theory is economic limits, as farmers have to seek external financing resources, such as grants, loans, and subsidies that are often

disposed due to risk-averse behavior by financial institutions disregarding the lack of special financial products related to agricultural activities(Coupet and McWilliams, 2017). All the above have been consistent with the findings of the study as more farmer innovators tend to have a heavy reliance on the financial services being offered to support their innovations which has also been found by(Alexander and Wells, 2008).

At the social level, the farmers rely on any outside knowledge base, which necessitates the use of the agricultural extension services and communities, which are either poorly equipped or unfamiliar to the agroecological practices(Shofi Ullah Mazumder, 2024). Such resource dependence constrains the exchange of information together with technical support as they cannot be used broadly in promoting agroecological innovations.

#### **2.4.4 2 Adoption Constraints Theory**

Despite being centered on the factors obstructing or delaying the up-take of innovations, the theory of adoption constraint provides a platform through which they can understand the barriers preventing individuals or societies from adopting the new behaviours (Wisdom *et al.*, 2014). Hypothesize forward and say that there are several problems, including deficiency of information, cultural obstacles, funding, and logistical issues, which obstruct the implementation of new technologies or practices. In agreement with the observation made by(Rogers (1983), the greatest impediment on the usage of innovations in this research field consists of financial bindings and is the most frequently mentioned.

The second set is the institutional challenges. Another major obstacle to agroecology implementation can be outlined in high cost of the transactions perceived, the lack of other channels of product access on the market and insufficient knowledge transfer(Mekuria *et al.*, 2022). However, unless combined with supplementary technical, research, and training initiatives, policy regulations and credit availability by themselves do not ensure the adoption of innovations.

### **2.5 summary**

#### **2.5.1 Literature Gaps on the Implementation of Agroecological Innovations and the Role of Financial Inclusion**

Despite the relationship between financial inclusion and agricultural innovation has garnered increasing academic and policy attention, significant gaps still persist particularly in the context of agroecology. The findings of this study confirm and elaborate on these gaps,

providing new evidence on how financial inclusion interventions interact with agroecological innovation in practice.

First, the nature and traits of financial inclusion interventions that are especially appropriate for agroecology are still not well understood by scholars. The majority of the material now in publication is about conventional agriculture, which is frequently focused on cash crops and quick productivity increases. The financial cycles and sustainability objectives of agroecological practitioners such as those involved in organic farming, permaculture, or integrated pest management who place a higher priority on long-term ecological balance than on immediate yields are not taken into account by these models. According to this survey, the majority of financial services provided do not meet the needs of innovators in terms of their size, type, cost, and lack of flexibility.

Second, the impact of financial inclusion on the implementation, uptake, and certification of agroecological innovations is not sufficiently examined in the literature. Few studies look at financial inclusion's impact on innovations based on sustainability and ecological principles, despite the fact that it is extensively researched in contexts including technologically complex or commercial developments. By showing how the structure of financial services can either facilitate or impede the implementation and adoption of such innovations, this study has helped close this gap. According to the survey, the respondents' access to financial services did not adequately support the implementation of innovation in terms of innovation type, number, and certification.

The outlined constraints are a mismatch of financial products. Interventions such as financial products, training, and policy frameworks specifically designed for agroecology have been proposed by respondents that can positively contribute to the implementation of innovations. The findings further highlight the slight to moderate influence of access to financial services on knowledge acquisition, access to equipment, and conducting research.

Third, the literature has not sufficiently examined the financial obstacles unique to agroecology. Few studies examine the specific barriers faced by agroecological innovators, such as a lack of credit, expensive certification procedures, institutional difficulties, and insufficient financial products for long-term ecological projects, even though previous research recognizes the general financing challenges in agriculture.

The current study shows how these obstacles appear at various phases of implementing innovation. Inadequate and misaligned financial resources, institutional governance, and technical difficulties all have an impact on the innovators' capacity to obtain the materials, expertise, and knowledge required to develop a given innovation. These issues have been shown to seriously hinder the implementation of innovations and considerably lower their overall success.

In alignment with Adoption Constraints Theory and Resource Dependence Theory, the findings underscore how a lack of access to relevant resources restricts the implementation and scaling of agroecological practices

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 introduction**

The research approach used in this study to evaluate the effect of financial inclusion interventions on the development of agroecological innovations in central Uganda is described in this chapter. In order to accomplish the research goals, it outlines the study area, research strategies, data gathering instruments, protocols, and analysis techniques. Considering that data has been gathered and examined, the chapter considers the planned and carried out processes to guarantee rigor, validity, and compatibility with the goals of the study.

#### **3.1 Research design**

##### **3.1.1 Mixed research approach**

The research in question employed a mixed research methodology so that the objectives of the research can be covered to full extent. It made it possible to collect diverse data, analyze numerical and contextual information and combine qualitative and quantitative methods to enhance a comprehensive picture of such a complex phenomenon as financial inclusion interventions and agroecology innovation (Dawadi, Shrestha and Giri, 2021).

The study focused on agroecology farmer innovators and used structured online surveys to gather quantitative data both in-person and through Kobo Toolbox. This format made it easier to use statistical analysis to evaluate the scope and impact of financial inclusion interventions

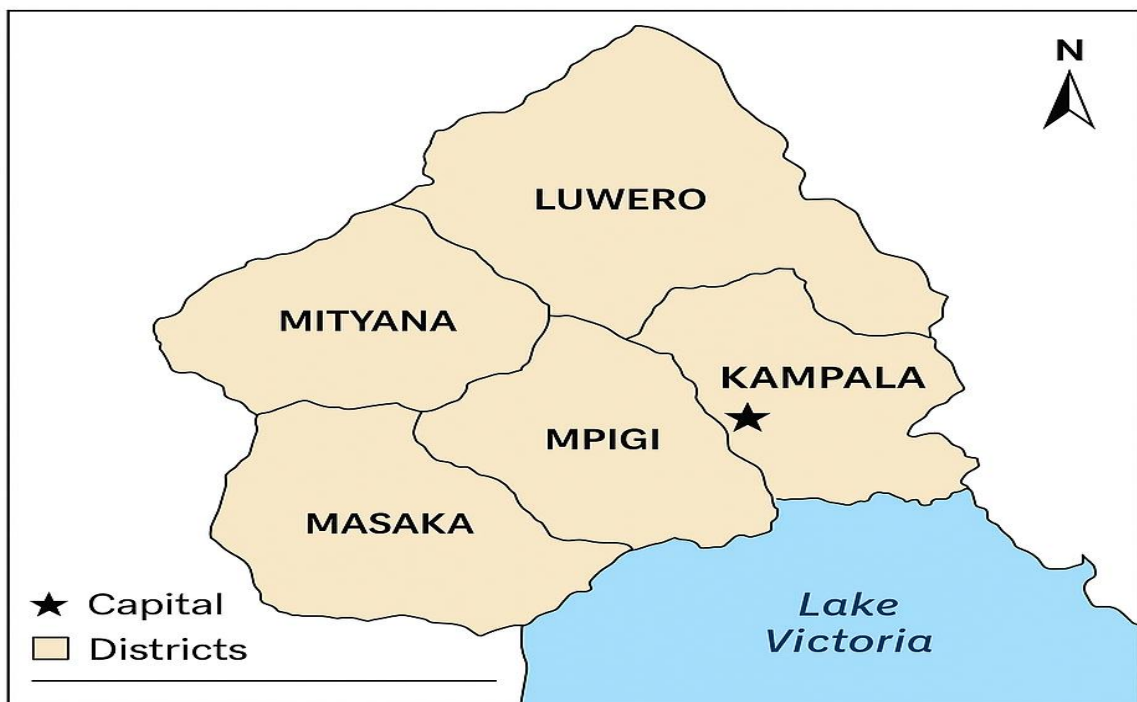
on the development of innovations. Open-ended questions in the same questionnaire that probed living experiences, perceptions, and difficulties were the source of the qualitative data.

By capturing both the quantifiable effects of financial interventions and the more profound, contextual elements affecting or limiting the implementation of innovation, the mixed method proved especially helpful in offering a more comprehensive understanding (Aarons *et al.*, 2012). This dual strategy complements the research's objective of comprehending the "what" and "why" of the connection between agroecological innovation and financial inclusion, making it ideal for the complex nature of the research objectives

### 3.2 Area of study

With a particular focus on districts like Kampala, Mpigi, Wakiso, Masaka, Mityana, and Luwero, the study was carried out in central Uganda. These districts were chosen because they are thriving agroecological innovation ecosystems where farmer innovators are working to create sustainable agriculture-promoting inputs, including seed treatments, bio-pesticides, and organic fertilizers. These innovators' geographic concentration made it possible to gather pertinent and focused data on the contribution of funding to the development of these ideas.

## STUDY AREA MAP: CENTRAL UGANDA



### Figure 3.2 Area of study Map

### 3.3 Sample size determination

The sample size of a study determines the reliability of the study results. The internal validity of a study, especially in terms of precision or power, depends largely on the sample size. The population of farmer innovators in central Uganda is known by Cochran (1977).

$$n = \frac{Z_{\alpha/2}^2 * p(1-p)}{d^2}$$

Where:

$n$  = Sample size estimate of study participants.

$Z_{\alpha/2}$  = Standard Z value at 95% confidence interval, corresponding to 1.96

$P = (p)$  is the estimated proportion of an attribute present in the population (often 0.5 is used for an unknown proportion, and it maximizes the sample size).

$d$  = the sampling error; 5%

$$n = \frac{1.96^2 * 2.05(1-0.5)}{0.05^2} = \mathbf{384}$$

Unknown population, [  $n_0 = (1.96)^2 * 0.5 * (1-0.5) / (0.05)^2$  gave 384. This total population size 384) was not very large and the study targeted a closed group, not the general public, hence adjusted to **192** sample size by using Cochran's Finite Population Correction formula (FPC);  $n_0 / [1 + \{(n_0 - 1) / N\}]$  where  $N$  was assumed to be 380.

### 3.4 Sampling technique

The method for the selection of individuals on which information is to be made has been described in the literature (Tongco, 2007). Some common sample designs described in the literature include purposive sampling, random sampling, and quota sampling (Campbell *et al.*, 2020). This study used a purposive sampling whereby the researcher purposively selected farmer innovators who engaged themselves in the production of organic farm inputs. The study chose such techniques due to the lack of database of farmer innovators in the study area. This sampling technique was integrated with snowballing in the way that some respondents were referred by their fellows engaged in the same activity.

### **3.5 Data Collection Procedure**

Data was collected in collaboration with local agricultural leaders, cooperatives, and networks to recruit participants due to the wide dispersion and inaccessibility of the target population. The study used Kobo Collect to collect data through semi-structured questionnaires.

### **3.6 Data collection tools and sources**

To comprehensively address the research objectives, the study employed a mixed-methods approach, integrating both quantitative and qualitative techniques to ensure a rich, contextual, and reliable analysis of financial inclusion and agroecological innovation.

#### **Quantitative Data Collection**

KoboToolbox and Semi-Structured Questionnaires were specific to Objectives 1 and 2. The study mainly used a semi-structured questionnaire administered through KoboToolbox, an open-source digital data collection platform. KoboToolbox was especially effective in reaching rural and hard-to-access areas with limited internet connectivity. Its use improved data accuracy, minimized manual entry errors, and protected the confidentiality and security of participant responses.

The questionnaire included both closed and open-ended questions, allowing for the collection of quantitative data on various indicators of financial inclusion. These covered access to credit and loans, financial literacy, savings and insurance products, mobile money platforms, and extension services. This enabled the statistical mapping of the availability, accessibility, affordability, and suitability of financial services, directly supporting Objective 1 and Objective 2. The questionnaire collected data on respondents' innovation practices and access to financial services. Statistical methods such as correlation analysis explored the relationships between access to financial services and innovation adoption, while tests like the Mann-Whitney U helped measure differences between groups.

#### **Qualitative Data Collection: Key Informant Interviews**

To address Objective 3, the study incorporated a qualitative component through Key Informant Interviews (KIIs). A Content analysis was conducted based on narratives from agroecology innovators.

These interviews were instrumental in uncovering personal experiences, motivations, challenges, and structural constraints, such as, bureaucratic bottlenecks, gender disparities in financial access, and sociocultural norms that shape innovation uptake. Respondents were encouraged to express their views in their own words, thereby enriching the data with deeper insights into the socio-economic and institutional factors affecting innovation.

### **3.7 Reliability of the Data Collection Instrument**

To secure the reliability and validity of the data collection tools, a two-step process was undertaken. First, a pilot test of the semi-structured questionnaire was conducted with a small group of agroecology innovators who shared similar characteristics with the target population but were excluded from the main study. The pilot aimed to assess clarity, consistency, and relevance of the items. Any ambiguous or low-performing items identified were revised or eliminated before full deployment.

For internal consistency reliability, the Cronbach's Alpha coefficient was computed for the key constructs relating to financial inclusion and innovation implementation. All values were above the commonly accepted threshold of 0.70 (Nunnally & Bernstein, 1994), indicating strong internal consistency of the instrument. This statistical validation confirmed that the questionnaire items coherently measured the intended variables, thereby ensuring reliability of the quantitative analysis.

For the qualitative tools, such as Key Informant Interview (KII) guide, content validity was addressed through expert review to ensure clarity and relevance of the questions. No statistical computation of the Content Validity Index (CVI) was conducted, as expert judgment and pilot testing were sufficient for validating the qualitative items.

### **3.8 Ethical consideration**

Strict ethical considerations were observed to protect the rights, health, and dignity of all study participants. All respondents provided informed consent prior to data collection. They were fully informed about the study's objectives, the voluntary nature of their participation, and their right to withdraw at any time without any reprisal. Consent forms were provided either electronically or in print, depending on the data collection method used.

Participant confidentiality and anonymity were strictly maintained. Personal identifiers such as names, phone numbers, and addresses were not collected in the final dataset. Data were

securely stored on password-protected devices and backed up in encrypted formats to prevent unauthorized access. All collected data were used solely for academic purposes in accordance with data protection regulations.

Approval to proceed with the study and data collection was obtained from the Faculty of Agriculture at Uganda Martyrs University. Special care was taken to ensure that participation did not cause psychological, economic, or social harm to respondents.

The study also respected cultural norms and local customs during field engagement, particularly when working with rural farmer innovators. Enumerators and field assistants were trained on ethical research conduct, including respectful interaction, confidentiality, and non-coercion.

### **3.9 Data analysis**

Quantitative data were analyzed using IBM SPSS Statistics version 27 due to its capacity to handle non-parametric statistical tests and manage missing data efficiently. Non-parametric statistical techniques were employed because of the nature of the data and the presence of non-random missing values resulting from skip logic in the questionnaire. Initially, system-missing codes were assigned to incomplete responses, and a select-case approach was used to ensure that only valid responses were included in the analysis, thereby avoiding bias from inappropriate imputations. Descriptive statistics such as frequencies, percentages, and cross-tabulations were used to summarize demographic information and key categorical variables. To compare differences between groups, specifically between farmer innovators who had access to financial services and those who did not, the Mann–Whitney U test was employed. This test, a non-parametric alternative to the independent samples t-test, is suitable for ordinal or continuous data that are not normally distributed. It enabled the study to determine whether there were statistically significant differences in the number, types, and certification of innovations developed between the two groups. The results were interpreted using mean ranks, sum of ranks, and p-values to assess the presence and significance of group differences.

In addition to significance testing, effect sizes were calculated and reported in the Results section to provide insight into the practical significance of observed differences. While potential issues with statistical power are acknowledged and addressed in the Limitations section, this analysis did not apply covariate control. This omission is acknowledged in the

Limitations and Future Research sections to highlight the need for adjusting for confounding variables in future studies to strengthen the validity of findings.

Content analysis was used to analyze qualitative data obtained from open-ended questions. This approach involved systematically coding the textual data to identify common patterns, categories, and recurring concepts that reflected the experiences, perceptions, and issues faced by farmer innovators in accessing financial services and applying agroecological innovation processes.

To guide the coding process, a clear coding frame was developed to ensure consistency and alignment with the study objectives. Multiple coders independently coded the data, and inter-coder reliability was assessed, showing good levels of consistency. **NVivo** software was employed to manage the data efficiently, assist in coding, and facilitate the organization of categories.

Through an iterative review of responses, emergent codes were grouped into broader conceptual categories. This rigorous content analysis enhanced the study by highlighting nuanced insights into barriers to financial inclusion, institutional support, and the lived experiences of agroecology innovators, thereby enriching and complementing the quantitative findings.

### **3.10 The study limitations**

A number of limitations were applied to the study. To begin with, the study only covered Central Uganda thus the generalizability of results in other parts of the country was hindered.

Second, the use of self-reported data could have resulted in the introduction of the response bias as well as the ability in the information provided. Third, structured, but not random, missingness was caused by missing data produced by skip logic, and this might affect the completeness of the data. Fourth, the cross-sectional design impedes the capability to make a causal hypothesis or determine how results may change due to time. Fifth, in spite of the fact that a post hoc power calculation was performed and is mentioned in the given section, the analysis was not controlled by covariates.

This omission underscores the need for future studies to adjust for confounding variables to strengthen the validity and robustness of findings. Finally, the study focused primarily on

financial inclusion, leaving other influencing factors such as policy, infrastructure, and training less explored.

## **CHAPTER FOUR**

### **STUDY FINDINGS**

#### **4.0 Introduction**

The primary findings of the study are analysed, presented, and interpreted in this chapter. The goal of the study was to evaluate how financial inclusion initiatives affected the development of innovations in agroecology. An examination of the demographic data gathered from the research area participants opens it. This chapter will cover the several goals listed in the first chapter in the order in which they are mentioned. Frequency tables, figures, and texts are used to present and analyse the data.

#### **4.1 Socio-demographic Characteristics of the Farmer Innovators**

The individual characteristics are as important in research as the variables included in a scientific investigation. Limited evidence suggests that the behaviour of variables is directly connected to the behaviour of the population or sample that generates the variable. In this regard, some demographic characteristics of the population are analysed to understand their inter-connectivity with the cross-sectional data used in this study.

Out of the 192 respondents, 104 (54.2%) were male and 88 (45.8%) were female. This relatively balanced gender distribution ensures inclusive representation, allowing both male and female voices to contribute to insights on agroecological innovation.

Most respondents were aged 30 and above, with 44.8% falling between 30–44 years and 36.5% between 45–59 years. Only 18.8% were aged 18–29. This shows that agroecological innovations are largely driven by mature individuals in their economically productive years.

The majority of farmer innovators (74.0%) were married, while 21.9% were single, 3.1% widowed, and 1.0% divorced. This suggests that most innovators operate within family structures, which may support innovation activities at the household level.

A significant portion of respondents (58.9%) held university degrees, 22.9% had secondary education, 17.2% completed primary education, and 1.0% had no formal education. This implies that formal education plays a key role in promoting innovation in agroecology.

Farming was the main occupation for 59.9% of respondents, while others were involved in small businesses, government work, teaching, social work, or were students. These highlights farming as the primary source of livelihood and innovation for most participants.

About 32.8% of respondents earned between 100,000–500,000 UGX, 26.0% earned below 100,000 UGX, 21.9% earned above 1,000,000 UGX, and 19.3% earned between 500,001–1,000,000 UGX. These figures reflect wide income disparities, with many still in low-income brackets.

**Table 4.1 Socio-Demographic characteristics**

	<b>Categories</b>	<b>Frequency</b>	<b>Percentage %</b>
<b>Gender</b>	Male	104	54.2
	Female	88	45.8
	<b>Total</b>	<b>192</b>	<b>100</b>
<b>Age</b>	18-29 years	36	18.8
	30-44 years	86	44.8
	45-59 years	70	36.5
	<b>Total</b>	<b>192</b>	<b>100</b>
<b>Marital Status</b>	Single	42	21.9
	Married	142	74
	Divorced	2	1
	Windowed	6	3.1
	<b>Total</b>	<b>192</b>	<b>100</b>
<b>Education level</b>	Primary	33	17.2
	Secondary	44	22.9
	Tertiary	113	58.9
	None	2	1
	<b>Total</b>	<b>192</b>	<b>100</b>
<b>Occupation</b>	Farmer	115	59.9
	Social worker	8	4.2
	Teacher	8	4.2
	Extension worker	6	3.1
	Student	7	3.6
	Business	29	15.1
	Agriculture officer	17	8.9
	Banker	2	1
	<b>Total</b>	<b>192</b>	<b>100</b>
<b>Monthly Income</b>	less than 100,000 UGX	50	26
	100,001 - 500,000 UGX	63	32.8

500,5001 -1,000,000		
UGX	37	19.3
I,000,000 UGX or more	42	21.9
<b>Total</b>	<b>192</b>	<b>100</b>

**Source: Primary data 2025**

## **4.2 Status of financial inclusion among farmer innovators in agroecology**

To determine the status of financial inclusion interventions among farmer innovators, descriptive statistics were conducted, and findings were presented in tables and figures.

### **4.2.1 Application for financial services**

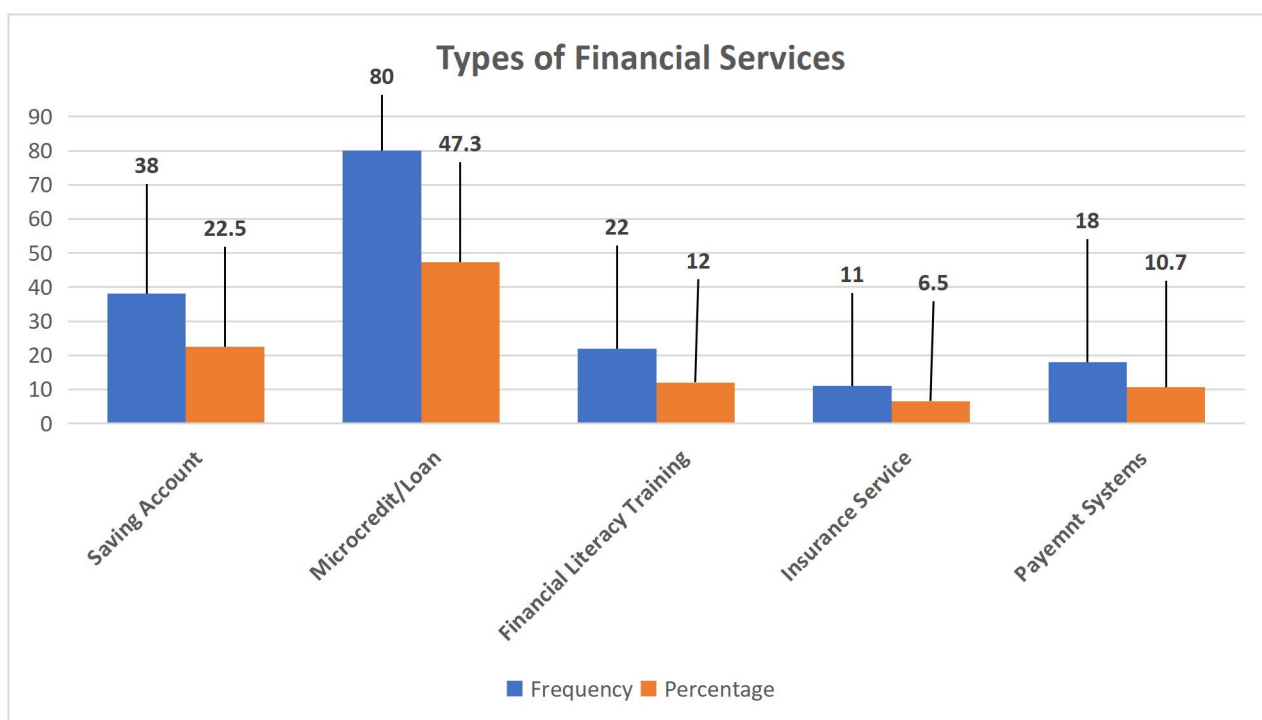
Table 4.2 shows the farmer innovators regarding the request for financial services. It has been reported that a significant majority, 169(88.0%) of farmer innovators out of 192, requested financial services to support the development of innovations. This indicates a stronger reliance on financial mechanisms to develop or scale innovations in farming practices. It also reflects a high demand and awareness of the importance of financial support among farmer innovators. Only 12% of respondents did not seek any financial services for their innovation activities. This small portion could deflect a group that is either safely funded or using informal support systems, for instance, family savings, lacking awareness of available financial services or discouraged by barriers such as a complex application process, lack of collateral or distrust in former financial institutions.

***Table 4.2 Applicants for Financial Inclusion Interventions***

<b>Responses</b>	<b>Frequency</b>	<b>Percentage %</b>
Yes	169	88
No	23	12
<b>Total</b>	<b>192</b>	<b>100</b>

### **4.2.2 Types of Financial Services Requested**

Figure 4.3 highlights the financial services most requested by farmer innovators to support innovation implementation.



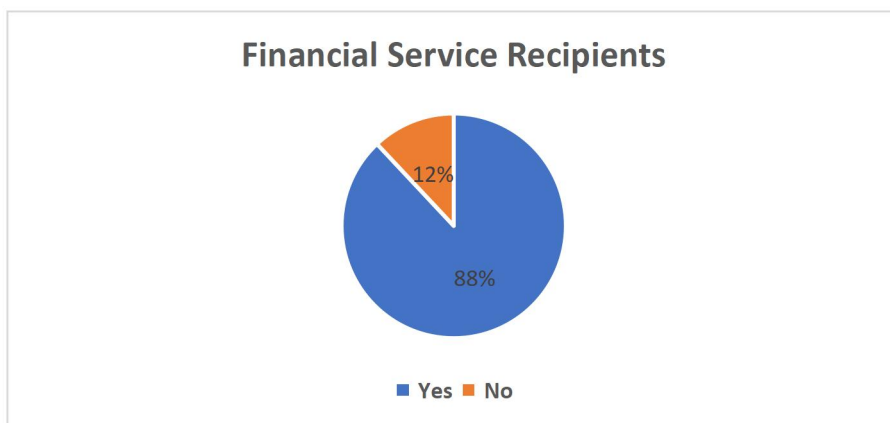
Source: Primary data 2025

Figure 4.3 Types of Financial Services

Micro-credit or loan services were the most sought after (47.3%), reflecting a strong need for capital to fund innovation activities. Savings accounts followed at 22.5%, suggesting a desire for financial stability and self-financing. Fewer respondents requested financial literacy training (13.0%), payment systems (10.7%), and insurance services (6.5%), indicating possible gaps in awareness, access, or perceived relevance of these services in supporting agroecological innovation.

#### 4.2.3 Recipients of financial services

The figure 4.4 below shows the farmer innovators who applied and accessed financial services.



**Source: Primary data 2025**

**Figure 4.4 Financial Services Recipients**

The beneficiary of financial services requested by farmer innovators is shown in figure 4.2. 21 farmer innovators (12.4%) who applied for financial services to promote the development of innovation out of 169, did not obtain the financial services, while 148 farmer innovators did receive the financial services(87.6%). This suggests that a generally positive financial climate in the agriculture industry is reflected in the fact that the majority of farmer innovators who requested financial services received them.

#### **4.2.4 Use of financial services requested**

Table 4.3 shows that the majority of respondents (37.2%) used financial services to increase capital, highlighting the importance of funding in scaling innovations. Another 29.7% used financial services for procuring resources, emphasizing the need for essential inputs. A smaller group (11.5%) preferred not to disclose their financial service usage, possibly due to privacy concerns. Additionally, 10.8% used the services for training, showing the value placed on skills development, while 6.8% used them for research activities. Only 4.1% used financial services for branding and packaging, indicating it is a lesser but still relevant priority for some innovators.

Several participants highlighted how access to capital enabled them to scale up their initiatives, while others underscored the importance of financing for procuring essential inputs such as seeds, tools, and fertilizers. Leader of farmer groups shared, *“With the loan I received, I was able to buy raw materials and conduct, which helped me test innovations.”* Training was also valued, with some respondents noting that financial support made it possible to attend capacity-building workshops. Although fewer innovators mentioned

branding and packaging, those who did recognized these as important steps toward accessing better markets.

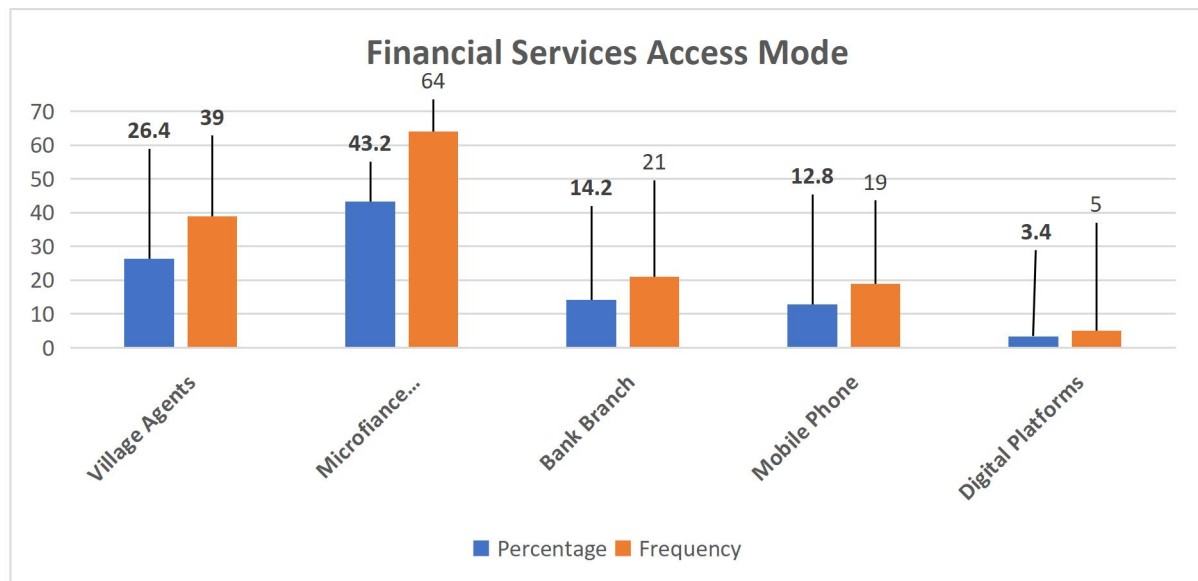
**Table 4.3 Use of financial services**

Responses	Frequency	Percentage
Procurement of Resources	44	29.7
Capital Increment	55	37.2
Not Comfortable Reviewing	17	11.5
Access to Training	16	10.8
Conducting Research	10	6.8
Branding and Packaging	6	4.1
<b>Total</b>	<b>148</b>	<b>100</b>

Source: Primary data 2025

#### 4.2.5 Financial services access mode

Figure 4.5 below illustrates the modes of access to financial services among farmer innovators



Source: Primary data 2025

**Figure 4. 5 Financial Services Access Mode**

As shown in Figure 4.5, the study found that most respondents (43.2%) accessed financial services through Microfinance institutions (MFIs), making them the primary source of financial support. This was followed by 26.4% who used village agents, highlighting the importance of community-based intermediaries. Traditional bank branches served 14.2% of

respondents, while 12.8% accessed services via mobile phones, reflecting growing mobile financial activity. Only 3.4% used digital platforms, suggesting that digital financial services remain limited in rural areas due to connectivity issues, low digital literacy, or trust concerns.

#### 4.2.6 Challenges faced while accessing financial services

The results of whether farmers encountered difficulties obtaining financial services are shown in Table 4.4. Of 148 farmer innovators who got financial services, 99 reported difficulties obtaining financial services, accounting for 66.9% of the total. However, 49 farmer innovators, or 33.1% of respondents, reported no obstacles. This suggests that the majority of respondents encountered difficulties while trying to obtain financial services, highlighting enduring obstacles that impede successful financial inclusion, especially for innovators putting agroecological innovations into practice.

Based on qualitative responses, many farmer innovators described significant challenges in accessing financial services, which aligns with the quantitative finding that 66.9% of respondents faced difficulties. Commonly cited obstacles included stringent collateral requirements, high interest rates, and complex application processes that were often discouraging or inaccessible for smallholder farmers. Representatives from Village Savings shared, *“Even when we know financial services exist, the conditions to qualify are so strict that most of us give up before applying.”* Others mentioned long distances to financial institutions and limited information about available products. These qualitative insights highlight persistent barriers that continue to restrict effective financial inclusion, especially for those seeking to develop agroecological innovations.

**Table 4.4 Challenges faced while accessing financial services**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	99	66.9
No	49	33.1
<b>Total</b>	<b>148</b>	<b>100</b>

**Source: Primary data 2025**

#### 4.2.7 Type of challenges faced while accessing the financial services

Table 4.5 outlines the key challenges farmer innovators faced when accessing financial services. The most common issue was product mismatch (18.2%), where available services did not meet innovation needs. Limited access points (15.2%) and long wait times (14.1%)

further hindered efficient access, while small loan sizes (14.1%) limited the ability to invest meaningfully. Other challenges included lack of collateral (13.2%), complex procedures (8.1%), inflexible repayment plans (5.1%), and lack of credit history (4.0%), highlighting various structural and procedural barriers to financial inclusion.

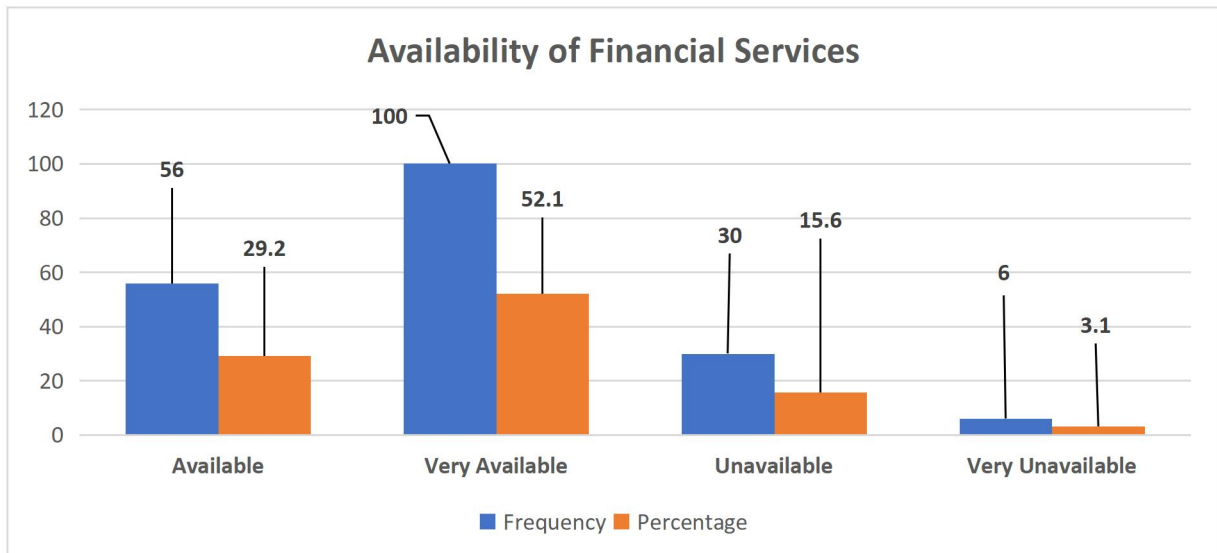
**Table 4.5 Types of challenges faced while accessing services.**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Long wait times	14	14.1
Small Loans	14	14.1
Complex Procedures	8	8.1
Unflexible Repayment Plan	5	5.1
Limited Security	13	13.1
Product Mismatch	18	18.2
Limited Branches	15	15.2
Credit History Insufficient	4	4
Inadequate Requirements	8	8.1
<b>Total</b>	<b>99</b>	<b>100</b>

**Source: Primary data 2025**

#### **4.2.8 Availability of financial services**

Figure 4.6 illustrates the reported availability of financial services among farmer innovators.



Source: Primary data 2025

**Figure 4.6 Availability of Financial Services**

Out of 192 responses, the majority (81.3%) reported that financial services in their area were either very available (52.1%) or available (29.2%), indicating a general positive perception of service availability, which may be attributed to the presence of microfinance institutions, mobile money agents, bank branches, and village agents. On the other hand, 18.7% of respondents indicated that financial services were either unavailable (15.6%) or very unavailable (3.1%) suggesting that a subset of the population still lacks adequate access, possibly due to remote location infrastructure gaps or exclusion from formal financial systems.

Based on qualitative feedback, many respondents expressed appreciation for the increased presence of financial services in their communities, which corresponds with the 81.3% reporting availability in the quantitative data. Participants frequently mentioned the convenience brought by mobile money agents and microfinance institutions that made accessing financial products easier. However, others highlighted persistent challenges, particularly those living in more remote or underserved areas. One respondent noted, *“Even though there are some agents nearby, for many of us in the farther villages, accessing these services means traveling long distances, which is costly and time-consuming.”* This underscores the quantitative finding that 18.7% of respondents still perceive financial services as inadequate or unavailable, pointing to infrastructural and systemic barriers that continue to limit full financial inclusion.

#### **4.2.9 Accessibility of financial inclusion interventions**

Respondents were asked to rate how accessible they found financial services in their locality, considering both physical location and eligibility requirements.

The table 4.6 below shows that 54.7% of the respondents perceived financial services as either accessible 31.3% or very accessible 23.4% indicating moderate to high accessibility for a significant portion of the population. However, 45.3% of the respondents reported that financial services were either difficult to access 39.6% or very difficult to access 5.7% suggesting that nearly half of the population continues to face challenges related to proximity and rural procedural requirements.

**Table 4. 6 Accessibility of financial inclusion interventions**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Difficult to access	76	39.6
Very Accessible	45	23.4
Accessible	60	31.3
Very Difficult to Access	11	5.7
<b>Total</b>	<b>192</b>	<b>100</b>

**Source: Primary data 2025**

#### **4.2.10 Affordability of financial inclusion interventions**

Respondents were asked to rate the affordability of financial services provided in their location. Out of 192 respondents, 67(34.9%) rated financial services as affordable, while 10(5.2%) found them very affordable. A total of 92 respondents indicated that financial services were not affordable, and 23 (12.0%) reported them as very unaffordable. Based on the results, nearly 60% (47.9% +12%) of respondents reported that financial services are either not affordable or very affordable. This indicates that a majority struggle with the cost of accessing and utilizing financial services in their area. Only 40.1% of respondents found financial services either affordable (34.9%) or very unaffordable (5.2%). These findings suggest that cost remains a key barrier to effective financial inclusion even when services are available.

Based on qualitative responses, many respondents highlighted the challenge of high costs associated with accessing financial services, which aligns with the quantitative finding that nearly 60% of respondents perceived these services as either not affordable or very unaffordable. Several farmers noted that fees, interest rates, and transaction costs often outweighed the benefits of accessing credit or savings products. Local agroecology

champions explained, “Even when the services are nearby, the charges and interest make it difficult to borrow or save without risking loss.”

**Table 4.7 Association Between Affordability and Sociodemographic Characteristics**

Variable	Category	Affordable (0)	Not Affordable (1)	$\chi^2$	p-value
<b>Gender</b>	Male	42 (40.4%)	62 (59.6%)	0.007	0.931
	Female	35 (39.8%)	53 (60.2%)		
<b>Education Level</b>	Primary	11 (33.3%)	22 (66.7%)	4.205	0.240
	Secondary	20 (45.5%)	24 (54.5%)		
	Tertiary	44 (38.9%)	69 (61.1%)		
	None	2 (100.0%)	0 (0.0%)		
<b>Monthly Household Income</b>	< 100,000 UGX	18 (36.0%)	32 (64.0%)	1.676	0.642
	100,001 – 500,000 UGX	23 (36.5%)	40 (63.5%)		
	500,001 – 1,000,000 UGX	17 (45.9%)	20 (54.1%)		
	1,000,000 UGX or more	19 (45.2%)	23 (54.8%)		

**Source: Primary data 2025**

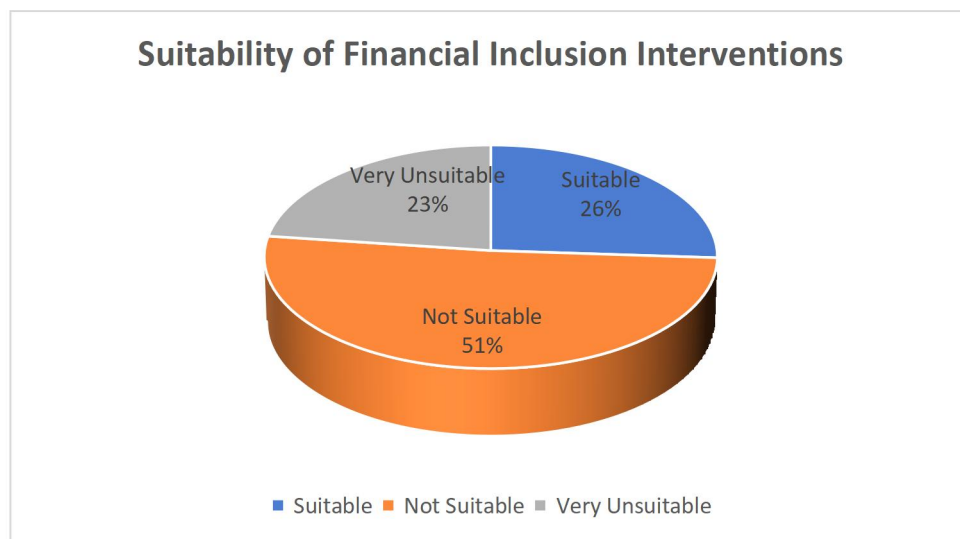
The study revealed that perceived affordability of financial services is a common challenge among farmer innovators, regardless of gender, education level, or monthly income.

The findings show that perception of affordability did not significantly differ by gender. Among male respondents, 40.4% perceived services as affordable compared to 39.8% of females ( $\chi^2 = 0.007$ ,  $p = 0.931$ ). Similarly, perception of affordability did not vary significantly by education level ( $\chi^2 = 4.205$ ,  $p = 0.240$ ), though respondents with no formal education all perceived financial services as affordable (100%). In terms of income, a higher percentage of respondents in the higher income groups (UGX 500,001 and above) viewed financial services as affordable (45.9% and 45.2%, respectively), compared to 36.0% in the lowest income group. However, these differences were not statistically significant ( $\chi^2 = 1.676$ ,  $p = 0.642$ ).

These results suggest that affordability barriers are widespread and not limited to any specific demographic group. Therefore, efforts to improve access to financial services should focus on systemic and inclusive solutions that address the broader affordability challenges faced by all farmer innovators.

#### 4.2.11 Suitability of financial inclusion interventions

The figure 4.7 below shows the suitability of financial inclusion interventions among farmer innovators.



Source: Primary data 2025

**Figure 4.7 Suitability of financial inclusion interventions**

The study found that only 26.0% of respondents felt the available financial services met their agroecological innovation needs. In contrast, 73.9% reported the services were either not suitable (51.0%) or very unsuitable (22.9%). This indicates a significant mismatch between financial service offerings and the specific requirements of farmer innovators, potentially hindering effective innovation implementation.

#### 4.2.11a Association between suitability and social demographic Characteristics

**Table 4. 8 Association Between Suitability and Sociodemographic Characteristics**

Variable	Category	Suitable (0)	Not Suitable (1)	$\chi^2$	p-value
<b>Gender</b>	Male	30 (28.8%)	74 (71.2%)	0.927	0.336
	Female	20 (22.7%)	68 (77.3%)		
<b>Education Level</b>	Primary	10 (30.3%)	23 (69.7%)	1.026	0.795
	Secondary	11 (25.0%)	33 (75.0%)		
	Tertiary	28 (24.8%)	85 (75.2%)		
	None	1 (50.0%)	1 (50.0%)		

<b>Monthly Household Income</b>	< 100,000 UGX	11 (22.0%)	39 (78.0%)	1.654	0.647
	100,001 – 500,000 UGX	16 (25.4%)	47 (74.6%)		
	500,001 – 1,000,000 UGX	9 (24.3%)	28 (75.7%)		
	1,000,000 UGX or more	14 (33.3%)	28 (66.7%)		

**Source: Primary data 2025**

The analysis examined the relationship between demographic factors, gender, education level, and monthly household income, and the perceived suitability of financial services. Among males, 28.8% found the services suitable compared to 22.7% of females; however, this difference was not statistically significant ( $p = 0.336$ ). Suitability varied slightly across education levels, with those having no formal education reporting the highest suitability at 50%, but this was based on a small sample. Differences among primary (30.3%), secondary (25.0%), and tertiary education levels were also not significant ( $p = 0.795$ ). Regarding income, the proportion finding services suitable ranged from 22% in the lowest income group (<100,000 UGX) to 33.3% in the highest ( $\geq 1,000,000$  UGX), yet the association was not statistically significant ( $p = 0.647$ ). These results suggest that perceptions of financial service suitability do not significantly differ across gender, education, or income groups, indicating a broadly consistent view on suitability among respondents.

### **4.3 Effect of financial inclusion interventions on the innovation development.**

#### **4.3.1 Number of innovations developed**

A Mann-Whitney U test was conducted to determine if there was a significant difference in the total number of innovations developed between farmer innovators who received financial services and those who did not. Although the mean rank was slightly higher for those who did not receive financial services (88.38) compared to those who did (84.52), the p-value was 0.650, well above the 0.05 threshold. This indicates that the observed difference is not statistically significant. Therefore, in this study, receiving financial services did not have a meaningful effect on the number of innovations developed.

To assess the magnitude of this difference, an effect size was calculated using the formula  $r = \frac{z}{\sqrt{N}}$  which yielded  $r = 0.035$ . This represents a very small effect, indicating a negligible practical difference between the two groups. Therefore, the findings suggest that receiving

financial services did not have a statistically or practically meaningful impact on the number of innovations developed by farmer innovators in this study.

**Table 4. 9** *Financial inclusion interventions on the number of innovations developed*

Did you receive the financial services you requested?	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Sig. (2-tailed)
Yes	148	84.52	12,509.00				
No	21	88.38	1,856.00				
<b>Total</b>	<b>169</b>			<b>1483</b>	<b>12,509.00</b>	<b>-0.454</b>	<b>0.65</b>

Source: Primary data 2025

#### 4.3.2 Types of innovation developed

A Mann–Whitney U test was conducted to assess whether there was a significant difference in the types of innovations developed between farmer innovators who received the financial services they requested and those who did not. Of the 169 who requested services, 148 received them, with a mean rank of 84.67 and a sum of ranks of 12,531.00. The 21 who did not receive services had a slightly higher mean rank of 87.33 and a sum of ranks of 1,834.00. While this suggests a minimal difference in innovation types between the two groups, the p-value of 0.814 exceeds the 0.05 significance threshold, indicating that the observed difference is not statistically significant.

To evaluate the practical significance of the result, an effect size was calculated using the formula  $r = \frac{z}{\sqrt{N}}$ , yielding a value of  $r=0.018$ . This represents a **very small effect size**, suggesting a negligible practical difference in the types of innovations developed between those who received financial services and those who did not.

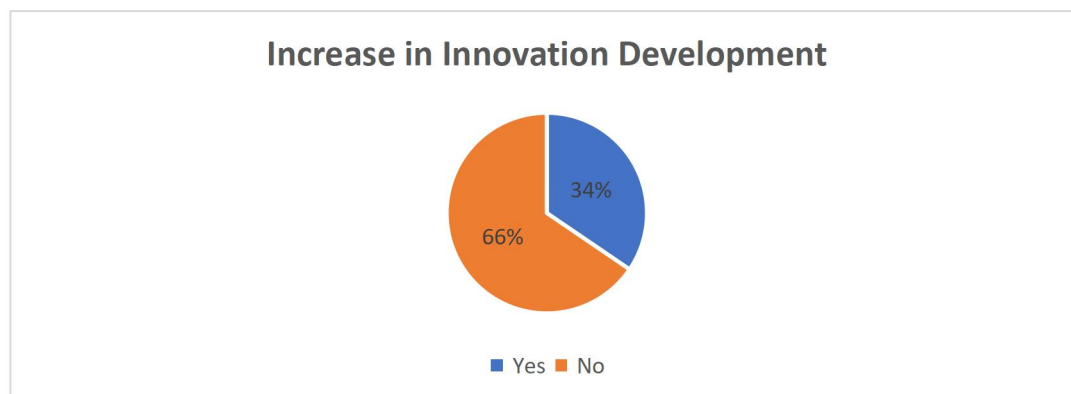
**Table 4. 10** *Ranks of financial inclusion interventions on innovation types*

Did you receive the financial services you requested?	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Sig. (2-tailed)
Yes	148	84.67	12,531.00				
No	21	87.33	1,834.00				
<b>Total</b>	<b>169</b>			<b>1505</b>	<b>12,531.00</b>	<b>-0.235</b>	<b>0.814</b>

Source: Primary data 2025

#### 4.3.3 Perceived increase in innovation development

Respondents who received financial services were asked whether these services led to improvements in the development or implementation of their innovations.



Source: Primary data 2025

**Figure 4.8 Percentage increase in innovation outcomes**

Based on the responses from 192 respondents, only 51 (26.6%) reported a positive effect, while the majority, 141 (73.4%), did not perceive any improvement. This indicates that nearly three-quarters of the recipients did not view financial services as directly supporting their innovation efforts. These findings suggest that current financial inclusion interventions may not be effectively tailored to the needs of agroecology innovators, limiting their effect on innovation development.

#### 4.3.4 Perceived percentage increase in innovation development

Among the 148 respondents, 51 (54.5%) reported that the financial services they accessed led to improvements in innovation development. These individuals estimated percentage increases ranging from 1% to 40%, with an average improvement of approximately 18.7% ( $\pm 10.9$  SD). This suggests a moderate positive impact of financial services on innovation for those who benefited. However, the wide range and high variation indicate that the effectiveness of financial services was not consistent and likely depended on factors such as the type of service received, additional support, and the nature or scale of the innovation.

**Table 4. 11 Preceived Pecentange Increase in Innovation Outcomes**

	N	Minimum	Maximum	Mean	Std. Deviation
Increase in percentage	51	1	40	18.71	10.895
Valid N (listwise)	51				

Source: Primary data 2025

#### 4.3.5 Innovation certification status

Table 4.12 presents the distribution of respondents based on the certification status of their innovations. Out of 192 respondents, only 36 (18.8%) reported having certified innovations, while the vast majority, 156 (81.3%), had not obtained certification. This notable gap highlights a critical challenge in formal validation, which may limit the scalability, legitimacy, and investment readiness of these agroecological innovations.

**Table 4. 12 certification of innovations**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	36	18.8
No	156	81.3
<b>Total</b>	<b>192</b>	<b>100</b>

**Source: Primary data 2025**

#### **4.3.6 Contribution of financial inclusion interventions to the certification of innovations**

To determine whether there is a statistically significant difference in innovation certification status between those who received financial services and those who did not, the Mann-Whitney U test was conducted to assess whether receiving financial services is associated with having certified innovations. The results show that those who did not receive financial services had a slightly higher average mean rank of 90.95 in certification status than those who did, with a mean rank of 84.16. However, the Z-score is -0.925 and the P value is 0.355, which is greater than the common significance level of 0.05. This indicates that the observed difference in innovation certification between the two groups is not statistically significant.

To assess the practical significance of this difference, an effect size was calculated using the formula  $r = \frac{z}{\sqrt{N}}$ ,  $r=0.071$ . This reflects a very small effect size, suggesting a negligible practical difference in innovation certification between the two groups. Therefore, the findings indicate that receiving financial services was not associated with a statistically or practically significant difference in the certification status of innovations.

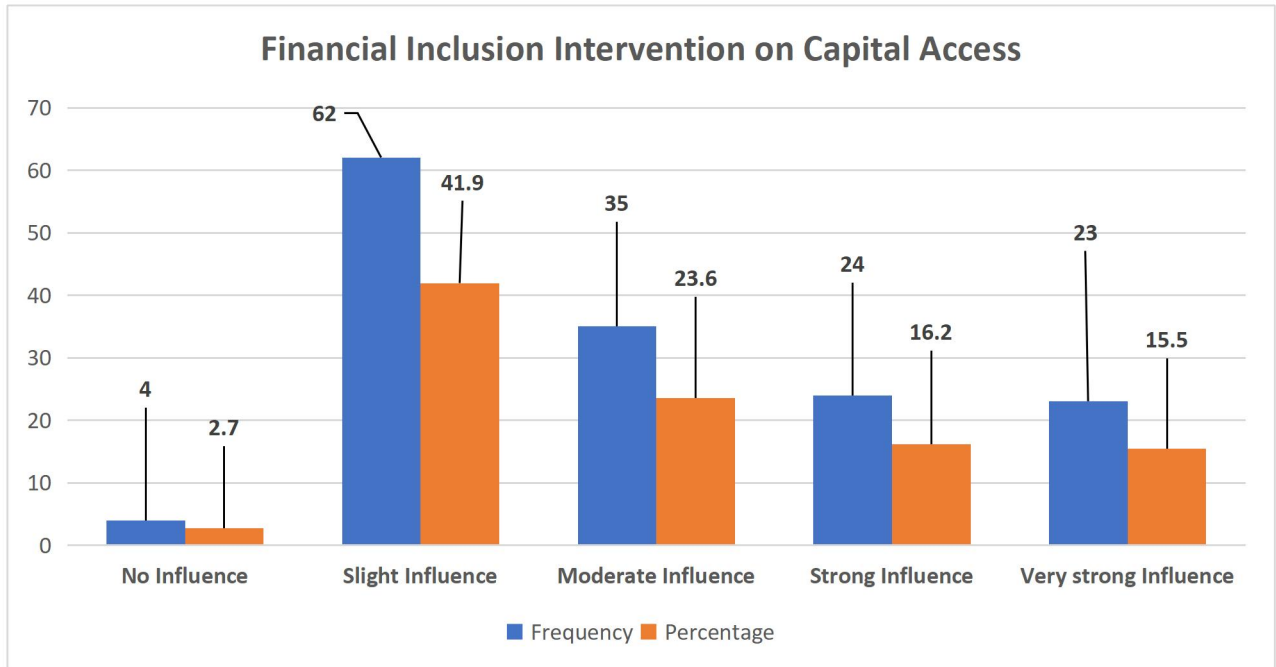
**Table 4.13 Ranks on innovation certification**

<b>Did you receive the financial services you requested?</b>	<b>N</b>	<b>Mean Rank</b>	<b>Sum of Ranks</b>	<b>Mann-Whitney U</b>	<b>Wilcoxon W</b>	<b>Z</b>	<b>Asymp. Sig. (2-tailed)</b>
Yes	148	84.16	12,455.00				
No	21	90.95	1,910.00				
<b>Total</b>	<b>169</b>			<b>1429</b>	<b>12,455.00</b>	<b>-0.925</b>	<b>0.355</b>

**Source: Primary data 2025**

### 4.3.7 Financial inclusion interventions contribution to Capital access

The figure below shows the respondents' perceptions of the contribution of financial inclusion interventions to capital access.



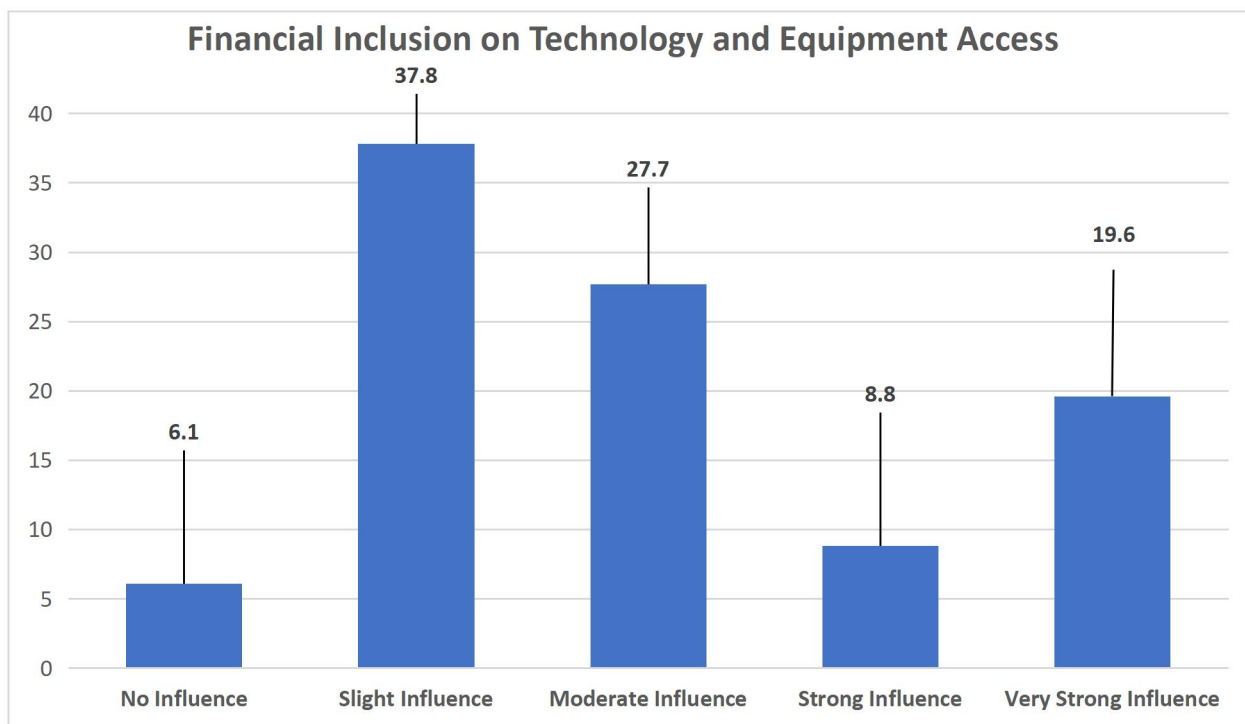
Source: Primary data 2025

*Figure 4.9 Financial inclusion intervention and capital access*

A total of 148 respondents provided their views on how financial inclusion interventions have influenced their access to capital needed for the development and implementation of innovations in agroecology. The results show that the majority of respondents 66% believe financial inclusion interventions have had at least a slight to moderate influence on improving their access to capital for innovation development. Only a small portion, 2.7% reported no influence at all. This indicates the meaning if the impact of financial inclusion interventions on capital accessibility needed for innovation activities.

### 4.3.8 Financial inclusion interventions on access to technology and equipment

The figure 4.10 below shows how respondents perceived the influence of financial inclusion interventions on their access to technology and equipment for innovation development.



**Source: Primary data 2025**

**Figure 4.10 Financial inclusion and access to technology and equipment**

Out of the 148 respondents, 65.5% (56 slight + 41 moderate) reported a slight to moderate influence, indicating a modest yet noticeable impact. An additional 28.4% (13 strong + 29 very strong) perceived a strong to very strong influence, suggesting that financial inclusion significantly enhanced access for some innovators. Only 6.1% (9 respondents) felt these interventions had no influence, highlighting that the majority experienced at least some positive effect from financial inclusion in supporting their innovation efforts.

#### **4.3.9 Effect of financial inclusion intervention on knowledge acquisition**

Out of 148 respondents who received financial services, the majority (70.2%) reported that financial inclusion interventions had a moderate to strong influence on their ability to acquire knowledge essential for innovation development. The most frequent response was moderate influence, while 26.3% reported a strong or very strong influence, indicating that financial access significantly enhanced learning and innovation capacity for some. Only 11.5% felt these interventions had no influence, suggesting that most respondents experienced at least some benefit in terms of knowledge acquisition.

Based on qualitative responses, many farmer innovators acknowledged that access to financial services played an enabling role in acquiring the knowledge needed for innovation. This aligns with the quantitative finding that 70.2% of respondents reported a moderate to strong influence of financial inclusion on their learning. For some, financial access allowed participation in training, purchase of educational materials, or learning by doing through experimentation. One respondent from green finance products stated, “*When I got a small loan, I could attend a training and acquire new skills; I learned more in one season than in years without support.*” This perspective highlights how financial inclusion can go beyond capital access, catalyzing capacity building and innovation development.

**Table 4.14** *Financial inclusion intervention on knowledge acquisition*

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
No Influence	17	11.5
Slight Influence	27	18.2
Moderate Influence	65	43.9
Strong Influence	23	15.5
Very Strong Influence	16	10.8
<b>Total</b>	<b>148</b>	<b>100</b>

**Source: Primary data 2025**

#### **4.3.10 perception of financial inclusion interventions on certification of innovations**

Out of 148 respondents, a majority (56.1%) reported that financial inclusion interventions did not influence the certification of their innovations, such as organic certification, ecological labeling, or official recognition. Only 23.7% indicated a moderate to strong influence, suggesting that financial services are not widely perceived as facilitating the certification process. These findings imply that most farmer innovators do not view financial access as a key driver for obtaining formal recognition or approval of their innovations.

**Table 4.15** *Financial inclusion interventions on the certification of innovations*

<b>Responses</b>	<b>Frequency</b>	<b>Percent</b>
No Influence	83	56.1
Slight Influence	30	20.3
Moderate Influence	13	8.8
Strong Influence	10	6.8
Very Strong Influence	12	8.1

<b>Total</b>	<b>148</b>	<b>100</b>
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**Source: Primary data 2025**

#### **4.3.11 Effectiveness of Financial Inclusion interventions in Supporting Innovation Development**

Respondents who received financial services were asked whether those services were appropriate for the development and implementation of their innovations. The findings reveal that a majority (77.7%) felt the financial services did not align with their innovation needs, while only 22.3% reported that the services were suitable and supportive. This highlights a significant disconnect between available financial inclusion offerings and the practical needs of farmer innovators in the agroecology context. The results suggest that current financial interventions may be too generic, short-term, or inflexible, lacking the tailored, long-term, and bundled support often required for innovation development.

***Table 4.16 Fitness of financial inclusion interventions***

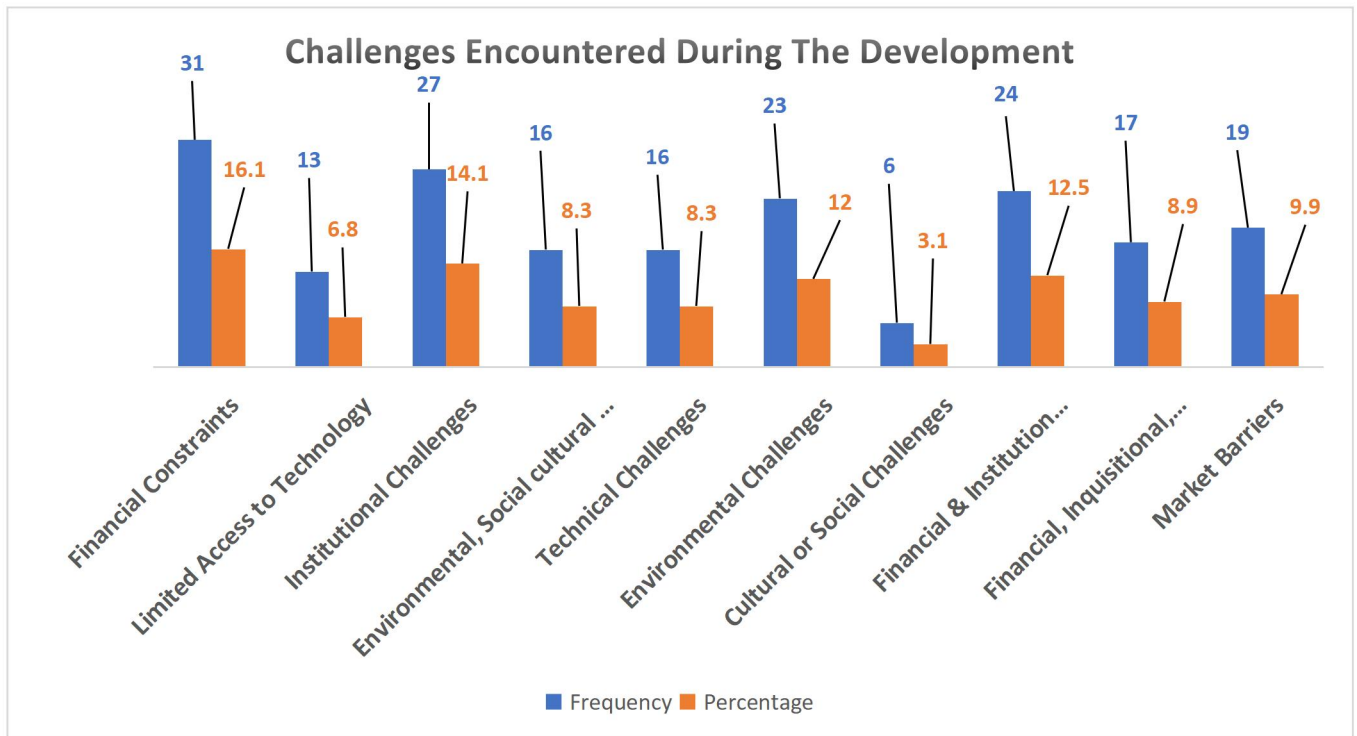
<b>Responses</b>	<b>Frequency</b>	<b>Percent</b>
Yes	33	22.3%
No	115	77.7%
<b>Total</b>	<b>148</b>	<b>100%</b>

**Source: Primary data 2025**

#### **4.4 Challenges in Developing Innovations**

##### **4.4.1 Challenges Encountered During the Development of Innovation.**

The figure below presents the challenges encountered in developing and implementing innovations in agroecology.



Source: Primary data 2025

Figure 4. 11 Challenges faced during innovation development

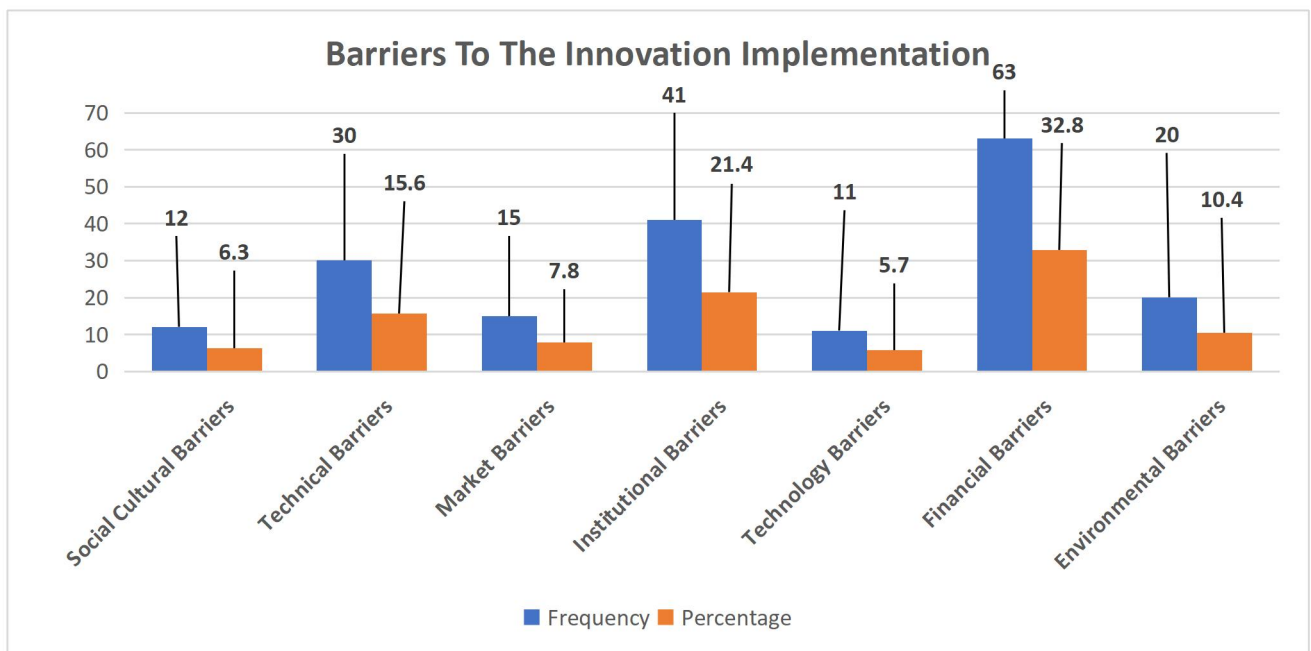
The most commonly reported challenge was financial constraints (16.1%), indicating that despite financial inclusion efforts, access to credit remains inadequate or misaligned with farmers’ needs. Institutional barriers (14.1%) and combined financial-institutional challenges (12.5%) point to systemic issues such as bureaucratic delays, limited extension services, or weak policy support. Environmental (12.0%) and technical challenges (8.3%), as well as their combinations (8.9%), reflect the impact of climate variability, knowledge gaps, and lack of appropriate agroecological tools. Market-related barriers (9.9%) and environmental-socio-cultural-market challenges (8.3%) suggest that limited market access, shifting consumer demand, and social norms also hinder innovation uptake. Fewer respondents (3.1%) reported purely social or cultural challenges, while 8.9% experienced multi-dimensional obstacles, highlighting the complex interplay between financial, institutional, and technical factors.

Based on qualitative responses, financial constraints were frequently cited as the most significant barrier to innovation, aligning with the quantitative finding that 16.1% of respondents identified finances as their primary challenge. Many innovators described difficulty accessing credit or financial products tailored to the needs of agroecological farming. One farmer shared, “Loans are made for businesses in town, not for those of us

testing organic products that take time to prove and scale” capturing the disconnect between available financial services and the realities of innovation on the ground. This perspective reinforces the quantitative data and highlights how systemic financial barriers continue to undermine innovation efforts despite ongoing financial inclusion initiatives.

#### 4.4.2 Significant Barriers to the Implementation of Innovation

Respondents were asked to identify the most significant challenges in developing and implementing innovations.



Source: Primary data 2025

Figure 4.12 Significant barriers to the innovation development

The financial barrier emerged as the most cited, accounting for 32.8% of total responses. This highlights persistent issues such as limited access to capital, high input costs, and lack of financial incentives as major obstacles for farmer innovators. Institutional barriers followed at 21.4%, reflecting difficulties with governance, policy support, and bureaucratic inefficiencies. Technical (15.6%) and environmental (10.4%) barriers were also noted as significant, pointing to gaps in knowledge, skills, and the effects of climate-related constraints. In contrast, social/cultural and technological barriers were among the least mentioned, suggesting these are either less critical or have been partly addressed in the areas studied.

#### 4.4.3 The extent of challenges and impediments to the development of innovations

The majority of respondents (91.7%) reported that their ability to develop innovations in agroecology was moderately to strongly impeded by various challenges. Specifically, 49.5% stated they were moderately impeded, indicating that innovation was possible but significantly slowed or hindered. An additional 42.2% felt strongly impeded, pointing to major barriers that severely limited their innovation efforts. Only 1.6% reported no impediment, clearly highlighting that innovation development in agroecology faces widespread obstacles in this study context.

Based on qualitative responses, farmer innovators expressed a deep sense of frustration and constraint regarding their ability to develop agroecological innovations. While many had the motivation and ideas, they lacked the necessary resources and support systems to move forward. One respondent emotionally captured this sentiment, stating: *“We have the ideas and the willingness, but without money, training, and support from leaders, we are stuck. Innovation is like planting seeds in dry land; nothing grows unless the conditions are right.”*

**Table 4.17 Extent of challenges and impediments to the innovation development**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Moderately Impeded	95	49.5
Slightly Impeded	13	6.8
Strongly Impeded	81	42.2
Not Impeded at All	3	1.6
<b>Total</b>	<b>192</b>	<b>100</b>

**Source: Primary data 2025**

#### **4.4.4 Effect of Challenges on the Overall Success of Innovation Development**

The findings reveal that 98% of respondents experienced a negative effect on the success of their innovation projects due to various challenges. A majority (62.5%) reported that these challenges moderately reduced their project success, while 35.4% indicated a significant reduction. Only 1% experienced improved success, and another 1% noted no effect, suggesting that successfully overcoming barriers is rare among the sampled farmer innovators.

**Table 4.18 Overall, Success effect on innovation development**

<b>Responses</b>	<b>Frequency</b>	<b>Percentage%</b>
Moderately Reduced Success	120	62.5
Significantly Reduced Success	68	35.4
Improved success	2	1

No effect	2	1
<b>Total</b>	<b>192</b>	<b>100</b>

**Source: Primary data 2025**

#### **4.5 Emerging Themes on the Support Needs for Innovation Development in Agroecology.**

In addition to main findings of the study objectives, participants were given an open-ended option to suggest interventions what they believe are critical for improving innovation development. The responses highlighted financial, institutional, capacity, and market-related needs. These insights are presented in detail under the Recommendations section.

The respondents identified several key interventions needed to support the development and implementation of agroecological innovations. Financial-related interventions including tailored products, better access, and proximity accounted for over 30% of responses, highlighting the need for innovation-friendly financial tools. Training, exposure, and demonstrations were also emphasized (16.1%), showing the importance of practical knowledge and capacity building. Policy reform (13.5%) and government support (11.5%) were cited as necessary to create an enabling environment. On the demand side, consumer awareness (8.9%) and market opportunities (4.7%) were noted, indicating that implementation depends on buyers valuing organic produce. Other needs included simplified certification (7.3%), and to a lesser extent, organic animal health innovation and youth empowerment (3.1% each). Overall, the responses reveal a strong demand for financial, institutional, technical, and market-based support.

***Table 4.19 Emerged themes to support innovation Development***

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Simplified & Subsidized Organic Certification	14	7.3
Increase Market Opportunities for Agroecology Products	9	4.7
Policy Reforms (organic support, price stability)	26	13.5
Government Support (Grants and Funding)	22	11.5
Enhancing Farmer Capacity (training, demos, exposure)	31	16.1
Access to Financial Services (affordable, flexible)	23	12
Consumer Awareness of Organic Products	17	8.9
Proximity of Financial Services to Farmer Innovators	5	2.6
Design Financial Products /Services to Support Agroecology	33	17.2
Organic Animal Health Innovation Advocacy	6	3.1
Youth Empowerment in Innovation	6	3.1
<b>Total</b>	<b>192</b>	<b>100</b>

**Source: Primary data 2025.**

Qualitative insights from open-ended responses reinforced the identified themes by providing deeper context to the statistical findings. Many farmer innovators expressed frustration with the inaccessibility of financial services, emphasizing the need for loan products tailored to the unique cycles and risks of agroecological farming. Respondents frequently mentioned the absence of financial institutions in rural areas, noting that long travel distances and rigid collateral requirements discouraged them from applying for loans. Other people emphasized that even in case of financial products being offered, they simply were not fit to develop innovation, as one of the participants put it, "*We require elastic loans that suit innovation needs and ones designed solely for agroecology.*"

Regarding training and capacity building, innovators indicated that they wanted to learn skills that are practical, including field demonstrations and peer-to-peer exchange visits. One Farmer innovator practicing agroecology stated, *when we have an opportunity to view what other farmers are doing and take it on board to do, we would learn quicker.* They also demanded policies and institutional support, with some innovators asking to reduce cumbersome certification procedures and supportive government systems that do as well as acknowledge and facilitate agroecological ways of doing things.

On the market side, the stakeholders expressed worries on the level of consumer awareness and lack of access to the reliable buyers. According to one of the farmers, they produce organically but the market fails to realize the worth. They won't want to pay extra. Others also have proposed that access to value chains can be improved through marketing cooperatives or branding assistance.

## CHAPTER FIVE

### DISCUSSION OF THE FINDINGS, CONCLUSION, AND RECOMMENDATIONS

#### 5.0 Introduction

The present chapter constructs the critical discussion of the core findings of the study, aimed at evaluating the effects of financial inclusion interventions on the development of the agroecological innovations in central Uganda. This analysis is embedded on the four major aspects of financial inclusion namely availability, accessibility, affordability and appropriateness whose focus is the way financial services influence innovation amongst farmer innovators. Besides evaluating the financial inclusion condition, the research examined the actual impact that these services had on the innovation development, major barriers encountered by beneficiaries and the ones encountered by non-beneficiaries, and analyzed findings of open-ended questions, the forms of support, appreciated by clients, preferred by the clients, and the propositions they thought should be performed in future interventions. This methodology establishes an overview of the way financial mechanisms relate to the system of innovation within the rural agricultural environment.

Five important theories are used to enhance the discussion on the findings of the study so as to understand them better; these are, inclusive finance theory, financial access theory, adoption constraints theory, resource dependence theory and the diffusion of innovation theory. According to the Inclusive Finance Theory, financial services alone will not do, but must be affordable, convenient and must suit the poor people or the rural populace. This goes some way to explain why even among the study, most of the farmers were struggling despite the fact that there was a offer of financial services. The services did not fit into the long duration that it takes to come up with the innovations.

With the Financial Access Theory, the potential benefits to having access to a credit, savings or insurance services is that the people can invest in their new ideas, as long as the services are adequate to their actual needs. In this study, loans were short-term and rigid, making them unhelpful for innovation. Adoption Constraints Theory shows that many connected barriers, like lack of money, poor government support, or limited information, can stop farmers from using new methods. Resource Dependence Theory explains that small farmers depend a lot on outside support like money, tools, and knowledge. When that support is missing or not well-designed, they struggle to improve or expand their innovations. Lastly, Diffusion of

Innovation Theory helps us understand how new ideas spread. It says that people need time, support, and good conditions to try new things.

### **5.1 Status of financial inclusion interventions**

The study revealed that a substantial majority of farmer innovators (88%) actively sought financial services to support the development and implementation of their agroecological innovations, underscoring the critical role of financial inclusion as a facilitator of agroecology innovation. Such intense demand strike fairly close to Financial Access Theory that postulates that access to a wide portfolio of financial products (credit, savings, insurance and financial literacy) enables individuals and communities to invest in productive ventures so as to embrace innovation and promote economic growth (Ozili, 2018). As can be seen (47.3%), micro credits top the list of farmers requests followed by savings (22.5%), the practical application of this theory is due to the fact that access to micro credit allows innovators to purchase inputs, fund research and training and use of new agroecological practices.

Nevertheless, the study also reveals certain recurring obstacles as those reflected in the previous research which include the inability to provide documentation, solvency, distrust, and perceived uselessness of formal financial services. Such difficulties somewhat restrict the extent of the benefits that can be enjoyed with Financial Access Theory indicating that access is not the whole deal as far as the inclusivity of many is concerned (Dupas *et al.*, 2018).

In this respect, the results can be strongly aligned with such theory as Inclusive Finance Theory (Stella, 2018), which underlines that, in addition to the accessibility, the financial services should be affordable, usable, and meet the particular needs of the marginalized groups in order to become really successful. The study identified that, even though there is an improvement in the availability and access to financial services generally achieved due to the micro finance institutions (43.2) and village agents (26.4), there still exist wide gaps in the sphere of affordability, suitability and easy access. As an example, 66.9 percent of beneficiaries complained about hindrances such as product inappropriateness (18.2 percent), restricted points of access, small ticket loans, and stringent collateral. The mismatch of this is especially foremost among agroecological innovators with their fluctuating cash flows and increased risk profiles, which the normal farm producer financial products respond to poorly (Fiore *et al.*, 2024).

The fact that low demand for insurance and the digital payment platforms is another instance that the financial innovations have not fully caught up with the capacities and realities of rural farmers is in keeping with the Inclusive Finance Theory idea of usability and appropriateness. Expenses were one of the most important factors, with close to 60 percent seeing services as lacking affordability, the most crucial barrier in the context of poor innovators and in line with the available literature in financial inclusion (Akanbi, 2020).

On the other hand, low demand was registered in financial services, constituting the insurance and digital payment services which could be linked to the fact that there is low digital infrastructure and low awareness towards these products among rural farmers. To this effect, observes, the mismatch between the services and farmer capacity or familiarity often becomes the obstacle to adoption of digital financial services (Tetteh, 2022). Nonetheless, the current findings suggest the existence of an overall favorable financial environment as most of the applicants (87.6 percent) were able to access financial services. However, the number of innovators who received no requested services when requested indicates the existence of either unobservable or structural obstacles, including poor documentation or bad credit history, none of which is minor according to African Development Bank (2024) as key impediments to successful financial inclusion.

In terms of financial services being obtained, most farmers indicated that they used the monies to introduce new capital (37.2), acquiring the much-needed resources (29.7), conducting research, training provision and branding and packaging. A minimal percentage (11.5) did not prefer to reveal how they use their financial benefits, and probably, it is connected with the concept of privacy- a concept that is mentioned in the (Penone, Giampietri and Trestini, 2024) and states that farmers might be hidden by the aspect of opportunity and personal motives of money withholding. These findings were supported by qualitative responses using the words of one innovator when he said, when I got the loan, I was able to enlarge my activities and purchase such products as the plastic drums, mixers, storage containers and labels and packaging materials. This is consistent with the (Ashwin *et al.*, 2010), which emphasizes the rising importance of decentralized financial intermediaries, including mobile platforms and local agents, in expanding access for rural populations.

Despite these positive trends, many recipients (66.9%) faced significant difficulties accessing financial services. The foremost challenge was product mismatch (18.2%), where existing financial products were not tailored to the unique requirements of agroecological innovations.

RVO (2024) supports this, noting that most agricultural finance products remain designed for conventional farming, overlooking the specific financial cycles and risk profiles of innovation-driven farmers. Other notable barriers included limited access points (15.2%), long wait times (14.1%), and small loan sizes (14.1%), which constrained meaningful investment. Additional issues such as stringent collateral demands, inflexible repayment plans, and complex application procedures were less frequently mentioned but still posed considerable obstacles particularly for low-income and first-time borrowers. MIT D-Lab (2021) argues that rigid lending criteria disproportionately exclude marginalized farmers, limiting the reach of formal financial services.

Lastly, in evaluating the core aspects of financial inclusion, namely availability, accessibility, affordability, and suitability, the majority of the respondents provided positive ratings on the availability aspect especially because of the existence of MFIs, mobile money agents as well as village representatives. This compares with the findings of (Akanbi, 2020) that more than 86 percent of smallholder farmers believed that financial services were easily accessible and with the National Financial Inclusion Strategy 2023-2028 (Bank of Uganda, 2023) which recognizes an increase in the spread of services although the gaps prevail in the underserved areas.

The extent of accessibility exhibited mixed findings, in that 54.7 percent of them had perceived services to be accessible or very accessible, but almost fifty percent (45.3) said they could not access the services due to distance and tedious procedures involved. Akanbi (2020) also mentioned that financial cooperatives are actually used widely, still, there are significant barriers to access of these cooperatives to some farmers. These results are supported by the fact that the Bank of Uganda (2023) notes the persistence of such adversaries as strict service conditions and the low levels of awareness on a regular basis.

Cost came out as one of the key barriers where almost 60 percent of farmer innovators said that financial services are unaffordable or very unaffordable. This is confirmed by the Financial Inclusion Strategy (2023) which singles out high service fees and interest rates as common barriers and particularly to the low-income and rural farmers. The results discovered by (Akanbi, 2020) were opposite of all because a lot of farmers thought that services were affordable, which implies that the perception of affordability can differ based on region and definite features of a service.

The least score was collected under suitability of financial services, where 74 percent of the people responded that the available financial products did not suit their particular innovation needs. This agrees with the Agricultural Finance Yearbook that noted that the majority of the available products are aligned to conventional agriculture and not the dynamic needs of innovators in agriculture (Hernández, 2017). This discrepancy is supported by the qualitative answers, as innovators demanded financial products that could allow the unusual flows of income and additional risks triggered by the agroecological practices.

To conclude, the evidence and qualitative responses are quite clear that although financial inclusion efforts have achieved significant gains in terms of accessibility and availability issues, there are still major chinks regarding affordable and accessible financial products, and much more on the matter of the suitability of the financial product. Management of these challenges will play a critical role in boosting the effects of the financial services on the adoption of agroecological innovation.

## **5.2 Effect of financial inclusion interventions on the development of innovation**

In this section, the researcher looks into whether financial inclusion interventions made a statistically significant contribution to the development of innovation by farmer innovators. Results from the Mann-Whitney U test revealed no significant differences in the number ( $p = 0.650$ ), types ( $p = 0.814$ ), or certification status ( $p = 0.355$ ) of innovations between farmers who received financial services and those who did not. The negligible effect sizes  $r = 0.035$ ,  $r = 0.071$ , and  $r = 0.018$ ) further underscore that financial services had no meaningful practical effect on innovation generation within the study context (Shiwani *et al.*, 2021). These findings challenge the widely held assumption that access to financial services, particularly credit, automatically stimulates innovation.

This lack of significant impact can be better understood through the lens of financial inclusion and innovation theories. Financial Access Theory (Błach, 2020) posits that access to credit, savings, insurance, and other financial services empowers individuals to invest in productive and innovative ventures. This theory, however, presupposes that such services are suitable and accommodating to the context of the user. In this research, though financial products were accessible, most of the farmer innovators believed that these were inappropriate to the type and the schedule of innovation. According to one farmer, *"I took out a loan, but I was supposed to pay it back within three months. Innovation is not made that*

way. *You have to make time to experiment and conform.*” This disconnect in financial products design and innovation lifecycle creates an indication that access does not really create an impact at desired levels, which the Financial Access Theory suggests, since it lacks appropriateness.

The Inclusion Finance Theory (Demirguc-Kunt, Klapper and Singer, 2017) further elaborates this in such a way that financial inclusion must not only be understood in the context of accessibility, but also by focusing on affordability of the financial services, its usability, and its suitability to low-income and underserved marginal groups. The research showed that the financial services were built with a short-term view of business or trade, not long-term iterative process of innovation. Such a design shortcoming worked against the pragmatics of the financial services in innovation that lies very much at the heart of the Inclusive Finance Theory: which is that untailed financial services are unlikely to bring forth an inclusive or sustainable developmental effect.

The results are also aligned with Diffusion of Innovation Theory (Rogers, 1983) that underlines the significance of certain factors namely trialability, compatibility, and observability in purposeful utilization of new ideas.

Theoretically, financial inclusion would further trialability, as it allows farmers to test, improvise and innovate on the new ideas. Nonetheless, this process in this study was hindered by the strict conditions of repayment and no financial flexibility as shown in this study thus reducing the chances of innovation adoption and diffusion.

Moreover, Resource Dependence Theory (Davis and Cobb, 2008) points at the fact that to succeed with their innovations, innovators frequently use the resources, which exist outside the firm, financial, technical and institutional. In this regard, through farmer innovators did not get the conducive financial aspects that would enable them to develop their innovation or even get certified. This external resource mismatch constrained their capacity to bring innovations to maturity or market.

In terms of certification, only 18.8% of respondents had certified their innovations, and no significant association was found between certification status and receipt of financial services. Many innovators reported using financial services primarily to purchase inputs, not to support administrative processes like certification. One Leader of farmer groups stated, *“I used the money to buy inputs, not to go to Kampala for certification paperwork or pay fees I didn’t*

*understand.*” These responses reflect a limited perception of financial services as enablers of formal recognition or market readiness. According to the Adoption Constraints Theory (Ruzzante, Labarta and Bilton, 2021), such institutional, informational, and financial barriers often prevent the effective uptake of innovations especially among smallholder farmers.

This is consistent with findings from the International Fertilizer Development Center (IFDC 2024) BRIGHT project by (Stamatopoulos, 2024), which highlighted that existing financial products in Uganda are rarely designed to support the specific needs of smallholder farmers in agroecology. Additionally, regional studies such as (Marus *et al.*, 2021a) found a weak and negative correlation between financial inclusion and agricultural commercialization in Buganda ( $r = -0.340$ ;  $p = 0.003$ ), reinforcing the notion that financial access alone does not guarantee positive innovation or commercialization outcomes.

Although the effect on output indicators was minimal, financial inclusion interventions showed a more positive influence on enabling conditions for innovation. Specifically, 66% of respondents reported slight to moderate improvements in capital access. While this did not always lead to direct innovation, it helped farmers overcome key resource gaps. One respondent explained, *“I used the loan to boost my skills for developing innovations, something which I achieved just within a few months”*. These experiences echo reports on Agri Connect, where digital loans helped smallholders invest in critical resources and inputs necessary for innovation readiness (Gill *et al.*, 2025).

Likewise, 65.5% of farmers reported improved access to technology and equipment through financial inclusion. For some, this meant acquiring solar dryers, improved tools, or better seeds. *“With the money I got, I bought a compost mixer and storage drums. That’s not new, but now I can produce more and maintain quality,”* one farmer innovator practicing agroecology responded. While such investments may not count as entirely innovative, they demonstrate how financial services can indirectly support innovation by enhancing production capacity and efficiency.

A particularly strong area of impact was knowledge acquisition. About 70.2% of farmers reported that financial services enabled them to gain essential knowledge through training, experimentation, or informal learning. One farmer stated, *“When I got the loan, I joined a cooperative’s training. That’s where I learned about using compost tea, which changed how I manage pests organically.”* This aligns with (Rogers, 1983) diffusion of innovation theory,

which emphasizes that learning is a foundational component of innovation. These learning indicate that financial inclusion is significant in supporting learning-by-doing, though the effects on the ultimate outcomes of innovation are not high.

Even with such enabling effects, 77.7 percent of the farmers observed that the financial services that they utilized were inappropriate to the development of innovation. The most common ones were short payback terms, inflexibility, and the non-availability of bundled services like extension services or technical assistance. This distance found one of its expressions in the words of one lead farmer participant: "*These loans are not to innovate but to trade. I want to find something that I can mature in, not something that will make me rip too soon.*" This indicates a disjuncture in the structure of financial products with complex and long-term procedures of agroecological innovation. In line with (King, 2013) Financial inclusion should not only focus on access, but it should be affordable, respectful, and tailored towards the particular demands of the consumers.

Even among the 51 respondents who answered positively to the group of questions based on a positive effect of financial services on innovation, experience was wide ranging. The mean reported growth in innovation development was 18.7% with a large standard deviation (10.9), thus presenting the lack of consistency of individual cases. This variation may be explained by contextual factors, including the nature of service being provided, age of the innovation and presence of complementary support service cooperatives or extension services.

Such observations echo with the arguments provided by (Prat-Benhamou *et al.*, 2024) because they claim that an adequate agricultural innovation system lists more than credit, i.e., what they need is the advisory services, peer learning, and market linkages. Innovation is a complex phenomenon, and financial inclusion should become one of the elements of a wider and friendlier ecosystem that would support all the phases of the innovation process.

### **5.3 key challenges to innovation development in agroecology**

As noted in this section, in spite of the fact that the initiatives aimed at financial inclusion have been available in the research setting, the implementation of multidimensional barriers still adversely affects the development and implementation of innovations in the field of agroecology. Financial problems became the most urgent issue, as 32.8% of the respondents stated it as the most significant limitation, and 16.1% were mentioned in the innovation development.

This is a strong pointer that mere availability of financial services does not amount to substantial promotion of innovations. This can be compared with the results of (Marus *et al.*, 2021a) who observe that usually the benefits of formal credit system in encouraging innovation are hampered by high interest rates, short repayment periods, and low loan amounts. This is supported by qualitative stories of the innovators, who were asked about how loans are present as one of the respondents said: "*Loans are given to town businesses, not farmers who take months to harvest.*"

This lack of connection of financial product with the reality of farmers reaffirms the assessment of Batra that regards financial inclusion strategies as a quantitatively strong but qualitatively poor strategy. In theoretical terms, the findings are fully consistent with Inclusive Finance Theory (Demirgüç-Kunt *et al.*, 2013) which builds upon the traditional working models of financial access by suggesting the significance of financial product appropriateness, usability, affordability, and congruence with specific contexts (environment). Availability of financial services is not enough although it is important except that the services are not structured in a way that they can cater to the needs of the rural fellow agroecological innovators. With no grace periods, season-linked repayment arrangements or collateral light lending schemes the instruments that are available to farmers are of little use or relevance in the development of innovation. Respondents frequently voiced feelings of frustration, stagnation, and disempowerment, underscoring the human dimension of systemic exclusion.

The emerging themes from the study's final section reinforce the need for targeted, multi-level interventions. Financial tools must be flexible, affordable, and co-designed with farmer innovators to match their innovation timelines. Capacity building efforts should focus on experiential learning, peer-to-peer exchange, and localized knowledge generation. Institutional reforms are necessary to simplify innovation certification processes, strengthen extension services, and establish predictable, supportive policy environments. Simultaneously, market development, through consumer education, cooperative branding, and demand creation, is essential for sustainability. Special attention should also be given to youth and those engaged in organic animal health systems, whose empowerment is critical to the long-term resilience of agroecological systems.

This study's findings demonstrate that the barriers to innovation are not merely technical or financial, but deeply systemic and interdependent. The data align with Inclusive Finance

Theory, which highlights the limitations of financial inclusion in the absence of contextual adaptability, and with Adoption Constraints Theory, which emphasizes the interplay of institutional, knowledge-based, and infrastructural challenges. Tackling these barriers will require a comprehensive approach that integrates financial redesign, institutional strengthening, knowledge-sharing systems, and inclusive market development, all nested within a coherent and responsive policy framework. Without such coordinated action, the promise of agroecological innovation will remain unrealized, despite the continued expansion of financial inclusion initiatives.

While the discussion has focused on findings aligned with the study objectives, respondents also emphasized broader enablers beyond financial inclusion, such as capacity building, policy frameworks, and market support. These are elaborated in the Recommendations section.

## **5.5 Summary and Conclusion of the Findings**

### **5.5.1 Status of financial inclusion interventions**

The findings of this study reveal that a significant proportion of farmer innovators actively seek financial services to support the development and implementation of their innovations. Among the various services available, microcredit/loan services and savings accounts emerged as the most commonly requested and accessed. These were primarily sourced through microfinance institutions, village savings and loan associations (VSLAs), and local agents. In contrast, payment systems and agricultural insurance services were the least utilized, despite their potential to offer critical risk mitigation tools for smallholder innovators.

The primary motivations for accessing financial services included raising capital for innovation development, purchasing equipment and agricultural inputs, accessing technical resources and knowledge, and funding exploratory research and experimentation. These uses suggest that many farmer innovators view financial services not just as a source of money, but as a means to unlock key innovation enablers.

However, the study also uncovered persistent structural barriers that limit the effectiveness of these services. The most commonly cited challenge was product mismatch, that is, the services offered did not align with the timing, scale, or nature of innovation processes. Additional barriers included inadequate loan amounts, prolonged processing and

disbursement periods, high interest rates, and limited physical access points, especially for innovators operating in more remote areas. These findings are consistent with those of (Stella, 2018), who argue that simply expanding access to financial services without addressing the relevance and usability of the products often leads to exclusion in practice.

The perceptions of farmers around the four core pillars of financial inclusion, availability, accessibility, affordability, and suitability, were telling. While availability and accessibility were generally viewed positively (services exist and can be reached), affordability and especially suitability (appropriateness or fitness for use) were consistently rated as the lowest-performing attributes. Many respondents noted that while services were technically available, they were either too costly or not aligned with the seasonal, long-term, and high-risk nature of agroecological innovation. As one MFI offering agricultural put it, *“Loans are there, but they don’t understand our timelines. Farming and innovation need flexibility; they give loans for quick returns, not experiments.”*

This gap presents a more general problem of rural finance: the lack of design of financial products to the existing realities of smallholder innovation cycles. (Fayyad and Al-Sinnawi, 2024) provided information that the concept of financial inclusion can be evaluated as relevant and effective, provided that the four dimensions dedicated to this concept, namely availability, accessibility, affordability, and appropriateness, will be addressed holistically. This is shown to be true by a current study, and findings indicate that financial services in the study area are not actually inclusive, at least not in the affordability and fitness to purpose areas.

And to add on to this, a number of respondents highlighted the absence of bundled services, i.e., technical training and market access information, or advice on innovation management. This agrees with the literature by (Gammage *et al.*, 2010) who asserted that financial inclusion in agriculture must be incorporated in a wider innovation ecosystem, such as extension services, mentorship, and knowledge platforms. Drawing this conclusion, it can be said that financial inclusion is not a fully developed status; it is functionally incomplete in the study area as a whole, where several opportunities of access to financial services in one or other form exist.

Services are often siloed, rigid, and designed without the user in mind, particularly in the context of smallholder agroecological innovation. True financial inclusion must therefore move beyond access and availability to ensure that products are tailored, timely, affordable,

and integrated into broader innovation support systems. Without this, financial interventions risk reinforcing exclusion or creating dependency, rather than enabling transformative innovation.

### **5.5.2 Effect of financial inclusion interventions on development of innovations in agroecology**

The study found no statistically significant differences in the quantity, types, or certification of innovations developed between farmer innovators who received financial inclusion interventions and those who did not. The p-values (0.650, 0.814, and 0.355, respectively) were all well above the accepted significance threshold of 0.05, indicating negligible statistical impact. This is further supported by the very small effect sizes ( $r = 0.035$  and  $r = 0.018$ ), which suggest that the practical influence of financial access on innovation output was minimal. These results resonate with the findings of (Marus *et al.*, 2021b), who reported a weak and negative correlation between financial inclusion and agricultural commercialization in Buganda, implying that mere access to financial services does not inherently translate to enhanced productivity or innovation outcomes.

While the quantitative data indicate limited direct effects, the qualitative responses offer more nuanced insights. Several respondents shared that although financial support helped with basic inputs or experimentation, it was often inadequate in scale, untimely, and poorly structured for the longer-term nature of innovation in agroecology. For instance, one farmer noted, *“I used the loan to conduct research for a new pesticide, but the repayment came before I could even harvest. So, I abandoned the new idea and returned to what I knew.”* This highlights the short-term nature of many financial products, which is incompatible with the cyclical, iterative, and seasonal nature of agroecological innovation.

Despite the lack of significant differences in output metrics (number and type of innovations), many respondents did perceive financial services as having a moderate to strong influence on enabling factors, particularly knowledge acquisition (70.2%), access to capital (66%), and equipment or technology (65.5%). These enabling conditions are foundational for innovation, even if they do not immediately result in higher outputs. As articulated by Rogers (2003) and supported by the innovation systems approach (Błach, 2020), innovation depends on a broad set of preconditions, such as access to information, networks, experimentation opportunities, and supportive infrastructure.

However, the variation across individuals was substantial. While some innovators reported modest improvements in their innovation efforts (with an average reported increase of 18.7%), the high standard deviation ( $\pm 10.9$ ) reflects significant inconsistencies in outcomes. This underscores the role of contextual factors, including the type of financial product received, duration of support, access to complementary services (like training or extension), and even personal capacity or existing resources. One participant remarked, *“The money helped because I already had a plan. But for others, without training or connections, the loan just becomes another debt.”*

Moreover, a small percentage (18.8) of respondents stated that their innovations were certified and the largest percentage (56.1) of them indicated that they were not cost relevant in the certification of innovations. That means there is a huge gap between the ability to get money and visualizing formal innovation. Certification usually involves dealing with complicated institutional conditions, regulatory surcharges, and technical requirements an element that is not facilitated by the existing financial interventions. (Kirui *et al.*, 2023)project reached comparable findings, reporting that the majority of financial products available to smallholder innovators in Uganda are not packaged to advance certification, scale of operations and market access, and pointing to the importance to financial products, bundled with advisory services, capacity building, and technical assistance.

These observations show that the nature of financial inclusion interventions in their present state cannot be considered transformational in the context of agroecological innovation. They have a fundamental support role but they do not have a structure that supports the entire innovation process; ideation all the way to validation and market readiness. The measures are transactional instead of developmental and cannot be seen as promoting medium term resilience and innovativeness.

Conclusively, the paper confirms that the concept of financial inclusion despite being identified as a significant tool of rural development has not been effectively operationalized as a means of facilitating innovation adoption in agroecology. Some drastic reorganization of financial services is necessary, something that has to be inviting of suitability, adaptability, time period, and combination with non-financial assistance. (Mwalupaso, Geng and Yasin, 2025) are insistent that successful financial inclusion should enable people to obtain a full range of services that are timely, affordable, and fit-for-purpose and this is particularly when advanced developmental problems are concerned, to the extent of agricultural innovation.

#### **5.5.4 Challenges that Influence development of Innovations**

There are a number of ongoing and interlinked impediments to the process of adopting agroecological innovations. These are financial, institutional, knowledge, climate related stresses, market and social or cultural norms. The combination of these factors has contributed negatively to the growth and the sustenance of innovation, to some extent as well as to a high level.

The greatest challenge was pointed out to be financial constraints. Farmers mostly had access to financial services but most of them did not lend themselves to their needs. Interest rates were high, rigid collateral requirements, and funding timing incompatible with crop cycles brought loans unaffordable or inappropriate. This (Araya *et al.*, 2024) that although in terms of financial inclusion, access has increased, the services are normally relevant and useless to farmers.

Slow innovation was also due to institutional bottlenecks including poor extension services, bureaucracies and lack of coordination of policies. These results conform with those of (Mapiye and Dzama, 2024), which attribute the agricultural innovation scope to restrained institutions that are fragmented. Farmers were complaining of low level of government development assistance and inadequate technical advice to encourage or facilitate innovation among the farmers.

There were common technical and knowledge gaps where the farmer did not receive training, practical demonstration, and proper use of agroecological tools. This resounds with (Kirui *et al.*, 2023), who have discovered that education and peer learning play the crucial role in embracing sustainable practices.

Other issues to do with the environment and climate such as erratic rain fall and pest outbreaks also made it harder to do innovation, it was less reliable and one would not take the risks to experiment except where there was adaptive support.

There were also the market obstacles. It was also challenging to gain profits on the basis of the innovations because the access of the buyers was limited, consumer knowledge about organic products was low, and infrastructure of value chains was weak. Some of the farmers said that “We farm organic but people in the marketplace do not know what it is worth.” This

agrees with that of (Babajani *et al.*, 2023) whose observations indicates that financial incentives are not enough when used without the development of the market.

Lastly, social and cultural norms, including resistance to change and gender inequalities, although less often mentioned, remain relevant. Youth empowerment and gender-sensitive programs were suggested as important for long-term sustainability.

In summary, agroecological innovation is challenged by multiple, overlapping factors. Addressing just one such as finance is not enough. A holistic approach that improves financial products, strengthens institutions, builds technical skills, enhances climate resilience, and develops markets is essential for meaningful progress.

Beyond financial inclusion, the study identified additional factors affecting agroecological innovation, including capacity building, supportive policies, and market mechanisms. These are elaborated in the Recommendations section

## **5.6 Study implications**

The findings of the study are pertinent in shedding light on the minimal contribution that the aforementioned financial inclusion programs have in promoting agroecological innovation in Central Uganda. Although the financial services are quite accessible and are seen as available by most farmer innovators, the interventions did not make any significant difference as to the number of innovations to be implemented or certified. This demonstrates acute incompatibility between the development of financial products and the requirements of short end agroecological innovators, who need flexible, long-term, and risk-adjusted finance that can be tailored in the context of seasonality and incremental returns. These realities cannot be met with the conventional financial services which are mostly constraining and short-sighted, curtailing the extent and efficacy of innovating process.

On top of the financial limitation, the research points at institutional and infrastructural limitations that also hinder the adoption of innovation. Agroecological innovation is epitomized in agencies with weak extension services that meet poor coordination among agencies with weak policy support. Infrastructural deficiencies, such as inadequate roads, markets, communication technologies, and storage, exacerbate these challenges by increasing costs and reducing incentives for innovators. These findings emphasize that financial

inclusion alone is insufficient; a holistic approach involving capacity building, policy reform, market development, and infrastructure investment is essential to nurture a conducive innovation ecosystem.

However, these conclusions must be interpreted in light of several study limitations. The geographic focus on Central Uganda restricts the generalizability of findings to other regions. Reliance on self-reported data introduces potential response bias, and missing data due to skip logic may affect dataset completeness. The cross-sectional design limits causal inference and the ability to track changes over time. While a post hoc power analysis was performed, the lack of covariate control in analyses remains a limitation, suggesting that future research should incorporate adjustments for confounding factors to enhance validity. Finally, the study concentrated on financial inclusion and only partially addressed other important factors such as policy frameworks, infrastructure, and training.

Taken together, these findings and limitations underscore the need for multi-stakeholder collaboration to co-design tailored financial products, strengthen institutional support, and address infrastructural gaps. Only through integrated, context-sensitive interventions can the potential of agroecological innovation be fully realized and sustained.

## **5.7 Recommendations**

Beyond the financial inclusion interventions examined in this study, respondents provided additional insights on support mechanisms necessary to enhance the development and sustainability of agroecological innovations. These suggestions, collected via open-ended survey and interview questions, highlighted a broader ecosystem of enablers, including capacity building, policy reform, and market development. The following recommendations are derived directly from these participant perspectives and supported by relevant literature.

### **5.7.1 Strengthening Financial Services for Agroecological Innovators**

It is recommended that financial service providers work closely with actors in agroecology, such as farmer innovators and extension agents, to co-design financial products and services tailored to the context of agroecological innovation. Such collaboration will facilitate the creation of flexible financial solutions that consider the specific risk burdens, seasonal income dynamics, and schedules characteristic of agroecological approaches, allowing innovators to access and utilize financial resources more efficiently.

### **5.7.2 Empowering Extension Services**

The government and non-governmental organizations (NGOs) should focus on strengthening extension services by expanding their reach and enhancing their technical proficiency. This will provide agroecological farmers with the guidance and encouragement necessary to implement innovative practices successfully.

### **5.7.3 Policy Simplification and Market Facilitation**

Reducing bureaucratic processes involved in organic agriculture, such as simplifying policies and streamlining organic product certification, will facilitate farmers' market entry. Simplified certification procedures will enable farmers to formalize their innovations, ensure market and consumer confidence, and create an enabling environment that supports agroecological innovation.

### **5.7.4 Capacity Building and Financial Literacy**

Beyond financial support, it is crucial to enhance farmers' technical and financial capacity. Increased training schedules, field demonstrations, and awareness programs will equip farmer innovators with the skills necessary to adopt, replicate, and scale innovations. Knowledge of available financial services and improved technical know-how will increase the likelihood of successful implementation and sustainability of agroecological innovations.

### **5.7.5 Research and Knowledge Generation**

Comparative studies in other regions of Uganda are recommended to examine regional variations in financial inclusion and agroecological innovation adoption. These studies will provide insights into location-specific challenges and opportunities, enabling more targeted and effective interventions. Longitudinal studies are also important for understanding the long-term impacts of financial inclusion, capacity building, and policy environments on innovation adoption over time.

### **5.7.6 Multi-Stakeholder Collaboration**

Finally, fostering multi-stakeholder platforms including farmers, financial institutions, policymakers, NGOs, and market actors is essential. Such collaboration promotes knowledge sharing, coordinated action, and co-creation of solutions that respond to the evolving needs of agroecological innovators, strengthening the entire innovation ecosystem.

## 5.8 References

Aarons, G.A., Fettes, D.L., Sommerfeld, D.H. and Palinkas, L.A. (2012) 'Mixed Methods for Implementation Research: Application to Evidence-Based Practice Implementation and Staff Turnover in Community-Based Organizations Providing Child Welfare Services', *Child Maltreatment*, 17(1), pp. 67–79. Available at: <https://doi.org/10.1177/1077559511426908>.

Abate, G.T., Abay, K.A., Chamberlin, J., Kassim, Y., Spielman, D.J. and Paul Jr Tabe-Ojong, M. (2023) 'Digital tools and agricultural market transformation in Africa: Why are they not at scale yet, and what will it take to get there?', *Food Policy*, 116, p. 102439. Available at: <https://doi.org/10.1016/j.foodpol.2023.102439>.

Abbas, S., Dastgeer, G., Nasreen, S., Kousar, S., Riaz, U., Arsh, S. and Imran, M. (2024) 'How Financial Inclusion and Green Innovation Promote Green Economic Growth in Developing Countries', *Sustainability*, 16(15), p. 6430. Available at: <https://doi.org/10.3390/su16156430>.

Abdulai, M.G. and Issahaku, H. (2024) 'The effect of financial development and legal institutions on financial inclusion in Sub-Saharan Africa', *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), p. 100255. Available at: <https://doi.org/10.1016/j.joitmc.2024.100255>.

Abosedo, J. and Onanuga, T. (2016) 'Research Design: A Review of Features and Emerging Developments', *European Journal of Business and Management* [Preprint].

Afeltra, G., Alerasoul, S.A., Minelli, E., Vecchio, Y. and Montalvo, C. (2022) 'Assessing the Integrated Impact of Sustainable Innovation on Organisational Performance: An Empirical Evidence From Manufacturing Firms', *Journal of Small Business Strategy*, 32(4). Available at: <https://doi.org/10.53703/001c.38515>.

Ahiafor, A. and Walden University, College of Management & Human Potential, Minneapolis MN, USA (2022) 'Strategies for Mitigating the Effects of Crisis in Microfinance

Institutions in Ghana’, *World Journal of Science, Technology and Sustainable Development*, 19(1), pp. 39–53. Available at: <https://doi.org/10.47556/j.wjstd.19.1.2022.4>.

Akanbi, A. (2020) ‘MDP-IFAD RESEARCH REPORT’.

Al Rifai, M. and AlBaker, Y. (2025) ‘The role of financial technology in enhancing financial inclusion: A regulatory perspective on current industry trends’, *Corporate & Business Strategy Review*, 6(1), pp. 43–52. Available at: <https://doi.org/10.22495/cbsrv6i1art4>.

Alexander, J.A. and Wells, R. (2008) ‘How Do Resource Dependencies Affect Treatment Practices?: The Case of Outpatient Substance Abuse Treatment Programs’, *Medical Care Research and Review*, 65(6), pp. 729–747. Available at: <https://doi.org/10.1177/1077558708320407>.

Andrade, C. (2018) ‘Internal, External, and Ecological Validity in Research Design, Conduct, and Evaluation’, *Indian Journal of Psychological Medicine*, 40(5), pp. 498–499. Available at: [https://doi.org/10.4103/ijpsym.ijpsym\\_334\\_18](https://doi.org/10.4103/ijpsym.ijpsym_334_18).

Andrieu, N., Dedieu, B., Girard, P., Scopel, E., Magaju, C., Dembele, C., Mekuria, W. and Coe, R. (2025) ‘Methodological challenges in assessing the viability of agroecological practices: lessons from a multi-case study in Africa’, *Agronomy for Sustainable Development*, 45(2). Available at: <https://doi.org/10.1007/s13593-025-01010-9>.

Araya, T., Ochsner, T.E., Mnkeni, P.N.S., Hounkpatin, K.O.L. and Amelung, W. (2024) ‘Challenges and constraints of conservation agriculture adoption in smallholder farms in sub-Saharan Africa: A review’, *International Soil and Water Conservation Research*, 12(4), pp. 828–843. Available at: <https://doi.org/10.1016/j.iswcr.2024.03.001>.

Arun, T. and Kamath, R. (2015) ‘Financial inclusion: Policies and practices’, *IIMB Management Review*, 27(4), pp. 267–287. Available at: <https://doi.org/10.1016/j.iimb.2015.09.004>.

Ashwin, J., Rao, V., Biradavolu, M., Chhabra, A., Haque, A., Khan, A. and Krishnan, N. (2010) ‘A Method to Scale-Up Interpretative Qualitative Analysis, with an Application to Aspirations in Cox’s Bazaar, Bangladesh’.

Autio, A., Johansson, T., Motaroki, L., Minoia, P. and Pellikka, P. (2021) 'Constraints for adopting climate-smart agricultural practices among smallholder farmers in Southeast Kenya', *Agricultural Systems*, 194, p. 103284. Available at: <https://doi.org/10.1016/j.agsy.2021.103284>.

Babajani, A., Muehlberger, S., Feuerbacher, A. and Wieck, C. (2023) 'Drivers and challenges of large-scale conversion policies to organic and agro-chemical free agriculture in South Asia', *International Journal of Agricultural Sustainability*, 21(1). Available at: <https://doi.org/10.1080/14735903.2023.2262372>.

Balana, B. and Oyeyemi, M. (2020) *Credit constraints and agricultural technology adoption: Evidence from Nigeria*. Washington, DC: International Food Policy Research Institute. Available at: <https://doi.org/10.2499/p15738coll2.133937>.

Barooah, P., Alvi, M., Ringler, C. and Pathak, V. (2023) 'Gender, agriculture policies, and climate-smart agriculture in India', *Agricultural Systems*, 212, p. 103751. Available at: <https://doi.org/10.1016/j.agsy.2023.103751>.

Basnayake, D., Naranpanawa, A., Selvanathan, S. and Bandara, J.S. (2024) 'Financial inclusion through digitalization and economic growth in Asia-Pacific countries', *International Review of Financial Analysis*, 96, p. 103596. Available at: <https://doi.org/10.1016/j.irfa.2024.103596>.

Ben Naceur, S., Beck, T., Belhaj, M. and Barajas, A. (2020) 'Financial Inclusion: What Have We Learned So Far? What Do We Have to Learn?', *IMF Working Papers*, 2020(157), p. 1. Available at: <https://doi.org/10.5089/9781513553009.001>.

Błach, J. (2020) 'Barriers to Financial Innovation, Corporate Finance Perspective', *Journal of Risk and Financial Management*, 13(11), p. 273. Available at: <https://doi.org/10.3390/jrfm13110273>.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D. and Walker, K. (2020) 'Purposive sampling: complex or simple? Research case examples', *Journal of Research in Nursing*, 25(8), pp. 652–661. Available at: <https://doi.org/10.1177/1744987120927206>.

Campuzano, L.R., Hincapié Llanos, G.A., Zartha Sossa, J.W., Orozco Mendoza, G.L., Palacio, J.C. and Herrera, M. (2023) 'Barriers to the Adoption of Innovations for Sustainable Development in the Agricultural Sector, Systematic Literature Review (SLR)', *Sustainability*, 15(5), p. 4374. Available at: <https://doi.org/10.3390/su15054374>.

Castle, S.E., Miller, D.C., Merten, N., Ordonez, P.J. and Baylis, K. (2022) 'Evidence for the impacts of agroforestry on ecosystem services and human well-being in high-income countries: a systematic map', *Environmental Evidence*, 11(1). Available at: <https://doi.org/10.1186/s13750-022-00260-4>.

Coupet, J. and McWilliams, A. (2017) 'Integrating Organizational Economics and Resource Dependence Theory to Explain the Persistence of Quasi Markets', *Administrative Sciences*, 7(3), p. 29. Available at: <https://doi.org/10.3390/admsci7030029>.

Czech, K., Ochnio, L., Wielechowski, M. and Zabolotnyy, S. (2024) 'Financial Literacy: Identification of the Challenges, Needs, and Difficulties among Adults Living in Rural Areas', *Agriculture*, 14(10), p. 1705. Available at: <https://doi.org/10.3390/agriculture14101705>.

Davis, G.F. and Cobb, J.A. (2008) 'Resource Dependence Theory: Past and Future•'.

Dawadi, S., Shrestha, S. and Giri, R.A. (2021) 'Mixed-Methods Research: A Discussion on its Types, Challenges, and Criticisms', *Journal of Practical Studies in Education*, 2(2), pp. 25–36. Available at: <https://doi.org/10.46809/jpse.v2i2.20>.

Demirguc-Kunt, A., Klapper, L. and Singer, D. (2017) *Financial Inclusion and Inclusive Growth: A Review of Recent Empirical Evidence*. World Bank, Washington, DC. Available at: <https://doi.org/10.1596/1813-9450-8040>.

Demirgüç-Kunt, A., Klapper, L., Stein, P., Bilandzic, N., Hommes, M., Taylor, S., Boubakri, N., Hansen, A. and Sile, E. (2013) 'Financial Inclusion in Africa'.

Deshpande, R. and Koning, A. (2023) 'THE IMPACT OF FINANCIAL INCLUSION ON YOUNG WOMEN'S W E L L- B E I N G'.

Dupas, P., Green, S., Keats, A. and Robinson, J. (2018) 'Challenges in Banking the Rural Poor: Evidence from Kenya's Western Province'.

Ewert, F., Baatz, R. and Finger, R. (2023) ‘Agroecology for a Sustainable Agriculture and Food System: From Local Solutions to Large-Scale Adoption’, *Annual Review of Resource Economics*, 15(1), pp. 351–381. Available at: <https://doi.org/10.1146/annurev-resource-102422-090105>.

F. A.O (2012) *State of Food and Agriculture 2012: Investing in agriculture for a Better Future*. Rome: FAO.

Fayyad, M. and Al-Sinnawi, A.R. (2024) ‘Challenges of achieving financial inclusion for individuals with visual impairments’, *Heliyon*, 10(16), p. e35573. Available at: <https://doi.org/10.1016/j.heliyon.2024.e35573>.

Fiore, V., Borrello, M., Carlucci, D., Giannoccaro, G., Russo, S., Stempfle, S. and Roselli, L. (2024) ‘The socio-economic issues of agroecology: a scoping review’, *Agricultural and Food Economics*, 12(1). Available at: <https://doi.org/10.1186/s40100-024-00311-z>.

Gammage, S., Kes, A., Winograd, L., Sultana, N., Hiller, S. and Bourgault, S. (2010) ‘Gender and digital financial inclusion: What do we know and what do we need to know?’

Gbongli, K., Xu, Y., Amedjonekou, K.M. and Kovács, L. (2020) ‘Evaluation and Classification of Mobile Financial Services Sustainability Using Structural Equation Modeling and Multiple Criteria Decision-Making Methods’, *Sustainability*, 12(4), p. 1288. Available at: <https://doi.org/10.3390/su12041288>.

Gill, K.-A., Teimouri, N., Bogard, J. and Cullerton, K. (2025) ‘What policy support do smallholders in high-income countries need to contribute to healthy, sustainable food systems? A scoping review’, *Global Food Security*, 44, p. 100839. Available at: <https://doi.org/10.1016/j.gfs.2025.100839>.

Gobezie, G. (2013) ‘Promoting Empowerment of Women and Gender Equality through Integrated Microfinance, Value-Chain Support and Gender Capacity Building’.

Hamdan, J.S., Lehmann-Uchner, K. and Menkhoff, L. (2022) ‘Mobile Money, Financial Inclusion, and Unmet Opportunities: Evidence from Uganda’, *The Journal of Development Studies*, 58(4), pp. 671–691. Available at: <https://doi.org/10.1080/00220388.2021.1988078>.

Hernández, E. (ed.) (2017) *Innovative risk management strategies in rural and agriculture finance: the Asian experience: China, India, Philippines, Viet Nam*. Rome: Food and Agriculture Organization of the United Nations.

Hillman, A.J., Withers, M.C. and Collins, B.J. (2009) ‘Resource Dependence Theory: A Review’, *Journal of Management*, 35(6), pp. 1404–1427. Available at: <https://doi.org/10.1177/0149206309343469>.

Iyabano, A., Klerkx, L., Faure, G. and Toillier, A. (2022) ‘Farmers’ Organizations as innovation intermediaries for agroecological innovations in Burkina Faso’, *International Journal of Agricultural Sustainability*, 20(5), pp. 857–873. Available at: <https://doi.org/10.1080/14735903.2021.2002089>.

Kikulwe, E.M., Fischer, E. and Qaim, M. (2014) ‘Mobile Money, Smallholder Farmers, and Household Welfare in Kenya’, *PLoS ONE*. Edited by A. Mahal, 9(10), p. e109804. Available at: <https://doi.org/10.1371/journal.pone.0109804>.

King, J. (2013) ‘Applied knowledge’, *Physics World*, 26(12), pp. 40–41. Available at: <https://doi.org/10.1088/2058-7058/26/12/42>.

Kirui, E.C., Kidoido, M.M., Mutyambai, D.M., Okello, D.O. and Akutse, K.S. (2023) ‘Farmers’ Knowledge, Attitude, and Practices Regarding the Use of Agroecological-Based Pest Management Practices in Crucifers and Traditional African Vegetable (TAV) Production in Kenya and Tanzania’, *Sustainability*, 15(23), p. 16491. Available at: <https://doi.org/10.3390/su152316491>.

Kuhn, C. (2024) ‘Project cluster evaluation on rural finance in the East and Southern Africa Region’.

Kurdyś-Kujawska, A., Soliwoda, M., Grzelczak, M. and Apanel, A. (2025) ‘Financial Innovation in Building Agricultural Sector Resilience: New Horizons and Challenges for Blended Finance in Poland’, *Agriculture*, 15(7), p. 754. Available at: <https://doi.org/10.3390/agriculture15070754>.

Kuria, A.W., Bolo, P., Adoyo, B., Korir, H., Sakha, M., Gumo, P., Mbelwa, M., Orero, L., Ntinyari, W., Syano, N., Kagai, E. and Fuchs, L.E. (2024) ‘Understanding farmer options, context and preferences leads to the co-design of locally relevant agroecological practices for

soil, water and integrated pest management: a case from Kiambu and Makueni agroecology living landscapes, Kenya’, *Frontiers in Sustainable Food Systems*, 8. Available at: <https://doi.org/10.3389/fsufs.2024.1456620>.

Kyeyune, G.N. and Ntayi, J.M. (2025) ‘Empowering rural communities: the role of financial literacy and management in sustainable development’, *Frontiers in Human Dynamics*, 6. Available at: <https://doi.org/10.3389/fhumd.2024.1424126>.

Leeman, J., Wangen, M., Kegler, M., Lee, M., O’Leary, M.C., Ko, L.K., Fernández, M.E. and Birken, S.A. (2022) ‘Applying Theory to Explain the Influence of Factors External to an Organization on the Implementation of an Evidence-Based Intervention’, *Frontiers in Health Services*, 2. Available at: <https://doi.org/10.3389/frhs.2022.889786>.

Madsen, S., Laske, E., Fisher, J., Sall, A.N., Enloe, S. and Bezner Kerr, R. (2025) ‘What good is agroecology? Predominant narratives about agroecology in Africa’, *Journal of Rural Studies*, 118, p. 103706. Available at: <https://doi.org/10.1016/j.jrurstud.2025.103706>.

Mapanje, O., Karuaihe, S., Machethe, C. and Amis, M. (2023) ‘Financing Sustainable Agriculture in Sub-Saharan Africa: A Review of the Role of Financial Technologies’, *Sustainability*, 15(5), p. 4587. Available at: <https://doi.org/10.3390/su15054587>.

Mapiye, O. and Dzama, K. (2024) ‘Strengthening research-extension-farmer-input linkage system for sustainable smallholder livestock farming in Africa: progress and prospects’, *Tropical Animal Health and Production*, 56(8). Available at: <https://doi.org/10.1007/s11250-024-04210-9>.

Marus, E., Fabian, M., Mary, E. and Sammy, G.P. (2021a) ‘Financial inclusion: Is it a precursor to agricultural commercialization amongst smallholder farmers in Uganda? A comparative analysis between Lango and Buganda sub-regions’, *Journal of Economics and International Finance*, 13(1), pp. 1–12. Available at: <https://doi.org/10.5897/jeif2020.1093>.

Marus, E., Fabian, M., Mary, E. and Sammy, G.P. (2021b) ‘Financial inclusion: Is it a precursor to agricultural commercialization amongst smallholder farmers in Uganda? A comparative analysis between Lango and Buganda sub-regions’, *Journal of Economics and International Finance*, 13(1), pp. 1–12. Available at: <https://doi.org/10.5897/jeif2020.1093>.

Mekuria, W., Dessalegn, M., Amare, D., Belay, B., Getnet, B., Girma, G. and Tegegne, D. (2022) 'Factors influencing the implementation of agroecological practices: Lessons drawn from the Aba-Garima watershed, Ethiopia', *Frontiers in Environmental Science*, 10. Available at: <https://doi.org/10.3389/fenvs.2022.965408>.

Mishra, D., Kandpal, V., Agarwal, N. and Srivastava, B. (2024) 'Financial Inclusion and Its Ripple Effects on Socio-Economic Development: A Comprehensive Review', *Journal of Risk and Financial Management*, 17(3), p. 105. Available at: <https://doi.org/10.3390/jrfm17030105>.

Mouratiadou, I., Wezel, A., Kamilia, K., Marchetti, A., Paracchini, M.L. and Bàrberi, P. (2024) 'The socio-economic performance of agroecology. A review', *Agronomy for Sustainable Development*, 44(2). Available at: <https://doi.org/10.1007/s13593-024-00945-9>.

Muhie, S.H. (2022) 'Novel approaches and practices to sustainable agriculture', *Journal of Agriculture and Food Research*, 10, p. 100446. Available at: <https://doi.org/10.1016/j.jafr.2022.100446>.

Mwalupaso, G.E., Geng, X. and Yasin, S.I. (2025) 'Financial inclusion for sustainable agriculture: Pathways among smallholder women farmers in rural Zambia', *PLOS One*. Edited by G.N.C. Munthali, 20(7), p. e0326980. Available at: <https://doi.org/10.1371/journal.pone.0326980>.

Nagaaba, N., Batamuriza, R., Basuta, J. and Owomugisha, M. (2025) 'Conceptualizing digital finance as a precursor for financial inclusion and financial service usage in Uganda', *Cogent Business & Management*, 12(1). Available at: <https://doi.org/10.1080/23311975.2024.2448285>.

Nuryanto, U.W., Basrowi, Quraysin, I. and Pratiwi, I. (2024) 'Harmonizing eco-control and eco-friendly technologies with green investment: Pioneering business innovation for corporate sustainability in the Indonesian context', *Environmental Challenges*, 15, p. 100952. Available at: <https://doi.org/10.1016/j.envc.2024.100952>.

Olabanji, M.F. and Chitakira, M. (2025) 'The Adoption and Scaling of Climate-Smart Agriculture Innovation by Smallholder Farmers in South Africa: A Review of Institutional

Mechanisms, Policy Frameworks and Market Dynamics’, *World*, 6(2), p. 51. Available at: <https://doi.org/10.3390/world6020051>.

Omar, M.A. and Inaba, K. (2020) ‘Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis’, *Journal of Economic Structures*, 9(1). Available at: <https://doi.org/10.1186/s40008-020-00214-4>.

Ozili, P.K. (2018) ‘Theories of financial inclusion’.

Penone, C., Giampietri, E. and Trestini, S. (2024) ‘Exploring farmers’ intention to adopt marketing contracts: empirical insights using the TOE framework’, *Agricultural and Food Economics*, 12(1). Available at: <https://doi.org/10.1186/s40100-024-00333-7>.

Persaud, A. and Thaffe, W. (2023) ‘The state of financial inclusion research on developing countries’, *Transnational Corporations Review*, 15(4), pp. 22–34. Available at: <https://doi.org/10.1016/j.tncr.2023.08.002>.

Prat-Benhamou, A., Bernués, A., Gaspar, P., Lizarralde, J., Mancilla-Leytón, J.M., Mandaluniz, N., Mena, Y., Soriano, B., Ondé, D. and Martín-Collado, D. (2024) ‘How do farm and farmer attributes explain perceived resilience?’, *Agricultural Systems*, 219, p. 104016. Available at: <https://doi.org/10.1016/j.agsy.2024.104016>.

Rahming, S. (2021) ‘The Importance of Financial Inclusion’.

Rogers, E.M. (1983) *Diffusion of innovations*. 3rd ed. New York : London: Free Press ; Collier Macmillan.

Ruzzante, S., Labarta, R. and Bilton, A. (2021) ‘Adoption of agricultural technology in the developing world: A meta-analysis of the empirical literature’, *World Development*, 146, p. 105599. Available at: <https://doi.org/10.1016/j.worlddev.2021.105599>.

Sahin, I. (2006) ‘DETAILED REVIEW OF ROGERS’ DIFFUSION OF INNOVATIONS THEORY AND EDUCATIONAL TECHNOLOGY-RELATED STUDIES BASED ON ROGERS’ THEORY’, *The Turkish Online Journal of Educational Technology*, 5(2).

Salami, A., Kamara, A.B. and Brixiova, Z. (2010) ‘Smallholder Agriculture in East Africa: Trends, Constraints and Opportunities’.

Sarfo, Y., Musshoff, O., Weber, R. and Danne, M. (2023) 'Farmers' preference for digital credit: Does the delivery channel matter?', *Q Open*, 3(1). Available at: <https://doi.org/10.1093/qopen/qoad007>.

Sarpong, B. and Nketiah-Amponsah, E. (2022) 'Financial inclusion and inclusive growth in sub-Saharan Africa', *Cogent Economics & Finance*, 10(1). Available at: <https://doi.org/10.1080/23322039.2022.2058734>.

Shirono, K. (2024) 'Understanding Barriers to Financial Access: Insights from Bank Pricing Data', *IMF Working Papers*, 2024(150), p. 1. Available at: <https://doi.org/10.5089/9798400280627.001>.

Shiwani, H.A., Bilal, M., Shahzad, M.U., Rodrigues, A., Suliman, J.A., Soban, M., Mirza, S., Lotca, N., Ruslan, M.R., Memon, D., Arshad, M.A., Fatima, K., Kamran, A., Egom, E.E. and Aziz, A. (2021) 'A comparison of characteristics and outcomes of patients with community-acquired and hospital-acquired COVID-19 in the United Kingdom: An observational study', *Respiratory Medicine*, 178, p. 106314. Available at: <https://doi.org/10.1016/j.rmed.2021.106314>.

Shofi Ullah Mazumder, M. (2024) 'Do climate-smart agricultural practices impact the livelihoods of vulnerable farmers in the Southern part of Bangladesh?', *Climate Services*, 36, p. 100524. Available at: <https://doi.org/10.1016/j.cliser.2024.100524>.

Simatele, M. and Maciko, L. (2022) 'Financial Inclusion in Rural South Africa: A Qualitative Approach', *Journal of Risk and Financial Management*, 15(9), p. 376. Available at: <https://doi.org/10.3390/jrfm15090376>.

Stamatopoulos, D. (2024) 'Report on IFAD's Development Effectiveness 2024'.

Stella, A. (2018) 'MAKERERE UNIVERSITY BUSINESS SCHOOL'.

Tetteh, G.K. (2022) *The economic outcomes of financial innovation and digital infrastructure in Sub-Saharan Africa*. Maastricht University. Available at: <https://doi.org/10.26481/dis.20220920gt>.

Tongco, Ma.D.C. (2007) ‘Purposive Sampling as a Tool for Informant Selection’, *Ethnobotany Research and Applications*, 5, p. 147. Available at: <https://doi.org/10.17348/era.5.0.147-158>.

UBOS (2024) ‘NPHC 2024 – Preliminary Results’.

Von Cossel, M., Scordia, D., Altieri, M. and Gresta, F. (2025) ‘Spotlight on agroecological cropping practices to improve the resilience of farming systems: a qualitative review of meta-analytic studies’, *Frontiers in Agronomy*, 7. Available at: <https://doi.org/10.3389/fagro.2025.1495846>.

Wanzala, R.W. and Obokoh, L.O. (2025) ‘Financial inclusion of the informal sector of marginalized counties in Kenya’, *Cogent Social Sciences*, 11(1). Available at: <https://doi.org/10.1080/23311886.2025.2522291>.

Wisdom, J.P., Chor, K.H.B., Hoagwood, K.E. and Horwitz, S.M. (2014) ‘Innovation Adoption: A Review of Theories and Constructs’, *Administration and Policy in Mental Health and Mental Health Services Research*, 41(4), pp. 480–502. Available at: <https://doi.org/10.1007/s10488-013-0486-4>.

Yeleliere, E., Yeboah, T., Antwi-Agyei, P. and Peprah, P. (2022) ‘Traditional agroecological knowledge and practices: The drivers and opportunities for adaptation actions in the northern region of Ghana’, *Regional Sustainability*, 3(4), pp. 294–308. Available at: <https://doi.org/10.1016/j.regsus.2022.11.002>.

Zeng, S., Li, J. and Wanger, T.C. (2023) ‘Agroecology, technology, and stakeholder awareness: Implementing the UN Food Systems Summit call for action’, *iScience*, 26(9), p. 107510. Available at: <https://doi.org/10.1016/j.isci.2023.107510>.

## **APPENDICES**

### **APPENDIX A: QUESTIONNAIRE**

My name is Chrissy Chawanda, a postgraduate student pursuing a Master of Science in Agroecology at Uganda Martyrs University. I am conducting a research study titled “Assessing the Effect of Financial Inclusion Interventions on the Implementation of Innovations in Agroecology in Central Uganda.” The purpose of this study is to understand how access to financial services such as credit, savings, mobile money, and financial literacy influences the development and adoption of agroecological innovations. Your participation in this study is voluntary, and all the information you provide will be kept strictly confidential and used only for academic purposes.

This questionnaire will take about 20 to 30 minutes to complete, and your honest responses are highly appreciated. By completing this questionnaire, you are agreeing to take part in the study.

Thank you for your valuable time and contribution.

#### **SECTION 1: RESPONDENT PROFILE**

**Age:** \_\_\_\_\_ years

**Gender:**

Male    Female    Other

**District/Region:** \_\_\_\_\_

**Education Level:**

None  Primary  Secondary  Tertiary

**Marital Status:**

Single  Married  Divorced  Widowed

**Occupation:** \_\_\_\_\_

**Role in Agroecology:**

Farmer  Innovator  Extension Worker  Other: \_\_\_\_\_

**Years of Experience in Agroecology:** \_\_\_\_\_

**Are you currently engaged in any agroecological innovation?**

Yes  No - If yes, please describe your innovation: \_\_\_\_\_

**Which crops/products do you produce?** \_\_\_\_\_

**Is your innovation certified?**  Yes  No- If no, what is the main reason? \_\_\_\_\_

**Are you a member of any farmer group or cooperative?**  Yes  No - If yes, name of the group: \_\_\_\_\_

**Number of employees or regular helpers:** \_\_\_\_\_

**SECTION 2: FINANCIAL INCLUSION INTERVENTIONS**

**2.1 Access and Use of Financial Services**

**Have you ever sought any financial services to support your innovation or agroecological activities?**  Yes  No

**Which of the following financial services have you used or requested? (Tick all that apply)**

Microcredit/Loans

Savings Accounts

Financial Literacy Training

- Mobile Banking Services
- Insurance Services
- Agricultural Grants or Subsidies
- None

**Did you receive the financial services you requested?**  Yes  No

**If yes, what requirements did you have to meet to access the services**

**What did you use the financial service(s) for?** *(Tick all that apply)*

- Buying seeds/inputs  Equipment/tools
- Hiring labor  Transport/marketing
- Innovation certification  Other: \_\_\_\_\_

**How do you normally access financial services?** *(Select all that apply)*

- Bank branch
- Mobile phone (apps, USSD codes)
- Microfinance institutions
- SACCOs/VSLAs
- Village agents or mobile money agents
- Other: \_\_\_\_\_

**What challenges, if any, did you face while trying to access financial services?**

- Lack of collateral  High interest rates
- Limited information  Complex procedures
- Rejection  Others: \_\_\_\_\_

**Did receiving financial services help you improve or implement your innovation?**

- Yes  No - If yes, by what percentage do you estimate improvement? \_\_\_\_%

**Which of the following innovations have you implemented using financial services?**

*(Tick all that apply)*

- New crop varieties/seeds

- Organic fertilizers/pesticides
- Bio stimulants
- Agroforestry practices
- Solar-powered or green tech
- Other: \_\_\_\_\_

**Were the financial services suitable for your agroecological activities?**

- Very Suitable    Suitable    Not Suitable    Very Unsuitable

**How did you learn about the financial services you accessed?**

- Government Program                       Bank/Financial Institution
- NGO/CBO     Peer network
- Media     Other: \_\_\_\_\_

**2.2 Perceptions of Financial Services**

**How available are financial services in your community?**

- Very Available    Available    Limited    Not Available

**How accessible are they in terms of distance, documentation, and convenience?**

- Very Accessible    Accessible    Hard to Access    Very Difficult

**How affordable are these services for you?**

- Very Affordable    Affordable    Not Affordable    Very Unaffordable

**To what extent have financial services helped in the following areas of your work?**

*(Use the scale: 1 = No Influence, 2 = Slight Influence, 3 = Moderate Influence, 4 = Strong Influence, 5 = Very Strong Influence)*

<b>Area of Impact</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Access to capital for innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access to new equipment or tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adoption of sustainable practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>Area of Impact</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Innovation certification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participation in training or research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### **SECTION 3: CHALLENGES IN IMPLEMENTATION**

**Which challenges have you faced in implementing your agroecological innovations?**

*(Tick all that apply)*

- Lack of institutional support
- Financial constraints
- Technical knowledge gaps
- Cultural/social resistance
- Environmental challenges (e.g., drought)
- Market barriers
- Other: \_\_\_\_\_

**Which of these challenges do you consider most significant?**

- Financial    Institutional    Social    Technical    Other: \_\_\_\_\_

**To what extent have these challenges affected your innovation efforts?**

- Strongly Impeded    Moderately Impeded    Slightly Impeded    Not at All

**How have these challenges affected the overall success of your agroecological work?**

- Significantly Reduced Success
- Moderately Reduced Success
- No Effect
- Improved Success (learned/adapted from them)

### **SECTION 4: RECOMMENDATIONS & FINAL COMMENTS**

**What kind of additional support would help you better implement your agroecological innovations?**

*(Open-ended)*

**Do you have any other comments or suggestions on financial inclusion or agroecology?**

*(Open-ended)*

## **APPENDIX B ; KEY INFORMANT INTERVIEW GUIDE**

*Assessing the Effect of Financial Inclusion Interventions on the Implementation of Innovations in Agroecology in Central Uganda*

### **Introduction**

Thank you for taking the time to speak with us today. We are conducting a study to understand how financial inclusion initiatives, such as access to loans, savings or financial literacy training, affect the work of farmer innovators practicing agroecology in Central Uganda. Your experience and insights are very important in helping us understand the real-world opportunities and barriers faced by innovators in this field. Please note that your responses will be kept confidential and will only be used for academic purposes.

### **Interview Questions**

From your perspective, how have financial services, such as loans, savings, supported or limited the work of farmer innovators in implementing agroecological practices?

Can you describe an example where a farmer innovator successfully implemented a new agroecological innovation as a result of accessing financial services?

What key challenges do farmer innovators continue to face when trying to develop or scale their innovations, even when financial services are available?

Do you believe that current financial services are designed in a way that suits the needs of farmer innovators working in agroecology? Why or why not?

In your view, how do farmer innovators usually become aware of financial inclusion opportunities, and what role does awareness play in their access and use of these services?

What recommendations would you give to improve financial inclusion initiatives so they better support agroecological innovation among farmer innovators in Central Uganda?

### **APPENDIX C: INSTITUTIONAL RESEARCH APPROVAL LETTER**

A copy of the official approval letter issued by Uganda Martyrs University, Faculty of Agriculture and Environment, granting clearance to conduct the study



making a difference

Office of the Dean, Faculty of Agriculture

CHAWANDA Chrissy,

REGISTRATION NO: 2023-M152-23850,

2ND FEB 2025,

**RE: APPROVAL OF YOUR PROPOSAL**

Dear Chrissy, following your proposal defense that took place on 24 June 2024 I am pleased to inform you that first and foremost your proposal titled "**ASSESSING THE EFFECT OF FINANCIAL INCLUSION INTERVENTIONS ON THE IMPLEMENTATION OF INNOVATIONS IN AGROECOLOGY IN CENTRAL UGANDA**" was accepted congratulations. Secondly, during your research process you have been assigned Dr. Marius Murongo Flarian who is a senior lecturer of Agroecology in the Department of Agroecology and Natural Resources-Faculty of Agriculture and Environment- Uganda Martyrs University.

You are advised to draw a clear work plan together with your mentor to assist you in the research process. In any case you are requested to submit your dissertation on or before 30<sup>th</sup> of May 2025.

I wish success in your studies

Yours Sincerely

For Dean Faculty of Agriculture and Environment

