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Effect of Rwanda National Agriculture Policy on Small Scale Maize Farmers' Livelihoods in Nyagatare District

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Abstract: This study examines the effect of the Rwanda National Agriculture Policy (NAP) on the livelihoods of small-scale maize farmers in Nyagatare District, with a specific focus on the impact of agricultural commercialization strategies. A descriptive research design was employed, incorporating both quantitative and qualitative approaches. The target population comprised 424 individuals from five cooperatives, with a sample size of 206 selected using the Yamane formula. Data were collected through surveys and interviews and analyzed using SPSS software version 25, employing both descriptive and inferential statistical techniques. The results revealed a significant positive correlation between agricultural commercialization strategies and improved livelihoods, with a Pearson correlation coefficient of r = 0.796, suggesting that commercialization plays a critical role in enhancing smallholder maize farmers' economic outcomes. Regression analysis further indicated that agricultural commercialization strategies are a strong predictor of improved livelihoods, with a standardized beta coefficient of 0.562. These findings were statistically significant, with a p-value of 0.000. The study concluded that agricultural commercialization positively influences income, food security, and overall livelihood improvements for small-scale maize farmers in Nyagatare. However, challenges such as limited market access, insufficient agricultural infrastructure, and climate variability were identified as barriers to full commercialization potential. The study recommends enhancing access to markets, investing in rural infrastructure, providing farmer training programs, and improving financial support systems to ensure the sustainability of agricultural commercialization in the region.

Keywords: Rwanda National Agriculture Policy, Small Scale Maize Farmers' Livelihoods, Agricultural commercialization strategies, Nyagatare District

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1. Introduction

The Rwanda National Agriculture Policy (NAP) is a comprehensive framework aimed at transforming the country's agricultural sector by promoting sustainable agricultural practices, increasing productivity, and improving market access. The policy's primary goals include enhancing food and nutrition security, reducing poverty, and fostering agricultural commercialization. It encourages the adoption of climate-smart agricultural practices, technological innovations, and enhanced access to finance for farmers. A key component of the NAP is to create an enabling environment for small-scale farmers, particularly maize growers, through strengthening value chains, boosting institutional capacity, and attracting

private sector investment (MINAGRI, 2020; Rwanda Agriculture Board, 2021).

On a global scale, agriculture remains an essential source of income and food for many, particularly in developing countries where farming is a primary livelihood (FAO, 2021). The agricultural sector worldwide has undergone significant transformations, driven by technological advancements, policy changes, and evolving market dynamics. Many nations, especially in developing regions, have prioritized increasing agricultural productivity and ensuring food security. Policies that provide better access to resources such as quality seeds, fertilizers, and markets have helped improve productivity and incomes for small-scale farmers. Additionally, there is an increasing emphasis on sustainability and climate change resilience in global agricultural policies (OECD, 2023).

In developed countries, agricultural policies often focus on subsidies, technological innovation, and sustainability. Nations like those in the European Union and the United States have created policies that ensure food security while offering financial support to farmers and promoting eco-friendly practices. These countries benefit from advanced infrastructure, easy access to credit, and well-established value chains that help small-scale farmers thrive. Technological innovations, such as precision farming, have contributed to higher productivity and reduced environmental impact. Additionally, insurance schemes and disaster relief programs safeguard farmers against climate-related risks (European Commission, 2020; USDA, 2022).

In Africa, agriculture is a vital economic sector, but small-scale farmers face substantial challenges, including limited access to finance, low productivity, poor infrastructure, and climate vulnerability. Governments and international organizations have made strides in implementing policies aimed at supporting smallholder farmers and promoting sustainability. One such initiative is the African Union's Comprehensive Africa Agriculture Development Programme (CAADP), which seeks to improve agricultural productivity across the continent. However, despite these efforts, many African farmers struggle to fully benefit from policy opportunities due to limited access to essential resources and markets, further hindering their potential (World Bank, 2023).

The East African region, which includes Rwanda, is home to many small-scale maize farmers who face both challenges and opportunities. Maize is a crucial staple crop in the region, with policies such as the East African Community's (EAC) regional agricultural policy aiming to promote integration, trade, and sustainable agricultural practices. Countries like Kenya, Uganda, and Tanzania have made progress in improving agricultural productivity by enhancing access to agricultural inputs, better seed varieties, and government-supported extension services. However, issues such as land fragmentation, climate change, and inadequate infrastructure still pose significant barriers to realizing the full potential of these policies (FAO, 2022; EAC, 2022).

In Rwanda, the NAP plays a central role in improving the livelihoods of small-scale maize farmers, particularly in districts like Nyagatare. Despite the success of programs like the Crop Intensification Program (CIP) and the Plan for Strategic Transformation of Agriculture (PSTA), challenges remain in ensuring farmers have access to the necessary resources, such as finance, technology, and training, to maximize the benefits of these policies (Rwanda Development Board, 2021; Ministry of Agriculture and Animal Resources, 2020).

1.1. Problem statement

Agriculture plays a pivotal role in the economies of many developing countries, particularly in Sub-Saharan Africa, where it is central to employment and food security (FAO, 2021; World Bank, 2020). Small-scale farmers are key to this sector, but they face significant challenges, including limited access to finance, technology, and markets, all of which impede their productivity (UNDP, 2022). Additionally, factors like climate change, inadequate infrastructure, and land degradation worsen these challenges, leading to low yields and persistent poverty (FAO, 2020). Despite its potential to reduce poverty, the agricultural sector often traps small-scale farmers in cycles of underdevelopment, preventing them from achieving sustainable livelihoods (OECD, 2023).

In Rwanda, agriculture contributes over 30% of the country's GDP, with maize being one of the most important crops grown by small-scale farmers (MINAGRI, 2020). Although the government has implemented policies such as the Rwanda National Agriculture Policy (NAP) and the Crop Intensification Program (CIP) to address these challenges, small-scale farmers in rural districts like Nyagatare continue to face difficulties. These include poor access to agricultural inputs, limited extension services, and inadequate market access (RAB, 2022). These barriers prevent farmers from fully benefiting from government initiatives, resulting in low yields and limited support (Munyaneza et al., 2021).

Existing research has shown some positive outcomes from the NAP and CIP, such as increased maize yields in certain regions (MINAGRI, 2021). However, much of the existing literature tends to focus on broader national impacts rather than the specific challenges faced by small-scale maize farmers, particularly in areas like Nyagatare (RDB, 2021). These studies often overlook local factors such as community involvement, infrastructure, and access to resources, all of which are crucial for understanding the full

impact of these policies at the local level (Rutagengwa et al., 2020).

While the literature recognizes the importance of the NAP in Rwanda's agricultural growth and economic transformation (Kigabo et al., 2021), there is a clear gap in research focused on how these policies specifically affect small-scale maize farmers in Nyagatare. Most studies concentrate on national policy frameworks and general productivity, neglecting to explore the localized effects on rural communities (MINAGRI, 2020). Furthermore, few studies examine how local socio-economic factors—such as land ownership, climate resilience, and the availability of extension services—interact with policy implementation and affect farmers' livelihoods (Rwanda Agriculture Board, 2021). This gap underscores the need for more localized research to fully understand the impact of the NAP on small-scale farmers in Nyagatare. This study aims to fill this gap by investigating the specific effects of the Rwanda National Agriculture Policy on small-scale maize farmers' livelihoods in Nyagatare, offering critical insights into the localized outcomes of these policies.

This study sought to achieve the following research objective:

> Evaluate the effect of agricultural commercialization strategy on small scale maize farmers' livelihoods in Nyagatare District

2.1 Literature Review

Rwanda's National Agriculture Policy (NAP) presents a comprehensive set of strategies aimed at transforming the agricultural sector and improving the livelihoods of small-scale farmers. The central objective of the NAP is to boost agricultural productivity, ensure food security, and promote rural development. These strategies are essential for addressing persistent challenges such as low productivity, the impacts of climate change, inadequate infrastructure, and limited market access, which hinder the growth of smallholder farming (MINAGRI, 2020). The policy adopts a holistic approach to enhancing the agricultural value chain, focusing on areas such as commercialization, innovation, sustainability, and market access (Kigabo et al., 2021).

A cornerstone of the NAP is the strategy of agricultural commercialization, which seeks to shift agriculture from subsistence farming to a market-oriented sector. This strategy focuses on improving market access, enhancing value-added products, and encouraging private sector investment in agriculture. Agricultural commercialization aims to increase the income of smallholder farmers by improving their access to quality inputs, technologies, and financial services (MINAGRI, 2020). By fostering a more competitive and market-driven agricultural sector, the NAP aims to promote sustainable economic growth and reduce rural poverty. However, challenges such as inadequate infrastructure and financial constraints continue to present obstacles to achieving these goals (Rutagengwa et al., 2020).

In addition to commercialization, the NAP also includes strategies to improve agricultural sustainability and productivity. The sustainable productivity strategy promotes climate-smart agricultural practices, such as soil conservation, water management, and the use of drought-resistant crops, to help farmers adapt to changing climatic conditions. The policy also emphasizes innovation and skill development, aiming to enhance farmers' technical capabilities through research, extension services, and training programs. These efforts are designed to increase the overall productivity of the agricultural sector and build resilience to environmental challenges (RAB, 2021). Furthermore, improving market access and ensuring food security are central components of the NAP. By strengthening market linkages, increasing storage capacity, and enhancing food safety standards, the policy aims to boost food availability and reduce post-harvest losses (FAO, 2020). Together, these strategies work to create a more robust and sustainable agricultural sector that can support long-term economic development.

2.1.1 Agricultural Commercialization Strategy

Agricultural commercialization refers to the process of transitioning agriculture from a subsistence-based system to a more market-oriented one (Gaspard, 2024). The objective of this strategy is to enhance agricultural productivity by focusing on market-driven production, improving access to markets, and promoting value-added agricultural products. Agricultural commercialization encourages farmers to produce surplus crops for sale in local, national, and international markets, thus increasing their income and improving their livelihoods. This shift motivates farmers to adopt improved agricultural practices, invest in modern technology, and develop their business acumen, enabling them to compete effectively in the agricultural market.

The agricultural commercialization strategy aims to transition Rwanda's agriculture from a subsistence sector to a commercially-oriented industry. Key components of this strategy include improving market access, promoting value-added products, and fostering greater private sector involvement in the agriculture sector. By increasing commercial production, Rwanda hopes to enhance the income potential of smallholder farmers, reduce reliance on food aid, and create sustainable agricultural systems. Initiatives such as improving infrastructure, increasing

access to agricultural inputs, and strengthening cooperatives to support collective marketing and value chain development are integral to this strategy (MINAGRI, 2020).

Small-scale maize farmers in Nyagatare, for example, are expected to benefit from this commercialization drive through better market access, higher-quality inputs, and improved productivity. The NAP's focus on strengthening the links between producers, processors, and traders is designed to support the commercialization of maize farming, leading to higher incomes and reduced post-harvest losses. However, challenges such as limited access to financial services and inadequate storage infrastructure remain, which are essential for smallholder farmers to fully capitalize on market opportunities (Nduhungirehe et al., 2021). Understanding how these commercialization efforts translate into tangible benefits for small-scale maize farmers is a key focus of this research.

2.1.2. Small Scale Maize Farmers' Livelihoods

Small-scale maize farmers play a vital role in Rwanda's agricultural sector, particularly in rural areas where maize is a staple crop for both food security and income generation. These farmers are integral to the local economy, yet they face numerous challenges that impede their ability to improve their livelihoods. Limited access to quality inputs, such as seeds, fertilizers, and irrigation systems, often results in low productivity. Additionally, smallholder farmers in regions like Nyagatare struggle with inadequate infrastructure, poor roads, and limited storage facilities, which hinder their ability to access markets and reduce post-harvest losses. These challenges are further compounded by climate change, which has led to erratic weather patterns, including prolonged droughts and floods, impacting crop yields and exacerbating food insecurity (MINAGRI, 2020; FAO, 2020). As a result, despite their hard work, many small-scale maize farmers remain trapped in cycles of poverty, struggling to achieve sustainable livelihoods.

Improving the livelihoods of small-scale maize farmers requires addressing both economic and environmental challenges through targeted policies and interventions. The Rwanda National Agriculture Policy (NAP) and the Crop Intensification Program (CIP) aim to enhance agricultural productivity by promoting climate-smart farming practices, improving market access, and supporting rural development. These initiatives seek to empower smallholder farmers by improving access to financial services, agricultural extension services, and modern technologies (MINAGRI, 2020; Rwanda Development Board, 2021). By strengthening value chains and fostering private sector involvement, the NAP aims to increase farmer incomes and reduce rural poverty (Rwanda Agriculture Board, 2022). However, for these efforts to be fully effective, there is a need for more localized support that addresses the specific needs of farmers in districts like Nyagatare, ensuring they have the tools, knowledge, and infrastructure to thrive in a changing agricultural landscape (Ntwali et al., 2021).

2.2 Theoretical Review

The theoretical framework for this study is grounded in several established theories that provide a basis for understanding the impact of agricultural policies on the livelihoods of small-scale maize farmers in Nyagatare District. The theories highlighted below guide the study based on the specific objectives of evaluating, examining, and assessing the effects of agricultural commercialization, innovation and skills development, sustainable productivity, and market access and food security strategies.

2.2.1 Agricultural Commercialization Theory

The Agricultural Commercialization Theory was developed by John H. Barrett in 2008 and expanded upon by other scholars focusing on the transition of smallholder farmers from subsistence agriculture to more market-oriented production (Tharus, 2020). Barrett's work emphasized how small-scale farmers could improve their productivity and income by producing agricultural products for sale rather than just for personal consumption. The theory is grounded in the notion that commercializing agriculture can enhance the economic stability of rural communities, drive development, and increase farmers' participation in national and international markets. This framework has been particularly impactful in Sub-Saharan Africa, where agriculture plays a dominant role in the economy but remains underdeveloped in terms of commercialization (Barrett, 2022).

The Agricultural Commercialization Theory posits that moving from subsistence to market-oriented agricultural practices leads to improved livelihoods for farmers by increasing their income, reducing poverty, and fostering economic growth at the grassroots level (Saunders, 2020). The key concept is the transition from growing crops primarily for family consumption to producing for broader markets, which encourages farmers to adopt more efficient and profitable farming methods. This shift involves enhancing access to markets, improving agricultural practices, and ensuring farmers are integrated into broader value chains. For smallholder farmers, this commercialization process helps them access better prices

for their products and creates opportunities for diversification (Hacher, 2021).

This theory is highly relevant to the study of the effect of agricultural commercialization on small-scale maize farmers in Nyagatare District. The Rwanda National Agriculture Policy (NAP) emphasizes increasing the commercialization of agriculture to boost productivity and income. The Agricultural Commercialization Theory can provide a lens through which to understand how smallholder maize farmers in Nyagatare could benefit from commercializing their production. By adopting this theory, the study assessed how market access, better marketing strategies, and improved agricultural practices can lead to better livelihoods for these farmers. The findings guide policymakers in designing interventions that facilitate market access and promote the commercialization of agriculture in rural areas, helping small-scale maize farmers integrate more fully into value chains.

2.2.2 Value Chain Theory

The Value Chain Theory, introduced by Michael Porter in 1985, focuses on the sequence of activities that businesses or industries perform to add value to their products from the initial production stage to the final consumer. In the context of agriculture, the value chain includes all stages from the input supply (such as seeds and fertilizers) to production, processing, marketing, and distribution of agricultural products (Porter, 1985). The central idea is that value is created at each step, and farmers who participate in a well-integrated value chain can benefit from higher prices, improved efficiency, and expanded market access. For small-scale maize farmers, engaging in a value chain means they are not only producing raw maize but also enhancing the value of their produce through processing or improved packaging, thus opening opportunities for better financial returns.

In agricultural commercialization, the Value Chain Theory is crucial because it provides a framework for understanding how smallholder farmers can increase their income through enhanced value creation at various stages of the production process. By integrating small-scale farmers into a more organized value chain, they can benefit from improved market access, better-quality inputs, and technology transfer, which are all critical components of the commercialization process (Minot, 2020). Furthermore, farmers can diversify their production and engage in higher-value activities such as maize milling or packaging, adding more value to their produce and thus earning more income. A well-functioning value chain also encourages better coordination among stakeholders, including input suppliers, farmers, processors, and traders, which is essential for minimizing inefficiencies and maximizing profitability at every stage.

For the small-scale maize farmers in Nyagatare, applying the Value Chain Theory can provide valuable insights into how they can benefit from the commercialization efforts outlined in Rwanda's National Agriculture Policy (NAP). The NAP emphasizes strengthening linkages between producers, processors, and traders to ensure that smallholders are not limited to just the production phase but are integrated into the entire value chain. This integration can lead to reduced post-harvest losses, better prices for their products, and the creation of sustainable market opportunities. By adopting value chain approaches, the study aims to understand how smallholder maize farmers in Nyagatare can improve their livelihoods through strategic engagement with value chains, ensuring that they are not only producers but also active participants in the economic benefits that the value chain offers (Porter, 1985; MINAGRI, 2020).

2.3 Empirical Literature

This section provides a review of existing studies related to the specific objectives of this research. It focuses on agricultural commercialization, innovation and skills development, sustainable productivity, and market access strategies, analyzing their effects on the livelihoods of small-scale maize farmers. The review covers studies globally, in developing countries, in Africa, East Africa, and Rwanda, with each study's findings presented along with a discussion of research gaps.

2.3.1 Agricultural Commercialization Strategy and Small Scale Maize Farmers' Livelihoods

A study conducted globally by Renkow et al. (2024) explored the impact of agricultural commercialization on smallholder farmers' incomes and livelihoods. The study used data from 1,000 farmers in various developing countries, including maize producers. The results indicated that increased commercialization of agriculture led to a 15% increase in farmers' incomes, with coefficients of 0.75 for income growth in commercialized markets. The ANOVA analysis showed significant differences in productivity and income growth between farmers engaged in commercial production and those who remained in subsistence farming. However, the study noted that the positive effects of commercialization were not uniform across all regions, highlighting the need for tailored interventions based on local contexts. While the study provides valuable insights, it lacks a focused analysis on specific crops like maize and does not address localized

challenges faced by small-scale farmers in Sub-Saharan Africa.

In developed countries, agricultural commercialization has been shown to have significant impacts on the income and productivity of small-scale farmers. A study by Smith et al. (2020) in the United States examined the effects of agricultural commercialization on small-scale maize farmers in the Midwest. The study found that commercialization, characterized by increased market access, use of modern inputs, and participation in value-added production, resulted in a 20% increase in maize farmers' income. The regression analysis revealed a coefficient of 0.82, indicating a strong positive relationship between commercialization and income growth. Additionally, the study found that farmers who embraced commercial farming techniques, such as high-efficiency irrigation and mechanization, experienced enhanced productivity and were more resilient to price fluctuations in global markets. However, the study also pointed out that smaller, less economically viable farms were often at a disadvantage, lacking access to credit and modern technology that would enable them to fully benefit from commercialization. This highlights the need for targeted policies and interventions to ensure that small-scale farmers can effectively participate in commercial agriculture.

In Africa, a study by Akinboade et al. (2024) analyzed the impact of agricultural commercialization in Nigeria, particularly focusing on small-scale maize farmers. The study revealed that commercialization led to a 30% increase in maize farmers' income, as farmers were able to sell directly to markets rather than relying on local intermediaries. The study also used regression analysis to find that better access to market infrastructure had a positive correlation with increased income ($\beta = 0.72$). The study emphasized the importance of market access and transportation infrastructure in ensuring the success of commercialization strategies.

In East Africa, the study by Kamau et al. (2020) assessed the effects of commercialization on smallholder maize farmers in Kenya. The findings suggested that commercialization of maize farming led to a 25% increase in farmer income. The study used a comparative approach between farmers who adopted commercialization strategies and those who did not. The results indicated that maize farmers who were more commercialized achieved significantly higher yields and were better able to manage financial risks through diversified income streams. The study highlighted the importance of market linkages and financial literacy in the success of commercialization initiatives in East Africa.

In Rwanda, a study by Rutagengwa et al. (2020) examined the impact of the Rwanda National Agriculture Policy and the Crop Intensification Program (CIP) on small-scale maize farmers' livelihoods. The study showed that farmers who adopted commercial farming practices through the CIP experienced a 10% increase in yield, with a 15% rise in income from maize production. However, the study also highlighted challenges related to limited access to finance and inputs, particularly for smallholders in remote areas. It suggested that while commercialization strategies have had some positive effects, their full potential could be realized with improvements in market access, financing, and infrastructure.

3. Methodology

The study adopted a descriptive research design to assess the impact of the Rwanda National Agriculture Policy (NAP) on the livelihoods of small-scale maize farmers in Nyagatare District. This design provided an in-depth exploration of the relationship between agricultural policies (independent variable) and farmers' livelihoods (dependent variable). It enabled a comprehensive analysis of how various NAP strategies, including agricultural commercialization, innovation, sustainable productivity, and market access, influenced the economic well-being of farmers.

The target population consisted of 424 individuals, which included small-scale maize farmers from five cooperatives and 4 government officials from MINAGRI and RAB involved in the implementation of the Rwanda National Agriculture Policy. The farmers in Nyagatare District were selected based on their active participation in maize farming and engagement with agricultural policies such as the Crop Intensification Program (CIP). This allowed the study to focus on those directly impacted by the policy and agricultural practices.

To ensure a representative sample, stratified random sampling was used, dividing the population into different strata based on their cooperative affiliation and government sector. The sample size was determined using the Yamane formula, which resulted in 206 participants. The sample was proportionally allocated to ensure each group, both farmers and government officials, was adequately represented, allowing for a balanced analysis of NAP's impact on both the farmer and policy implementation perspectives.

Data collection involved a combination of quantitative and qualitative methods, including surveys, interviews, and direct observations. Surveys provided numerical data on farmers' experiences, while interviews with both farmers and government officials offered deeper qualitative insights. Secondary data, including official policy documents and reports from MINAGRI and RAB, supplemented the primary data, providing a broader context of the policy's design and previous evaluations.

The collected data was analyzed using a blend of descriptive and inferential statistical techniques. Descriptive statistics summarized the data's basic characteristics, while regression analysis examined the relationships between NAP strategies and farmers' livelihoods. For qualitative data, thematic analysis was conducted to identify key themes and patterns in participants' responses. This mixed-methods approach allowed for a comprehensive understanding of the effects of the Rwanda National Agriculture Policy on the livelihoods of small-scale maize farmers in Nyagatare District. The study was also conducted a multiple regression analysis to test the relationship between the independent variables and the dependent variable. The regression equation was:

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

Where:

- Y = Livelihood of small-scale maize farmers
- β_0 = Constant (intercept)
- β_1= Coefficients of the independent variables
- X_1 = Agricultural commercialization strategy
- ε = Error term

4. Results and Discussion

4.1 Findings

This section presents the analysis and interpretation of the findings of the study in relation to the research questions**.**

4.1.1 Response Rate

The study targeted 424 individuals, including small-scale maize farmers from five cooperatives and government officials from MINAGRI and RAB. A sample of 206 participants was selected through proportional allocation, with 204 receiving questionnaires and 2 selected for interviews. Of the 206 participants, 186 completed and returned the questionnaires, resulting in a response rate of 91.2%. Eighteen participants (8.7%) did not return their questionnaires. The two interviewees provided qualitative insights into the impact of the Rwanda National Agriculture Policy on small-scale maize farmers in Nyagatare District. Additionally, the 2 participants who were interviewed provided qualitative insights into the impact of the Rwanda National Agriculture Policy on small-scale maize farmers in Nyagatare District.

Table 1: Response Rate of Respondents

Category	Frequency	Percentage
Questionnaire returned back	186	91.2
Questionnaire nor returned back	18	8.8
Total	204	100

Source: Field data, 2025

According to Mugenda and Mugenda (2003), a high response rate is essential for ensuring the reliability and validity of the study's findings. In this study, out of the 204 participants who were given questionnaires, 186 responded, resulting in a response rate of 91.2%. This is considered a high response rate, suggesting that the majority of the selected participants were engaged and committed to providing their views on the impact of the Rwanda National Agriculture Policy on small-scale maize farmers in Nyagatare District. The 8.8% non-response rate (18 participants) is relatively low and does not significantly impact the generalizability of the study's results. A response rate of over 90% is indicative of a strong level of participation and suggests that the collected data are likely to be accurate and reflective of the target population.

4.1.2 Descriptive Statistics of Agricultural Commercialization Strategy

The first objective of the study was to evaluate the effect of agricultural commercialization strategy on small scale maize farmers' livelihoods in Nyagatare District. The study evaluated the respondents' level of agreement with the various statements on the agricultural commercialization strategy using a scale of 1 – 5 where 5- strongly agree, 4- agree, 3- neutral, 2- disagree and 1- strongly disagree. The findings are as illustrated in Table 2

Table 2: Level of agreement of Agricultural Commercialization Strategy

Statement	N	Mean	Std. Deviation
Agricultural commercialization has helped farmers produce more maize to sell in the market.	186	4.68	.466
The commercialization strategy has helped farmers keep workers for longer periods due to better income.	186	4.11	.317
Commercialization has increased farmers' income by improving access to better markets.	186	4.08	.749
Farmers have started using modern inputs like better seeds and fertilizers to increase maize production.	186	4.25	.438
Farmers now have better access to markets, which helps them sell their maize at higher prices.	186	4.56	.639
Agricultural commercialization has helped farmers produce more maize to sell in the market.	186	4.68	.466
Valid N (listwise)	186		

Source : Primary Data, 2024-**Key** : M=Mean ; SD=Standard Deviation

Table 2 presents the results of evaluating the impact of the agricultural commercialization strategy on the livelihoods of small-scale maize farmers in Nyagatare District. Respondents were asked to rate their agreement with various statements on a 1–5 scale, where 1 represented "strongly disagree" and 5 represented "strongly agree." The findings, outlined in Table 4.7, provide valuable insights into how farmers perceive the effects of commercialization on their farming practices and overall livelihoods. The statement, *"Agricultural commercialization has helped farmers produce more maize to sell in the market,"* received the highest mean score of 4.68, suggesting that respondents strongly agree that the commercialization strategy has significantly boosted maize production. This indicates that the strategy has encouraged farmers to increase their production levels, likely due to enhanced access to resources such as improved inputs or more efficient farming techniques. This positive outcome demonstrates how commercialization has played a key role in boosting farmers' productivity.

Similarly, the statement, *"Farmers now have better access to markets, which helps them sell their maize at higher prices,"* received a mean score of 4.56. This suggests that farmers generally agree that the commercialization strategy has improved their market access, allowing them to sell their maize at higher prices. Enhanced market access has enabled farmers to reach a larger customer base, which increases the likelihood of selling at favorable prices, ultimately boosting their income and improving their livelihoods. The statement, *"Farmers have started using modern inputs like better seeds and fertilizers to increase maize production,"* scored a mean of 4.25. This indicates that many respondents agree that commercialization has encouraged the adoption of modern farming practices. The use of high-quality seeds and fertilizers contributes to enhanced maize yields, aligning with the broader objectives of agricultural commercialization. By adopting these modern inputs, farmers can improve their efficiency and production, further supporting the strategy's success.

The statement, *"The commercialization strategy has helped farmers keep workers for longer periods due to better income,"* earned a mean score of 4.11. This indicates that farmers agree that the increased income from commercialization has enabled them to offer more stable and long-term employment to their workers. With higher earnings from selling maize at better prices, farmers can afford to provide more consistent work opportunities, which benefits both the farmers and their workers. Overall, the findings from this study suggest that the agricultural commercialization strategy has had a substantial positive impact on the livelihoods of small-scale maize farmers in Nyagatare District. The strategy has led to increased maize production, enabling farmers to produce more for sale. It has also improved access to markets, allowing farmers to sell their maize at higher prices, which in turn has resulted in increased income. Furthermore, the strategy has promoted the adoption of modern farming inputs, boosting production efficiency. Additionally, commercialization has positively influenced labor retention, as higher incomes have allowed farmers to offer more stable employment to workers, enhancing financial security. In sum, agricultural commercialization has improved productivity, income, and market access, while promoting the use of modern agricultural practices and contributing to the sustainability of farming operations.

These findings align with the research by Juma and Kazadi (2023), who also observed that agricultural commercialization strategies significantly enhance the productivity and income of small-scale farmers by improving market access and encouraging the adoption of modern farming techniques. Similar to the findings in Nyagatare District, Juma and Kazadi concluded that commercialization strategies help farmers produce more for sale and sell their produce at higher prices, resulting in improved financial stability. Furthermore, their research highlighted the positive impact of commercialization on labor retention, as higher incomes allowed farmers to offer more stable employment to workers, reinforcing the findings of this study.

4.1.3 Correlation Analysis

The findings of the correlations between the independent variables and the dependent variables are summarized and presented in Table 3

Table 3: Correlation between independent variable and dependent variable

		Agricultural Commercialization Strategy	Small scale maize farmers' livelihoods
Agricultural Commercialization Strategy	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	186	
Small scale maize farmers' livelihoods	Pearson Correlation	.796**	1
	Sig. (2-tailed)	.000	
	N	186	186

Source: Primary data, 2025

Table 3 presents the results of the correlation analysis between the agricultural commercialization strategy and the livelihoods of small-scale maize farmers. The Pearson correlation coefficient between the agricultural commercialization strategy and small-scale maize farmers' livelihoods is 0.796, indicating a strong positive correlation. This suggests that as the agricultural commercialization strategy improves, the livelihoods of small-scale maize farmers also improve. The correlation is statistically significant, with a p-value of 0.000, confirming that the relationship between the two variables is not due to random chance. The analysis was based on a sample size of 186 respondents.

4.1.4 Regression analysis

A multiple regression analysis was performed in this section to identify the predictor and its contribution towards the criterion. It aims to determine the prediction of a single dependent variable from a group of independent variables. The multiple regression analysis was performed with all the assumptions complied with. Table 4 shows the model summary of the results

Table 4: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.866[a]	.750	.746	.23282

a. Predictors: (Constant), Agricultural commercialization strategy

Table 4 presents the model summary for the regression analysis, which evaluates the relationship between the agricultural commercialization strategy and small-scale maize farmers' livelihoods. The R value of 0.866 indicates a strong positive correlation between the independent and dependent variables. The R Square value of 0.750 suggests that approximately 75% of the variability in small-scale maize farmers' livelihoods can be explained by the agricultural commercialization strategy. The Adjusted R Square value of 0.746 accounts for the number of predictors in the model, providing a slightly adjusted estimate of the proportion of variance explained. The standard error of the estimate is 0.23282, reflecting the average distance between the observed and predicted values.

Table 5: Summary of ANOVA results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.574	3	9.858	181.864	.000[b]
	Residual	9.865	182	.054		
	Total	39.440	185			

a. Dependent Variable: Agricultural commercialization strategy

b. Predictors: (Constant), Small-Scale Maize Farmers' Livelihoods

Table 5 summarizes the ANOVA results for the regression model analyzing the impact of the agricultural commercialization strategy on small-scale maize farmers' livelihoods. The regression sum of squares is 29.574, and the corresponding mean square is 9.858, which indicates a significant contribution of the predictors to explaining the variability in the dependent variable. The F-statistic of 181.864, with a significance value (Sig.) of 0.000, suggests that the overall regression model is highly significant. This indicates that the agricultural commercialization strategy is a significant predictor of small-scale maize farmers' livelihoods. The residual sum of squares is 9.865, and the residual mean square is 0.054, which reflects the variability unexplained by the model. Overall, the ANOVA results confirm that the model is statistically significant and the agricultural commercialization strategy effectively predicts changes in the livelihoods of small-scale maize farmers.

Table 6: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.675	.188		-3.592	.000
	Agricultural commercialization strategy	.554	.062	.590	8.935	.000

a. Dependent Variable: livelihoods of small-scale maize farmers

Table 6 presents the regression coefficients for the model examining the impact of the agricultural commercialization strategy on the livelihoods of small-scale maize farmers. The unstandardized coefficient for the constant term is -0.675 with a standard error of 0.188, and it is statistically significant ($t = -3.592$, $p = 0.000$). This indicates that when the agricultural commercialization strategy is not considered, the baseline livelihood of small-scale maize farmers is negative, though this value is adjusted when the strategy is included. The unstandardized coefficient for the agricultural commercialization strategy is 0.554 with a standard error of 0.062, and the standardized coefficient (Beta) is 0.590. This suggests that for each unit increase in the agricultural commercialization strategy, the livelihoods of small-scale maize farmers increase by 0.554 units, and the effect is moderately strong. The t-value for this coefficient is 8.935, and the significance value is 0.000, confirming that the agricultural commercialization strategy has a highly significant positive effect on the livelihoods of small-scale maize farmers.

These findings are in agreement with Juma and Kazadi (2023), who observed that agricultural commercialization strategies have a significant positive impact on the livelihoods of small-scale farmers. Their study also highlighted that the adoption of commercialization strategies improved farmers' productivity and income, similar to the results seen in this study, where the agricultural commercialization strategy positively influenced the livelihoods of small-scale maize farmers. Furthermore, both studies found that the commercialization strategies enhanced market access, allowed for higher selling prices, and promoted the use of modern farming practices, all of which contributed to improved financial stability for farmers. The strong correlation and significant regression coefficients in this study further support the idea that agricultural commercialization plays a critical role in enhancing small-scale farmers' livelihoods, as demonstrated in both the Nyagatare District and other similar contexts.

5. Conclusion and Recommendations

5.1 Conclusion

This study highlights the positive impact of agricultural commercialization strategies on the livelihoods of small-scale maize farmers in Nyagatare District. The findings demonstrate that commercialization has significantly increased maize production, improved market access, and

boosted selling prices, leading to higher incomes for farmers. The adoption of modern agricultural inputs, such as better seeds and fertilizers, further enhanced productivity. Additionally, the increased income allowed farmers to offer more stable employment, improving labor retention. The correlation and regression analyses confirm a strong relationship between commercialization and improvements in farmers' livelihoods, aligning with previous research. In conclusion, the study underscores the importance of agricultural commercialization in enhancing productivity, income, and market access, while also promoting modern farming practices and supporting the sustainability of small-scale farming operations.

5.2. Recommendations

Based on the study findings, the following recommendations are made:

1. The government should strengthen the implementation of agricultural policies by ensuring small-scale farmers have consistent access to essential resources, such as quality seeds, fertilizers, and financial literacy programs. This will help boost productivity and support sustainable livelihoods.

2. here should be a greater focus on developing rural infrastructure, such as improving roads, building storage facilities, and establishing better market linkages. These improvements will reduce post-harvest losses, improve market access, and enable farmers to sell their produce at higher prices, ultimately increasing their income.

3. The government should expand agricultural extension services to provide ongoing support and training for farmers on modern agricultural practices and the benefits of the Rwanda National Agriculture Policy. This will equip farmers with the knowledge and skills needed to improve their farming practices and livelihood outcomes.

References

Akinboade, O. A., Oladejo, M. O., & Akinola, O. A. (2024). Agricultural commercialization and small-scale maize farming in Nigeria. *African Journal of Agricultural Economics, 41*(2), 112-125.

Barrett, J. H. (2022). Agricultural commercialization and smallholder development in Sub-Saharan Africa. *Journal of Rural Development, 39*(1), 34-46.

European Commission. (2020). *The European Union and the United States: Cooperation in agricultural innovation*. European Commission.

FAO. (2020). *The state of food security and nutrition in the world 2020*. Food and Agriculture Organization of the United Nations. https://www.fao.org/3/ca9692en/CA9692EN.pdf

FAO. (2021). *Agriculture in developing countries: Key statistics and trends*. Food and Agriculture Organization of the United Nations. https://www.fao.org/statistics/en/

Gaspard, P. (2024). Agricultural commercialization and sustainable farming. *Agricultural Policy Journal, 19*(3), 45-67.

Hacher, A. (2021). Agricultural commercialization and rural development in Sub-Saharan Africa. *Agricultural Policy Journal, 27*(5), 178-192.

Kamau, D. W., Mwangi, S., & Njiru, H. (2020). Effects of commercialization on smallholder maize farmers in Kenya. *East African Journal of Agricultural Economics, 15*(3), 87-102.

Kigabo, S., Rutagengwa, J., & Nduhungirehe, A. (2021). *Rwanda's agricultural policy and its impact on food security*. Kigali Press.

MINAGRI. (2020). *Rwanda National Agriculture Policy (NAP)*. Ministry of Agriculture and Animal Resources, Rwanda.

MINAGRI. (2021). *Annual report on the status of agriculture in Rwanda*. Ministry of Agriculture and Animal Resources, Rwanda.

Minot, N. (2020). Value chains and smallholder farmers in developing countries: Evidence and policy recommendations. *Agricultural Economics Research Review, 33*(2), 210-225.

Nduhungirehe, J., Rutagengwa, D., & Rukundo, P. (2021). Agricultural commercialization in Rwanda: Challenges and opportunities. *Rwandan Journal of Agricultural Development, 23*(1), 105-123.

OECD. (2023). *Agricultural policies in developing countries*. Organisation for Economic Co-operation and Development. https://www.oecd.org/agriculture/

Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance*. Free Press.

RAB. (2021). *Rwanda Agriculture Board Annual Report 2021*. Rwanda Agriculture Board.

RDB. (2021). *Report on the impact of Rwanda's agricultural policies on small-scale farmers*. Rwanda Development Board.

Renkow, M., & Byerlee, D. (2024). The impact of agricultural commercialization on smallholder farmers' livelihoods. *Journal of Development Economics, 49*(4), 310-328.

Rwanda Agriculture Board. (2022). *Challenges and opportunities for smallholder maize farmers in Rwanda*. Rwanda Agriculture Board.

Rutagengwa, D., Munyaneza, P., & Nkubito, P. (2020). The role of smallholder farmers in Rwanda's agricultural transformation. *Journal of Rural Development, 32*(4), 215-230.

Rutagengwa, D., Munyaneza, P., & Nkubito, P. (2020). Impact of Rwanda's National Agriculture Policy on small-scale maize farmers: A case study of the Crop Intensification Program (CIP). *Journal of Agricultural Policy and Development, 21*(1), 56-72.

Saunders, D. (2020). Commercialization and economic development in rural areas: The case of smallholder farming in Sub-Saharan Africa. *Economic Development Quarterly, 32*(3), 218-233.

Smith, R., & Johnson, L. (2020). Agricultural commercialization and small-scale farming in the U.S. Midwest: Impacts on productivity and income. *Journal of Agricultural Economics, 19*(2), 101-115.

Tharus, D. (2020). The role of agricultural commercialization in poverty reduction: A theoretical framework. *Development Economics Review, 12*(2), 45-59.

USDA. (2022). *US agricultural policy and smallholder farming: A global comparison*. United States Department of Agriculture. https://www.usda.gov

World Bank. (2020). *Agriculture in Sub-Saharan Africa: Addressing challenges and opportunities*. World Bank Group. https://www.worldbank.org/en/topic/agriculture

World Bank. (2023). *Agriculture in Africa: Key issues and policies*. World Bank Group