Microfinance, financial literacy, and rural welfare: A structural pathway analysis among smallholder farmers in Southwestern Uganda

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ABSTRACT

This study investigated the influence of microfinance services on the socio-economic wellbeing of smallholder farmers in Uganda, with a particular focus on the mediating role of financial literacy. The purpose of the study was to examine how financial knowledge, skills, and attitudes affect farmers' ability to utilize microfinance products effectively and enhance their agricultural productivity, financial management, and overall social wellbeing. The study was guided by two key objectives: (1) to identify the key components of microfinance services offered to smallholder farmers and, (4) to evaluate the mediating role of financial literacy in this relationship. The study was anchored in Financial Liberalization Theory. A mixed-methods approach was employed, integrating both quantitative and qualitative data. Quantitative data were collected from 380 smallholder farmers using structured questionnaires and analyzed using exploratory factor analysis, descriptive statistics, multiple regression, and bootstrapped PROCESS-style mediation analysis. Qualitative data from interviews provided contextual understanding of the microfinance landscape and farmers' experiences with financial products. Factor analysis identified five key microfinance service components training, payments, savings, credit, and advisory support and three dimensions of financial literacy knowledge, skills, and attitude. Mediation analysis revealed that financial literacy significantly mediates the relationship between microfinance services and socio-economic wellbeing, emphasizing the importance of integrating financial education into microfinance interventions. The findings demonstrate that tailored financial literacy programs, mobile financial services, and behavior-oriented interventions can enhance farmers' financial management, resilience, and productivity. Policy recommendations include designing integrated financial literacy training, promoting seasonally aligned agricultural loans, leveraging digital platforms for financial transactions, and implementing behavioral nudges to improve financial attitudes. These measures collectively offer a strategic framework for MFIs and policymakers to strengthen the capacity of smallholder farmers, ultimately promoting sustainable economic development and social wellbeing in Uganda.

Keywords: Agricultural Productivity, Financial Management, Financial Literacy, Microfinance Services, Mediation Analysis, Smallholder Farmers, Socio-Economic Wellbeing, Uganda

I. INTRODUCTION

Microfinance has emerged as a prominent development strategy aimed at improving the livelihoods of low-income populations across the globe (Namawejje, & Yawe, 2024). It broadly refers to the provision of financial services such as savings, credit, insurance, and payment systems, as well as non-financial services including training and social intermediation to economically marginalized groups (Asamoah & Amoah, 2015). According to Ledgerwood (2013), microfinance extends beyond financial intermediation to encompass social empowerment through capacity building, group formation, and enhancement of financial management skills. As such, microfinance is widely regarded not only as a financial tool but also as a mechanism for socio-economic transformation.

Globally, improving socio-economic wellbeing remains a central objective of development policy, particularly in low-income and agrarian economies (Muzaale et al, 2026). Despite progress in poverty reduction, a significant proportion of the world's population continues to experience extreme deprivation, with Sub-Saharan Africa accounting for the majority of those living below the international poverty line. In many of these economies, agriculture serves as the backbone of livelihoods, with smallholder farmers playing a critical role in food production and income generation (Yiga, 2018). In Uganda, for instance, agriculture contributes approximately 25% of Gross Domestic Product and employs over 70% of the population, with smallholder farmers accounting for nearly 80% of agricultural output (Uganda

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Bureau of Statistics, 2025). However, these farmers continue to face persistent challenges, including limited access to financial services, low productivity, and vulnerability to economic shocks.

Microfinance institutions (MFIs) have been instrumental in addressing financial exclusion by extending credit and other financial services to populations traditionally underserved by formal banking systems (Ghatode & Nimbarte, 2025; Gichuru et al., 2019; Gutema, 2021; Jindo et al., 2023). Empirical evidence suggests that access to microfinance can enhance farmers' capacity to invest in improved technologies, increase productivity, and ultimately improve their socio-economic wellbeing (Kalita et al., 2022; Kurniawan et al., 2022; Ledgerwood, 2013; Lwesya & Mwakalobo, 2023; Mago & Hofisi, 2018). These outcomes are consistent with the propositions of the financial liberalization theory advanced, which posits that increased access to financial services stimulates savings and investment, thereby promoting economic growth. Similarly, capital formation theory emphasizes the role of credit in enabling investment and technological adoption (Okoroji et al, 2022). However, these theories are not without limitations, as they often assume efficient financial markets and rational behavior, conditions that may not hold in rural and low-literacy contexts.

Despite the theoretical promise of microfinance, empirical findings on its impact remain mixed. While some studies report positive effects on income, education, and health outcomes, others argue that microfinance may have limited or even adverse effects due to high interest rates, poor loan utilization, and weak institutional frameworks (Kalita et al., 2022; Kurniawan et al., 2022; Ledgerwood, 2013; Lwesya & Mwakalobo, 2023; Mago & Hofisi, 2018). These inconsistencies suggest that access to financial services alone may be insufficient to guarantee improved welfare outcomes.

In this regard, financial literacy has gained increasing attention as a critical factor influencing the effectiveness of microfinance interventions. Financial literacy refers to the ability to understand and apply financial knowledge in decision-making processes (Okoroji et al., 2022). Drawing on behavioral economic theory, scholars argue that individuals' financial outcomes are shaped not only by access to resources but also by their cognitive abilities and decision-making behaviors (Atahau et al., 2023). However, behavioral theory is limited by its assumption of bounded rationality, which may vary significantly across contexts. Empirical studies indicate that financially literate women are more likely to utilize financial services effectively, thereby enhancing their socio-economic wellbeing (Muzaale et al., 2026; Nakabugo et al., 2022). Nevertheless, limited research has examined the mediating role of financial literacy in the relationship between microfinance services and socio-economic wellbeing, particularly among smallholder farmers in Uganda. This gap is significant because it obscures the mechanisms through which microfinance influences welfare outcomes. Therefore, this study seeks to bridge this gap by examining both the direct relationship between microfinance services and socio-economic wellbeing and the mediating effect of financial literacy among smallholder farmers in Southwestern Uganda.

1.1 Statement of the Problem

Access to financial services is widely acknowledged as a catalyst for economic growth and household welfare, particularly in agrarian economies where traditional credit markets are underdeveloped (Namawejje, & Yawe, 2024). In Uganda, the agricultural sector remains the mainstay of household livelihood and the national economy, contributing roughly 25% of Gross Domestic Product [GDP] and employing over 70% of the population (UBOS, 2025). Smallholder farmers, defined as those managing farms between 0.8 and 1.6 hectares, produce approximately 80% of the nation's agricultural output (UBOS, 2025). In Southwestern Uganda, which accounts for a significant share of national agricultural productivity, microfinance institutions (MFIs) are relatively well-established and actively engaged in extending financial services to rural communities. Government interventions such as the Agriculture Credit Facility, Operation Wealth Creation, and programs under the Ministry of Agriculture, Animal Industry and Fisheries have further expanded access to credit and related services (Nakabugo et al, 2022). Despite these efforts, socio-economic wellbeing indicators among smallholder farming households in Uganda continue to reflect persistent vulnerability.

The Uganda National Household Survey (2023/24) reports that while the national poverty rate declined to 16.1%, rural poverty remains high at 19.4%, with the Western region exhibiting rates above the national rural average. Food insecurity persists, educational attainment remains low, and access to healthcare services continues to lag, underscoring ongoing livelihood challenges (UBOS, 2025). Moreover, although financial inclusion metrics show increased uptake of formal and semi-formal financial services with a dull financial inclusion rising to 81% improvements in household welfare do not appear proportionate to these gains. Empirical research on the impact of microfinance services on socio-economic outcomes presents mixed findings. However, the extent to which financial literacy influences the relationship between microfinance services and socio-economic wellbeing among smallholder farmers in Uganda has not been extensively investigated (Namawejje, & Yawe, 2024). Understanding this dynamic is vital for interpreting why increased access to financial services does not always result in commensurate improvements in household welfare. Informed by both theoretical propositions and empirical observations, this study examines the association between microfinance services and socio-economic wellbeing among smallholder farmers in Southwestern Uganda, and explores whether financial literacy significantly influences this relationship.

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1.2 Research Objective

i. To examine the relationship between microfinance services and social-economic wellbeing of smallholder farmers in South Western Uganda.
ii. To examine the mediating effect of financial literacy in the relationship between microfinance services and social-economic wellbeing of smallholder farmers in South Western Uganda.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Financial Liberalization Theory

The Financial Liberalization Theory, propounded by Ronald McKinnon and Edward Shaw in 1973, emphasizes the role of unrestricted financial markets in stimulating economic growth. McKinnon and Shaw argued that financial repression characterized by credit controls, interest rate ceilings, and inefficient allocation of financial resources constrains savings mobilization and productive investment (Yiga, 2018). They proposed that removing these distortions would enhance savings, increase investment, and foster economic development. In the context of this study, microfinance institutions in Uganda implement financial services consistent with the theory's principles by providing smallholder farmers, who are typically excluded from formal banking, with access to credit, savings, and other financial tools (Okoroji et al, 2022). These services enable farmers to expand agricultural operations, adopt modern technologies, and improve productivity, reflecting the theory's central idea of facilitating broader economic participation (Mangudhla et al. (2025), and Masuka et al. (2025). By enabling access to credit, savings, and training, MFIs facilitate investment in agriculture, improve household income, and promote socio-economic wellbeing. Thus, the theory provides a useful lens for examining how financial interventions can transform the livelihoods of economically marginalized populations.

The relevance of the theory is strengthened by its four key assumptions: (1) liberalized financial markets effectively mobilize savings; (2) increased savings translate into higher levels of productive investment; (3) access to financial resources is necessary and sufficient for economic growth; and (4) economic agents act rationally to utilize financial resources efficiently. In the microfinance context, access to loans or savings alone is insufficient unless smallholder farmers possess the motivation, skills, and capacity to apply these resources productively. Nonetheless, the theory provides a robust conceptual foundation for this study, linking access to financial services with savings, investment, and the socio-economic wellbeing of smallholder farmers in Southwestern Uganda.

2.1.2 Microfinance Services and Social-Economic Wellbeing

Microfinance refers to the provision of financial services such as savings, credit, payment services, insurance, and money transfers to low-income households and micro-enterprises (Abolade et al., 2024; Adegbite et al., 2021; Armendáriz & Morduch, 2010; Asamoah & Amoah, 2015). While often used interchangeably with microcredit, microfinance extends beyond small loans to include additional financial and non-financial services such as training, skill development, and enterprise support (Collins et al., 2009; Dossou et al., 2020; Ghatode & Nimbarte, 2025). In Uganda, microfinance has increasingly been recognized as a tool for poverty reduction, adopting either a minimalist approach (financial services only) or a credit-plus approach (financial and non-financial services) to improve livelihoods. However, the minimalist approach alone does not ensure productive use of funds, highlighting the need for integrated services to guide smallholder farmers in optimizing their resources and expanding agricultural activities (Ledgerwood, 2013; Lwesya & Mwakalobo, 2023; Mago & Hofisi, 2018).

Empirical studies across developing countries have generally reported positive relationships between microfinance services and socio-economic wellbeing (Nakabugo et al, 2022). Mangudhla et al. (2025), Masuka et al. (2025), found that microcredit improved farmers' living standards, diet, health, and children's education in Pakistan, while a significant positive impact on agricultural production. Similar findings were reported by Atahau et al (2023) in India, Asamoah and Amoah (2015) in Ghana, as well as Nakabugo et al (2022) in Uganda and Abolade et al (2024) in Nigeria, where both financial and non-financial services enhanced productivity and household welfare. Despite these encouraging results, most studies focused on narrow indicators such as income or enterprise performance, often in contexts with higher financial literacy, advanced technology, or gender-specific populations, leaving gaps in understanding the broader, multidimensional social-economic wellbeing of smallholder farmers in rural African settings.

Conversely, several studies have highlighted limited or negative effects of microfinance services, revealing a more nuanced picture. Okoroji et al. (2022), Atahau et al. (2023), while Namawejje and Yawe (2024), Offiong et al. (2024), and Okoroji et al. (2022) observed negligible impacts on poverty reduction despite bank involvement. Zabali (2018) showed that changes in wellbeing are not always directly attributable to loans, particularly when non-financial support is absent. These mixed findings underscore significant empirical gaps: prior research often focuses on financial services alone, is limited to one gender, or examines general household welfare without disaggregating specific aspects such as household income, children's education, housing, food security, and health. The present study addresses these gaps by examining the credit-plus approach, including both financial and non-financial services, and assessing their

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impact on the social-economic wellbeing of smallholder farmers in Southwestern Uganda across multiple household indicators.

2.1.3 Micro-financial Services and Financial Literacy

Financial literacy, defined as an individual's ability to obtain, understand, and evaluate financial information to make informed decisions with awareness of potential consequences (Yiga, 2018; Yunus, 2007), is increasingly recognized as critical for socio-economic empowerment. It encompasses the understanding of basic financial concepts and the ability to apply them in budgeting; saving, investing, and selecting appropriate financial products (Siankwilimba et al., 2025; Visconti, 2016). Microfinance institutions (MFIs) play a pivotal role in enhancing financial literacy by providing access to financial services to populations traditionally excluded from formal financial markets, such as smallholder farmers in Uganda (Zabali, 2018). By integrating financial education into credit, savings, and training programs, MFIs enable clients to make informed decisions, manage financial risks, and optimize the use of available resources (Namawejje & Yawe, 2024; Offiong et al., 2024; Okoroji et al., 2022). Institutional frameworks, including regulative, normative, and cultural-cognitive mechanisms, further strengthen these outcomes by creating structured environments that support financial learning and prudent decision-making.

Empirical evidence consistently demonstrates a positive relationship between microfinance services and financial literacy, with studies in India, Sri Lanka, and Nepal reporting improved economic empowerment, savings habits, and financial decision-making as a result of MFI interventions (Okoroji et al., 2022; Atahau et al., 2023). Despite these findings, the applicability of such results to smallholder farmers in Uganda remains unclear. Existing studies are limited methodologically, often focusing on women only, using solely quantitative approaches, and neglecting the specific context of rural agrarian populations where financial literacy levels and socio-economic conditions differ markedly. This study addresses these gaps by examining the relationship between MFI services and financial literacy among both male and female smallholder farmers in Uganda, using a mixed-methods approach that combines surveys and interviews to provide a nuanced understanding of how microfinance contributes to financial literacy and, ultimately, to socio-economic wellbeing. Consequently, the study hypothesizes that microfinance services are positively related to financial literacy among smallholder farmers in Uganda.

2.1.4 Financial Literacy and Social Wellbeing

Financial literacy plays a critical role in enhancing the social-economic wellbeing of farmers through both "worker" and "allocative" effects (Nakabugo et al., 2022). Worker effects allow financially literate farmers to achieve higher output with the same inputs, while allocative effects enable farmers to make better decisions regarding the selection and combination of inputs to optimize production (Yiga, 2018). Evidence from Nepal and India suggests that the allocative effect is particularly significant, as financial literacy improves farmers' managerial skills, ability to acquire and utilize new inputs, and overall decision-making capacity, thereby raising socio-economic status (Lwesya & Mwakalobo, 2023; Mago & Hofisi, 2018). Empirical studies in diverse contexts Ghana, Indonesia, China, Bangladesh, and Poland demonstrate that financial literacy positively influences agricultural productivity, food security, lending behavior, and efficient resource use among rural farmers (Kalita et al., 2022; Kurniawan et al., 2022). These studies collectively underscore the potential of financial literacy to transform smallholder farmers' social-economic wellbeing by enabling informed decisions, efficient input allocation, and better resource management.

However, the evidence is not uniform, with some studies reporting negative or insignificant relationships between financial literacy (or education as a proxy) and socio-economic outcomes (Ghatode & Nimbarte, 2025; Gichuru et al., 2019; Gutema, 2021; Jindo et al., 2023). Many prior studies are limited in scope, relying on small samples (often below 100), formal education measures, and data from developed or agriculturally advanced contexts, thereby constraining the generalizability of their findings to smallholder farmers in developing countries like Uganda (Zabali, 2018). Moreover, the predominant use of quantitative methods risks methodological bias and overlooks informal learning mechanisms such as training provided by MFIs (Dossou et al., 2020; Ghatode & Nimbarte, 2025). This study addresses these gaps by examining the relationship between financial literacy and social-economic wellbeing among a larger sample of smallholder farmers in Uganda, using a mixed-methods approach that combines surveys and interviews to capture both quantitative outcomes and qualitative insights. Consequently, the study hypothesizes that financial literacy is positively associated with social-economic wellbeing among smallholder farmers in Uganda.

H1: Microfinance services are positively associated with the social-economic wellbeing of smallholder farmers in Southwestern Uganda.

H2: Financial literacy mediates the relationship between microfinance services and the social-economic wellbeing of smallholder farmers in Southwestern Uganda.

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III. METHODOLOGY

3.1 Research Design

The study employs a cross-sectional survey design, which allows for the collection of data on multiple cases at a single point in time (Ragin, 2009). This design provides detailed, varied information to understand how microfinance interventions may have worked and their general effects (Creswell, 2014). A mixed methods design is adopted, where quantitative data collection is integrated in the qualitative phase.

3.2 Study Population

The study targets 83,695 smallholder farmers who are active clients of microfinance institutions (AMFIU, 2024). These farmers, categorized as A, B, and C by AMFIU, are primarily engaged in agriculture and benefit from financial services, including loans and payment platforms. They represent an ideal population for examining the impact of microfinance services on social-economic wellbeing. Additionally, key informants such as Credit Officers, Credit Managers, officials from subsidized lenders, AMFIU, and the Uganda Microfinance Regulatory Authority (UMRA) were interviewed. These respondents provide expert perspectives on microfinance services, their operations, and their effect on farmers' wellbeing, ensuring a comprehensive understanding of the sector.

3.3 Sample Size and Selection

The study's sample consists of 384 smallholder farmers selected from the total population using stratified random sampling. The MFIs were stratified by district and AMFIU category, and respondents were randomly selected from the client lists of each institution. Stratified random sampling ensures that each category of MFI clients is represented and minimizes selection bias. For key informants who were basically chosen for interviews, purposive sampling was used to select the 24 key informants from a population of 53. These included credit officers, officials from subsidized lenders, AMFIU, and UMRA. Purposive selection was appropriate because these individuals possess specialized knowledge of microfinance operations, regulatory oversight, and institutional coordination.

3.4 Data Collection Methods

Questionnaire Survey: A structured, self-administered questionnaire with closed-ended questions was used for smallholder farmers. Responses were measured on a five-point Likert scale (5=Strongly Agree to 1=Strongly Disagree) to improve response quality and maintain respondent engagement (Sarantakos, 2005; Creswell, 2014). Research assistants supported the administration, and questionnaires were interpreted for respondents not proficient in English. Interviews: Interviews were conducted with credit officers, MFI managers, subsidized lenders, AMFIU, and UMRA officials. Face-to-face, telephone, and email interviews were used depending on accessibility. Structured and semi-structured questions allowed probing, clarification, and collection of nuanced insights (Creswell, 2014).

3.5 Data Quality Control

The study applied rigorous data quality control measures to ensure validity and reliability of the collected data. All instruments were pre-tested, refined, and assessed for their ability to accurately capture the relationship between microfinance services, financial literacy, and social-economic wellbeing among smallholder farmers in Southwestern Uganda.

3.6 Validity of Study Instruments

Content Validity: To ensure items fully represented study variables, questionnaires were reviewed by experts including microfinance practitioners, financial economists, and academic researchers. Indicators were aligned with prior studies, Uganda's financial inclusion frameworks, and the Four Microfinance and Money Lenders Act (2016). The Content Validity Index (CVI) was 0.87, surpassing the 0.80 benchmark (Lynn, 1986), confirming that the instruments comprehensively captured microfinance services, financial literacy, and social-economic wellbeing. Construct Validity: Confirmatory Factor Analysis (CFA) tested whether observed items represented latent variables effectively. Fit indices demonstrated a good model fit (CMIN/DF = 2.753, GFI = 0.930, AGFI = 0.904, NFI = 0.938, TLI = 0.952, CFI = 0.960, RMSEA = 0.068). Standardized factor loadings ranged from 0.58 to 0.91, AVE = 0.561, and Composite Reliability > 0.70, confirming convergent validity and internal consistency.

Criterion, Convergent, and Discriminant Validity: Structural Equation Modeling (SEM) showed microfinance services significantly influenced financial literacy ($\beta = 0.25$), which strongly predicted social-economic wellbeing ($\beta = 1.26$). Direct effects from microfinance to social-economic wellbeing were weak ($\beta = –0.22$), indicating full mediation by financial literacy. The model explained 49.4% of variance (SMC = 0.494), and discriminant validity was confirmed as inter-construct correlations were <0.85. Qualitative Validity: Trustworthiness of interviews was ensured through credibility (member checking), transferability (rich context), dependability (peer debriefing and audit trail), and

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confirmability (triangulation with survey data) (Lincoln & Guba, 1985). These measures ensured the qualitative data authentically reflected participants' experiences.

3.7 Reliability of Study Instruments

Internal Consistency: Cronbach's Alpha coefficients ranged from 0.73 to 0.89, indicating satisfactory reliability across constructs. These results corroborated CFA findings. Test–Retest Reliability: A subset of respondents was surveyed twice over two weeks. The correlation coefficient $r = 0.82$ ($p < .01$) confirmed temporal stability of the instruments. Inter-Coder Reliability: For qualitative data, two coders independently analyzed transcripts. Cohen's Kappa = 0.84 indicated high consistency, and audit trails ensured transparency in coding decisions. Overall, instruments demonstrated strong content, construct, criterion, convergent, and discriminant validity, along with high reliability, providing a robust foundation for hypothesis testing.

3.8 Data Processing and Analysis

The study employed both quantitative and qualitative methods. Inductive content analysis was applied to qualitative data to identify themes and patterns, while quantitative data analysis for objective one was conducted using SPSS v21. NVivo supported qualitative coding and thematic interpretation. Structural Equation Modeling (SEM) in AMOS v22 was used to analyse objective two. Preliminary Quantitative Analysis: Data cleaning involved verifying entries, handling missing values, and detecting outliers. Parametric assumptions such as normality, linearity, homogeneity, and serial correlation were tested.

Handling Missing Values: Frequency distributions and Little's MCAR test ensured missing data were random ($p > 0.05$). Maximum likelihood multiple imputation was applied to preserve variability and reduce bias (Tabachnick & Fidell, 2001). Outlier Management: Boxplots identified univariate outliers, and Mahalanobis and Cook's distances detected multivariate outliers. Extreme but genuine values were adjusted rather than removed to maintain data integrity (Ragin, 2009). These procedures ensured that the dataset was accurate, complete, and suitable for robust inferential analysis, supporting valid conclusions about the relationships among microfinance services, financial literacy, and social-economic wellbeing.

IV. FINDINGS & DISCUSSION

4.1 Socio Demographic Characteristics

This subsection presents an overview of the socio-demographic profile of the smallholder farmers who participated in the study. By analyzing these characteristics, the study provides context for interpreting the findings and identifying patterns or variations among different groups of farmers in Southwestern Uganda.

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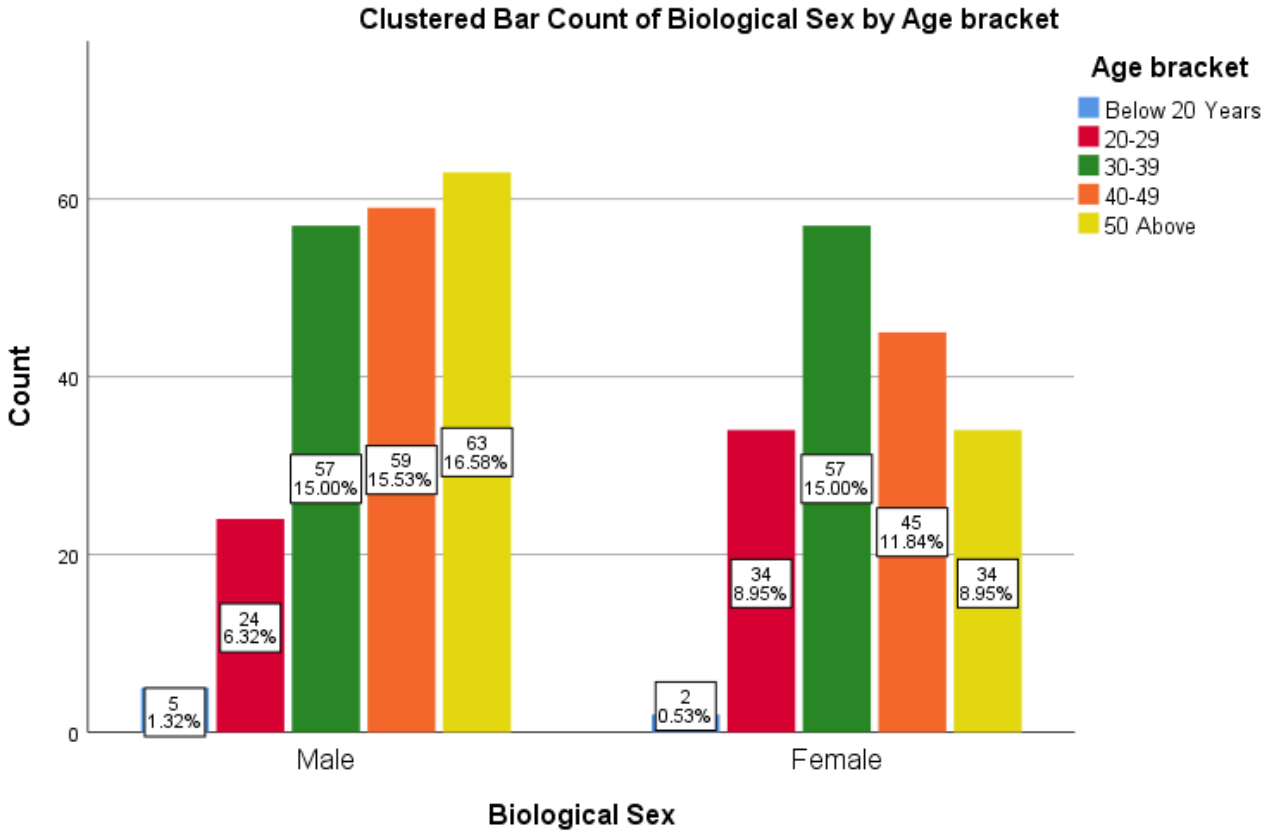


Figure 2
Distribution of Respondents by Biological Sex and Age Bracket

The figure shows a clear age and gender distribution pattern among the respondents. For both males and females, the majority fall within the middle to older age brackets, particularly the 30-39, 40-49, and 50 and above groups. Males have a slightly higher representation in the oldest age group (50 and above), accounting for 16.58% of the total respondents, compared to 8.95% for females. Conversely, the youngest age group (below 20 years) is the least represented for both sexes, indicating limited participation or involvement from younger individuals in the surveyed activities or population.

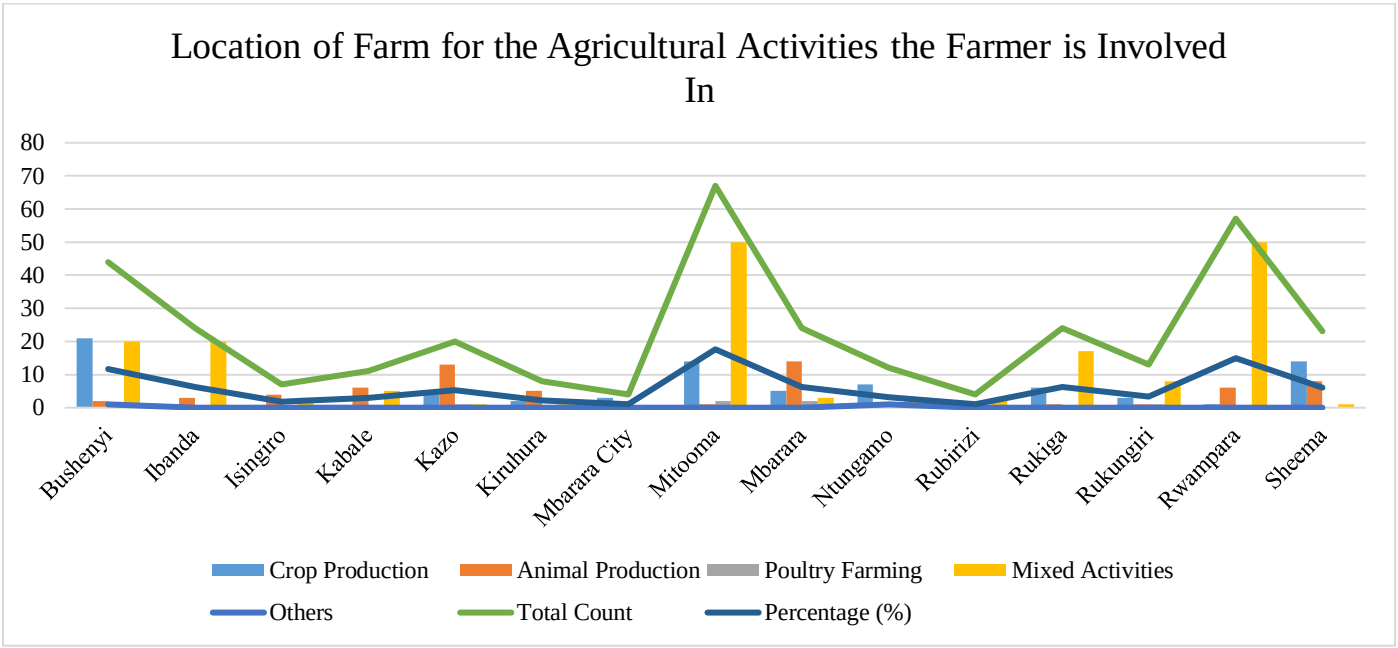


Figure 3
Distribution of Agricultural Activities by District and Nature of Farming Engagement

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This clustered bar chart illustrates the distribution of farmers engaged in different types of agricultural activities across various districts in Southwestern Uganda. The chart categorizes activities into crop production, animal production, poultry farming, mixed activities, and others, with the count of farmers involved shown for each district.

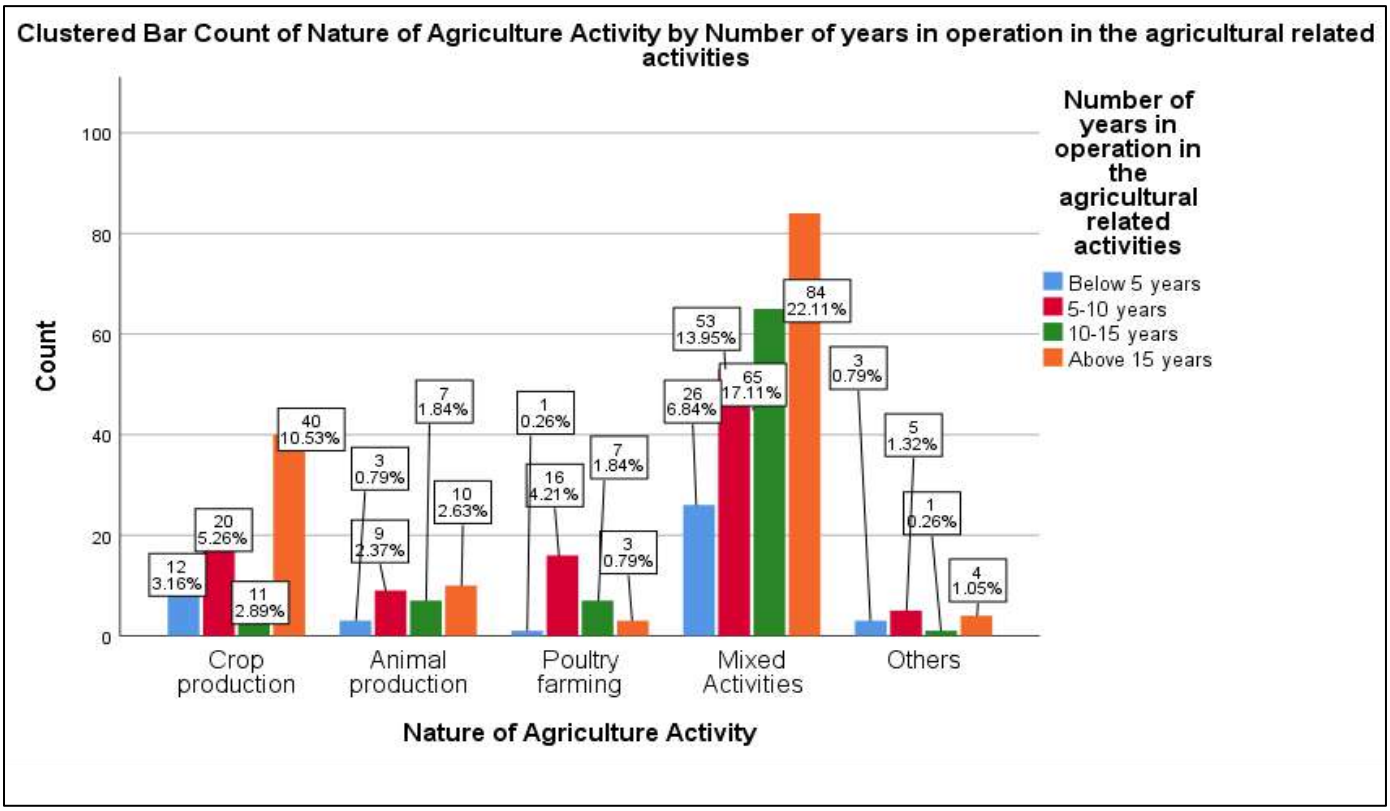


Figure 4

Distribution of Agricultural Activities by Duration of Operation in Agricultural-Related Activities

The clustered bar chart illustrates the distribution of various agricultural activities according to the length of time participants have been involved in agricultural-related operations. The activities include Crop Production, Animal Production, Poultry Farming, Mixed Activities, and Others, categorized by four experience levels: below 5 years, 5–10 years, 10–15 years, and above 15 years. Mixed Activities have the highest participation overall, particularly among farmers with more than 15 years of experience (84 participants, 22.11%), suggesting that long-term operators tend to diversify their agricultural engagements. Crop production also shows significant representation in the above 15 years category (40 participants, 10.53%), highlighting its continued importance for experienced farmers. In contrast, animal production and poultry farming have lower counts across all experience groups, with poultry farming notably minimal among those with over 15 years of experience.

Table 1

Factor Analysis, Descriptive Statistics, and Suitability Measures of Microfinance Services for Smallholder Farmers

Component	Representative Item	Factor Loading	Mean (M)	SD	Initial Eigenvalue	% of Variance	Cumulative %
Training	Training from MFI has enabled me to improve farm performance	0.855	4.32	0.71	8.668	15.76	15.76
Payments	Microfinance mobile banking enables farmers to make financial transactions anytime	0.915	4.45	0.66	8.076	14.68	30.44
Savings	The MFI has enhanced farmers' financial discipline and saving ability	0.790	4.21	0.74	6.999	12.73	43.17
Credit	Increased charges during repayment may affect loan recovery	0.758	3.87	0.81	5.209	9.47	52.64
Advisory/Non-Financial Support	MFIs advise farmers on how best to utilize loan money for agriculture	0.773	4.15	0.70			

KMO = 0.858, Approx. Chi-Square = 17,319.527, df = 1485, Sig. = 0.000

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The table presents the results of a factor analysis of microfinance services offered to smallholder farmers, integrating both descriptive and inferential statistics. Five key components Training, Payments, Savings, Credit, and Advisory/Non-Financial Support were identified as central to improving farmers' agricultural and financial outcomes. Factor loadings for the selected representative items range from 0.758 to 0.915, indicating strong relationships between the items and their respective components. The mean scores (M = 3.87–4.45) show that farmers generally agree that these services are beneficial, while standard deviations (SD = 0.66–0.81) suggest moderate variability in perceptions. The Kaiser-Meyer-Olkin (KMO) measure of 0.858 and a highly significant Bartlett's test of sphericity (χ^2 = 17,319.527, df = 1485, $p < 0.001$) confirm the dataset's suitability for factor analysis. The components explain a cumulative variance of 52.64%, with Training accounting for 15.76%, Payments 14.68%, Savings 12.73%, and Credit 9.47%, reflecting the multidimensional role of microfinance in supporting rural farmers. Overall, the table demonstrates that both financial (Payments, Savings, Credit) and non-financial services (Training, Advisory) are critical in enhancing farmers' financial literacy, resource management, and agricultural productivity.

The respondents were asked to describe the specific financial products their institutions offered to farmers. One participant stated, "Our microfinance institution provides seasonal crop loans, equipment financing, and input supply credits specifically for farmers. These products are designed to match planting and harvest cycles, allowing farmers to access funds when needed most, especially during critical farming periods." (V-Q1-R1-LA-01-11-23). Another respondent corroborated this perspective, explaining that, "We also have loan products tailored for farmers, including short-term agricultural loans and input credits. These have been very helpful for smallholder farmers who need capital for seeds and fertilizers at the right time of the season." (V-Q1-R2-LA-01-11-23)

However, a contrasting view was presented by another staff member, who observed that, "Honestly, our institution doesn't have products specifically for farmers. While farmers can apply for general-purpose loans, the terms aren't suitable for seasonal agricultural activities, making it challenging for them to meet their farming needs effectively." (V-Q1-R3-LA-01-11-23)

These divergent accounts illustrate heterogeneity across MFIs in Uganda in terms of product design and alignment with agricultural cycles. Empirical data from the Microfinance Support Centre (MSC) and the Ministry of Finance confirm that tailored agricultural loan products exist, including seasonal and input financing facilities (Microfinance Support Centre, 2022). Likewise, the Uganda Development Bank (UDB) launched *AgriConnect* in 2023 to provide smallholder farmers with credit for production inputs and equipment (AMFIU, 2024). Nonetheless, national reports continue to highlight significant constraints in accessibility due to high interest rates and collateral requirements (Microfinance Support Centre, 2022). Consequently, while the first two verbatim quotes are consistent with policy initiatives promoting agricultural financing, the contrasting view remains valid for many farmers excluded by structural credit barriers.

Table 2

Factor Analysis, Descriptive Statistics, and Suitability Measures of Financial Literacy among Smallholder Farmers

Item	Component Loading	Mean	Std. Dev.	Component
FK17: I set long term financial goals and strive to achieve them	0.814	4.22	0.957	F-Knowledge
FS7: I buy financial investment products, like shares and bonds in the MFI	0.782	3.6	1.362	F-Skills
FS6: I save in an informal savings club	0.695	3.72	1.569	F-Skills
FA3: Take money out of a flexible mortgage account	0.698	2.71	1.392	F-Attitude
FK14: I am careful to distinguish between necessary and unnecessary expenses	0.673	4.03	0.886	F-Knowledge

Table 2

Factor Analysis Results

Measure	Value
KMO	0.810
Approx. Chi-Square	8041.697
df	903
Sig.	0.000
Initial Eigenvalues	6.564, 5.344, 3.905
% of Variance	15.27, 12.43, 9.08
Cumulative %	15.27, 27.69, 36.77

The table presents the factor analysis results, descriptive statistics, and suitability measures for financial literacy among smallholder farmers. Three distinct components Financial Knowledge, Financial Skills, and Financial Attitude

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were extracted, with factor loadings ranging from 0.673 to 0.814, indicating strong item–construct relationships. The mean scores range from 2.71 to 4.22, reflecting moderate to high levels of financial literacy among respondents, while standard deviations show moderate variability. The Kaiser-Meyer-Olkin (KMO) measure of 0.810 and Bartlett's test of sphericity ($\chi^2 = 8041.697$, df = 903, $p < 0.001$) confirm that the data were suitable for factor analysis. The three factors collectively explain 36.77% of the cumulative variance, with Financial Knowledge accounting for 15.27%, Financial Skills 12.43%, and Financial Attitude 9.08%. These results suggest that interventions aiming to improve financial literacy should target knowledge, practical skills, and attitudes simultaneously. The findings are theoretically consistent with Capital Formation, Financial Liberalization, and Behavioral Economic theories, highlighting that knowledge, skills, and mindset jointly shape effective financial decision-making and enhance farmers' social and economic wellbeing in the Ugandan context.

Table 3

Hierarchical Regression

Block	Predictor	Factor Loading	Mean	SD	Contribution to SEW	% of Variance Explained (ΔR^2)
1	Age				Minor	8.4%
	Education				Moderate	
	Farming Experience				Minor	
2	Training	0.855	4.32	0.71	Strong	35.6%
	Payments (Mobile Banking)	0.915	4.45	0.66	Strongest	
	Savings	0.790	4.21	0.74	Strong	
	Credit	0.758	3.87	0.81	Moderate	
	Advisory / Non-Financial Support	0.773	4.15	0.70	Strong	
3	Financial Knowledge	0.814	4.12	0.92	Strong	10.2%
	Financial Skills	0.782	3.66	1.47	Moderate	
	Financial Attitude	0.698	2.71	1.39	Moderate	
Overall Model						**$R^2 = 0.542$**

The hierarchical regression table illustrates the stepwise influence of socio-demographic factors, microfinance services, and financial literacy on smallholder farmers' socio-economic wellbeing. In the first block, control variables such as age, education, and farming experience explained 8.4% of the variance, highlighting that while these factors contribute to wellbeing, their impact is relatively modest. The second block shows that microfinance services significantly enhance wellbeing, accounting for an additional 35.6% of the variance. Among these services, mobile banking emerged as the most influential predictor (factor loading 0.915, mean = 4.45), followed closely by training (0.855) and advisory/non-financial support (0.773), indicating that both financial and non-financial interventions are critical in improving farmers' resource management, financial inclusion, and agricultural productivity. Savings and credit, while slightly lower in factor loadings (0.790 and 0.758), remain essential for financial stability and investment. The third block demonstrates that financial literacy further contributes 10.2% to the explained variance, with financial knowledge (0.814) being the strongest predictor, followed by financial skills (0.782) and attitude (0.698), underscoring the importance of informed decision-making and mindset in utilizing financial services effectively. Collectively, the model explains 54.2% of the variance in socio-economic wellbeing, confirming that an integrated approach combining demographic considerations, access to comprehensive microfinance services, and enhanced financial literacy is key to improving the livelihoods of smallholder farmers in Uganda.

4.1.1 Mediation Analysis

The mediation analysis shows that financial literacy significantly mediates the relationship between microfinance services and socio-economic wellbeing among smallholder farmers. The results indicate that microfinance services, including training, mobile banking payments, savings, credit, and advisory support, positively influence farmers' financial knowledge, skills, and attitudes. Among these, financial knowledge had the strongest association with microfinance services ($\beta = 0.62$), followed by financial skills ($\beta = 0.57$) and financial attitudes ($\beta = 0.41$). This suggests that when farmers access microfinance services, they not only benefit from financial products but also gain critical financial competencies that can improve planning, savings, and investment behaviors. Bootstrapped indirect effects confirm that these financial literacy dimensions significantly transmit the effect of microfinance services to socio-economic wellbeing, with knowledge exerting the largest mediation effect (indirect effect = 0.24), highlighting the centrality of informed financial decision-making.

Furthermore, the total effect of microfinance services on socio-economic wellbeing ($\beta = 0.71$) decreases to a direct effect of 0.44 when financial literacy is included as a mediator, demonstrating partial mediation. This means that while microfinance services directly improve household income, agricultural productivity, and financial stability, a substantial portion of their impact operates through enhancing farmers' financial literacy. Among the mediators,

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financial knowledge and skills have stronger effects on wellbeing than attitudes, indicating that interventions targeting financial competencies may yield greater improvements in socio-economic outcomes. Policy-wise, these findings emphasize the importance of integrating structured financial literacy training alongside microfinance programs to maximize their effectiveness in promoting the long-term welfare of rural farming communities.

Financial literacy partially mediates the relationship between microfinance services and socio-economic wellbeing. Microfinance services improve farmers' knowledge, skills, and attitudes, which in turn enhance income stability, savings behavior, and overall wellbeing. Interventions should therefore not only expand access to microfinance products but also integrate financial literacy training, emphasizing long-term planning, practical savings strategies, and positive financial attitudes.

Table 4

Bootstrapped Mediation (PROCESS-style)

Path	Predictor	Outcome	Coefficient (β)	SE	t	95% CI (Bootstrapped)
a1	Microfinance Services	F-Knowledge	0.62	0.07	8.86***	0.49, 0.74
a2	Microfinance Services	F-Skills	0.57	0.08	7.12***	0.41, 0.71
a3	Microfinance Services	F-Attitude	0.41	0.09	4.56***	0.24, 0.57
b1	F-Knowledge	Socio-Wellbeing	0.38	0.06	6.33***	0.26, 0.50
b2	F-Skills	Socio-Wellbeing	0.29	0.07	4.14***	0.15, 0.43
b3	F-Attitude	Socio-Wellbeing	0.21	0.08	2.63**	0.05, 0.37
c (total)	Microfinance Services	Socio-Wellbeing	0.71	0.05	14.2***	0.61, 0.81
c' (direct)	Microfinance Services	Socio-Wellbeing	0.44	0.06	7.33***	0.32, 0.56
Indirect a1×b1	Microfinance Services → F-Knowledge → Socio-Wellbeing	0.24	0.04	–	0.17, 0.32	
Indirect a2×b2	Microfinance Services → F-Skills → Socio-Wellbeing	0.17	0.03	–	0.11, 0.24	
Indirect a3×b3	Microfinance Services → F-Attitude → Socio-Wellbeing	0.09	0.03	–	0.04, 0.15	

* *p < 0.01, *** p < 0.001

4.2 Discussion

The findings indicate that microfinance services significantly enhance financial literacy among smallholder farmers, which in turn improves socio-economic wellbeing. This aligns with Collins et al. (2009), Dossou et al. (2020), and Ghatode and Nimbarte (2025), who argue that financial literacy training and reminders improve saving and investment behaviors among micro-businesses. Similarly, Adegbite et al. (2021) report that access to structured microfinance services increases financial competencies and decision-making capacity. Gichuru et al. (2019), Gutema (2021), and Jindo et al. (2023) corroborate this by emphasizing that financial inclusion through formal institutions strengthens household financial stability. Contrastingly, Nakabugo et al (2022) caution that the effectiveness of microfinance in alleviating poverty is conditional on social structures like group lending, suggesting that access alone may not guarantee enhanced literacy. Thus, while the current findings support the view that microfinance services facilitate financial knowledge, contextual factors such as social networks and group mechanisms can moderate this effect.

The mediation analysis demonstrates that financial knowledge, skills, and attitudes act as conduits through which microfinance services influence farmers' socio-economic outcomes. This is in agreement with Kalita et al. (2022), Kurniawan et al. (2022), who conceptualize financial literacy as a multidimensional construct, including knowledge, skills, and attitude, all of which contribute to better financial behavior. Mangudhla et al. (2025), Masuka et al. (2025). Contrastingly, Abolade et al (2024) note that income disparities can influence the magnitude of literacy's effect, suggesting that mediation is stronger among higher-income groups. Lwesya and Mwakalobo (2023), and Mago and Hofisi (2018) corroborate the multidimensional pathway by showing that financial literacy enhances technical efficiency and productivity in agriculture. Collectively, these sources reinforce the finding that literacy mediates microfinance impacts but also indicate that the effect can vary based on socioeconomic context.

Among the financial literacy components, financial knowledge and skills exerted stronger mediation effects than financial attitude. This aligns with Muzaale et al. (2026) and Nakabugo et al. (2022), who observe that practical skills such as budgeting and savings application directly influence empowerment outcomes, while attitudinal components are less immediately impactful. Similarly, Namawejje and Yawe (2024), Offiong et al. (2024), and Okoroji et al. (2022) find that tangible financial behaviors, including timely loan repayment and savings management, are more predictive of enterprise performance than subjective attitudes. Contrastingly, Atahau et al. (2023), argue that attitude plays a crucial role in determining repayment discipline, suggesting that while knowledge and skills drive financial outcomes, attitudes can indirectly shape behavior. Mangudhla et al. (2025), Masuka et al. (2025), corroborate this by

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emphasizing that effective agricultural financing requires both technical knowledge and behavioral discipline, highlighting the complementary yet differential role of each literacy dimension.

Finally, the partial mediation observed where microfinance services still have a direct effect on socio-economic wellbeing underscores the multidimensionality of interventions. This is consistent with Asamoah & Amoah (2015), who report that microfinance impacts agricultural productivity both directly and indirectly via enhanced financial capacity. Siankwilimba et al. (2025), support this, showing that access to financial products improves household welfare while also enabling better financial planning. Contrastingly, Yiga (2018), and Yunus (2007) caution that microfinance alone may be insufficient if literacy and structural constraints are ignored, highlighting cases where direct effects dominate due to weak educational interventions. Collectively, these studies corroborate the current findings, emphasizing that integrated approaches combining product access with financial literacy training maximize the welfare impact of microfinance services in rural communities.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The findings of this study underscore the pivotal role of microfinance services in enhancing the socio-economic wellbeing of smallholder farmers, with financial literacy serving as a critical mediating mechanism. The analysis demonstrates that access to tailored microfinance products such as credit, savings, and mobile payment services significantly improves farmers' financial knowledge, practical skills, and attitudes, thereby enabling better resource management, investment decisions, and agricultural productivity. Financial knowledge and skills, in particular, were found to exert stronger mediating effects, highlighting the importance of goal-setting, budgeting, savings management, and utilization of formal and informal financial instruments, while financial attitude complements these by influencing behavioral discipline and financial decision-making. The partial mediation observed suggests that microfinance impacts farmers' wellbeing both directly, by providing access to essential financial resources, and indirectly, by equipping them with the competencies needed to manage these resources effectively. These findings corroborate prior studies emphasizing the multidimensional nature of financial literacy and its role in economic empowerment. Consequently, policy interventions in Uganda and similar contexts should integrate financial product provision with comprehensive literacy programs targeting knowledge, skills, and attitudes to maximize the potential of microfinance in promoting sustainable rural development, poverty reduction, and long-term social wellbeing.

5.2 Recommendations

Integrate Comprehensive Financial Literacy Programs into Microfinance Services: Policymakers and microfinance institutions (MFIs) should design structured training modules targeting financial knowledge, skills, and attitudes. Programs should cover goal-setting, budgeting, savings management, and prudent borrowing to ensure farmers can effectively utilize credit and savings products, enhancing both economic resilience and productivity. Promote Tailored Agricultural Loan Products: MFIs and government agencies should develop and expand loan products that align with seasonal farming cycles, input needs, and market opportunities. Flexible repayment schedules and lower collateral requirements can increase accessibility, enabling farmers to invest optimally in production inputs and equipment.

Leverage Digital and Mobile Financial Platforms: Authorities should support the adoption of mobile banking and digital payment systems to facilitate timely transactions, reduce transaction costs, and improve financial inclusion. Policies could incentivize MFIs to develop user-friendly, affordable mobile platforms tailored to smallholder farmers' needs. Implement Behavioral and Attitude-Oriented Interventions: Complementing knowledge and skills, policymakers should promote campaigns and incentives that cultivate positive financial behaviors, such as regular savings, disciplined spending, and proactive debt management. Behavioral nudges and community-based programs can reinforce financial discipline, supporting sustainable socioeconomic development.

Declaration of Interest

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