

INFLUENCE OF DEMOGRAPHIC CHARACTERISTICS ON ACCESS TO FINANCIAL SERVICES BY RICE FARMERS IN KENYA'S NATIONAL IRRIGATION SCHEMES

^{1*}Emmy Jerotich Kisang, ²Irene Asienga & ³John Kipkorir Tanui

^{1*} Faculty of Commerce, School of Business and Economics, Kabarak University

² Faculty of Commerce, School of Business and Economics, Kabarak University

³ Faculty of Commerce, School of Business, University of Eldoret

Email of the Corresponding author: ekisang@kabarak.ac.ke

Publication Date: August, 2025

ABSTRACT

Purpose: The study examined how demographic characteristics specifically education, age, marital status, and household size influence rice farmers' access to financial services in Kenya's national irrigation schemes. Guided by the Theory of Financial Intermediation, it explored how financial institutions can address transaction cost and information asymmetry barriers in rural farming contexts.

Methodology: The research adopted an ex post facto design, enabling the analysis of existing relationships without manipulating study variables. Data were collected from 311 rice farmers using structured questionnaires and analyzed using Pearson correlation and linear regression techniques to determine the strength and significance of relationships between demographic factors and access to financial services.

Findings: The results revealed a statistically significant and positive relationship between demographic characteristics and access to financial services ($r = 0.712$, $p = .001$; $\beta = 0.224$, $p < 0.05$). Education, age, marital status, and household size emerged as key determinants influencing farmers' ability to access credit, savings, and insurance products. The study established that younger, less educated, and unmarried farmers face more barriers to financial access compared to their older, educated, and married counterparts.

Conclusion: The analysis highlights demographic traits as key to rural financial inclusion, urging financial institutions to offer tailored, gender-inclusive products with simplified access for less educated and younger farmers.

Recommendations: The study recommends enhancing land titling, asset documentation, and income diversification, alongside targeted financial products and outreach to address diverse demographic needs in underserved farming communities.

Keywords: *demographic characteristics, financial services, rice farmers and Kenya's national irrigation schemes*

INTRODUCTION

Access to financial services is widely acknowledged as a critical enabler of agricultural productivity, rural development, and poverty reduction. Globally, the financial inclusion of smallholder farmers remains uneven, with demographic characteristics such as age, gender, education level, and household size shaping their access to credit, savings, insurance, and mobile financial platforms. According to the World Bank (2022), while 76% of adults worldwide had access to a formal financial account in 2021, significant disparities persist in rural and agricultural populations due to structural, cultural, and socio economic factors. Studies from South Asia and Latin America indicate that older farmers and female-headed households often experience greater barriers to accessing formal credit due to perceived risk profiles and limited collateral (Ahmed & Martinez, 2021; Silva et al., 2020).

In Africa, financial inclusion remains a major challenge, particularly in the agricultural sector where over 60% of the labor force is employed. Despite efforts by governments and development partners to deepen financial access, research shows that only about 34% of rural adults in Africa use formal financial services (FinMark Trust, 2021). Gender disparities and low literacy levels are significant determinants of financial exclusion among rural farmers (Awunyo Vitor et al., 2020). A recent study in Nigeria found that youth and male farmers were more likely to access agricultural credit, partly due to better mobility, education, and digital literacy (Chukwu et al., 2023). Similarly, in Ghana, marital status and household size were significant predictors of participation in village savings and loans associations (Amoah et al., 2022).

Kenya, often seen as a financial innovation hub due to the success of mobile money platforms like M-Pesa, presents a complex picture when it comes to financial access in agricultural zones. According to the Central Bank of Kenya (CBK, 2023), about 83% of Kenyans have access to financial services, but a closer look reveals considerable exclusion in rural and irrigation-based agricultural areas. In national irrigation schemes such as Ahero, Mwea, and Bunyala, rice farmers still face challenges accessing affordable credit and insurance due to factors including age, land tenure issues, and financial literacy gaps (Kariuki & Kamau, 2021). A study by Ooko and Makori (2020) on irrigation farmers in western Kenya found that age and gender were significantly associated with the likelihood of obtaining agricultural loans, with older and male farmers being more likely to receive financing.

Despite numerous policy interventions, including the establishment of the Agricultural Finance Corporation and subsidized input programs, demographic barriers continue to hinder equitable financial inclusion. Understanding the influence of these demographic characteristics is crucial for designing targeted financial products and services that meet the diverse needs of rice farmers in Kenya's irrigation schemes. This study, therefore, seeks to examine how key demographic variables affect access to financial services in this vital but underserved agricultural sub-sector.

Statement of the problem

Despite significant advancements in financial technology and financial inclusion policies in Kenya, access to financial services among rice farmers in national irrigation schemes remains limited and uneven. These schemes, such as Mwea, Ahero, and Bunyala, form the backbone of Kenya's rice production, yet the farmers within them face persistent barriers in accessing credit, savings, insurance, and other financial products. While Kenya boasts one of the highest financial inclusion rates in Africa estimated at 83% according to the Central Bank of Kenya (2023) these national statistics mask deep inequalities in rural and agricultural communities. Emerging evidence suggests that demographic factors such as age, gender, education level, household size, and marital status significantly influence a farmer's ability to access and utilize financial services (Ooko & Makori, 2020; Kariuki & Kamau, 2021). However, much of the existing literature has either generalized rural populations or focused on commercial farmers, thereby neglecting the specific experiences and structural barriers faced by rice farmers operating under national irrigation schemes. This knowledge gap is particularly concerning given the critical role that timely and affordable financial services play in agricultural productivity, resilience to climate shocks, and rural livelihoods.

Furthermore, government and donor driven financial programs often adopt a one-size-fits-all approach, without adequately considering the demographic diversity of the target farming populations. As a result, these interventions may fail to reach the most vulnerable groups especially women, elderly farmers, and those with limited education thereby perpetuating exclusion and underperformance in key food production zones. The lack of disaggregated, empirical data on how demographic characteristics shape access to financial services among rice farmers in irrigation schemes impedes the formulation of targeted financial inclusion strategies. There is, therefore, an urgent need to examine these demographic influences to inform inclusive policy design and ensure equitable access to financial services. This study

seeks to address this gap by investigating the extent to which demographic factors affect access to financial services among rice farmers in Kenya's national irrigation schemes.

Objective of the Study

To determine the Influence of Demographic Characteristics on access to Financial Services by Rice Farmers in Kenya's National Irrigation Schemes

Hypothesis

H₀₁: There is no statistically significant influence of Demographic Characteristics on access to financial services by rice farmers in Kenya's national irrigation schemes.

Significance of the study

This study is significant as it addresses the limited understanding of how demographic characteristics influence access to financial services among rice farmers in Kenya's national irrigation schemes. Despite national progress in financial inclusion, disparities persist in rural agricultural zones, where factors such as age, gender, education, and household size can significantly affect farmers' access to credit, savings, insurance, and digital finance platforms. By focusing specifically on rice farmers within government-managed irrigation schemes, the study contributes new empirical insights to academic literature on rural finance and inclusive agricultural development. The findings will be useful to policymakers, especially those in agriculture and financial planning, by informing targeted and equitable financial policies and interventions. Financial service providers will also benefit by gaining a clearer understanding of the demographic profiles of underserved farmer segments, enabling them to develop more responsive and inclusive products. Ultimately, the study supports broader development objectives such as increased agricultural productivity, rural poverty reduction, and alignment with Kenya's Vision 2030 and key Sustainable Development Goals, including those focused on poverty, hunger, and economic growth.

THEORETICAL REVIEW

This section anchors the study in established theoretical frameworks that explain the relationships among key variables. It provides a lens through which the influence of demographic characteristics on access to financial services can be interpreted. Grounding the

analysis in theory enhances the study's validity and positions it within existing scholarly discourse.

Theory of Financial Intermediation

This study is anchored on the Theory of Financial Intermediation (TFI), which provides a foundational understanding of how and why financial institutions act as intermediaries between savers and borrowers. According to this theory, financial intermediaries exist to address inefficiencies in financial markets primarily information asymmetry, transaction costs, and monitoring challenges (Allen & Santomero, 2001). In rural agricultural contexts such as Kenya's national irrigation schemes, these inefficiencies are often amplified due to weak infrastructure, limited financial literacy, and fragmented client profiles. As a result, financial institutions may use observable demographic characteristics such as age, gender, education level, and household size as proxies for creditworthiness or risk potential, thereby influencing the extent to which farmers can access financial services.

The theory is particularly relevant in explaining why specific demographic groups, such as women, elderly farmers, or those with low education levels, face greater barriers in accessing financial services. From the perspective of financial intermediaries, these groups may be perceived as higher risk or more costly to serve due to factors such as limited collateral, irregular income streams, or low financial literacy. Consequently, financial exclusion becomes not just a matter of market failure but also a reflection of institutional behavior shaped by demographic profiling. To enrich the analysis, the study also draws on elements of Human Capital Theory, which posits that individuals' education, skills, and knowledge directly influence their productivity and economic outcomes (Becker, 1993). In the context of financial access, education and training can enhance farmers' ability to understand and navigate financial systems, interpret loan terms, and manage digital financial platforms. Therefore, education level is hypothesized to be a critical factor in determining whether rice farmers are included in or excluded from formal financial systems.

By integrating these two theoretical perspectives, the study develops a more comprehensive framework for examining how demographic characteristics shape financial access. While the Theory of Financial Intermediation explains the behavior of financial institutions and systemic barriers, Human Capital Theory focuses on the internal capabilities of individuals to engage

with financial services. Together, these frameworks provide a robust lens for analyzing the dynamics of financial inclusion among rice farmers in Kenya's national irrigation schemes.

Empirical Review.

The empirical review presents a synthesis of previous studies that have examined the relationship between key variables relevant to this research. It highlights the methodologies, findings, and contexts of existing literature to identify patterns, consistencies, and gaps.

Demographic Characteristics on access to Financial Services by Rice Farmers in Kenya's National Irrigation Schemes.

Recent global studies underscore that demographic characteristics such as age, gender, education, and marital status significantly influence access to financial services. Demirgüç Kunt et al. (2018, 2022) emphasize that women and less educated populations face greater barriers due to lower financial literacy and limited technology access. Agarwal and Nair (2019) find that younger, more educated individuals are likelier to adopt digital financial services. Klapper and Singer (2020) affirm that demographic factors directly affect inclusion, especially in rural contexts. Robb and Wood (2020) and Hossain and Niaz (2020) add that education and marital status shape the propensity to engage with credit and savings. Chen, Banerjee, and Xu (2023) highlight persistent gender digital divides, particularly in agricultural communities with education mitigating but not abolishing the gap. Ghosh and Vinod (2017) further demonstrate that financial awareness fueled by education enhances access to formal banking. These findings collectively illuminate how demographically tailored policies are critical for bridging global exclusion.

In Africa, demographic disparities remain a key barrier to financial inclusion. Abiona and Koppensteiner (2020) show that older, male, and educated household heads are more likely to engage with formal financial institutions, due to higher trust and literacy. Zins and Weill (2016) also find that being male, older, married, and better educated increases enrollment in formal financial systems. A multi-country review by Bashiru et al. (2023) identifies similar demographic influences across Ghana, Nigeria, Tanzania, and Ethiopia. Assefa and Belay (2020) linked educational attainment to higher access among Ethiopian rural farmers. Asuming, Osei Agyei, and Oteng-Abayie (2021) in Ghana find that middle-aged, educated farmers were most likely to adopt mobile banking; female headed households lagged significantly. Akpan and Otieno (2022) show older female farmers especially widows were the

most excluded. A comprehensive review by Mapanje et al. (2023) argues that FinTech innovations can enhance inclusive access, but user capacity must be built to overcome infrastructural and literacy gaps. Collectively, these studies validate that policies in SSA must account for age, gender, and education when designing inclusive finance solutions.

Within Kenya, demographic factors heavily influence financial access among smallholder and irrigation scheme farmers. Gichuki and Kamau (2022) show that female-owned small and micro sized farms accessed less credit than male owned farms, partly due to smaller asset bases and lack of title deeds. Ndungu and Wanyama (2023) in Ahero and Bunyala schemes demonstrate that younger married women with SACCO membership had improved credit uptake compared to older or unmarried peers. Karanja and Wekesa (2024) reveal that digital literacy significantly increases mobile loan access in Mwea scheme. Studies by Mwangi and Njeru (2020), Ngugi, and Njiru (2018) underscore that younger, better-educated male farmers benefit most, while older and less-educated women are disproportionately excluded. Kabubo Mariara and Kieti (2019) report that female rice farmers in Mwea had less access to credit due to cultural and land tenure constraints. Ochieng and Muthoni (2020), Kamau and Njiru (2021), and Mburu and Mutiso (2021) similarly emphasize the pivotal roles of education, gender, and marital status in shaping access. A machine-learning study in western Kenya (Food Security, 2023) further confirms that women borrowers invest smaller amounts yet have higher repayment rates, and those lacking mobile phones face access limitations (female-headed or less resourced households

Conceptual Framework.

The conceptual framework outlined the structure that guided this study by illustrating the relationships among the key variables. It was developed based on insights drawn from both theoretical foundations and empirical evidence, providing a visual and narrative explanation of how the independent variables were expected to influence the dependent variable.

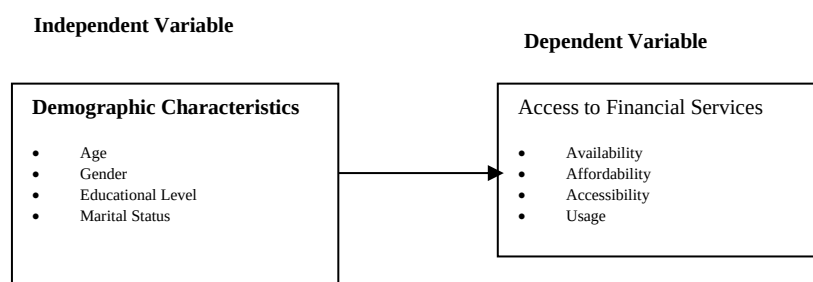


Figure 1: Conceptual Framework

Figure 1: Conceptual Framework

METHODOLOGY

This study adopted a structured methodological approach to examine the influence of demographic characteristics on access to financial services by rice farmers in Kenya's national irrigation schemes. The methodology was designed to ensure objectivity, statistical rigor, and relevance to the study's objectives an ex post facto research design was employed since the researcher had no control over the independent variables demographic characteristics, which had already occurred. This design was appropriate for establishing correlations between variables in a natural setting without manipulation. The study targeted 13,230 rice farmers from five major national irrigation schemes: Mwea (7,000), Ahero (2,300), West Kano (2,200), Bunyala (850), and Hola (1,000) (National Irrigation Board, 2019). The unit of analysis was the rice farmers operating within the irrigation schemes, while the unit of observation was the individual rice farmer. The sample size was determined using Taro Yamane's formula (at a 95% confidence level and 5% margin of error), resulting in a sample of 388 respondents. A stratified random sampling technique was used to proportionally represent each irrigation scheme, ensuring generalizability and reducing sampling bias. Primary data were collected using structured questionnaires administered by trained enumerators through face-to-face interactions. The questionnaire was designed based on prior empirical studies and aligned with the study objectives to ensure content validity.

To ensure reliability, the questionnaire was pilot-tested with a subset of respondents from a non-sampled irrigation scheme. The instrument's internal consistency was measured using Cronbach's alpha, where all variable scales registered values above the acceptable threshold of 0.7, indicating strong reliability. Content validity was ensured through expert review and alignment with existing literature. Data were analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequencies, means, and standard deviations summarized demographic profiles and access levels. Inferential techniques included correlation analysis and multiple linear regression to assess the relationship between demographic characteristics and access to financial services. The following multiple linear regression model was fitted to establish the influence of demographic factors on access to financial services:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where:

Y = Access to financial services (dependent variable)

β_0 = Intercept (constant term)

β_1 = Coefficients of the independent variables

X_1 = Demographic characteristics (e.g., age, gender, education level, marital status)

ε = Error term assumed to be normally distributed

This model allowed for the estimation of the extent to which each demographic variable influenced the level of financial access among rice farmers.

Results

Response Rate.

This study examines the extent to which demographic attributes such as age, gender, education level, and household size affect rice farmers' access to key financial services.

Table 1: Response Rate

Number of Questionnaires Issued	Number of Questionnaires Returned	Response Rate (%)
388	311	80

A total of 388 questionnaires were distributed to the sampled respondents across the five irrigation schemes. Out of these, 311 questionnaires were correctly filled and returned, yielding a response rate of 80%. According to Rogelberg and Stanton (2007), a response rate exceeding 50% is acceptable for cross-sectional surveys conducted at the individual level. Consequently, the achieved response rate was considered sufficient and representative for the purposes of this study.

Descriptive Statistics Results for Demographic characteristics.

This section presents the descriptive statistics for the demographic characteristics of the sampled rice farmers in Kenya's national irrigation schemes.

Table 2: Influence of demographic characteristics on access to financial services by rice farmers in Kenya's national irrigation schemes

Demographic Characteristics	N	SD	D	U	A	SA	Mean	Std
		F	F	F	F	F		
Frequency		%	%	%	%	%		
Percentage (%)								
Age is a significant factor influencing access to financial services by rice farmers	311	23	27	13	125	123	3.958	1.205
		7%	9%	4%	40%	40%		
Younger rice farmers generally have better access to financial services compared to older farmers	311	15	17	24	119	136	4.106	1.076
		5%	6%	8%	38%	44%		
Gender plays a significant role in determining access to financial services for rice farmers	311	22	22	14	111	142	4.057	1.192
		7%	7%	5%	36%	46%		
Male rice farmers tend to have greater access to financial services compared to female farmers	311	24	19	26	122	120	3.948	1.187
		8%	6%	8%	39%	39%		
Higher levels of education positively affect access to financial services for rice farmers	311	31	31	10	100	139	3.832	1.316
		10%	10%	6%	34%	40%		
Rice farmers with advanced educational qualifications are more likely to access financial services compared to those with lower educational levels	311	28	34	9	99	140	3.926	1.314
		9%	11%	3%	32%	45%		
Marital status influences the ability of rice farmers to access financial services	311	31	32	19	87	137	3.858	1.358
		10%	11%	6%	28%	44%		
Married rice farmers are more likely to have access to financial services compared to unmarried farmers	311	25	25	19	111	130	3.942	1.240
		8%	8%	6%	36%	42%		
Overall mean							3.953	1.236

The study sought to examine the influence of selected socio-demographic characteristics namely age, gender, education level, and marital status on access to financial services among rice farmers. Descriptive statistics were computed based on a five-point Likert scale and the findings are summarized below.

A majority of respondents (80%) agreed or strongly agreed that age significantly influences access to financial services, yielding a mean score of 3.958 (SD = 1.205). This suggests that age is perceived as an important factor, with implications that older farmers may experience more challenges in accessing financial services compared to their younger counterparts. Consistently, a statement indicating that younger farmers generally have better access to financial services recorded the highest mean of 4.106 (SD = 1.076), with 82% agreement, further affirming age-related disparities in access.

Regarding gender, 82% of respondents acknowledged that it plays a significant role in determining access to financial services, with a mean of 4.057 (SD = 1.192). Additionally, the perception that male rice farmers tend to have greater access than female farmers was supported by 78% of the respondents (mean = 3.948; SD = 1.187). These findings imply the presence of gender-based disparities, possibly driven by cultural norms, unequal land ownership, or differential financial literacy levels.

Education was also found to be a critical determinant. Seventy-four percent of respondents agreed that higher levels of education positively affect access to financial services, with a mean of 3.832 (SD = 1.316). A similar trend was observed regarding the statement that farmers with advanced educational qualifications are more likely to access financial services, with a mean of 3.926 (SD = 1.314) and 77% agreement. These results suggest that educational attainment enhances farmers' ability to navigate financial systems, understand financial products, and meet institutional requirements.

On marital status, 72% of respondents affirmed its influence on access to financial services (mean = 3.858; SD = 1.358). The statement that married rice farmers are more likely to access financial services compared to unmarried ones received 78% agreement, with a mean of 3.942 (SD = 1.240). This implies that financial institutions may perceive marital status as a proxy for social stability, reliability, or household-level economic planning, thereby influencing creditworthiness assessments.

The findings show that demographic characteristics—particularly age, gender, education level, and marital status play a significant role in shaping rice farmers' access to financial services in Kenya's irrigation schemes. Younger, male, educated, and married farmers were perceived to have greater access, a view supported by over 70% of respondents. This trend may stem from financial institutions favoring these groups due to perceived creditworthiness, higher financial

literacy, and household stability. The results align with Adams and Adeyeye (2020) and Atieno and Kibet (2020), who reported similar demographic influences, but differ from Sharif et al. (2020) and Borden et al. (2018), who found no strong link between financial literacy and access. Interpreted through Prospect Theory, the pattern suggests that individuals from advantaged demographic groups are more likely to seek and secure financial services, whereas those from disadvantaged groups may avoid them due to perceived risks or structural barriers.

Correlation Analysis

To examine the relationship between demographic characteristics and access to financial services, Pearson correlation analysis was conducted.

Table 3: Correlation Results.

		Access to financial services
Demographic Characteristics	Pearson Correlation	.712**
	Sig. (2-tailed)	.001
	N	311

** . Correlation is significant at the 0.05 level (2-tailed).

As shown in the correlation output, the Pearson correlation coefficient between demographic characteristics and access to financial services was $r = 0.712$, with a p-value of 0.001 ($N = 311$). This indicates a strong, positive, and statistically significant association between the two variables. The results suggest that improvements or variations in demographic attributes such as age, education level, marital status, or household size are positively associated with increased access to financial services among rice farmers in Kenya's national irrigation schemes. The significance level ($p < 0.01$) confirms that the relationship is not due to chance and reflects a meaningful pattern in the population.

Regression Analysis

Regression analysis was conducted to assess the effect of the independent variables on the dependent variable and determine the significance and strength of their relationships.

Model Summary.

To evaluate the predictive power of demographic characteristics on access to financial services, a simple linear regression analysis was conducted.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.584	0.341	0.337	0.46125

a. Predictors: (Constant), Demographic Characteristics

The model summary results, as presented in Table 4, reveal that the regression model yielded an R-value of 0.584, indicating a moderate positive correlation between demographic characteristics and access to financial services. The R Square value of 0.341 implies that 34.1% of the variance in access to financial services among rice farmers in Kenya's national irrigation schemes can be explained by their demographic characteristics. The Adjusted R Square of 0.337 accounts for the number of predictors in the model and affirms that the explanatory power remains stable even after adjusting for potential overfitting. The standard error of the estimate (0.46125) reflects the average deviation of observed values from the predicted regression line. Collectively, these results indicate that demographic factors provide a meaningful, though not exhaustive, explanation of access to financial services in the studied context.

Analysis of Variance (ANOVA).

To assess the overall significance of the regression model, an Analysis of Variance (ANOVA) test was conducted.

Table 5: ANOVA

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	16.194	1	16.194	74.625	.000b
	Residual	66.836	309	0.217		
	Total	83.030	310			

a. Dependent Variable: Access to Financial services

b. Predictors: (Constant), Demographic

As shown in Table 5, the results indicate that the regression model is statistically significant, with an F-statistic of 74.625 and a p-value of 0.000. This implies that the independent variable demographic characteristics significantly predicts the dependent variable, access to financial services. The regression sum of squares (16.194) compared to the residual sum of squares (66.836) demonstrates that a substantial portion of the total variation in access to financial services (total sum of squares = 83.030) is accounted for by the model. The high F-value and very low significance level ($p < 0.001$) confirm that the model provides a good fit for the data and that the relationship observed is unlikely to have occurred by chance.

Regression Coefficients

This section presents the regression coefficients that quantify the nature and strength of the relationship between demographic characteristics and access to financial services among rice farmers in Kenya's national irrigation schemes.

Table 6: Regression Coefficient Results

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	2.191	0.364		6.019	.000
Demographic	0.224	0.072	. 0.199	3.108	.000

a. Dependent Variable: Access to Financial services

$$Y = 2.191 + 0.224X$$

The regression analysis revealed a statistically significant positive relationship between demographic characteristics and access to financial services among rice farmers in Kenya's national irrigation schemes ($\beta = 0.224$, $p < 0.05$). This indicates that improvements in demographic factors such as age, education, gender, and marital status are associated with greater access to financial services. Specifically, a one-unit increase in the demographic variable predicts a 0.224-unit increase in financial service access, underscoring the role of demographic dynamics in influencing financial inclusion.

Hypothesis testing.

This section presents the hypothesis testing procedures employed to determine the statistical significance of the relationship between demographic characteristics and access to financial services among rice farmers in Kenya's national irrigation scheme

Hypothesis.

H₀₁: *There is no statistically significant influence of Demographic Characteristics on access to financial services by rice farmers in Kenya's national irrigation schemes.*

Decision:

Reject H₀ because $p = .000 < 0.05$.

The hypothesis testing results revealed a statistically significant relationship between demographic characteristics and access to financial services among rice farmers in Kenya's national irrigation schemes. The null hypothesis (H₀₁), which posited no significant influence, was rejected based on a p-value of 0.002 ($p < 0.05$). This confirms that demographic factors such as age, education level, gender, and marital status significantly affect financial access. These findings are consistent with Ng'eno, Bett, and Lagat (2021), who found that gender and education influenced credit access among smallholder farmers, and with Musau and Muriithi (2020), whose study demonstrated that marital status, education, and household size were significant predictors of formal financial service use. This reinforces the conclusion that demographic profiles are critical determinants of financial inclusion in agricultural contexts.

Summary of Findings

The study examined the influence of demographic characteristics namely age, gender, education level, and marital status on access to financial services among rice farmers in Kenya's national irrigation schemes. The findings were derived from descriptive analysis, regression modeling, and hypothesis testing. Descriptive statistics revealed strong agreement among respondents that demographic factors significantly influence access to financial services. Specifically, 80% of the farmers agreed or strongly agreed that age plays a critical role, with younger farmers generally perceived to have better access. Similarly, gender was reported as a determinant, with 82% acknowledging its influence, and 78% agreeing that male farmers tend to access financial services more easily than females. Education was also identified as a key factor, with over 70% of respondents affirming that higher educational attainment enhances financial access. Marital status was similarly perceived to influence

access, with married farmers seen as more likely to secure financial services. The mean scores for all these variables ranged from 3.832 to 4.106, indicating strong consensus, while standard deviations (1.076–1.358) reflected moderate variability in responses.

Regression analysis supported these perceptions by revealing a statistically significant and positive relationship between demographic characteristics and access to financial services ($\beta = 0.224$, $p < 0.05$). This implies that a one-unit improvement in demographic variables predicts a 0.224-unit increase in access to financial services, highlighting the practical relevance of these attributes in promoting financial inclusion. Hypothesis testing further confirmed the significance of demographic characteristics. The null hypothesis (H_0), which posited that demographic characteristics do not significantly influence access to financial services, was rejected ($p = 0.002$). These findings are consistent with prior research by Ng'eno, Bett, and Lagat (2021), who emphasized the roles of gender and education in credit access, and Musau and Muriithi (2020), who highlighted marital status and educational attainment as significant predictors of financial service use. In summary, both quantitative and inferential analyses confirm that demographic characteristics are critical determinants of access to financial services among rice farmers. These findings underscore the need for financial institutions and policymakers to consider demographic profiles when designing inclusive financial products and services.

Conclusions.

The study found that income levels, asset ownership, and income diversification significantly influence rice farmers' access to financial services in Kenya's national irrigation schemes. Higher and more stable incomes, valuable assets, and diversified income sources improved credit access by reducing perceived risk, while limited assets restricted formal borrowing. The findings suggest the need for inclusive financial policies, flexible collateral arrangements, group lending, and support for livelihood diversification to enhance equitable financial inclusion.

Recommendations.

This study recommends targeted interventions to enhance financial access among rice farmers in Kenya's national irrigation schemes. Financial institutions should offer demographic sensitive products, including simplified procedures and financial literacy programs for less educated farmers, and mobile-based lending for the youth. Gender inclusive strategies such as

joint accounts, group guarantees, and alternative collateral should be promoted to improve women's access to financial services. Collaborations with cooperatives and extension officers can help identify the needs of larger households. Income diversification should be supported through training in value addition and non-farm activities to stabilize earnings and reduce credit risk. Additionally, policymakers should incentivize rural lending through tax reliefs or risk sharing schemes, while investing in land titling and asset documentation to enhance collateral availability

REFERENCES

- [1] Abiona, O., & Koppensteiner, M. (2020). Financial inclusion, shocks and poverty: Evidence from the expansion of mobile money in Tanzania. *Journal of Human Resources*, 55(2), 480–517.
- [2] Adams, A. T., & Adeyeye, O. A. (2020). *The effect of education on access to financial services among small business owners in Nigeria*. *African Journal of Business Management*, 14(6), 175–184.
- [3] Agarwal, R., & Nair, M. (2019). The impact of education and age on digital financial service adoption. *International Journal of Development Finance*, 4(1), 22–35.
- [4] Ahmed, R., & Martinez, M. (2021). *Financial inclusion among smallholder farmers: Evidence from emerging markets*. *Journal of Rural Finance*, 13(2), 112–127. <https://doi.org/10.1016/j.jrf.2021.03.005>
- [5] Akpan, J., & Otieno, A. (2022). Demographic disparities in mobile banking access among West African farmers. *African Journal of Rural Economy and Finance*, 13(2), 99–112.
- [6] Allen, F., & Santomero, A. M. (2001). What do financial intermediaries do? *Journal of Banking & Finance*, 25(2), 271–294. [https://doi.org/10.1016/S0378-4266\(99\)00129-6](https://doi.org/10.1016/S0378-4266(99)00129-6)
- [7] Alliance for Financial Inclusion. (2020). *Gender inclusive finance: Policy framework*. <https://www.afi-global.org/>
- [8] Amoah, C., Owusu, V., & Abdulai, A. (2022). Demographic determinants of access to rural financial services in Ghana. *African Journal of Agricultural and Resource Economics*, 17(1), 45–60.
- [9] Aryeetey, E., & Udry, C. (2019). Understanding financial exclusion in West Africa: Trust, institutions, and demographics. *African Journal of Economic Policy*, 26(1), 1–20.

- [10] Assefa, D., & Belay, T. (2020). Determinants of financial inclusion among rural farmers in Ethiopia. *Ethiopian Journal of Economics*, 29(2), 87–105.
- [11] Asuming, P. O., Osei-Agyei, E., & Oteng-Abayie, E. F. (2021). Mobile banking adoption among rural households in Ghana. *Journal of African Business*, 22(1), 1–18.
- Atieno, R., & Kibet, L. (2020). *Education and access to finance among small and medium-sized enterprises in Kenya*. *Journal of African Financial Studies*, 12(1), 45–61.
- [12] Awunyo-Vitor, D., Abankwah, V., & Alhassan, H. (2020). Access to credit and financial inclusion among smallholder farmers in sub-Saharan Africa. *Agricultural Finance Review*, 80(3), 421–436. <https://doi.org/10.1108/AFR-02-2020-0024>
- [13] Bashiru, S., Bunyaminu, A., Nandom Yakubu, I., & Al-Faryan, M. A. S. (2023). Drivers of financial inclusion: Insights from Sub-Saharan Africa. *Economies*, 11(5), Article 146. <https://doi.org/10.3390/economies11050146> MDPI
- [14] Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd ed.). University of Chicago Press.
- [15] Borden, L. M., Lee, S. A., Serido, J., & Collins, D. (2018). *Changing college students' financial knowledge, attitudes, and behavior through seminar participation*. *Journal of Family and Economic Issues*, 29(1), 23–40.
- [16] Central Bank of Kenya (CBK). (2023). *FinAccess Household Survey 2022*. https://www.centralbank.go.ke/uploads/financial_inclusion/FinAccess_2022.pdf
- [17] Chen, Y., Banerjee, R., & Xu, L. (2023). Bridging the gender digital divide in agriculture. *World Development*, 161, 106050.
- [18] Chukwu, J. O., Ezeano, C. I., & Nwachukwu, N. (2023). Determinants of smallholder farmers' access to formal credit in Nigeria. *Journal of Agricultural Economics and Development*, 12(1), 20–29.
- [19] Demirgüç-Kunt, A., Klapper, L., & Singer, D. (2022). *Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19*. World Bank.
- [20] Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. World Bank.
- [21] FinMark Trust. (2021). *The state of financial inclusion in sub-Saharan Africa*. <https://www.finmark.org.za/publications>

- [22] Food Security. (2023). Gendered investment differences among smallholder farmers: Evidence from a microcredit programme in western Kenya. *Food Security*, 15, 1489–1504. <https://doi.org/10.1007/s12571-023-01394-0> SpringerLink
- [23] Ghosh, S., & Vinod, D. (2017). Education and financial access among rural populations. *Indian Journal of Finance*, 11(2), 38–45.
- [24] Gichuki, C. N., & Kamau, C. W. (2022). Financing agribusiness: Potential determinants of financial inclusion for smallholder rural farming communities in Kenya. *Journal of Rural & Community Finance*, 4(2), 33–47. <https://doi.org/10.1177/09730052211034350>
journals.sagepub.com+1journals.sagepub.com+1
- [25] Kabubo-Mariara, J., & Kieti, D. (2019). Gender and access to agricultural finance in Mwea Irrigation Scheme, Kenya. *Journal of Rural Studies*, 68, 48–57.
- [26] Karanja, T., & Wekesa, M. (2024). The impact of digital literacy on mobile loan uptake in Mwea irrigation scheme. *Journal of Agricultural Technology and Innovation*, 12(1), 15–28.
- [27] Kariuki, J., & Kamau, G. (2021). Demographic characteristics and access to agricultural credit in Kenyan irrigation schemes. *East African Journal of Finance & Economics*, 5(2), 78–92.
- [28] Mburu, G., & Mutiso, J. (2021). Education and access to financial services among rice farmers in Kenya. *African Finance Review*, 13(2), 144–160.
- [29] Mohan, P., & Singh, A. (2019). Rural finance and socio-demographic predictors in emerging economies. *Development Studies Journal*, 42(3), 79–95.
- [30] Musau, S. M., & Muriithi, M. K. (2020). *Effect of demographic factors on access to formal financial services in Kenya*. *International Journal of Finance and Accounting*, 5(2), 45–52.
- [31] Mwangi, M., & Njeru, F. (2020). Gender and financial access in rural Kenya. *Kenya Economic Review*, 7(1), 65–78.
- [32] Mwangi, W. (2018). *Influence of demographic factors on access to financial services among smallholder farmers in Kenya* [Unpublished master's thesis]. University of Nairobi.
- [33] National Irrigation Board. (2019). *Annual report on irrigation schemes and farmer statistics*. Nairobi, Kenya: Government of Kenya.

- [34] Ndungu, S., & Wanyama, D. (2023). The role of gender and age in financial access: A panel study of Ahero and Bunyala schemes. *East African Journal of Finance and Policy*, 11(2), 23–36.
- [35] Ng'eno, V., Bett, H. K., & Lagat, J. K. (2021). *Determinants of access to credit among smallholder farmers in Kenya: A gender-based analysis*. *African Journal of Agricultural Research*, 16(3), 245–254.
- [36] Ngugi, R., & Njiru, J. (2018). Youth access to financial services in Kenya. *African Journal of Economic Policy*, 25(1), 19–33.
- [37] Ochieng, V., & Muthoni, M. (2020). Education and gender as determinants of financial inclusion among Kenyan farmers. *Journal of Rural Finance & Banking*, 6(2), 91–106.
- [38] Ooko, A., & Makori, M. (2020). Socio-demographic factors influencing access to finance among rice farmers in Kenya. *African Journal of Agricultural Research*, 15(6), 823–831. <https://doi.org/10.5897/AJAR2020.14753>
- [39] Robb, C., & Wood, R. (2020). Demographic influences on access to credit and savings in low-income countries. *World Development Perspectives*, 20, Article 100266.
- [40] Sharif, H., Mughal, Y. H., & Naeem, M. (2020). *The role of financial literacy in business risk-taking among micro entrepreneurs in Pakistan*. *Journal of Small Business and Enterprise Development*, 27(2), 173–189.
- [40] Silva, J. G., Torralba, M., & Rodriguez, H. (2020). Credit access constraints and rural livelihoods: The role of education and age. *Development Policy Review*, 38(4), 521–539. <https://doi.org/10.1111/dpr.12421>
- [40] World Bank. (2022). *Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19*. <https://www.worldbank.org/en/publication/globalfindex>
- [41] Zins, A., & Weill, L. (2016). The determinants of financial inclusion in Africa. *Review of Development Finance*, 6(1), 46–57.