Financial Pathways to Sustainable Farmers' Future

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ABSTRACT

Financial inclusion is a critical determinant of agricultural productivity and economic resilience among smallholder rice farmers in developing contexts, including the Philippines. Despite existing initiatives, farmers often face barriers such as limited access to formal credit, inadequate infrastructure, and high service costs, which constrain effective utilization of financial services. This study aimed to quantitatively assess the current state, outcomes, and influencing factors of financial inclusion among rice farmers in San Miguel, Surigao del Sur.

A descriptive-correlational quantitative research design was employed. Data were collected using a structured survey questionnaire administered to 321 rice farmers selected through stratified random sampling across six barangays. The instrument captured respondents' demographic profiles, access to financial services, financial literacy, and utilization of credit, savings, insurance, and digital platforms. Instrument validity was ensured through expert review, and reliability was confirmed with a Cronbach's alpha of 0.87. Quantitative data were analyzed using descriptive statistics, one-way ANOVA, t-tests, and Pearson correlation to determine levels, differences, and relationships among variables.

Results indicate that financial inclusion among rice farmers was moderate, with financial literacy being the strongest component. Utilization of services remained constrained by infrastructure gaps, distance, and affordability. Significant relationships were observed between technology adoption and financial inclusion outcomes ($r = 0.489–0.523$, $p < 0.001$) and between geographical proximity to financial institutions and outcomes ($r = 0.362–0.438$, $p < 0.001$). Demographic variables such as income, education, and employment status also significantly influenced access and affordability of financial services.

The findings highlight that enhancing financial inclusion requires targeted interventions focusing on financial literacy, credit accessibility, cooperative support, digital readiness, and risk protection. These quantitative insights provide a data-driven foundation for policy and program design aimed at improving utilization of financial services, economic empowerment, and sustainable agricultural development.

Keywords: Financial Inclusion, Rice Farmers, Agricultural Credit, Economic Empowerment, Digital Finance, Cooperative Support

INTRODUCTION

Agriculture constitutes a cornerstone of many developing economies, including the Philippines, providing livelihoods, food security, and socio-economic stability. Among agricultural sectors, rice production remains vital, underpinning both local economies and household sustenance. However, smallholder rice farmers often confront systemic challenges that threaten productivity and long-term economic resilience. Limited access to formal financial services, exposure to climatic risks, and market volatility constrain their ability to invest in quality inputs, manage operational costs, and adopt sustainable farming practices (Fowowe, 2020; Peprah et al., 2021). These constraints underscore the critical role of financial inclusion, which encompasses the accessibility, affordability, and utilization of financial services to support economic participation and reduce vulnerability (Demirgüç-Kunt et al., 2020; Ozili, 2023).

Financial literacy, the capacity to understand, evaluate, and manage financial resources, is central to effective participation in inclusive financial systems. Empirical evidence suggests that financially literate farmers are better able to budget, save, use credit, and mitigate risks, thereby enhancing both farm productivity and household welfare (Sanglay et al., 2021; International Fund for Agricultural Development, 2020). Concurrently, agricultural credit pathways, including cooperative lending, microfinance institutions, and digital financing platforms, serve as essential mechanisms for enabling investment in farm inputs, risk management, and income stabilization (Batt, 2019; Li et al., 2025). Yet, disparities in digital finance adoption and access to cooperatives further complicate the equitable distribution of benefits, particularly in geographically remote or underserved communities (ASEAN, 2021; Ramos, 2021).

Despite initiatives by government agencies, cooperatives, and financial institutions, persistent barriers such as inadequate infrastructure, procedural complexity, affordability constraints, and limited awareness continue to impede full financial inclusion (Picpican et al., 2024; Bendaña et al., 2025). These gaps reveal a significant research problem: while financial programs exist, their utilization and impact remain uneven across farmer demographics, highlighting the need for context-specific, evidence-based frameworks that integrate literacy, credit access, cooperative support, digital tools, and risk mitigation.

Although numerous studies have examined financial literacy, agricultural credit, digital finance adoption, and cooperative participation among farmers, most investigations have treated these dimensions independently and have focused primarily on access to financial services rather than their combined influence on livelihood outcomes. Existing literature in the Philippine context remains fragmented, with limited empirical evidence explaining how financial literacy, technology adoption, geographical accessibility, institutional support, and socio-demographic characteristics collectively shape financial inclusion outcomes among rice farmers in rural municipalities. Furthermore, previous studies have concentrated on national or regional analyses, leaving a scarcity of localized evidence from geographically isolated agricultural communities such as San Miguel, Surigao del Sur.

This study addresses these gaps by providing an integrated quantitative assessment of financial inclusion among rice farmers using multiple dimensions of access, utilization, affordability, institutional support, and digital readiness. The study further contributes a context-specific framework, the RICE-FIN PLUS Framework, which synthesizes empirical findings into a practical model for improving financial inclusion, economic resilience, and sustainable agricultural livelihoods. The novelty of this research lies in its simultaneous examination of financial inclusion determinants and outcomes within a single analytical framework and its development of an evidence-based intervention model specifically designed for rice-farming communities in rural Philippine settings.

Research Objectives

The general objective of this study is to strengthen financial inclusion, economic resilience, and sustainable livelihood outcomes among rice farmers in San Miguel, Surigao del Sur, through a data-driven assessment of access, utilization, and influencing factors of financial services. This general aim provides the foundation for evidence-based recommendations and the development of a structured framework to enhance inclusive agricultural finance.

1. To determine the demographic and socio-economic profile of rice farmers in San Miguel, Surigao del Sur, including age, sex, civil status, educational attainment, sources of income, and employment status.

2. To assess the current state of financial inclusion among rice farmers in terms of the availability and affordability of financial services, financial literacy, government and policy support, and infrastructure development.

3. To examine significant differences in the current state of financial inclusion when grouped according to farmers' demographic and socio-economic profiles.

4. To evaluate the extent of outcomes of financial services on rice farmers, specifically economic empowerment, social impact, sustainable development, and utilization of financial services.

5. To analyze the influence of key factors—technology adoption, geographical location, and gender dynamics—on financial inclusion among rice farmers.

6. To determine the significant relationships between the extent of financial inclusion outcomes and the level of influence of technology adoption, geographical location, and gender dynamics.

REVIEW OF RELATED LITERATURE

Financial Access and Agricultural Credit

Access to financial services, particularly credit, is foundational to financial inclusion and farm productivity. Studies demonstrate that formal credit, cooperatives, and microfinance institutions (MFIs) are critical in enabling farmers to invest in inputs and manage risk (Picpican et al., 2024; Girasol et al., 2025). Bendaña et al. (2025) highlight that microfinance improves household consumption stability and enhances resilience to shocks. Despite these benefits, persistent barriers—high interest rates, collateral requirements, and inconsistent loan availability—limit full participation. Evidence from the Philippines confirms that informal lending remains prevalent where formal access is constrained, underscoring the need for accessible, context-sensitive credit pathways (Manalili, 2021; Ambong et.al, 2022). Collectively, these findings indicate that while credit access is necessary, structural inefficiencies and operational gaps impede optimal financial inclusion.

Financial Literacy and Farmer Behavior

Financial literacy significantly influences farmers' engagement with financial services. Literate farmers demonstrate better budgeting, savings, and loan management, resulting in improved farm productivity (Sanglay et al., 2021; Fronda, 2024). Conversely, limited understanding of loan terms, interest computation, and digital transactions constrains effective utilization of financial products, even when available (International Fund for Agricultural Development, 2020). The literature suggests that literacy interventions must be practical, locally contextualized, and linked to actual farm cycles to translate knowledge into economic outcomes.

Digital and Innovation-Driven Financial Pathways

The adoption of digital financial platforms enhances reach and efficiency, reducing costs and expanding service coverage (Li et al., 2025; Ramos, 2021). Behavioral nudges integrated into mobile banking and e-wallet platforms have shown promise in increasing engagement among marginalized farmers (Pandey, 2025). However, low digital literacy, weak connectivity, and apprehension toward technology remain critical barriers (ASEAN, 2021). These insights highlight the importance of combining digital access with capacity-building to ensure equitable inclusion.

Institutional and Policy Support

Institutional frameworks and government programs shape the implementation and effectiveness of financial inclusion initiatives (Ozili, 2023; Bangko Sentral ng Pilipinas, 2022). Evidence suggests that coordinated policies, transparent program delivery, and tailored support mechanisms increase farmers' participation and utilization of services (Bautista, 2020; Garcia, 2025). Nonetheless, inconsistencies in program rollout and bureaucratic complexities continue to constrain the realization of intended benefits.

Gender and Socio-Demographic Dynamics

Socio-demographic factors, including gender, income, and geographic location, influence financial inclusion outcomes. Studies in the Philippines and comparable contexts indicate that women often face greater exclusion from credit and extension services, limiting their ability to adopt sustainable practices (Pyburn et al., 2023; International Rice Research Institute, 2022). Similarly, farmers in remote areas face infrastructural and logistical barriers, underscoring the need for location-specific interventions.

Synthesis and Research Gap

A critical review of the literature reveals several unresolved issues. First, while financial literacy is consistently identified as a predictor of financial inclusion, studies differ on the extent to which knowledge translates into the actual use of financial services. Some scholars report significant improvements in savings and credit management following literacy interventions, whereas others argue that structural barriers such as distance, affordability, and institutional constraints diminish the practical effects of financial knowledge.

Second, research on digital finance demonstrates substantial potential to expand financial access among rural populations; however, the effectiveness of digital platforms remains contingent on internet connectivity, device ownership, and digital competencies. This suggests that technology adoption alone is insufficient without complementary institutional and educational support.

Third, institutional mechanisms such as cooperatives, government assistance programs, and microfinance services are widely recognized as facilitators of financial inclusion. Nevertheless, inconsistencies in program implementation, bureaucratic procedures, and limited outreach continue to restrict participation among vulnerable farming households.

Finally, existing studies have largely examined these factors independently rather than exploring their combined influence on measurable livelihood outcomes. Consequently, there remains a limited understanding of how financial literacy, technology adoption, institutional support, geographical accessibility, and demographic characteristics interact to influence economic empowerment, social impact, sustainable development, and utilization of financial services. Addressing this gap provides a stronger basis for developing integrated and evidence-based financial inclusion strategies for rice-farming communities.

Theoretical Framework

This study is grounded in theories that explain the relationship between financial inclusion, farmer characteristics, and the outcomes of financial services, providing a conceptual basis for the quantitative research design. The framework emphasizes how structural, behavioral, and institutional factors influence the access, utilization, and impact of financial services among rice farmers in San Miguel, Surigao del Sur.

Sustainable Livelihoods Framework (SLF)

The Sustainable Livelihoods Framework (SLF) posits that sustainable livelihoods depend on access to multiple forms of capital, including financial, human, social, and physical resources (Chambers & Conway, 1992; Scoones, 2009). In the context of this study, financial capital—particularly credit, savings, insurance, and cooperative support—enables farmers to invest in inputs, adopt productive practices, and buffer against risks. Quantitative variables such as economic empowerment, utilization of financial services, and sustainable development outcomes are directly informed by SLF, guiding the measurement of financial inclusion outcomes relative to farmers' access to resources.

Financial Inclusion Theory

Financial Inclusion Theory emphasizes the importance of providing accessible, affordable, and reliable financial services to marginalized populations (Demirgüç-Kunt et al., 2018; Ozili, 2023). In this study, the theory underpins the quantitative assessment of the current state of financial inclusion, including indicators such as availability and affordability of services, financial literacy, government support, and infrastructure. Hypotheses regarding differences in financial inclusion across demographic profiles and correlations with technology adoption, geographical location, and gender dynamics are derived from this theoretical perspective.

Institutional Theory

Institutional Theory explains how policies, regulations, and organizational structures shape the implementation and outcomes of programs (North, 1990; Ozili, 2023). This theory supports the study's examination of institutional factors such as cooperative participation, government assistance, and program accessibility, which

are quantitatively measured and tested for their influence on financial inclusion outcomes. It provides the rationale for including variables such as policy support and infrastructure development in the survey instrument.

Behavioral Finance Considerations

Although traditionally associated with qualitative analysis, select aspects of Behavioral Finance Theory are applicable to quantitative assessment in this study. Specifically, cognitive biases and financial decision-making patterns are operationalized through measurable indicators such as loan utilization, savings behavior, and participation in digital financial services (Kahneman & Tversky, 1979; Shiller, 2003). These variables enable statistical examination of how individual financial behavior mediates the relationship between access to services and measurable outcomes.

Collectively, these theories establish a robust conceptual foundation that links farmer profiles, access to financial services, influencing factors, and quantifiable outcomes. They support the study's quantitative design by guiding variable selection, hypothesis formulation, and interpretation of relationships between financial inclusion indicators and agricultural livelihood outcomes.

Synthesis of Theoretical Bases

The interaction among the theoretical foundations provides a stronger explanation of financial inclusion outcomes than any single theory alone. The Sustainable Livelihoods Framework explains why financial capital contributes to resilience and productivity, while Financial Inclusion Theory explains the mechanisms through which individuals gain access to financial services. Institutional Theory complements these perspectives by emphasizing the role of governance structures, cooperatives, and policy interventions in shaping access opportunities. Meanwhile, Behavioral Finance explains why individuals with similar access conditions may exhibit different utilization patterns due to differences in risk perception, trust, financial confidence, and decision-making behavior.

The integration of these theories suggests that financial inclusion is not merely an issue of service availability. Rather, it is a multidimensional process shaped by the interplay among individual capabilities, institutional arrangements, technological accessibility, and socio-economic contexts. This theoretical integration provides a more comprehensive explanation of the observed findings, particularly the moderate level of financial inclusion despite respondents' relatively high financial literacy. The findings imply that knowledge alone does not guarantee utilization unless supported by favorable institutional conditions, accessible infrastructure, and practical opportunities for participation.

The present study on financial inclusion among rice farmers in San Miguel, Surigao del Sur, is anchored in a coherent set of theories that collectively provide a robust conceptual foundation for the quantitative research design. These theoretical bases—Sustainable Livelihoods Framework (SLF), Financial Inclusion Theory, Institutional Theory, and selected aspects of Behavioral Finance—interact to explain how structural, individual, and institutional factors influence measurable outcomes of financial services.

The Sustainable Livelihoods Framework emphasizes that access to multiple forms of capital, particularly financial capital, determines the sustainability and resilience of farming households (Chambers & Conway, 1992; Scoones, 2009). In the study, variables such as economic empowerment, sustainable development, and utilization of financial services are operationalized to quantify the impact of financial access on livelihood outcomes. SLF thus directly informs the measurement of the outcomes of financial inclusion and provides a theoretical rationale for the study's hypotheses regarding differences in access and utilization across farmer profiles.

Financial Inclusion Theory underlines the necessity of accessible, affordable, and reliable financial services for marginalized populations (Demirgüç-Kunt et al., 2018; Ozili, 2023). This theory supports the study's focus on quantitative indicators, including the availability and affordability of financial services, financial literacy, government support, and infrastructure development. It provides justification for examining significant

relationships between these indicators and socio-demographic variables, such as age, education, income, and employment, and for guiding the formulation of research hypotheses and survey items.

Institutional Theory explains how organizational structures, policies, and governance influence the accessibility and effectiveness of financial services (North, 1990; Ozili, 2023). Quantitative assessment of institutional variables—such as cooperative participation, policy support, and program delivery—enables empirical testing of the extent to which institutional factors predict variations in financial inclusion outcomes.

Finally, selected constructs from Behavioral Finance Theory operationalize decision-making patterns in measurable terms, including loan utilization, savings behavior, and participation in digital financial services (Kahneman & Tversky, 1979; Shiller, 2003). By translating cognitive and behavioral tendencies into quantitative variables, the study examines how individual behaviors mediate the relationship between access to financial services and economic outcomes.

Collectively, these theories provide a multidimensional, quantitative framework. They justify the selection of variables, guide hypothesis formulation, and ensure that the research design captures the interplay between access, behavior, institutional support, and measurable outcomes of financial inclusion. This integrated theoretical foundation validates the study's quantitative methodology, supporting rigorous analysis and interpretation of statistically derived relationships.

METHODOLOGY

Research Design

This study employed a quantitative descriptive-correlational design to examine the current state, outcomes, and factors influencing financial inclusion among rice farmers in San Miguel, Surigao del Sur. The design allows for the measurement and statistical analysis of relationships between independent variables—such as technology adoption, geographical location, gender dynamics, and socio-demographic characteristics—and dependent variables, including economic empowerment, social impact, sustainable development, and utilization of financial services. This design aligns with the study objectives and facilitates hypothesis testing regarding significant differences and associations among measured variables.

Population and Sample

The study population consisted of 1,624 registered smallholder rice farmers across six barangays: Bolhoon, Libas Sud, Mahayag Maitum, Patong, Poblacion, and San Roque. A stratified random sampling technique was used to ensure proportional representation from each barangay, reflecting variations in farm size, income, and access to financial services. The sample comprised 321 respondents, representing approximately 20% of the population. This sample size provides sufficient statistical power for descriptive analyses, ANOVA, and Pearson correlation tests while maintaining feasibility for data collection.

Data Collection Instrument

Data were collected using a researcher-developed structured questionnaire, designed in English and translated into Surigaonon to ensure comprehension. The instrument comprised four sections: (1) demographic and socio-economic profile, (2) access to financial services and financial literacy, (3) outcomes of financial services (economic empowerment, social impact, sustainable development, and utilization), and (4) factors influencing financial inclusion (technology adoption, geographical location, and gender dynamics).

Validity and Reliability

Face and content validation were conducted by five experts in agricultural finance and survey research. A pilot test with 30 non-sampled farmers established the instrument's reliability, yielding a Cronbach's alpha of 0.87, indicating high internal consistency.

Data Collection Procedure

Survey questionnaires were personally administered by the researchers to ensure completeness and accuracy. Respondents were briefed on the purpose of the study, voluntary participation, and confidentiality of responses. Ethical approval was obtained from the Graduate School, and local authorities provided formal permission prior to data collection.

Data Analysis

Quantitative data were analyzed using SPSS version 25. Descriptive statistics (frequency, percentage, weighted mean) summarized demographic profiles and levels of financial inclusion. One-way ANOVA and t-tests were employed to examine significant differences across demographic groups, while Pearson correlation coefficients assessed the relationships between financial inclusion outcomes and influencing factors. These analyses directly address the research objectives and test the study's hypotheses.

Ethical Considerations

The study adhered to the principles of Respect for Persons, Beneficence, and Justice (Belmont Report, 1979). Participation was voluntary, confidentiality was strictly maintained, and all data were reported in aggregate form to prevent identification of individual respondents.

Research Locale and Respondents

Research Locale

The study was conducted in the Municipality of San Miguel, Surigao del Sur, Philippines, a predominantly agricultural area where rice farming constitutes the primary livelihood. Six barangays were selected as the research sites—Bolhoon, Libas Sud, Mahayag Maitum, Patong, Poblacion, and San Roque—based on the density of rice farmers, socio-economic diversity, and varying access to financial services. These locations provided a representative context for assessing financial inclusion among smallholder farmers, capturing both geographic and infrastructural variation relevant to quantitative analysis.

Research Respondents

The target population comprised 1,624 registered smallholder rice farmers across the selected barangays. Respondents were primarily full-time rice farmers, with a predominance of middle-aged males, most of whom had completed elementary or high school education. The demographic characteristics of interest included age, sex, civil status, educational attainment, sources of income, and employment status, which informed the analysis of differences in financial inclusion across socio-economic groups.

A stratified random sampling technique was employed to ensure proportional representation from each barangay. Each barangay constituted a stratum, with the number of respondents drawn proportionally to the population of rice farmers in that area. This approach reduces sampling bias and enhances the generalizability of the findings within the municipality. The final quantitative sample consisted of 321 respondents, representing approximately 20% of the population, which is sufficient for descriptive, inferential, and correlational statistical analyses while remaining feasible for administration of structured surveys.

This sampling strategy and selection of research locales provided a replicable framework for assessing the state of financial inclusion, its determinants, and measurable outcomes among rice farmers in San Miguel, ensuring alignment with the study's quantitative objectives and hypotheses.

Research Instrument

The study utilized a researcher-developed structured questionnaire as the primary quantitative instrument to measure the current state, outcomes, and influencing factors of financial inclusion among rice farmers in San

Miguel, Surigao del Sur. The questionnaire was designed to systematically capture measurable data corresponding to the study's research objectives and hypotheses.

Construction of the Instrument

The questionnaire was organized into four sections. Part I collected demographic and socio-economic information, including age, sex, civil status, educational attainment, sources of income, and employment status. Part II measured the current state of financial inclusion through indicators such as availability and affordability of financial services, financial literacy, government and policy support, and infrastructure development. Part III assessed the outcomes of financial services, including economic empowerment, social impact, sustainable development, and service utilization. Part IV captured the influence of selected factors on financial inclusion, specifically technology adoption, geographical location, and gender dynamics.

Items were developed based on a review of relevant literature and theoretical constructs, ensuring alignment with the Sustainable Livelihoods Framework, Financial Inclusion Theory, and Institutional Theory. All items employed Likert-type scales, allowing respondents to indicate the extent of agreement or perceived influence, facilitating quantitative analysis and hypothesis testing.

Validity and Reliability

To ensure content validity, the instrument underwent face and content validation by five experts in agricultural finance and survey research, including agriculture technologists, loan officers, and academics. The experts evaluated each item for relevance, clarity, and alignment with the research objectives. A pilot test was conducted with 30 non-respondent farmers to evaluate clarity and feasibility, and the Cronbach's alpha coefficient was 0.87, indicating high internal consistency and reliability for quantitative analysis.

Alignment with Research Objectives

The structured questionnaire directly operationalizes the study's variables and objectives by quantifying both independent factors (technology adoption, location, gender dynamics, demographic profile) and dependent outcomes (economic empowerment, social impact, sustainable development, utilization of financial services). The instrument thus provides a rigorous, replicable tool for examining the relationships specified in the study hypotheses and supports statistical analyses including descriptive statistics, ANOVA, and Pearson correlation.

Data Gathering Procedure

The quantitative data for this study were systematically collected to assess financial inclusion among rice farmers in San Miguel, Surigao del Sur. The procedure was conducted in six barangays Bolhoon, Libas Sud, Mahayag Maitum, Patong, Poblacion, and San Roque—selected based on the density of rice farmers and variability in access to financial services.

1. Approval and Coordination: Formal permission was obtained from the Graduate School and the thesis committee, followed by letters of request to the Municipal Agriculture Office (MAO) and barangay authorities to secure access and facilitate scheduling with farmer respondents.

2. Sampling and Scheduling: Using stratified random sampling, 321 respondents were proportionally selected from the total population of 1,624 farmers across the six barangays. Each barangay was treated as a stratum to ensure proportional representation. Respondents were informed of the study purpose, schedule, and voluntary nature of participation.

3. Administration of Questionnaire: The structured survey questionnaire was personally administered by the research team during pre-arranged sessions at barangay centers or accessible community locations. Instructions were standardized, and each respondent completed the questionnaire individually, with assistance provided to clarify items without influencing responses. The instrument covered demographic characteristics, financial inclusion indicators, outcomes of financial services, and influencing factors.

4. Response Recording: Completed questionnaires were collected immediately after completion. Each respondent was assigned a unique code to maintain confidentiality. Responses were checked for completeness and consistency before entry into SPSS version 25 for analysis.

5. Standardization Measures: To ensure uniformity and reduce bias, all research assistants received prior training on questionnaire administration, including instructions, item clarification, and ethical considerations. Items were presented consistently across respondents, and translations in Surigaonon were used where necessary to enhance comprehension.

6. Ethical Considerations: Participants were briefed on informed consent, voluntary participation, and confidentiality of responses. Codes replaced personal identifiers, and all data were securely stored. Respondents were assured that withdrawal from the study at any time would incur no penalty. The procedure complied with institutional protocols and the Data Privacy Act of 2012.

Statistical Treatment

The study employed rigorous quantitative statistical techniques to analyze data collected from 321 rice farmers in San Miguel, Surigao del Sur. All analyses were conducted using SPSS version 25, providing a robust platform for descriptive and inferential statistics.

Descriptive Statistics

Descriptive measures including frequency counts, percentages, and weighted means—were used to summarize the demographic and socio-economic profiles of respondents, as well as the levels of financial inclusion across key indicators such as availability and affordability of financial services, financial literacy, government support, and infrastructure development. Weighted means enabled interpretation of Likert-scale responses, facilitating the classification of financial inclusion levels and outcomes, and providing a foundational understanding aligned with Objective 1 and Objective 2.

Inferential Statistics

To examine differences in financial inclusion across demographic and socio-economic groups (Objective 3), One-Way Analysis of Variance (ANOVA) was utilized. ANOVA determined whether statistically significant differences existed among multiple groups (e.g., age, education, income, and employment status) for variables such as access to financial services and affordability. The significance level was set at $\alpha = 0.05$, with p-values below this threshold considered indicative of meaningful differences.

For testing relationships between the extent of financial inclusion outcomes and influencing factors (Objective 5 and Objective 6), Pearson correlation coefficients were computed. This technique quantified the strength and direction of linear associations between independent variables (technology adoption, geographical location, gender dynamics) and dependent variables (economic empowerment, social impact, sustainable development, and utilization of financial services), directly supporting the study hypotheses.

Rationale For Statistical Methods

Descriptive statistics provided a clear profile of the population and baseline measures of financial inclusion, essential for interpreting patterns and trends. ANOVA was selected to detect statistically significant differences across multiple categorical groups, consistent with the study's aim of evaluating variation in financial inclusion by demographic factors. Pearson correlation was employed to assess linear relationships between continuous variables, aligning with the study's goal of understanding the influence of key factors on measurable financial inclusion outcomes.

Assumptions and Criteria

Normality, linearity, and homogeneity of variances were assumed for ANOVA and Pearson correlation tests. The $\alpha = 0.05$ criterion ensured a balance between Type I and Type II error risks. These statistical treatments

collectively ensured a transparent, replicable, and methodologically sound approach, providing reliable evidence to support the quantitative research objectives and hypotheses.

RESULTS AND DISCUSSION

Table 1. Demographic Profile of Respondents

Age	**Frequency**	**Percentage**
18-30	29	9%
31-45	62	19%
46-60	140	44%
61 and above	90	28%
Total	321	100%
Sex	**Frequency**	**Percentage**
Male	262	82%
Female	59	18%
Total	321	100%
Civil Status	**Frequency**	**Percentage**
Single	56	17%
Married	195	61%
Widowed/Separated	59	18%
Others, specify	11	3%
Total	321	100%
Educational Attainment	**Frequency**	**Percentage**
Elementary Graduate	146	45%
High School Graduate	129	39%
College Graduate	34	11%
Others	16	5%
Total	321	100%
Source of Income	**Frequency**	**Percentage**
Rice Farming	255	79%
Livestock	22	7%

Small Business or Trading	22	7%
Salary	16	5%
Others	6	2%
Total	321	100%
Employment Status	**Frequency**	**Percentage**
Full-Time Farmers	226	70%
Part-Time Farmers	83	26%
Self-Employed in Non-Farming Activities	6	2%
Seasonal Laborers	6	2%
Total	**321**	**100%**

Table 1 summarizes the demographic characteristics of the 321 rice farmers surveyed. The largest age group was 46–60 years (44%), followed by 61+ years (28%), indicating an aging farming population, whereas younger farmers aged 18–30 represented only 9%. The majority of respondents were male (82%) and married (61%). Educational attainment was predominantly elementary (45%) and high school graduates (39%), with college graduates comprising only 11%. Rice farming was the primary source of income for 79% of respondents, and 70% were full-time farmers.

These demographics reveal a population that is heavily dependent on traditional rice farming and is characterized by limited formal education, which may influence the ability to access and effectively utilize financial services. The profile aligns with previous studies indicating that middle-aged, low- to moderately educated farmers require targeted financial literacy and inclusion programs (Sanglay et al., 2021; Briones, 2020).

Table 2 Current State of Financial Inclusion among Farmers

Indicators	**Mean**	**Adjectival Rating**
Availability of Financial Services	2.743	Moderate Extent
Affordability of Services	3.189	Moderate Extent
Financial Literacy	3.890	Great Extent
Government and Policy Support	3.222	Moderate Extent
Infrastructure Development	2.480	Slight Extent
Overall Mean	**3.105**	**Moderate Extent**

Table 2 presents the assessment of financial inclusion across five key indicators. Financial literacy received the highest mean score (3.890, Great Extent), indicating strong understanding of budgeting and loan management. Availability of financial services (2.743) and infrastructure development (2.480) scored lowest, highlighting access and physical limitations. The overall financial inclusion level was moderate (3.105).

While farmers possess adequate financial knowledge, structural barriers limit actual access and participation. These findings corroborate prior literature emphasizing that awareness alone does not guarantee utilization of formal financial services (Bendaña et al., 2025; Picpican et al., 2024).

Table 3 Extent of Outcomes of Financial Services

Indicators	**Mean**	**Adjectival Rating**
Economic Empowerment	3.612	Great extent
Social Impact	3.710	Great extent
Sustainable Development	3.636	Great extent
Utilization of Financial Services	3.307	Moderate extent
Over-all-Mean	**3.566**	**Great extent**

Table 3 shows that financial services positively influenced economic empowerment (3.612), social impact (3.710), and sustainable development (3.636), with overall outcomes rated as great (3.566). Utilization of services, however, was moderate (3.307), indicating a gap between knowledge and application.

The results suggest that while access to credit, savings, and cooperative programs contributes to empowerment and community engagement, practical constraints—such as distance, procedural complexity, and affordability—limit full utilization. These trends are consistent with the Sustainable Livelihoods Framework, which links access to financial capital with economic resilience (Chambers & Conway, 1992).

Table 4 Level of Influence of the Factors on Financial Inclusion

Indicators	**Mean**	**Adjective Rating**
Technology	3.355	Moderately Influential
Geographical Location	3.521	Highly Influential
Gender Dynamics	3.631	Highly Influential
Overall Mean	**3.502**	**Highly Influential**

Table 4 illustrates the level of influence of technology, geographical location, and gender dynamics on financial inclusion. Gender dynamics (3.631) and geographical location (3.521) were highly influential, while technology adoption was moderately influential (3.355).

The findings underscore that locational and socio-demographic factors significantly affect access and use of financial services, aligning with Institutional Theory and Financial Inclusion Theory (North, 1990; Ozili, 2023). The relatively lower influence of technology suggests that digital literacy and infrastructure may constrain the benefits of digital financial platforms.

Implications

Overall, the quantitative findings support the RICE-FIN PLUS framework, highlighting the need for integrated interventions addressing literacy, credit access, cooperative support, risk management, digital inclusion, and locational disparities. They provide evidence for policy and program design that can enhance utilization and impact of financial services among rice farmers in San Miguel, Surigao del Sur.

Empirical Basis for the RICE-FIN PLUS Framework

The proposed RICE-FIN PLUS Framework was developed through empirical synthesis of the study findings. Components included in the framework were derived directly from variables that demonstrated significant statistical influence on financial inclusion outcomes. Financial literacy was incorporated because it recorded the highest mean score among financial inclusion indicators ($M = 3.890$), indicating its central role in enabling financial participation. Technology adoption and geographical location were included because both demonstrated significant positive relationships with economic empowerment, social impact, sustainable development, and utilization of financial services ($p < .001$).

Similarly, the inclusion of cooperative strengthening, agricultural credit access, and risk protection mechanisms was supported by respondents' moderate ratings regarding availability and affordability of financial services, suggesting the need for interventions that address access constraints. Monitoring and evaluation mechanisms were incorporated to ensure continuous assessment and refinement of implementation strategies.

Although the framework has not yet undergone longitudinal implementation testing, its components are grounded in statistically significant findings and supported by established theoretical foundations. Therefore, the framework may be considered empirically informed and theoretically anchored, providing a practical model for policy development and future validation studies.

Proposed Framework Output

The Rice-Based Financial Literacy and Capability Building component is critical because it directly addresses a foundational barrier to effective financial inclusion: farmers' limited understanding of financial products, services, and digital platforms. Even when access to credit, savings, insurance, and digital tools is available, inadequate financial knowledge can prevent farmers from utilizing these resources responsibly, leading to poor loan management, inefficient savings, underutilization of insurance, and vulnerability to economic shocks. By providing practical, localized training tied to actual rice production cycles, this initiative equips farmers with the skills to make informed financial decisions, plan expenditures, and optimize the use of loans and savings. Moreover, it strengthens the broader objectives of the RICE-FIN PLUS framework by enhancing responsible credit use, promoting digital adoption, and supporting sustainable livelihood practices. In essence, this component ensures that financial resources are not only accessible but also effectively leveraged to improve economic resilience, productivity, and long-term household stability, making it a cornerstone for both policy implementation and measurable quantitative outcomes.

The framework has nine components:

1. Policy Institutionalization and Baseline Profiling. Establish a formal LGU policy mechanism through resolution or ordinance and form a municipal implementation team. Conduct baseline profiling to identify farmer-beneficiaries, financial access points, cooperative coverage, internet availability, income sources, documentation gaps, and risk exposure. This ensures evidence-based, targeted interventions for the most vulnerable farmers.

2. Rice-Based Financial Literacy and Capability Building. This component is prioritized early in the implementation timeline to ensure farmers acquire the knowledge necessary for responsible use of financial services. While financial literacy scored highest among financial inclusion indicators, farmers often struggle with technical financial terms, interest computation, insurance processes, loan conditions, and digital platforms. To address this, the policy mandates practical, localized training directly connected to the rice production cycle. Instruction should use concrete examples, including seed costs, fertilizer expenses, labor payments, irrigation fees, household expenses, loan deductions, expected harvest income, palay price fluctuations, and repayment schedules. Training in the local dialect is essential for farmers with limited formal education.

3. Documentation and Eligibility Assistance. Implement barangay-level assistance to help farmers secure valid IDs, land documents, proof of income, cooperative membership, and other records. This ensures broader participation in formal financial programs and makes inclusion pro-poor.

4. Accessible and Flexible Agricultural Credit. Facilitate pre-planting loan applications, harvest-aligned repayment schedules, transparent interest rates, and loan orientations. This addresses access and affordability constraints and supports productive use of credit without increasing vulnerability.

5. Cooperative Strengthening and Governance. Enhance cooperative management through officer training, improved financial reporting, member education, and linkages with banks. Cooperatives function as local centers for education, savings, insurance, digital support, and market access, bridging gaps between farmers and formal institutions.

6. Savings, Emergency Fund, and Risk Protection. Establish harvest-based savings schemes, cooperative emergency funds, and crop insurance enrollment. This reduces dependency on high-interest loans during emergencies and enhances repayment capacity and household resilience.

7. Digital Financial Inclusion Support. Provide hands-on training in mobile banking, e-wallets, digital payments, and remittance systems. Establish barangay-level help desks and peer mentorship to increase confidence and adoption, particularly among older or digitally inexperienced farmers.

8. Livelihood Diversification and Market Linkage. Promote alternative income sources such as vegetable gardening, livestock, aquaculture, food processing, and value-adding activities. Support market linkages, cooperative marketing, and access to buyers to improve income stability and reduce dependence on rice.

9. Monitoring, Evaluation, Feedback, and Policy Refinement. Conduct continuous monitoring from Month 3 to 16, including quarterly reports, satisfaction surveys, credit tracking, savings logs, and digital usage assessments. Use collected feedback to adjust programs, enhance delivery, and ensure responsive, evidence-based implementation.

Summary of Findings

The results revealed that financial inclusion among rice farmers in San Miguel, Surigao del Sur, exists at a moderate level, with substantial variation across demographic profiles and geographic locations. Financial literacy emerged as the most developed component, indicating that farmers possess considerable understanding of budgeting, savings, and loan management. However, actual utilization of financial services including credit, savings, insurance, and digital platforms remained constrained by infrastructure gaps, distance to service providers, and affordability of services.

Farmers were primarily dependent on rice farming, with full-time male farmers dominating the population, highlighting their exposure to seasonal, climatic, and market risks. Statistical tests demonstrated that employment status, educational attainment, income level, and age significantly influenced access and affordability of financial services, whereas gender and civil status were generally not significant predictors, except for sustainable development outcomes where gender dynamics showed minor influence.

Correlation analyses revealed that technology adoption was strongly and positively associated with all outcomes, particularly social impact ($r = 0.523$, $p < 0.001$), indicating that digital tools enhance access, communication, and participation in financial activities. Geographical location also showed significant relationships with economic empowerment ($r = 0.438$, $p < 0.001$) and other measured outcomes, emphasizing the importance of proximity to banks, cooperatives, ATMs, and government offices. Gender dynamics exhibited a limited but measurable effect, significant only for sustainable development outcomes ($r = 0.119$, $p < 0.05$).

Overall, these findings indicate that financial inclusion is shaped by a combination of literacy, access, technological adoption, and locational factors. They underscore the need for integrated, evidence-based interventions to enhance utilization, economic empowerment, social participation, and sustainable development.

These results provide a robust foundation for the proposed RICE-FIN PLUS framework, which targets financial literacy, cooperative support, credit access, digital readiness, risk protection, and livelihood diversification to strengthen the outcomes of financial inclusion.

Scientific Contributions of the Study

This study contributes to the financial inclusion literature in three significant ways. First, it provides localized empirical evidence on financial inclusion among rice farmers in a rural Philippine municipality, addressing the limited availability of community-level studies in agricultural finance. Second, it integrates financial literacy, institutional support, technology adoption, geographical accessibility, and socio-demographic factors into a unified analytical framework, offering a more comprehensive understanding of financial inclusion determinants and outcomes. Third, the study proposes the RICE-FIN PLUS Framework, an empirically informed and context-specific model that can guide local governments, cooperatives, financial institutions, and development organizations in designing interventions that strengthen financial resilience and sustainable agricultural livelihoods.

CONCLUSIONS

Based on the quantitative results of this study, several conclusions can be drawn regarding financial inclusion among rice farmers in San Miguel, Surigao del Sur. First, the overall level of financial inclusion was moderate, with strong financial literacy but limited access, affordability, infrastructure, and utilization of services. This indicates that knowledge alone is insufficient to ensure effective engagement with formal financial services.

Second, measurable outcomes of financial services including economic empowerment, social impact, and sustainable development were positively influenced by access to financial resources, yet utilization remained suboptimal, highlighting structural and operational constraints that restrict the translation of knowledge into practice.

Third, technology adoption and geographical location significantly affected all financial inclusion outcomes, emphasizing that digital readiness and proximity to financial institutions are critical determinants of economic and social benefits. Gender dynamics had a statistically significant but limited effect, primarily on sustainable development outcomes, suggesting targeted interventions may be needed for equitable inclusion.

Finally, the study demonstrates that quantitative analysis validates the interplay between demographic, institutional, and technological factors in shaping financial inclusion outcomes. These findings support the theoretical underpinnings of the Sustainable Livelihoods Framework, Financial Inclusion Theory, and Institutional Theory, and justify the proposed RICE-FIN PLUS framework as an evidence-based, quantitatively grounded model to enhance financial literacy, credit access, cooperative support, digital adoption, and risk protection among rice farmers.

Collectively, the conclusions indicate that improving financial inclusion requires an integrated, data-driven approach that addresses structural barriers, leverages technology, and targets critical demographic and locational factors. These insights have practical and policy implications, providing guidance for local government units, cooperatives, financial institutions, and development partners to design programs that strengthen farmers' economic resilience, optimize utilization of financial services, and support sustainable agricultural development.

Limitations of the Study

Several limitations should be considered when interpreting the findings. First, the study employed a cross-sectional design, which limits the ability to establish causal relationships among variables. The findings reflect associations observed during the data collection period rather than long-term effects.

Second, the study was confined to rice farmers in San Miguel, Surigao del Sur. While the sample size was statistically adequate and representative of the municipality, the findings may not be fully generalizable to other agricultural sectors or regions with different socio-economic and institutional conditions.

Third, data were collected through self-reported questionnaires, which may be influenced by recall bias and social desirability bias. Although validity and reliability procedures were implemented, respondent perceptions may not perfectly reflect actual financial behaviors.

Fourth, the proposed RICE-FIN PLUS Framework was developed based on empirical findings from the present study but has not yet been subjected to implementation-based or longitudinal validation. Future studies should test the framework across different agricultural communities and evaluate its effectiveness using experimental or quasi-experimental research designs.

Despite these limitations, the study provides valuable empirical evidence and practical insights into the determinants and outcomes of financial inclusion among rice farmers, contributing to both academic literature and policy development.

RECOMMENDATIONS

Based on the results of this study, it is recommended that local government units, cooperatives, financial institutions, and development partners implement targeted interventions to enhance financial inclusion among rice farmers in San Miguel, Surigao del Sur. First, programs should strengthen financial literacy by providing practical, farm-cycle-oriented training tailored to the educational levels of the farmers, focusing on budgeting, savings, loan management, and digital financial tools to improve utilization of services. Second, access to formal financial services should be expanded through the establishment of barangay-level service points, harvest-aligned credit disbursement, and affordable service structures to address gaps in availability, affordability, and infrastructure. Third**,** technology adoption should be promoted through hands-on digital training, assisted mobile banking, and e-wallet support, particularly for older farmers or those in remote areas, ensuring measurable improvements in participation and outcomes. Fourth, locational barriers should be mitigated by prioritizing resource allocation, mobile banking units, and cooperative support in underserved barangays to facilitate equitable access. Fifth, although gender dynamics had a smaller effect, programs should include inclusive participation strategies to ensure women benefit from financial services and sustainable development initiatives. Finally, continuous monitoring and evaluation of service utilization, savings behavior, and credit uptake should be institutionalized to track progress, enable evidence-based adjustments, and guide refinement of interventions. These recommendations are directly aligned with the study's quantitative objectives, hypotheses, and key findings, offering actionable, measurable, and replicable guidance to improve access, utilization, and resilience, while providing a data-driven foundation for policy development and the implementation of the RICE-FIN PLUS framework.

REFERENCES

1. Asian Development Bank. (2021). Rural finance policies for sustainable agriculture. Asian Development Bank.
2. Association of Southeast Asian Nations. (2021). ASEAN guidelines on promoting the utilization of digital technologies in the food, agriculture and forestry sector. ASEAN Secretariat.
3. Atakli, B., & Agbenyo, W. (2020). Financial inclusion and agricultural productivity in Ghana. Journal of Agricultural Finance and Rural Development.
4. Banerjee, A., & Duflo, E. (2019). Financial access and poverty alleviation in rural sectors.
5. Bangko Sentral ng Pilipinas. (2021). Financial inclusion survey. Bangko Sentral ng Pilipinas.
6. Bangko Sentral ng Pilipinas. (2022). Financial inclusion framework for the Philippine agricultural sector. Bangko Sentral ng Pilipinas.
7. Bangko Sentral ng Pilipinas. (2022). National strategy for financial inclusion 2022–2028. Bangko Sentral ng Pilipinas.
8. Batt, P. J. (2019). Microfinance and the development of farmer clusters in the Philippines. Journal of Agribusiness and Rural Development.
9. Bautista, R. (2020). The role of government in rural banking initiatives in the Philippines.
10. Bayudan-Dacuycuy, C., Baje, L. K., & Lim, J. A. (2022). Agricultural credit and financial inclusion among small farmers in the Philippines. Philippine Institute for Development Studies.

11. Beck, T., Demirgüç-Kunt, A., & Levine, R. (2021). Digital banking and rural financial inclusion.
12. Bill & Melinda Gates Foundation. (2020). Mobile money and financial inclusion among smallholder farmers. Bill & Melinda Gates Foundation.
13. Biru, A. M., Teka, A. M., & Tadesse, G. (2024). Financial inclusion and household welfare: A meta-analysis. Journal of Development Finance.
14. Briones, R. M. (2020). Agricultural employment and income conditions in the Philippines. Philippine Institute for Development Studies.
15. Briones, R. M. (2022). Rice farming income, productivity, and market conditions in the Philippines. Philippine Institute for Development Studies.
16. Delos Santos, M. (2020). Microfinance programs and their impact on rural sustainability.
17. Demirgüç-Kunt, A., Klapper, L., & Singer, D. (2020). Financial inclusion and development: A global perspective.
18. Department of Agriculture. (2021). ACPC and financial assistance programs for farmers. Department of Agriculture.
19. Fowowe, B. (2020). The effects of financial inclusion on agricultural productivity in Nigeria. Journal of Economics and Development Studies.
20. Garcia, R. (2025). Awareness and access to agricultural financing: Implications for rural development. Agricultural Finance Review.
21. Girasol, M., & Roxas, A. (2025). Microfinance credit access and farm productivity among mango farmers in Davao del Sur. Philippine Journal of Agricultural Economics.
22. International Fund for Agricultural Development. (2020). Financial literacy training for sustainable farming. IFAD.
23. Li, Y., Wei, X., & Chen, H. (2025). Digital financial inclusion and farmers' income growth in China. Agricultural Economics and Rural Development.
24. Ozili, P. K. (2023). Institutional theory of financial inclusion. Journal of Financial Regulation and Compliance.
25. Picpican, F., & Duyan, A. (2024). Access to formal and informal credit among high-value crop farmers in the Philippines. Journal of Rural Finance.
26. Ramos, K. (2021). The rise of fintech and mobile banking among Filipino farmers.
27. Sanglay, P. M. D., Apat, E. J. C., Sumague, J. A., & Tec, E. T. (2021). Financial literacy and income management among rice farmers. International Journal of Research Studies in Management.
28. Vo-Tong Xuan, Pede, V. O., Dawe, D., & colleagues. (2024). Livelihood diversification and welfare of smallholder rice farmers in Central Luzon. Rice Science.
29. World Bank. (2021). Financial inclusion and agricultural development. World Bank.