

Impact of Financial Cooperatives on the Livelihood of smallholder Farmers in Rulindo district. Case of UMITE SACCO, Period 2019-2023

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Abstract-This study investigates the impact of UMITE SACCO on smallholder farmers in Rulindo from 2019 to 2023. UMITE SACCO (UMUSINGI MW'ITERAMBERE KISARO) aims to provide loans, savings products, and financial education to improve farmers' livelihoods and economic contributions. Utilizing a mixed-methods strategy that incorporates both quantitative surveys and qualitative interviews, the study explored the impact of the cooperative. The sample size is determined through random sampling techniques. By using slovin's formulae with error tolerance of 0.5 the data were from 222 participants while the analysis utilized a multiple regression model in SPSS, focusing on access to credit, financial literacy, and loan utilization. The findings revealed that access to credit, financial literacy, marital status, and market access significantly motivate farmers' education, health, asset acquisition, and income generation. However, variables like family size and education level exhibit less significant effects. Additionally, the study underscores the significance of financial inclusion, literacy programs, and sustainable agriculture practices in motivating farmers' livelihoods. It recommends policy interventions to boost financial inclusion, invest in financial literacy, enhance market access, and promote sustainable agriculture. Furthermore, future research areas include investigating gender dynamics, exploring the effects of technological innovations, and evaluating existing policies to better serve smallholder farmers.

Key words: Accessibility, Credit, financial cooperatives, financial literacy, Kisaro, smallholder farmers, UMITE Sacco.

I. INTRODUCTION

1.1. Background of study

72.1% of Rwandans reside in rural areas, with agriculture forming the backbone of the economy employing over 70% of the workforce, [1] Smallholder farmers, defined as those owning and operating less than one hectare to 10 hectares, [2], that constitute the vast majority cultivating

approximately 57.5% of the total country's land [3]. Challenges Faced by Smallholder Farmers: Despite their vital role, smallholder farmers face significant hurdles. They struggle with low yields, insufficient post-harvest knowledge and equipment, and production below potential [4], [5]. Also microclimates vary widely [6] And limited land availability is a primary concern, exacerbated by Rwanda's high population density and hilly terrain [7] and stated by [8], [9]. Furthermore, accessing financial resources proves challenging, as traditional banks often require collateral unavailable to most smallholders and lack the flexibility to accommodate their specific needs [10], [11]. [12] emphasized that, smallholder farmers contribute more to food security and poverty reduction in Rwanda. However, the lack of agricultural finance is one of numerous challenges they face for improving productivity and increasing income along the value chain. Additionally, inadequate market infrastructure and transportation networks hinder efficient produce transport and access to fair market prices [13],

Government Initiatives: Recognizing these challenges, the Rwandan government has implemented various initiatives to promote rural development and financial inclusion. The Vision 2020 Umurenge program aims to transform rural areas into self-sustaining economic hubs through infrastructure development and community-driven initiatives [14], [15] [16]. Moreover, the establishment of the Rwanda Agriculture and Animal Resources Development Board (RAB) provides farmers with essential support through training, technology integration, and improved market access [17].

SACCOs, member-owned and operated financial cooperatives, provide specifically to the needs of their rural communities. They offer a diversified range of services, including savings accounts, loans, insurance, and capacity building programs, tailored to empower and support their members [18]. Compared to traditional financial institutions, SACCOs offer several advantages. Their member-based ownership model fosters a sense of participation and accountability, empowering members to motivate the SACCO's operation and profit sharing [19]. Additionally, SACCOs demonstrate greater flexibility in loan terms and conditions, adapting to the unique circumstances and financial capabilities of smallholder farmers [18]. Furthermore, their deep understanding of the local context enables them to deliver services and advice relevant to the specific needs and challenges faced by their members [20]. While other rural financial institutions, such as government-sponsored microfinance institutions (MFIs) and commercial banks, exist, SACCOs often offer distinct advantages [20]. MFIs, while providing similar services, may impose

stricter eligibility requirements and higher interest rates [21]. Commercial banks, often absent in rural areas and demanding significant collateral, remain largely inaccessible to most smallholder farmers [22] and [23]. In Rwanda, Saving and Credit Cooperatives (SACCOs) are main provider of finance to smallholder farmers in rural areas [18], The National Bank that regulates 439 SACCOs as of 31-July-2022 including 23 non-Umurenge SACCOs and 416 Umurenge SACCOs in the country so that UMITE SACCO is included [24]

UMITE SACCO serves over 1,000 smallholder farmers in the Kisaro sector, Rulindo. Its mission is to empower members through financial inclusion and access to essential services, making it a vital community resource (UMITE Sacco, 2024). It offers services, including savings accounts that allow farmers to securely save income and earn interest, promoting financial discipline and capital growth. The basic interest rate for credit is 24%, with additional products like TINYUKA URASHOBOYE at 18%, focusing on women and youth. Loans: Farmers can access loans for various agricultural purposes, such as purchasing seeds, fertilizer, and livestock, empowering them (UMITE Sacco, 2024).

II. MATERIAL AND METHODS

2.1. Area of Study

UMITE Sacco is located in the Kisaro sector of Rulindo District, Northern Province, which encompasses 17 sectors, 71 cells, and 494 villages over an area of 567 square kilometers. As of 2023, this district has a population of 360,144. The primary food crops grown in Kisaro include wheat and Irish potatoes (LODA 2013).

2.2. Research Design, Population and Sample, Data Collection and Analysis

The study employed a mixed-methods research design to evaluate the impact of SACCO on smallholder farmers' livelihoods, using structured surveys and qualitative interviews. Quantitative data, gathered through surveys on credit access, financial literacy, and loan utilization, were analyzed using SPSS for descriptive statistics, correlation, and multiple regression to identify patterns and relationships. Qualitative data from in-depth interviews and focus groups provided deeper insights into farmers' experiences and perceptions. The target population comprises smallholder farmers engaged in UMITE SACCO. A stratified random sampling technique was utilized to ensure representation from various demographic and socio-economic backgrounds, ensuring a representative analysis of how SACCO services influence income, asset acquisition, education, and health. By end of 2023, SACCO had a total population of 6653 individuals who

had opened accounts. Among these, 501 individuals' small farmers had actively sought financial services between 2019 and 2023 (UMITE SACCO, 2024). The sample size was determined using

slovin's formulae ($n = \frac{N}{1+N(e)^2}$) resulting in a representative group for detailed analysis.

$$n = \frac{501}{1+501(0.05)^2} = 222 \text{ respondents}$$

Where: n: the sample size, N is total population, e: error

margin.

2.6. Multiple regression model

The multiple regression model analyzed the impact of various factors on smallholder farmers' livelihoods, identifying the relative contributions of financial services, credit access, financial literacy, loan utilization, education level, age, and household size.

$$Y = \beta_0 + \beta_1(\text{Financial services}) + \beta_2(\text{Access to credit}) + \beta_3(\text{Financial literacy}) + \beta_4(\text{Loan utilization}) + \beta_5(\text{Level of education}) + \beta_6(\text{Age}) + \beta_7(\text{Household size}) + \epsilon$$

Y is dependent variable, independent variables (β_1 to β_7), and coefficients (β_0 to β_7). The coefficients represent the magnitude and direction of the relationship between each independent variable and the dependent variable. The error term (ϵ) represents the difference between observed and predicted values.

2.7. Ethical Considerations

The study adhered to strict ethical guidelines, obtaining informed consent from participants while ensuring their anonymity and confidentiality, and upholding principles of integrity, respect, and beneficence.

III. Results and discussion

This section used analytical techniques to analyze gathered data, uncovering insights into demographic trends, socio-economic dynamics, and predictive factors.

3.1. Demographic characteristic of respondents

Table 1: Gender of respondents

Gender		Frequency	Percent
Valid	Male	131	59.0
	Female	91	41.0
	Total	222	100.0

Source: Primary data 2024

The table 1: Indicate the survey of 222 respondents shows a gender distribution where 59.0% identified as male and 41.0% as female.

Table 2: Marital status of respondents

Marital status		Frequency	Percent
Valid	Single	101	45.5
	Married	121	54.5
	Total	222	100.0

Source: Primary data 2024

Table 2 shows that out of 222 respondents, 101 (45.5%) are single and 121 (54.5%) are married, indicating a higher proportion of married individuals, with the cumulative percentage confirming the full representation of the sample.

Table 3: Education level of respondents

Education level		Frequency	Percent
Valid	Primary	88	39.6
	Secondary	55	24.8
	A1	79	35.6
	Total	222	100.0

Source: Primary data 2024

Table 3 details the educational attainment of 222 respondents, showing that 39.6% completed primary education, 24.8% for secondary education, and 35.6% attained an "A1" level.

Table 4: Family size of respondents

Family size		Frequency	Percent
Valid	1	6	2.7
	2	6	2.7
	3	30	13.5
	4	45	20.3
	5	45	20.3
	6	42	18.9

7	18	8.1
8	18	8.1
9	12	5.4
Total	222	100.0

Source: Primary data 2024

Table 4 provides an overview of family sizes among 222 respondents, showing that the most common sizes were 4, 5, and 6 members (each about 20.3%), with a gradual decrease in percentage for larger families and smaller percentages for family sizes of 1, 2, and 9 members.

3.2. Descriptive statistics

This section provides a detailed analysis of the quantitative data collected in the study, highlighting central tendencies, variability, and distribution of key variables.

Table 5: Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	222	1.00	2.00	1.4099	.49293
Marital status	222	1.00	2.00	1.5450	.49909
Education level	222	1.00	3.00	1.9595	.86833
Family size	222	1.00	9.00	5.1486	1.87638
Market access and infrastructures	222	3.00	5.00	4.1306	.55148
Agriculture practices	222	1.00	5.00	3.7432	1.19267
Access to credit	222	2.75	4.50	3.6982	.47934
Financial literacy	222	3.00	4.40	3.7883	.39642
Loan utilization	222	3.00	4.25	3.7500	.41398
Livelihood of farmers	222	3.43	4.31	3.7839	.23072
Valid N (listwise)	222				

Source: Primary data 2024

The table 5 presents descriptive statistics for various variables among 222 respondents. For categorical variables like gender and marital status, the statistics provide insight into the distribution of responses, with mean values indicating the proportion of respondents falling into each category. For numerical variables such as education level, family size, and the surveyed

factors, the statistics reveal the range of values, central tendency (mean), and dispersion (standard deviation). For instance, the mean education level is approximately 1.96, suggesting that respondents, on average, have completed secondary education. Similarly, the mean family size is approximately 5.15, indicating that the average household consists of around five members. The standard deviations for these variables provide information on the variability or spread of responses around the mean.

3.3. Correlation coefficients

Table 6: Correlation coefficients results

Correlations							
	age	Market access and infrastructure	Agriculture practices	Access to credit	Financial literacy	Loan utilization	Livelihood of farmers
Age	1	-.353**	-0.13	-.290**	-.421**	-.430**	0.043
Market access and infrastructures	-.353**	1	0.044	.552**	.611**	.624**	0.016
Agriculture practices	-0.13	0.044	1	-.229**	-0.117	-.179**	.420**
Access to credit	-.290**	.552**	-.229**	1	.946**	.882**	0.011
Financial literacy	-.421**	.611**	-0.117	.946**	1	.946**	0.127
Loan utilization	-.430**	.624**	-.179**	.882**	.946**	1	0.12
Livelihood of farmers	0.043	0.016	.420**	0.011	0.127	0.12	1
**. Correlation is significant at the 0.01 level (2-tailed).							

Source: Primary data 2024

The table 6 depicts correlation coefficients among various variables, shedding light on their relationships within the dataset. Each correlation coefficient, ranging from -1 to 1, signifies the strength and direction of the relationship between two variables. For instance, a correlation coefficient of 1 denotes a perfect positive relationship, while -1 signifies a perfect negative relationship, and 0 indicates no correlation. Notably, significant correlations (** at the 0.01 level, 2-tailed) are observed between certain variables, such as access to credit and financial literacy (0.946**), indicating a strong positive relationship. Conversely, age demonstrates a moderate negative correlation with market access and infrastructure (-0.353**). These correlations provide valuable insights into the interplay between different factors, facilitating a deeper understanding of the underlying dynamics and patterns within the dataset.

3.4. Data analysis

This section involves systematically examining and interpreting data using various methods to identify patterns, relationships, providing valuable insights into research questions and objectives.

3.5. Impact of financial cooperatives on education and health of smallholder farmers

This study examines how financial cooperatives enhance smallholder farmers' education and health, revealing their crucial role in advancing socioeconomic development and suggesting pathways for sustainable progress.

Table 7: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.880 ^a	.774	.766	.16752

a. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy.

The table 7 presents the model summary statistics for a regression analysis conducted with multiple predictors. The model's overall fit is evaluated through several indicators. The coefficient of determination (R-squared) indicates that approximately 77.4% of the variance in the dependent variable can be explained by the independent variables included in the model. The adjusted R-squared, which considers the number of predictors and sample size, is slightly lower at 76.6%, reflecting the model's goodness of fit while adjusting for potential overfitting. The standard error of the estimate, measuring the average deviation of observed values from the regression line, is reported as 0.16752. These statistics collectively suggest that the regression model, comprising predictors such as education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, and financial literacy, provides a reasonably good fit to the data, explaining a substantial proportion of the variance in the dependent variable.

Table 8: Analysis of variance

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	20.499	8	2.562	91.306	.000 ^b
Residual	5.978	213	.028		
Total	26.477	221			

a. Dependent Variable: education and health

b. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy

The ANOVA table presents the results of a regression analysis aimed at predicting the dependent variable "education and health" using multiple predictors. The regression section indicates that the predictors collectively explain a significant amount of variance in the dependent variable, as evidenced by the substantial sum of squares (SS) of 20.499 and a high F statistic of

91.306 with associated significance (Sig.) at .000. Conversely, the residual section demonstrates unexplained variance in the dependent variable, as indicated by the residual SS of 5.978. the ANOVA results suggest that the effectively predicts variations in the "education and health" variable, yielding a highly significant overall model ($p < .001$).

Table 9: Regression results of Impact of financial cooperatives on education and health of smallholder farmers

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.648	.166		9.913	.000
Access to credit	-.483	.081	-.669	-5.986	.000
Financial literacy	.439	.143	.503	3.060	.003
Loan utilization	.220	.090	.263	2.446	.015
Marital status	.185	.026	.267	7.033	.000
Family size	-.006	.006	-.033	-.983	.327
Market access and infrastructure	.103	.027	.165	3.796	.000
Agriculture practices	.215	.011	.740	19.892	.000
Education level	.013	.013	.032	.971	.333

a. Dependent Variable: education health

The table 9 presents the coefficients of a regression model aimed at predicting the dependent variable "education health" based on various predictors. The "B" column shows the unstandardized coefficients, indicating the change in the dependent variable for a one-unit change in the predictor,

while the "Beta" column displays the standardized coefficients, representing the change in standard deviations of the dependent variable for a one-standard deviation change in the predictor.

The results indicate that access to credit ($B = -0.483$, $p = .000$), financial literacy ($B = 0.439$, $p = .003$), loan utilization ($B = 0.220$, $p = .015$), marital status ($B = 0.185$, $p = .000$), market access and infrastructure ($B = 0.103$, $p = .000$), and agriculture practices ($B = 0.215$, $p = .000$) have statistically significant effects on education health, as indicated by their respective t-values and associated p-values (Sig.). Specifically, higher levels of access to credit, financial literacy, loan utilization, marital status, market access and infrastructure, and agriculture practices are associated with higher levels of education health. Conversely, family size ($B = -0.006$, $p = .327$) and education level ($B = 0.013$, $p = .333$) do not have statistically significant effects on education health, as their associated p-values are greater than the conventional threshold of .05.

3.6. Impact of financial cooperatives on Assets acquisitions

This section examines the role of financial cooperatives in asset acquisitions for smallholder farmers, focusing on their socioeconomic implications and pathways to asset accumulation facilitated by cooperative financial services, through detailed analysis and presentation of findings.

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.496 ^a	.246	.218	.25226

a. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy

The model Summary table 10 shows that the regression model has a moderate predictive ability, with an R value of 0.496 indicating a moderate positive correlation between predictors and asset acquisition. The R^2 value of 0.246 means that approximately 24.6% of the variance in education health is explained by the model, while the adjusted R^2 of 0.218 accounts for the number of predictors. The standard error of 0.25226 reflects the prediction accuracy, indicating that the model accounts for a significant portion of the variance in education, health.

Table 11: Analysis of variance

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	4.422	8	.553	8.686	.000 ^b

Residual	13.555	213	.064		
Total	17.977	221			

a. Dependent Variable: asset acquisition

b. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy

The ANOVA table 11, presents the results of a regression analysis predicting asset acquisition as the dependent variable. The regression model, including predictors such as education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, and financial literacy, significantly explains variance in asset acquisition ($F = 8.686$, $p < 0.001$). The regression component accounts for 4.422 units of the total variation in asset acquisition, while the residual component represents unexplained variance. These findings suggest that the model as a whole is statistically significant in predicting asset acquisition, with the included predictors contributing significantly to the model's explanatory power.

Table 12: Regression results of Impact of financial cooperatives on Assets acquisitions

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.631	.250		10.508	.000
Access to credit	-.296	.121	-.497	-2.437	.016
Financial literacy	.685	.216	.952	3.171	.002
Loan utilization	.010	.136	.014	.072	.943
1 Marital status	.260	.040	.456	6.557	.000
Family size	.009	.009	.059	.965	.336
Market access and infrastructure	-.232	.041	-.449	-5.664	.000
Agriculture practices	.018	.016	.075	1.101	.272
Education level	-.012	.020	-.038	-.619	.537

a. Dependent Variable: asset acquisition

The table 12 displays the results of a regression analysis predicting asset acquisition, with several predictors included. The model indicates that marital status ($\beta = 0.456$, $p < 0.001$) and financial literacy ($\beta = 0.952$, $p = 0.002$) have significant positive effects on asset acquisition, while market access and infrastructure ($\beta = -0.449$, $p < 0.001$) has a significant negative effect. Access to credit ($\beta = -0.497$, $p = 0.016$) also shows a significant negative influence on asset acquisition. However, variables such as loan utilization, family size, agriculture practices, and education level do not significantly contribute to predicting asset acquisition. The constant term in the model is statistically significant ($t = 10.508$, $p < 0.001$), indicating that even without the predictor variables, there is a baseline level of asset acquisition. This model suggests that marital status, financial literacy, and market access and infrastructure are important factors influencing asset acquisition.

3.7. Impact of financial cooperatives on Income generating activities of small holders' farmers

This chapter explores the significant influence of financial cooperatives on the income-generating activities of smallholder farmers, analyzing their role in enhancing their livelihoods by providing income opportunities and promoting economic empowerment within agricultural communities.

Table 13: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.746 ^a	.556	.539	.15954

a. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy

The table 13 presents the model summary statistics for a regression analysis predicting an outcome variable. The model's overall fit is evaluated using the R and R Square values. In this case, the model's multiple correlation coefficient (R) is 0.746, indicating a moderately strong relationship between the predictors and the outcome variable. The coefficient of determination (R Square) is 0.556, suggesting that approximately 55.6% of the variance in the outcome variable can be explained by the predictors included in the model. The Adjusted R Square, which adjusts for the number of predictors in the model, is 0.539. This value is slightly lower than the R Square but still indicates a good fit of the model. The Standard Error of the Estimate (SEE) is 0.15954, representing the average difference between the observed and predicted values of the outcome

variable. The model shows a satisfactory level of explanatory power, suggesting that the included predictors collectively contribute to predicting the outcome variable.

Table 14: Analysis of variance

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	6.783	8	.848	33.314	.000 ^b
Residual	5.421	213	.025		
Total	12.205	221			

a. Dependent Variable: income generating activities

b. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy

The table 14 presents the results of an analysis of variance (ANOVA) for a regression model predicting income generating activities. The regression model's overall significance is evaluated through the F-test. The regression sum of squares (SSR) is 6.783, and the residual sum of squares (SSE) is 5.421. The degrees of freedom (df) for regression and residual are 8 and 213, respectively. The mean square (MS) for regression is 0.848, and for residual, it is 0.025. The F-statistic is calculated by dividing the mean square of regression by the mean square of residual, resulting in an F-value of 33.314. The associated p-value (Sig.) is less than 0.0001, indicating that the regression model is statistically significant. Therefore, the predictors included in the model collectively have a significant effect on predicting income generating activities.

Table 15: Regression results of Impact of financial cooperatives on Income generating activities of small holders' farmers

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.938	.158		12.239	.000
Access to credit	-.427	.077	-.872	-5.563	.000
Financial literacy	.746	.137	1.259	5.462	.000
Loan utilization	.321	.086	.566	3.747	.000
Marital status	.266	.025	.564	10.574	.000

Family size	.003	.006	.028	.586	.558
Market access and infrastructure	-.264	.026	-.618	-10.169	.000
Agriculture practices	.018	.010	.089	1.707	.089
Education level	-.004	.013	-.015	-.312	.755

a. Dependent Variable: income generating activities

The coefficients table provides insights into the relationship between predictor variables and income generating activities. The constant, at 1.938, represents the baseline value when all predictors are zero and is statistically significant. Access to credit negatively influences income generating activities, with a coefficient of -0.427, indicating a decrease of 0.427 units in income for each unit increase in access to credit. Conversely, financial literacy positively affects income generation, with a coefficient of 0.746, implying that each unit increase in financial literacy leads to a 0.746-unit increase in income. Loan utilization also has a positive impact on income generation, with a coefficient of 0.321, indicating a 0.321-unit increase in income for every unit increase in loan utilization. Marital status significantly influences income, as being married is associated with a 0.266-unit increase in income compared to being single. However, family size, education level, and agriculture practices do not significantly affect income generating activities. Market access and infrastructure negatively impact income, with a coefficient of -0.264, suggesting a decrease of 0.264 units in income for each unit increase in market access and infrastructure.

3.8. Aggregated impact of financial cooperatives on livelihood of small holders' farmers

This section examines the impact of financial cooperatives on smallholder farmers' livelihoods,

Table 16: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688 ^a	.473	.453	.17064

a. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy

The model summary reveals that the regression model explains approximately 47.3% of the variance in the dependent variable, as indicated by an R-square of 0.473. The adjusted R-square value of 0.453, which accounts for the number of predictors, is slightly lower, suggesting limited

improvement with additional predictors. The standard error of 0.17064 represents the average prediction error, indicating that the model has a moderate level of explanatory power, capturing nearly half of the variance in the outcome.

Table 17: Analysis of variance

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	5.562	8	.695	23.878	.000 ^b
Residual	6.202	213	.029		
Total	11.764	221			

a. Dependent Variable: livelihood of farmers

b. Predictors: (Constant), education level, agriculture practices, market access and infrastructure, family size, marital status, access to credit, loan utilization, financial literacy

The ANOVA table assesses the overall significance of the regression model in predicting the dependent variable, "livelihood of farmers." The table indicates that the regression model is statistically significant ($p < 0.001$), as evidenced by the significant F-statistic of 23.878. This suggests that the independent variables collectively contribute to explaining the variability in the dependent variable. The regression sum of squares (SS) is 5.562, indicating the amount of variability in the dependent variable that is accounted for by the regression model. The residual sum of squares, representing unexplained variability, is 6.202. The mean squares provide an average measure of variability, with the regression mean square being 0.695 and the residual meansquare being 0.029.

Table 18: Regression results of Aggregated impact of financial cooperatives on livelihood of small holders' farmers

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.073	.169		12.236	.000
1 Access to credit	-.402	.082	-.835	-4.893	.000
Financial literacy	.624	.146	1.071	4.266	.000
Loan utilization	.184	.092	.330	2.004	.046

Marital status	.237	.027	.513	8.828	.000
Family size	.002	.006	.017	.337	.737
Market access and infrastructure	-.131	.028	-.313	-4.718	.000
Agriculture practices	.083	.011	.431	7.584	.000
Education level	-.001	.014	-.004	-.084	.933

a. Dependent Variable: livelihood of farmers

The regression analysis results reveal several significant coefficients in the model predicting livelihood of farmers. The constant term holds a coefficient of 2.073 ($p < .001$), indicating that when all other variables are zero, the expected value of the dependent variable is 2.073. Notably, access to credit exhibits a negative coefficient of -.402 ($p < .001$), suggesting that an increase in access to credit is associated with a decrease in livelihood of farmers. Conversely, financial literacy shows a positive coefficient of .624 ($p < .001$), indicating a positive relationship between financial literacy and livelihood. Additionally, marital status displays a positive coefficient of .237 ($p < .001$), suggesting that being married is associated with higher livelihood. Market access and infrastructure also show a negative coefficient of -.131 ($p < .001$), implying that improved access to markets and infrastructure could potentially reduce livelihood. Agriculture practices demonstrate a positive coefficient of .083 ($p < .001$), indicating that favorable agricultural practices positively influence livelihood. However, family size and education level do not show statistically significant coefficients, suggesting that these variables may not significantly impact the livelihood of farmers in this model.

IV. CONCLUSIONS RECOMMENDATION

The survey revealed a gender distribution skewed towards males at 59.0%, with females at 41.0%, highlighting potential gender disparities in survey participation. The marital status data shows a higher proportion of married individuals (54.5%) compared to single respondents (45.5%), suggesting the need to explore how marital status impacts financial decision-making and resource allocation.

Educational attainment among respondents varies, with levels including primary, secondary, and "A1," emphasizing education's role in socio-economic status and livelihood opportunities. Family size data indicates that most respondents come from households with 4, 5, or 6 members, which is

crucial for understanding resource allocation and socio-economic resilience. Correlation and regression analyses highlight significant relationships between access to credit, financial literacy, and livelihood outcomes, underscoring the importance of financial inclusion and targeted interventions to improve economic opportunities and resilience.

The study recommends expanding financial cooperatives to underserved rural areas and enhancing financial literacy through targeted programs. Additionally, it suggests investing in rural infrastructure to improve market access and supporting sustainable agriculture practices to address the key challenges faced by smallholder farmers.

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