



DETERMINANTS OF SOCIOECONOMIC FACTORS INFLUENCING MAIZE PRODUCTION AMONG SMALLHOLDER FARMERS FOR ENHANCED FOOD SECURITY IN BUNGOMA-NORTH SUB-COUNTY, BUNGOMA COUNTY, KENYA

Mercy Nafula Kombe, Rose Onamu (Ph.D.), and Lydia Wamocha (Prof.).

Department of Biological and Agricultural Sciences,
Masinde Muliro University of Science and Technology.

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ABSTRACT: Maize production plays a critical role in enhancing food security, income generation, and rural livelihoods in Kenya. Smallholder farmers contribute a substantial proportion of national maize output, yet their productivity remains below potential due to various socioeconomic constraints. This study examined the socioeconomic factors influencing maize production among smallholder farmers in Bungoma-North Sub-County, Bungoma County, Kenya, with a view to enhancing food security. The study was guided by the Theory of Production, which explains how variations in production inputs and resources influence agricultural output. A descriptive survey research design was adopted, targeting smallholder maize farmers within Naitiri, Mbakalo, and Kabuyefwe wards. Data were collected using structured questionnaires and interview schedules and analyzed using descriptive and inferential statistics. The socioeconomic variables examined included credit accessibility, land ownership, labor availability, educational attainment, income levels, and demographic characteristics. Findings revealed that socioeconomic factors significantly influenced maize production among smallholder farmers. Access to credit enhanced the ability of farmers to purchase improved inputs and adopt modern farming technologies. Household income levels positively influenced investment in agricultural production, while educational attainment improved farmers' capacity to adopt recommended agronomic practices. Land ownership and farm size were also found to significantly affect maize yields due to their influence on production scale and resource allocation. Regression analysis demonstrated that socioeconomic factors significantly predicted maize production outcomes, indicating that improvements in access to financial resources, education, labor, and productive assets could substantially increase maize productivity and strengthen household food security. The study concludes that socioeconomic factors remain fundamental determinants of maize production among smallholder farmers and should be prioritized in agricultural development programs. The study recommends strengthening rural credit systems, promoting farmer education and training, improving access to agricultural inputs, and supporting income-generating activities that enhance farmers' production capacity. These interventions would contribute significantly to sustainable maize production and improved food security in Bungoma-North Sub-County and similar agricultural regions.

KEYWORDS: Agricultural Productivity, Credit Accessibility, Income, Food Security, Land Ownership, Maize Production, Smallholder Farmers.



BACKGROUND OF THE STUDY

Food security remains one of the most important development concerns globally, particularly in developing countries where agriculture is the primary source of livelihood for the majority of rural populations. The Food and Agriculture Organization (FAO, 2023) defines food security as a situation in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life. Despite substantial advances in agricultural technology and food production systems, approximately 735 million people worldwide continue to experience chronic food insecurity, with the greatest burden occurring in Sub-Saharan Africa (FAO et.al., 2023). Agricultural productivity therefore remains central to achieving Sustainable Development Goal 2, which seeks to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture (United Nations, 2023).

Maize is one of the most important cereal crops globally and serves as a staple food for billions of people. According to FAOSTAT (2023), maize accounts for a significant proportion of global cereal production and is cultivated in over 160 countries. The crop plays a crucial role in food systems, livestock feed production, industrial manufacturing, and household income generation. Countries such as the United States, China, Brazil, India, Argentina, and Mexico dominate global maize production due to advanced agricultural technologies, access to credit, mechanization, and favorable socioeconomic conditions (Maitra & Singh, 2021). Studies have shown that socioeconomic factors significantly influence maize productivity because they determine farmers' ability to access productive resources, adopt innovations, and invest in improved farming practices (Kılıç et al., 2020; Meyer et al., 2006).

In Africa, maize constitutes one of the most important staple crops and is consumed by millions of households daily. According to Mudadirwa et al. (2023), more than fourteen African countries depend heavily on maize as a staple food, with consumption levels accounting for between 85% and 95% of total cereal intake. The African maize market continues to grow because of increasing population, urbanization, and rising demand for food and livestock feed (Yadesa & Diro, 2023). However, maize productivity across much of Africa remains relatively low compared to global standards due to several socioeconomic constraints, including limited access to credit, inadequate agricultural inputs, low levels of education, poor infrastructure, and limited extension support (AGRA, 2022). These challenges disproportionately affect smallholder farmers who produce the majority of food consumed across the continent.

Smallholder farmers are recognized as the backbone of agricultural production in most African countries. According to the African Development Bank (AfDB, 2022), smallholder farmers account for approximately 80% of agricultural production in Sub-Saharan Africa and contribute significantly to household food security and rural economic development. However, their production capacity is often constrained by inadequate access to financial resources, insecure land tenure systems, labor shortages, and limited market opportunities (World Bank, 2023). Access to credit has particularly been identified as a critical determinant of agricultural productivity because it enables farmers to purchase improved seeds, fertilizers, pesticides, machinery, and other production inputs (Mwonge & Naho, 2022). Farmers who lack access to affordable financial services often struggle to invest in productivity-enhancing technologies, resulting in low yields and reduced household food security.



In Kenya, maize is the principal staple food crop and contributes significantly to national food security, employment, and income generation. The crop occupies approximately 40% of the total cultivated land and provides food for more than 90% of Kenyan households (FAO, 2023). Smallholder farmers contribute nearly 70% of the country's maize production, making them central to national agricultural development efforts (Santpoort, 2020). Despite this importance, maize productivity remains below potential levels due to numerous socioeconomic challenges. Studies conducted in Kenya indicate that limited access to agricultural credit, high input costs, inadequate farmer training, low household incomes, and land fragmentation continue to hinder maize production among smallholder farmers (Njoroge et al., 2024; Ochieng et al., 2021). These constraints reduce farmers' capacity to adopt modern farming technologies and improve productivity.

Education has emerged as another important socioeconomic determinant of agricultural productivity. According to Schultz (1964), education enhances farmers' ability to acquire, interpret, and apply agricultural information effectively. Empirical studies conducted by Ragasa and Mazunda (2020) found that educated farmers are more likely to adopt improved agricultural technologies, maintain better farm records, access extension information, and implement recommended production practices. Similarly, Minten and Barrett (2019) observed that farmers with higher educational attainment generally achieve higher agricultural productivity than those with lower levels of education. Education therefore contributes significantly to improved decision-making and efficient resource utilization among farming households.

Land ownership and farm size also play a fundamental role in determining agricultural productivity. Secure land tenure encourages investment in soil conservation, irrigation systems, and other long-term productivity-enhancing measures (Deininger & Feder, 2009). Larger farms often benefit from economies of scale, allowing farmers to utilize machinery, labor, and other inputs more efficiently than smaller farms (Feder et al., 2010). However, increasing population pressure and land subdivision have resulted in shrinking farm sizes across many parts of Kenya, thereby limiting agricultural productivity and household food security (Ministry of Agriculture, 2023).

In Bungoma County, maize farming constitutes the primary economic activity for a majority of rural households. Bungoma-North Sub-County is particularly recognized as one of the leading maize-producing regions in Western Kenya. Nevertheless, farmers in the area continue to experience declining productivity due to a combination of socioeconomic constraints, including inadequate credit accessibility, low household incomes, limited access to modern farming inputs, labor shortages, and challenges associated with land ownership and farm management (Ministry of Agriculture, Bungoma-North Sub-County, 2024). These challenges have contributed to reduced maize yields, declining profitability, and increased vulnerability to food insecurity among farming households.

Although numerous studies have examined agricultural productivity and food security in Kenya, much of the existing literature has focused on environmental factors and extension services, with relatively limited attention devoted to the specific influence of socioeconomic determinants on maize production among smallholder farmers in Bungoma-North Sub County. Furthermore, socioeconomic conditions continue to evolve due to changing economic circumstances, demographic shifts, and agricultural policy reforms. Consequently, there is a need for empirical evidence that specifically examines how socioeconomic factors influence



maize production and contribute to food security among smallholder farmers in the study area. Understanding these relationships is essential for informing policy interventions, agricultural development programs, and resource allocation strategies aimed at enhancing maize productivity and improving household food security.

Problem Statement

Maize is the principal staple food crop in Kenya and contributes significantly to household food security, employment creation, and income generation. Despite the critical role played by smallholder farmers in producing approximately 70% of the country's maize output, maize productivity remains below its potential in many regions of Kenya, including Bungoma-North Sub-County (Santpoort, 2020). Previous studies have identified several socioeconomic constraints affecting agricultural productivity, including inadequate access to credit facilities, low household incomes, limited ownership of productive assets, labor shortages, and low levels of education among farmers (Mwonge & Naho, 2022; Njoroge et al., 2024). These constraints limit farmers' ability to purchase quality inputs, adopt improved farming technologies, and implement recommended agronomic practices, ultimately reducing maize yields and threatening food security. Although government interventions such as subsidized inputs, agricultural credit programs, and farmer training initiatives have been implemented, maize yields among smallholder farmers in Bungoma-North Sub-County continue to remain relatively low. Existing studies have largely focused on environmental and extension-related determinants of agricultural productivity, leaving limited empirical evidence regarding the specific influence of socioeconomic factors on maize production within the study area. Consequently, there is inadequate information to guide policymakers, development partners, and agricultural stakeholders in designing targeted interventions that address socioeconomic barriers to maize production. Therefore, this study sought to determine the socioeconomic factors influencing maize production among smallholder maize farmers to enhance food security in Bungoma-North Sub-County, Bungoma County, Kenya.

Main Objective

To determine socioeconomic factors influencing maize production among smallholder maize farmers to enhance food security in Bungoma-North Sub-County, Bungoma County, Kenya.

Research Hypothesis

H₀: Socioeconomic factors do not significantly influence maize production among smallholder maize farmers in Bungoma-North Sub-County, Bungoma County, Kenya.

H₁: Socioeconomic factors significantly influence maize production among smallholder maize farmers in Bungoma-North Sub County, Bungoma County, Kenya.

Conceptual Framework

Figure 1: Conceptual Framework Showing the Influence of Socioeconomic Factors on Maize Production Among Smallholder Farmers

**Independent Variable****Socioeconomic Status**

Credit accessibility
Land ownership
Labor
Demographics

Dependent Variable

Maize production (Number of bags)

Source: Adapted from the *Theory of Production and the Study Conceptualization* (2025).

The conceptual framework postulates that socioeconomic factors influence maize production among smallholder farmers. Improved access to credit, higher income levels, better educational attainment, secure land ownership, adequate labor availability, and favorable demographic characteristics are expected to enhance maize productivity. Increased maize production subsequently contributes to improved household food security through increased food availability and income generation.

Theoretical Review

This study was anchored on the **Theory of Production**, which explains the relationship between production inputs and the quantity of output generated from a production process. The theory originates from classical economic thought and has been extensively applied in agricultural economics to explain variations in farm productivity (Huang et al., 2021). According to the theory, agricultural output is determined by the efficient combination and utilization of available production factors such as land, labor, capital, entrepreneurship, and technology (Daly & Farley, 2011). In the context of smallholder maize farming, socioeconomic factors constitute critical production inputs because they influence farmers' ability to access resources necessary for agricultural production. Factors such as credit accessibility, educational attainment, income levels, labor availability, and land ownership directly affect farmers' capacity to acquire improved seeds, fertilizers, pesticides, machinery, and technical knowledge required for efficient maize production. The theory further posits that increased access to productive resources enhances output, while constraints in resource availability reduce productivity and efficiency. Therefore, smallholder farmers with greater financial resources, higher levels of education, secure land tenure, and adequate labor are expected to achieve higher maize yields compared to those facing socioeconomic limitations. The Theory of Production was considered appropriate for this study because it provides a framework for understanding how socioeconomic factors influence maize production and ultimately contribute to household food security among smallholder farmers in Bungoma-North Sub-County.

Empirical Literature Review

Socioeconomic factors have been widely recognized as important determinants of agricultural productivity and food security across the world. Access to credit has consistently emerged as one of the most influential factors affecting agricultural production among smallholder farmers. According to the World Bank (2023), access to agricultural finance enables farmers to purchase quality inputs, invest in mechanization, adopt improved technologies, and expand production activities. A study conducted by Mwonge and Naho (2022) found that farmers with access to formal credit facilities recorded significantly higher maize yields compared to those without access to credit. Similarly, Diagne and Zeller (2001) established that agricultural credit



positively influences productivity by increasing farmers' capacity to invest in productivity-enhancing inputs and technologies. However, many smallholder farmers in developing countries continue to face financial exclusion due to lack of collateral, high lending rates, and limited access to formal financial institutions.

Household income is another critical socioeconomic determinant of maize production. Income determines farmers' purchasing power and their ability to acquire agricultural inputs necessary for crop production (Feder et al., 2010). According to Njoroge et al. (2024), households with higher income levels are more likely to invest in improved seeds, fertilizers, irrigation technologies, and labor, resulting in increased agricultural productivity. In Kenya, studies have demonstrated that diversified income sources enhance farmers' resilience and capacity to finance agricultural operations, thereby contributing to higher maize yields and improved food security (Ochieng et al., 2021). Conversely, low-income households often experience difficulties accessing productive resources, which negatively affects agricultural output.

Education has also been identified as a significant factor influencing agricultural productivity. Schultz (1964) argued that education improves farmers' managerial skills and enhances their ability to acquire, process, and utilize information effectively. Empirical evidence from Ragasa and Mazunda (2020) indicates that educated farmers are more likely to adopt improved agricultural technologies and modern farming practices than their less educated counterparts. Similarly, Minten and Barrett (2019) reported that educational attainment significantly improves decision-making, resource management, and adoption of innovations, all of which contribute to increased farm productivity. In Kenya, farmers with secondary and tertiary education levels have been found to achieve higher maize yields due to better access to agricultural information and extension services (Kathuri & Wesonga, 2021).

Land ownership and farm size also influence agricultural production outcomes. According to Deininger and Feder (2009), secure land tenure encourages long-term investment in land improvement practices such as soil conservation, irrigation, and infrastructure development. Farmers with secure ownership rights are more willing to invest in productivity-enhancing technologies because they have confidence in retaining the benefits of their investments. Additionally, larger farm sizes often facilitate economies of scale and enable efficient utilization of machinery and labor resources (Feder et al., 2010). However, increasing population pressure and land fragmentation have reduced average farm sizes in many parts of Kenya, limiting production capacity among smallholder farmers (Ministry of Agriculture, 2023).

Labor availability remains another important determinant of maize productivity. Agricultural labor contributes significantly to land preparation, planting, weeding, pest management, harvesting, and post-harvest handling. According to AfDB (2022), labor shortages frequently result in delayed farming operations and reduced crop yields. Family labor has been identified as a critical source of labor among smallholder farming households because it reduces production costs and enhances operational efficiency (Yadesa & Diro, 2023). Studies conducted in Sub-Saharan Africa indicate that households with adequate labor resources generally achieve higher productivity than those experiencing labor constraints (AGRA, 2022).

Demographic characteristics such as age, gender, and household size have also been found to influence agricultural productivity. Younger farmers are generally more willing to adopt innovative farming practices, while experienced older farmers possess valuable indigenous



knowledge that supports production decisions (Maitra & Singh, 2021). Gender disparities in access to productive resources have similarly been identified as significant barriers to agricultural productivity, particularly among female farmers who often face limitations in accessing land, credit, and extension services (FAO, 2023). Household size influences labor availability and consumption requirements, thereby affecting production decisions and food security outcomes (World Bank, 2023).

Although numerous studies have examined the relationship between socioeconomic factors and agricultural productivity, most existing studies have focused on national-level analyses or broader agricultural systems. Limited empirical evidence exists regarding the specific influence of socioeconomic factors on maize production among smallholder farmers in Bungoma-North Sub-County. Furthermore, socioeconomic conditions vary across regions due to differences in income levels, resource accessibility, educational attainment, and institutional support systems. This study therefore seeks to bridge this knowledge gap by providing empirical evidence on how socioeconomic factors influence maize production and contribute to food security among smallholder farmers in Bungoma-North Sub County, Bungoma County, Kenya.

METHODOLOGY

This study adopted a descriptive survey research design to determine the socioeconomic factors influencing maize production among smallholder farmers in Bungoma-North Sub-County, Bungoma County, Kenya. The design was considered appropriate because it enabled the collection of quantitative and qualitative data from a representative sample of smallholder maize farmers and facilitated the examination of relationships between socioeconomic factors and maize production. The study was conducted in Bungoma-North Sub-County, comprising Naitiri, Mbakalo, and Kabuyefwe wards, which are recognized as important maize-producing areas within Bungoma County. The target population consisted of 10,548 smallholder maize farming households obtained from records maintained by the Ministry of Agriculture in Bungoma-North Sub-County. The sample size was determined using Yamane's (1967) formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = Sample size

N = Target population (10,548)

e = Level of precision (0.05)

$$n = 10,548 / (1 + 10,548)^2$$

$$n = 10,548 / 27.37$$

$$n = 385$$

Therefore 385 respondents were selected from East Ward. However, the study had a response rate of 78.97%. A sample of respondents was proportionately distributed across the three wards using stratified sampling, while simple random sampling was used to select individual



respondents. Primary data were collected using structured questionnaires and interview schedules. The questionnaire consisted of demographic information and statements measuring the influence of socioeconomic factors on maize production using a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). The instruments were subjected to expert review to establish content validity, while reliability was assessed through a pilot study and test-retest procedures. Data collection commenced after obtaining ethical approval from the Masinde Muliro University of Science and Technology Institutional Ethics Review Committee (IERC) and a research permit from the National Commission for Science, Technology and Innovation (NACOSTI). Participants were informed about the study objectives and procedures before providing written informed consent. Participation was voluntary, respondents could withdraw at any point without consequences, anonymity was maintained by excluding names and other identifiers from the questionnaires, and confidentiality was ensured through secure storage of data and reporting findings only in aggregate form.

Quantitative data were coded and analyzed using the Statistical Package for Social Sciences (SPSS Version 26). Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize respondent characteristics and perceptions regarding socioeconomic factors. Inferential statistics were employed to determine the relationship between socioeconomic factors and maize production. A simple linear regression model was applied to test the study hypothesis using the following model:

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

Where:

Y = Maize Production

β_0 = Constant

β_1 = Regression Coefficient

X_1 = Socioeconomic Factors

ε = Error Term

The coefficient of determination (R^2), Analysis of Variance (ANOVA), standardized beta coefficients, and significance values were used to determine the predictive influence of socioeconomic factors on maize production. Statistical significance was tested at $\alpha = 0.05$. Qualitative responses obtained from interviews were analyzed thematically and integrated with quantitative findings to provide a comprehensive understanding of the socioeconomic determinants influencing maize production among smallholder farmers.

FINDINGS AND DISCUSSION

The study had a response rate of 78.97%, representing a total of 304 responses.

Socioeconomic Factors Influencing Maize Production Among Smallholder Farmers

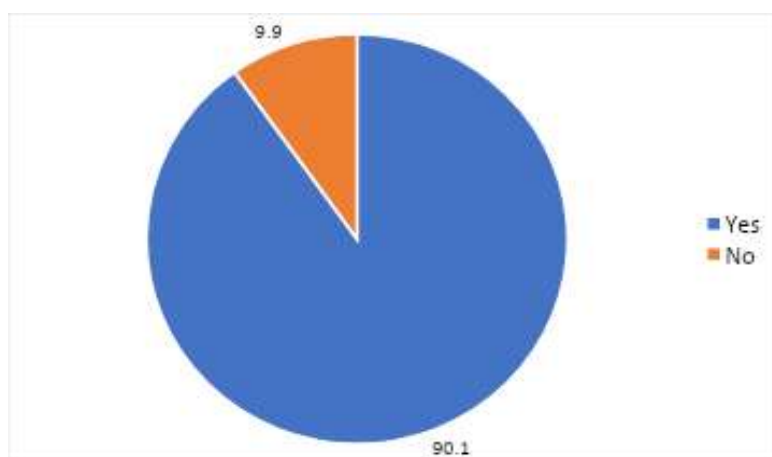
Socioeconomic factors that influence maize production among smallholder maize farmers to enhance food security in Bungoma North Sub-County.

The primary purpose of the study was to identify the socioeconomic determinants influencing maize output among smallholder farmers in Bungoma North Sub-County. The findings are delineated in the subsequent sections.

Engaging in other economic activities besides farming

The respondents were required to indicate if they engaged in other economic activities besides farming. The findings are summarized in Figure 4.4.

Figure: 4.1: Engaging in other economic activities other than Farming

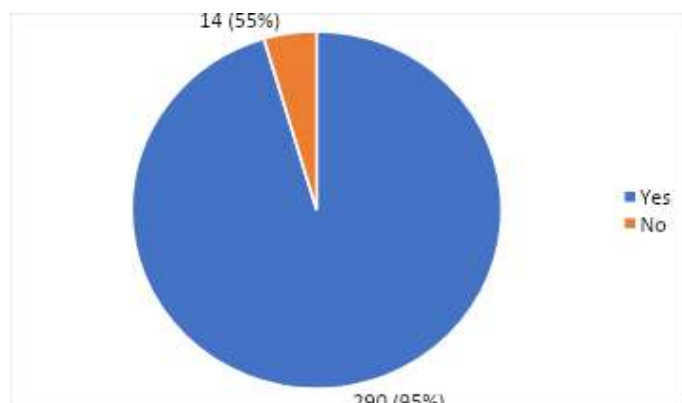


A total of 274 participants (90.1 %) concurred that they participate in other economic activities, as shown in Figure 4.4. This suggested that most of the smallholder farmers diversified their income sources and did not rely solely on farming. Only 30 individuals (9.9 %) stated that they do not partake in such activities, indicating that only a small portion of the population relied exclusively on farming as their primary or sole source of income.

Overall, these findings suggest that while farming is a common activity among the smallholder farmers, most individuals also engage in other forms of economic activity, potentially to supplement their income or mitigate the risks associated with relying solely on agriculture.

Use of family labour

The researcher sought to know whether the respondents relied on family labour in maize farming. The findings are indicated in Figure 4.2.

Figure 4. 2: Use of family labour

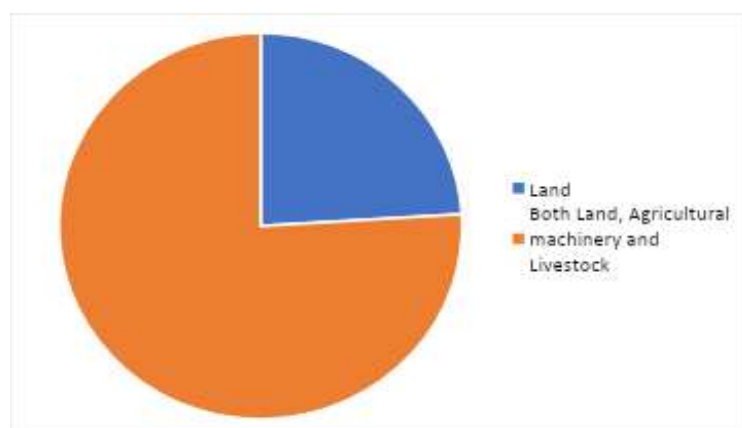
As shown in Figure 4.5, 290 (95 %) of the respondents concurred with the assertion that they employ family labor for maize farming. This indicated that family labor was a crucial resource for most farming households in the study area, potentially reducing the need for hired labor and keeping farming operations within the family unit. Whereas only 14 (5 %) disagreed. This small percentage suggested that a few individuals either use hired labor, manage farming activities independently, or rely on other forms of support.

One of the respondents, while in an interview, responded that:

“In most cases I rely on my family to carry out all my farming activities because of the size of my land. It is small and doesn’t warrant me to outsource workers; yet again I have a large family that finds it comfortable doing their work.”

Assets owned in relation to farming

Respondents were requested to list any assets associated with agriculture that they possessed. Listed assets consist of animals, agricultural machinery, and land. The findings are depicted in Figure 4.3.

Figure 4. 3: Assets owned for farming

The results in Figure 4.6 indicate that most of the respondents, 231 (76%), owned land, agricultural machinery, and livestock, indicating a more diversified agricultural operation, while 73 (24%) indicated that they only owned land on which they practice farming, suggesting



that their farming practices may be less resource-intensive or focused solely on crop production. This indicated that owning a combination of assets might be more common or necessary for more comprehensive agricultural activities among smallholder farmers.

Credit accessibility influence maize production

The findings on how credit accessibility influences maize production are summarized in Table 4.5.

Table 4. 5: The various factors that influence access to credit

	Strongly disagree		Disagree		Undecided		Agree		Strongly agree		Total
	F	%	F	%	F	%	F	%	F	%	
The level of income significantly influences credit accessibility.	10	3.3%	16	5.3%	2	0.7%	3	1.0%	278	91.4%	304
Gender affects the capacity to obtain and secure credit.	29	9.5%	58	19.1%	3	1.0%	39	12.8%	178	58.6%	304
The capacity of farmers to participate in supplementary economic activity enhances their ability to obtain loan products.	1	0.3%	17	5.6%	2	0.7%	49	16.1%	238	78.3%	304
The capacity to save, as shown by credit turnover, affects the loan acquisition potential of maize producers.	2	0.7%	16	5.3%	3	1.0%	57	18.8%	230	75.9%	303

The findings presented in Table 4.5.1 indicate the following:

Table 5.2 Income level and credit accessibility

Response	No. of respondents	Percentage
Strongly disagree	10	3.30%
Disagree	16	5.30%
Undecided	2	0.70%
Agree	3	1.00%
Strongly agree	273	89.80%
Total	304	100%



A total of 273 respondents (89.80 %) expressed strong agreement with the statement "Income level significantly influences credit accessibility." Conversely, cumulatively 26 respondents (8.6 %) held a negative stance on the matter. The consensus among respondents strongly supported the idea that higher income levels are crucial for easier access to credit. This implied that income played a critical role in determining whether individuals could secure loans or other forms of credit.

One of the respondents narrated this in an interview schedule:

"Yes, income level plays a critical role in credit accessibility. Financial institutions often assess a borrower's income level to determine their ability to repay loans. Higher income levels typically improve the likelihood of obtaining credit, as they suggest greater financial stability and lower risk for lenders. Conversely, individuals with lower income levels may face challenges in accessing credit due to perceived higher risk and concerns about their ability to meet repayment obligations."

The findings on the influence of gender in safeguarding cash are shown in Table 4.5.2.

Table 4. 5.2: Gender impact on ability to obtain and safeguard cash

Response	No. of respondents	Percentage
Strongly disagree	29	9.5%
Disagree	58	19.1%
Undecided	2	0.7%
Agree	39	12.8%
Strongly agree	176	57.9%
Total	304	100%

Regarding the question of whether gender impacts the ability to obtain and safeguard cash, 176 respondents (57.9 %) strongly agreed, 39 (12.8%) agreed, 58 (19.1%) disagreed, and 29 (9.5%) strongly disagreed (Table 4.7). While a significant portion of the respondents agreed that gender has an impact on cash management abilities, there is still a considerable minority who either disagreed or strongly disagreed (Table 4.7). This suggested that gender may be a factor, but it is not universally accepted as a determinant in cash management ability.

One respondent narrated this on an interview question on whether gender influences the ability to access and secure credit:

"Yes, gender can influence the ability to access and secure credit in my experience. In some places, women may face more barriers due to social norms, lack of collateral, or discrimination, which can limit their access to credit compared to men."

Another respondent disagreed by saying this:

"No, gender does not influence the ability to access and secure credit in my experience. Credit decisions are typically based on factors like income, credit history, and collateral, rather than gender."



The findings on the assertion that farmers' capacity to participate in supplementary economic endeavors is shown in Table 4.5.3 below.

Table 4. 5.3: Participation in supplementary economic endeavors and loan accessibility

Response	No. of respondents	Percentage
Strongly disagree	2	0.70%
Disagree	17	5.60%
Undecided	3	1.00%
Agree	49	16.10%
Strongly agree	233	76.60%
Total	304	100%

Regarding the assertion that farmers' capacity to participate in supplementary economic endeavors enhanced their likelihood of obtaining loan goods, 233 respondents (76.60 %) expressed strong agreement, 49 agreed (16.1%), 17 disagreed (5.6 %), and 2(0.70%) strongly disagreed (Table 4.8) above. The data provide strong support for the idea that engaging in additional economic activities improves one's chances of securing loans, highlighting the importance of diverse income streams in improving financial access.

The findings on the assertion that credit turnover, as measured by farmers' ability to save, influences their capacity to obtain loans are represented in Table 4.5.4 below

Table 4. 5.4: Credit turnover and loan accessibility

Response	No. of respondents	Percentage
Strongly disagree	2	0.70%
Disagree	16	5.30%
Undecided	3	1.00%
Agree	57	18.80%
Strongly agree	226	74.30%
Total	304	100%

A substantial majority of 226 respondents (74.30%) strongly agreed with the assertion that credit turnover, as measured by farmers' ability to save, influences their capacity to obtain loans, while 57 respondents (18.8%) agreed, and 16 respondents (5.3%) opposed (Table 4.5.4) above. The findings suggested that there was a strong belief among respondents that credit turnover, closely tied to saving ability, was a key factor in loan accessibility. This underscored the importance of financial discipline and the ability to save in enhancing creditworthiness.

In general, these findings emphasize the significant role that income, gender, participation in economic activities, and financial management played in determining access to credit and loans. The majority of opinions in each case highlighted these factors as critical components of financial accessibility, although there were some variations in perspectives, particularly regarding the impact of gender. Furthermore, the majority of maize farmers reported that they lack collateral or personal guarantees to secure loans. This aligns with the observations of Dorward (April, 2009), which highlight that borrowing costs for smallholder borrowers can be



two to three times higher than the nominal interest payments. In addition to interest rates, small-scale farmers face various expenses, including transportation, incentives for bank officials; some of whom may demand bribes before processing credit, processing fees, and legal fees. According to Bali (2001), only 5% of farmers in Africa have accessed credit facilities from formal institutions.

Regression test on the effect of socioeconomic factors on maize production

The findings of the summary model on the effect of socioeconomic factors on Maize production are shown in Table 4.6

Table 4. 6: Summary Model Results on Effect of socioeconomic factors on Maize production

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.639 ^a	.506	.407	.48815	.409	208.746	1	302	.000

a. Predictors: (Constant), socioeconomic factors

The regression results indicated that socioeconomic factors significantly influenced maize production, with an $R^2 = .506$, meaning that 50.6% of the variation in maize yield was explained by these factors. The adjusted R^2 value of .407 further confirmed the model's explanatory strength. The F-statistic ($F = 208.746$, $p < .05$) demonstrated the overall significance of the model, suggesting that socioeconomic factors collectively played a crucial role in determining maize yields among smallholder farmers. These findings highlight the need for strategic interventions aimed at improving key socioeconomic conditions to enhance maize productivity.

Table 4.7: Model Coefficient Results on Effect of Socioeconomic factors on Maize production

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.699	.123		13.863	.000
	socioeconomic factors	.514	.036	.639	14.448	.000

a. Dependent Variable: Maize Yields

Examining the model coefficients, the results showed that socioeconomic factors had a significant positive effect on maize production. The standardized coefficient ($\beta = .639$, $p < .05$) indicated that a unit increase in socioeconomic factors led to a 0.639 increase in maize yield. The constant term ($B = 1.699$, $p < .05$) suggested that, in the absence of the socioeconomic factors considered in the model, maize production would still have a baseline yield. The significance of the predictor variable ($p = .000$) confirmed that enhancing socioeconomic conditions, such as improving access to land, credit, and labor, could positively impact maize production and contribute to food security in the region.



The simple linear regression model used to estimate the relationship between the independent variable and the dependent variable was:

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

Based on the regression results, the estimated model was:

$$\hat{Y} = 1.699 + 0.514X$$

where **1.699** is the intercept, indicating the expected value of the dependent variable when the independent variable equals zero, while **0.514** is the regression coefficient, implying that a one-unit increase in the independent variable leads to an expected increase of **0.514 units** in the dependent variable, holding all other factors constant.

The findings align with previous studies emphasizing the role of land ownership, credit access, labor availability, and demographic factors in agricultural productivity. Land ownership remains a key determinant of maize production, as confirmed by the Department of Farming, Livestock and Fisheries (2018), which reported that population growth leads to reduced farm sizes, limiting agricultural productivity. Similarly, the Consultative Group on International Agricultural Research (CGIAR, 2016) noted that land fragmentation in sub-Saharan Africa presents challenges for sustainable farming. In Bungoma-North Sub-County, rapid population growth has restricted access to fertile land, exposing farmers to declining soil quality and inadequate farm sizes. These findings are consistent with Simiyu (2014), who emphasized that reduced farm sizes contribute to soil degradation, negatively affecting maize yields. Addressing this issue requires the implementation of land-use policies that prioritize sustainable agricultural practices.

Access to credit also emerged as a significant factor influencing maize production, corroborating studies by Nweke (2001) and Akpan et al. (2013), who found that financial resources are crucial for smallholder farmers to invest in quality inputs. However, as indicated by Mamuye (2021) and Ajagbe (2012), many small-scale farmers face credit constraints due to factors such as lack of collateral, financial illiteracy, and institutional limitations. Similar to findings by Omonona *et al.* (2008) in Nigeria, this study confirmed that limited credit access hinders the adoption of modern agricultural technologies. Additionally, labor availability and demographic factors significantly impact maize production. Labor shortages, particularly during peak farming seasons, constrain productivity, as observed by Richards (2009), who found that delays in farm activities due to labor scarcity reduced yields. Demographic factors such as education levels also influence technology adoption, aligning with Fufa and Hassan (2006), who noted that educated farmers are more likely to adopt improved maize varieties.

In conclusion, the study confirms that socioeconomic factors play a significant role in determining maize production among smallholder farmers. Key factors such as land ownership constraints, limited access to credit, labor shortages, and demographic characteristics, including education and income levels, influence maize yields. These findings align with existing literature, reinforcing the need for targeted interventions such as land-use reforms, improved access to affordable credit, and labor support programs to enhance maize production and food security.



SUMMARY OF FINDINGS

The study sought to determine the socioeconomic factors influencing maize production among smallholder farmers in Bungoma-North Sub-County, Bungoma County, Kenya. The findings established that socioeconomic factors play a significant role in influencing maize productivity. Specifically, access to credit was found to enhance farmers' ability to purchase agricultural inputs, adopt improved technologies, and expand production activities. Household income levels positively influenced investment in maize farming through the acquisition of quality seeds, fertilizers, pesticides, and labor. Educational attainment improved farmers' capacity to access agricultural information, adopt recommended farming practices, and make informed production decisions. Land ownership and farm size were also found to contribute to maize productivity by influencing the scale of production and long-term investment in farming activities. Regression analysis further demonstrated that socioeconomic factors significantly predicted maize production, indicating that improvements in farmers' socioeconomic conditions are likely to result in increased maize yields and improved household food security.

CONCLUSION

The study concludes that socioeconomic factors are critical determinants of maize production among smallholder farmers in Bungoma-North Sub-County. Farmers with better access to financial resources, higher income levels, greater educational attainment, adequate labor availability, and secure land ownership are more likely to achieve higher maize productivity than those facing socioeconomic constraints. The findings support the Theory of Production, which posits that output is influenced by the availability and efficient utilization of production resources. The significant relationship observed between socioeconomic factors and maize production demonstrates that improving farmers' socioeconomic conditions can substantially enhance agricultural productivity and contribute to household food security. Consequently, interventions aimed at strengthening farmers' access to productive resources should be prioritized in agricultural development policies and programs.

RECOMMENDATIONS

1. The national and county governments should strengthen agricultural credit programs to improve smallholder farmers' access to affordable financing for farm inputs and production activities.
2. Agricultural extension services should be enhanced to provide continuous farmer training on modern maize production technologies and best agronomic practices.
3. Development partners and financial institutions should promote farmer savings groups and cooperative societies to improve access to credit and investment capital.
4. Policies aimed at improving rural household incomes through agricultural value addition and market access should be strengthened.
5. County governments should support land-use planning and sustainable land management practices to improve agricultural productivity among smallholder farmers.



6. Further studies should examine additional socioeconomic determinants of maize production and food security in other maize-producing regions of Kenya.

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