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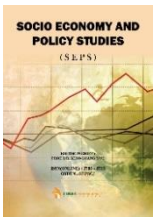

RESEARCH ARTICLE

ANALYSING THE MAIZE PRODUCTION PERFORMANCE IN RWANDA THROUGH GOVERNMENT POLICY INITIATIVES

Xavier Uwiringiyimana*, Kusnandar

Faculty of Agriculture, Universitas Sebelas Maret, Surakarta, Indonesia
**Corresponding Author's Email: uwiringiyimanaxavier@student.uns.ac.id*

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ABSTRACT

Maize production plays a critical role in Rwanda's agriculture sector. This study explores how government interventions, notably the Crop Intensification Program (CIP), have influenced its performance. CIP was begun in 2007 and hoped to improve the productivity of farms by grouping land, providing advanced seeds and fertilizer, and providing advice through extension helpers. Using a qualitative method, researchers review academic studies, government reports by governments, and policies to see how well these measures function, what challenges occur, and the outcomes. We found data by systematically reviewing and conducting a systematic review of articles on ScienceDirect, Scopus, and government repositories. The results show that CIP significantly increased maize production from 324,368 metric tons in 2017 to 507,985 metric tons in 2024. At the same time, differences in performance by area suggest that implementation is not going smoothly. Approaching policy design has not solved the different challenges of smallholder farmers. Limited input availability in some regions, poor infrastructure, and minimal farmer involvement in policy-making have contributed to the continued underperformance of the agricultural sector. Additionally, digital skills among farmers and a shortage of related services in rural areas are still barriers to using technology in agriculture. The study finds that Rwanda can achieve sustainable and inclusive growth in maize if government policies are adaptive, people-centered, and tailored to local conditions. It is recommended that extension services be strengthened, agricultural inputs fit local conditions by following local needs, digital literacy among farmers be upgraded, and farmers' participation in policy development be encouraged. The findings of this study aid those who create and apply food security and rural livelihood policies in Rwanda.

KEYWORDS

Agricultural Performance, Government Policy, Maize Production, Rwanda Agriculture

1. INTRODUCTION

Major government policy initiatives have benefited Rwanda's agricultural transformation, including increased maize production. In 2007, the Crop Intensification Program (CIP) was started to help farmers increase productivity by putting together several plots, using better seeds and fertilizers, and offering training services (Muyombano and Espling, 2020). Such efforts demonstrate the government's belief in using agriculture to boost its economy, secure enough food, and lower poverty (Moon and Lee, 2020). These policies have helped because maize output has gone up. From 2017 to 2024, production of maize went up by 56.6%, from 324,368 to 507,985 metric tons, and yields grew by 29.8%, from 1.54 to 2.0 MT/ha, as a result of coordinated government interventions (NISR, 2019, 2024).

Figure 1 illustrates the growth tendency of maize production in Rwanda between 2017 and 2024. The statistics show an overall upward trend in production, with a significant growth over the past few years, especially in 2024. The trend is indicative of the good role played by the government programs, particularly the Crop Intensification Program (CIP), in enhancing agricultural output. Although the results have been positive, important differences in maize yields from region to region suggest issues with the program. The models for standardizing regulations used by CIP do not always reflect the range of smallholding farms and the different farming environments in Rwanda. Thus, several farmers in remote or resource-scarce places have difficulty getting the inputs, loans, and markets these policies aim to provide (Choruma et al., 2024). In addition, because policies are made mainly by governments that overlook the needs of farmers, the agricultural sector becomes valuable and is likely to respond to farmers' needs.

Research has focused on how government agricultural policies affect the economy overall, yet few studies look at the direct effects these policies have on maize grown in different regions of Rwanda. This study looks into how improvements in maize production were affected by government policy initiatives. Since Rwanda depends more on decentralized rule to manage its agriculture, it is necessary to study how policies and implementation systems affect grassroots maize growing. According to a study, supporting sustainable farming means building policies that include everyone and drawing from the experiences of smallholder farmers (Terlau et al., 2019).

This research was conducted to study how well Rwanda's policies, particularly the CIP, have contributed to raising local maize production. The field studies what shapes agricultural policies and recommends

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methods to make them more inclusive and sustainable. The results of our work will offer helpful advice to policymakers and those involved in Rwanda's agriculture, helping to maximize the industry's success and share the benefits with all smallholder farmers.

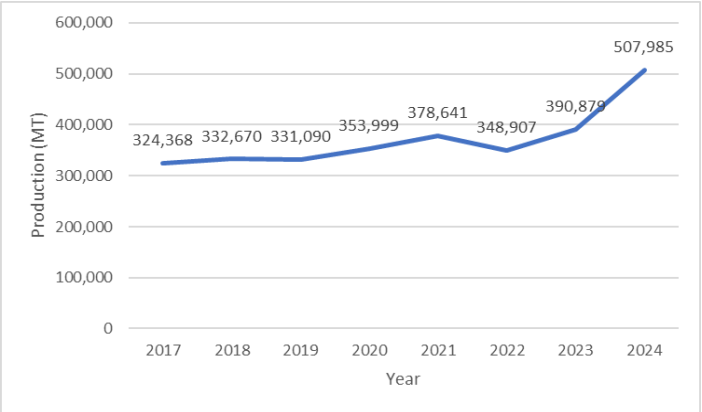

Figure 1: Maize Production Trend in Rwanda (2017–2024)

2. Method

2.1 Research Design

This study used a qualitative approach to study the unique and detailed role of government policies in making decisions about maize production and the results of such decisions on Rwanda's agricultural sector. Researchers thoroughly examine existing theories and evidence, looking at the part government policy plays in shaping agriculture and its challenges for implementation.

2.2 Data Sources

This study used information from research journals, academic books, reports issued by the government, and official policy documents discussing maize production, government policies, and Rwanda's agricultural results. Essential references consist of fundamental theories related to maize production (Hegland, 1981). Democratic government policy research and evaluations of agriculture in Rwanda show that public engagement is important when shaping policies (Browne, 2022). It examines secondary material issued by the Rwandan government, including data and case studies, to study the relationship between citizen participation and Rwandan policy on maize farming and the overall agriculture sector.

2.3 Data Collection Techniques

Data for this study were obtained by extensively searching academic databases, including Google Scholar and ScienceDirect, searching academic databases, Scopus, and digital libraries from universities and government agencies. We looked for, gathered, and studied relevant scholarly articles, policy briefs, and official reports. The researcher used information based on the keywords "maize production, government policies, agricultural performance, and Rwanda agriculture. Using this technique, a broad and thorough data collection was made to help accomplish the research aims.

2.4 Data Analysis Method

The data used a qualitative method to identify, cluster, and interpret patterns and themes related to maize production because of policies by the Rwandan government. It supports an analysis of how government policies affect farming in Rwanda and enables important findings to be drawn from existing research. The study focused on learning which main factors affect maize production, what difficulties the government faces in bringing about changes, and the influence of the policies on Rwanda's agriculture (Benimana et al., 2021; Kim et al., 2022; Murindangabo et al., 2021). The results were combined to produce a framework highlighting the right ways and major lessons for improving maize production using government policies. Using this approach gives us a strong basis to examine the effects of government policies on Rwanda's maize production. It gives important suggestions to anyone promoting farming in Rwanda.

3. Result and Discussion

According to government policies, various factors regulate how effectively they shape these policies for farmers and how accessible that support becomes. Local farmers and organizations should play a part in setting government policy when analyzing how well maize is produced in Rwanda. By including all of these, this strategy makes government programs better suited to improving maize and agriculture in Rwanda. However, the actual realization of this ideal varies a lot between maize producers since factors affecting production can be very different.

Analysis shows that maize production in Rwanda is mainly shaped by government initiatives, mainly the Crop Intensification Program (CIP). Farmers now receive fertilizer, seeds, and valuable help because of these government policies. However, different regions experience different outcomes for these initiatives because of factors such as resource supply and the strength of institutions. This result is in accord with what Nilsson discovered: although the CIP increased maize production, concerns arise about who can access its benefits and its consistent implementation in every farming region (Nilsson, 2019).

Besides, the Rwandan government has greatly affected agriculture, especially by improving maize production. Programs like the Crop Intensification Program (CIP) have equipped farmers with improved seed varieties, good fertilizers, and new farming methods. At the same time, applying these policies has presented several obstacles. In regions where CIP has helped increase production, differences in access to key resources and inputs have caused farmers' benefits to differ. A group researchers show that standard solutions in agriculture for all farmers can easily leave out smallholder needs and abilities, which affects how Rwanda's policies in this area work (Ntihinyurwa et al., 2019).

However, although proper government policies are good, the study shows that several challenges exist in Rwanda that regional authorities must manage to ensure good results (Aubert, 2018; Dawson et al., 2016). However, although good government policies are important, research in Rwanda has shown that regional authorities should resolve some problems. Expectations in agriculture are different from what farmers achieve when shaping agriculture. Many smallholder farmers are discouraged and less interested in government policies when their knowledge is not fully considered. Because there are usually no good communication channels or feedback programs, farmers often find it hard to understand the decision-making process in government (Buckingham et al., 2021). Such difficulties reduce the success of efforts to improve maize production in Rwanda.

Digital technology used in Rwanda's maize growing helps to follow government rules and improve agriculture. Digital platforms make sharing and getting information easier, as well as joining a market and managing resources. However, when faced with insufficient technology, many people cannot work with it, and because of privacy concerns, these

technologies prove less effective for rural populations. A review done by points out that even though mobile-based services aim to share information with farmers, they are not adopted as much due to low technology and low capacities among farmers (Ayim et al., 2022). Because of this, both digital knowledge and infrastructure should be developed to help digital tools assist in growing maize and farmers' overall productivity in Rwanda. The study concludes that inclusive policy creation is important in boosting Rwanda's maize production. For government actions to successfully improve the maize sector, it is necessary to introduce systems that genuinely include farmers. For this to happen, we need strong institutional support, clear policies, better agricultural learning training, and innovative technology to share details and make use of technology for sharing details and making things clear (Chan, 2023). Promoting methods that allow farmers to learn about and shape important farming policies should be a top priority for Rwanda's government. Making agricultural policies with many viewpoints will promote trust in and the success of Rwanda's maize policies and support the country's plans to become more sustainable.

Table 1: Represent maize production in the last 8 years

Year	Cultivate Crop Area(ha)	Harvested area (ha)	Production (MT)	Av. Yield (MT/ha)
2017	210,609	210,609	324,368	1,54
2018	218,179	218,179	332,670	1,52
2019	215,159	215,159	331,090	1,64
2020	221,521	221,521	353,999	1,59
2021	236,642	236,642	378,641	1,59
2022	219,683	218,689	348,907	1,6
2023	226,982	224,976	390,879	1,7
2024	249,435	249,276	507,985	2

As part of the government's Crop Intensification Program (CIP), Rwanda has seen dramatic growth in maize production. From 2017 to 2024, the planted crop area grew from 210,609 to 249,435 hectares, and overall output went up from 324,368 to 507,985 metric tons. As a result, the yield per hectare increased from 1.54 MT to 2.0 MT over that period because of the government's help.

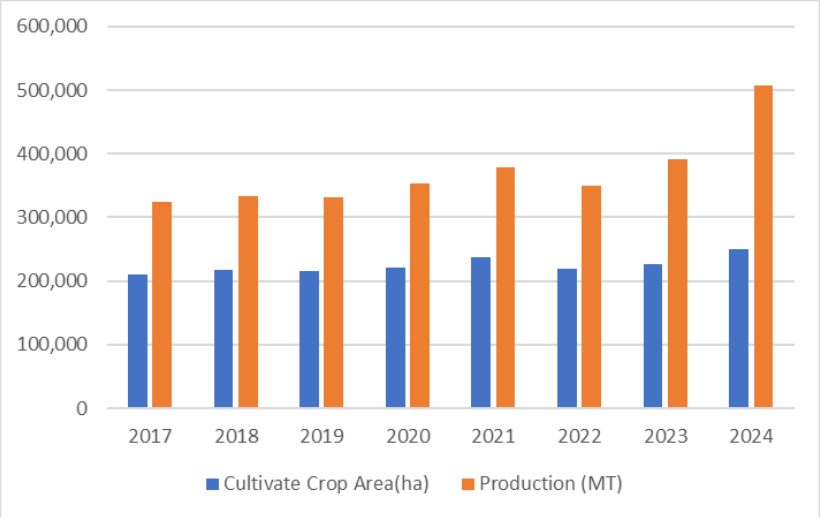

Figure 2: Cultivated Area vs Production (2027-2024)

Figure 2 shows the maize production against cultivated crop area in Rwanda between 2017 and 2024. The findings demonstrate that the cultivated area has been increasing steadily with time, but the production of maize has been increasing at a higher rate, particularly in 2024. This means that there has been an increase in productivity, which must have been facilitated by government intervention, like the Crop Intensification Program (CIP), which has helped to increase production beyond the expansion of land.

\Using the same model in every part of Rwanda does not work for all farming conditions, so production has not been consistent. While yields rose in 2019 (1.64 MT/ha) and 2023 (1.7 MT/ha) compared to 2020 and 2021 (both years at 1.59 MT/ha), it seems that many approaches and systems faced difficulties. Most of researchers suggest that it is likely that heavy rainfall in climate change will happen all at once as a storm, with long intervals without any rain afterward (Miklyaev et al., 2021; Yao et al., 2020; Brunner et al., 2021). As a result, we might experience more flooding as well as droughts. The findings indicate that Rwanda should provide tailored agricultural policies to farmers to improve the maize sector.

3.1 The role of government policy initiatives in maize production

The Crop Intensification Program (CIP), supported by the Rwandan government, has changed how people farm maize. The CIP, set up in 2007, focuses on raising productivity in agriculture through land grouping, improved seed availability, fertilizer assistance, and assistance with agricultural training (Ngango and Hong, 2021). Thanks to these steps, maize yields have increased, as seen when several studies show a more than doubled increase in regions where the program worked well. The strategy of the CIP supports Rwanda's main national development goal of using modern agriculture to fight poverty and ensure food security (Bizoza, 2021). How these top-down policies are applied has shown many important weaknesses. Since inputs and practices are the same everywhere, they do not match the country's conditions, and smallholder farmers experience uneven results. Still, farmers in areas far from markets or lacking resources cannot easily obtain subsidies, credits, or market

access, so the policy's hope for all people is not fully met (Bisht et al., 2020). Besides, the program's focus on growing the same crop increases concerns about whether it can be sustainable (Shah and Wu, 2019). Such findings indicate that the CIP has accelerated maize production in the country, but the results depend on using open and adaptable approaches. Farmers in Rwanda should be able to help shape policies that would make agriculture better and more accessible to all (Pasgaard et al., 2022).

3.2 Barriers faced during the implementation of the policy

Fulfilling the government's objectives for maize production in Rwanda has been met with various severe difficulties that restrict its success. Access to good seeds and fertilizers is a significant problem for smallholder farmers, as these are commonly too far away or too costly for agricultural resources, making it difficult for farmers to use new practices and tools to raise maize production (Miklyaev et al., 2021). Moreover, CIP and other top-down programs are run, top-down programs are run meaning farmers do not independently decide what to do. Many farmers must meet government requirements to grow certain crops, no matter how well traditional farming in their area fits the new crop choices. As a result, traditional farming methods limit the types of crops we farm, making communities weaker due to weather changes. Problems are made worse by a lack of money. Rising costs for the things they need and a lack of cheap credit hinder farmers from investing in their farms. In addition, because storage and markets are insufficient, much maize is wasted, and farming profitability decreases (Kadjo et al., 2018).

Institutions also face different issues. In many cases, a lack of extension services results in farmers not receiving the knowledge they need to start applying best practices in maize production. Because this knowledge gap exists, it prevents organizations from adopting new approaches that raise productivity. As a final point, farmers have little influence in policy discussions, so policy objectives may not match how things work in practice. If farm policies do not include meaningful interactions with growers, they may not correctly serve maize producers, and their unique problems may make them less effective and less sustainable.

3.3 Strategies for Enhancing Government Policy

A combination of approaches is necessary to increase the success of government policy in Rwanda's maize production. An important move is to create diversified policies that suit the different types of soil and economies across the country (de Roest et al., 2018). While the CIP program has raised maize production for farmers, it has been hard for the program to achieve the same success due to its standard procedure that does not consider local conditions and farmer differences. A policy framework appropriate for local needs can solve these gaps and improve solutions.

Increasing farmers' access to agricultural materials is very important. While the government's effort to lower fertilizer costs has helped some, logistical difficulties and problems getting data to rural regions have stopped them from reaching many smallholder farmers (Benson and Mogues, 2018). If maize farmers can count on reliable and prompt delivery of inputs, the productivity of maize can rise. Spending on agricultural extension is just as necessary. When farmers receive guidance on conservation farming and using inputs well, their yields may improve significantly. One good example is conservation agriculture, which raises maize productivity by 20% and profits by 40% (Dusingizimana et al., 2025).

Moreover, using digital resources can make carrying out sound policies easier. It has become much simpler since farmers can access new technologies on their phones or portable gadgets, move information, go online, and use resources (Khan et al., 2021). That is why we must couple the new digital offers with improved digital understanding and facilities in rural areas. When farmers help develop and execute agricultural policies, the outcomes will be better suited and more likely to last. Working with each community group makes policies match their needs and makes them more effective. Government help will allow maize farming to increase in Rwanda and aid efforts to achieve food security and improve the economy (Mgomezulu et al., 2024).

4. Conclusion

The study was designed to examine how and why the country's maize production has changed, focusing primarily on the effects of government efforts, including the Crop Intensification Program. The research reveals that maize production and yields have improved thanks to government policies, which raised output from 324,368 metric tons in 2017 to 507,985 metric tons in 2024. However, there are still noticeable differences in performance among different regions. Such differences mainly result from different levels of agricultural input availability, organizational support, and policies tailored to the place's environment and economy.

The study finds that a one-size-fits-all policy often overlooks what smallholder farmers need and can do. Problems, including a few extension services, challenging logistics, and weak market systems, prevent equal benefits from government measures. The research finds that Rwanda's maize production policies will work better when flexible, all-inclusive, and adapted to the country's situation.

On this basis, some ideas are offered for future research and policy creation:

- Localized Policy Adaptation: In the future, policies should consider the wide range of agroecology and the different economic backgrounds of farmers, especially those who live in outlying areas.

- Farmer Participation in Policy Design: We should create better ways for smallholder farmers to be part of decisions on agricultural policy so that what they experience is included.

- Investment in Extension Services and Infrastructure: Providing extension services liberally and better equipping rural areas with storage facilities and roads will allow government programs to succeed more easily.

- Digital Agriculture Integration: More ICT equipment and higher digital literacy among farmers will open easier paths to information, sell goods, and benefit from the support offered by the government.

- Further Research: Studies in the future should compare CIP adoption across regions to discover what approaches have worked and what haven't, and examine if such intensive cultivation of a single plant can be sustained in Rwanda.

These results give helpful advice to people working in rural development, government, and research, guiding them toward better, more inclusive rural policies in Rwanda.

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