

Enhancing Agricultural Extension and Advisory Services in Rwanda

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ABSTRACT

Over the past decades, Rwanda has adopted various agricultural extension strategies, transitioning from area-based comprehensive package programs to modified training and visit systems. The most recent model, known as "Twigire Muhinzi," aims to enhance participatory extension services. However, these approaches often rely on a standardized advisory system, applying a "one-size-fits-all" method that disseminates uniform technological solutions and extension messages to all smallholder farmers.

Agricultural extension services play a crucial role in knowledge transfer and the promotion of innovative farming technologies, contributing to increased productivity and sustainability. Traditional models often overlook the diverse ecological and socio-economic conditions of farmers. This study explores the significance of customized agricultural extension services in Rwanda, highlighting their importance, implementation strategies, challenges, and advantages. Leveraging digital tools, participatory methods, and farmer-centric models, tailored extension services can significantly improve agricultural productivity and sustainability.

Employing a desk review methodology, this research synthesizes insights from academic literature, policy reports, and institutional strategies. Findings indicate strong governmental support, promising ICT-driven initiatives, and organized farmer networks, yet challenges persist in terms of coordination and financial sustainability. Key recommendations include enhancing research integration, aligning policies, and strengthening capacity-building efforts to ensure an effective and scalable agricultural extension framework.

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1. INTRODUCTION

The agriculture sector is a cornerstone of Rwanda's economy, contributing about 26% to its GDP and providing employment for over 60% of the population, particularly in rural areas (NISR, 2023). As main source of income for millions of Rwandans, it is also critical in generating export earnings—with coffee and tea alone accounting for around 48% of the nation's export revenues. This sector is vital to Rwanda's poverty reduction efforts, underpinning food security and rural development initiatives that have lifted thousands out of poverty. Additionally, the sector plays an important role in Rwanda's development in the following areas:

➤ **Contribution to Employment** - Agriculture employs 71.2% of Rwanda's working-age population, with 44.8% specifically in food-

related agriculture. However, there is a significant shift towards non-agricultural sectors, driven by diversification and urban employment growth, especially after the COVID-19 pandemic.

- **Contribution to Incomes** - Agricultural workers in Rwanda earn an average of RWF 28,000 per month, which is below the national poverty benchmarks. Gender disparities are evident, with women earning less than men, highlighting significant economic vulnerabilities, especially for female workers whose earnings fall below the poverty threshold.
- **Contribution to Poverty Reduction** - Agriculture has been pivotal in reducing poverty, enhancing food security, and fostering rural development in Rwanda, with modern farming

practices and infrastructure investments lowering the poverty rate from 60% in 2000 to 38.2% in 2017. Programs like Girinka have improved productivity, nutrition, and income by providing cows to families in need. Increased agricultural productivity has boosted farmers' incomes by 30% and reduced extreme poverty by 14%, while commercialization and export growth have lifted over one million people out of severe poverty.

Consequently, the transformation of the agriculture sector is critical to the countries development and its ability to meet its NST 2 targets and more importantly its Vision 2050. For Rwanda to secure its food security and strengthen the rural economy, the professionalisation of the sector is a prerequisite. As such, customised extension services will be required to transform the sector from one dominated by subsistence farming to more intensified commercial agriculture that delivers increased productivity and raises rural incomes.

In the past twenty years, Rwanda has implemented multiple agricultural extension approaches, each designed to increase the adoption of agricultural technologies for higher productivity. The "*Twigire Muhinzi*," initiative one of the approaches was introduced as the primary extension strategy, characterized by packaged interventions, greater agricultural input utilization, and an expanded workforce of extension personnel. Despite its widespread presence and deployment of development personnel, the extension system faces two primary challenges. First, technology packages are designed based on broad factors like Agro-ecology, rainfall, and elevation, rather than specific farmer needs. Second, the system treats all smallholder farmers as a uniform group, failing to tailor extension messages accordingly.

This approach assumes "access" is defined by physical proximity to services, neglecting affordability, socio-cultural appropriateness, and relevance to different farmer categories. These shortcomings align with the limitations of a "one-size-fits-all" model, which struggles to deliver specialized advisory services.

Customization in service delivery focuses on tailoring interventions to meet distinct customer needs, a concept widely embraced in marketing. Unlike conventional approaches that target broad audiences with limited customization, personalized services aim to address diverse farmer requirements. Scholars like Kotler and Pine emphasize customization as a response to growing consumer demand for variety, advanced features, and superior quality. While this concept is well-developed in marketing, agricultural

extension services remain largely standardized. Research, including studies (Hara et al.,) suggests that integrating product-service system (PSS) customization into extension services could enhance their effectiveness by acknowledging farmer diversity and differentiating service delivery.

Agricultural extension services facilitate knowledge dissemination, but traditional top-down models often fail to meet the unique challenges of farmers. Personalized agricultural extension services tailored to regional, environmental, and socio-economic conditions provide a more efficient means of delivering knowledge and support. This paper examines the relevance, challenges, and benefits of customized extension services in Rwanda.

2. Conceptual Framework

2.1. Customized Agricultural Extension System (CAES)

The Strategic Plan for Agriculture Transformation (PSTA) emphasizes the need for a diversified partnership model for funding and delivering agricultural extension services. It advocates for a commercialized extension system involving multiple stakeholders, including public institutions, private sector actors, research institutions, NGOs, development partners, and farming communities. In line with this vision, a new Customized Agricultural Extension System (CAES) is proposed.

CAES is designed to be efficient, market-oriented, and value-chain-driven, addressing the specific needs of small- and large-scale farmers, food crop producers, commercial farmers, and livestock keepers. This system incorporates various extension approaches, communication channels, and support services to enhance effectiveness. CAES features include:

- Development of content tailored to farmer needs.
- Integration of value-chain-based extension services.
- Comprehensive support for both crop and livestock systems, including post-production activities.
- Capacity-building initiatives for extension personnel.
- Incentives to motivate farmer promoters and facilitators.
- Utilization of ICT to enhance service delivery.
- Coordinated extension efforts involving multiple stakeholders.
- Mainstreaming of cross-cutting issues such as climate change adaptation and gender inclusion.

➤ **Regular monitoring and evaluation mechanisms.**

Generally, we have noticed many challenges and strategies in implementing the agriculture extension services. Despite its benefits, implementing extension services faces several challenges like: Limited financial and human resources, Digital divide and ICT access issues, Farmer engagement barriers, Policy and institutional constraints. To address the above, key strategies need to be considered starting with Digital and ICT-Based Approaches whereby Mobile apps and SMS-based advisory services can be introduced, consideration of Real-time data collection platforms and Remote sensing and GIS for precision farming.

It is to note that participatory strategies need to be strengthened particularly by focusing on a participatory approach such as Farmer Field Schools (FFS), Community-led extension services and Peer-to-peer knowledge sharing.

By addressing the above challenges and leveraging innovative strategies, agriculture extension services can effectively support Rwanda's farming communities, ensuring long-term agricultural productivity and resilience.

2.2. My thoughts on the Characteristics of CAES

➤ **Appropriate Content for Client Needs:**

Extension services must address the distinct requirements of various farmer categories, including smallholder subsistence producers, commercial farmers, and value chain actors. Ensuring the relevance and appropriateness of extension content enhances its impact on productivity and farmer engagement.

➤ **Value-Chain-Based Extension Services:**

Effective extension services go beyond production, encompassing processing, marketing, and value addition. A value-chain approach integrates these elements, ensuring that extension support aligns with market demands and profitability.

➤ **ICT-Supported Extension Services:** Digital tools, such as mobile applications, internet platforms, and television programs, offer potential for improved information dissemination. Although Rwanda has made strides in ICT adoption, the full potential of digital extension services remains under-utilized. CAES seeks to complement traditional extension methods with ICT innovations to enhance efficiency and outreach.

➤ **Pluralistic Extension Services:** CAES promotes a collaborative model involving public

institutions, private sector actors, NGOs, farmer organizations, and educational institutions. This approach ensures that diverse expertise contributes to service delivery. Additionally, private sector participation is encouraged to enhance advisory service accessibility and customization.

➤ **Market-Oriented Extension Services:**

Customized extension efforts should emphasize market engagement, helping farmers transition from subsistence farming to commercial agriculture. This includes training on agribusiness management, cooperative organization, and market linkages.

➤ **Demand-Driven and Client-Oriented Services:**

Extension strategies should be responsive to farmer needs, ensuring accountability and effectiveness. Needs assessments and participatory planning can enhance the demand-driven nature of extension services.

➤ **Decentralized Extension System:**

Effective agricultural extension requires local-level implementation. CAES aligns with Rwanda's decentralization policies, enabling local government entities and cooperatives to take active roles in extension service delivery.

3. Methodology

This study employs a qualitative desk review approach, analysing secondary data from government reports and donor-funded projects, academic publications. The analysis focuses on governance structures, service delivery mechanisms, stakeholder engagement, and innovations in Rwanda's customized agricultural extension landscape.

4. Results and Discussion

Research underscores the significance of tailored agricultural extension services in boosting smallholder farmers' productivity and resilience. The "*Twigire Muhinzi*" model, which integrates Farmer Field Schools (FFS) and Farmer Promoters (FPs), combines community-driven and institutional extension services. While adopting ICT in extension services is promising, obstacles such as inadequate infrastructure and low digital literacy remain challenges.

➤ **Integrated Extension Services for All Farmers**

To sustainably enhance Rwanda's agricultural productivity and livelihoods, the Customized Agriculture Extension System (CAES) should extend beyond food crops to also include export crops and livestock. This approach is in fact aligned with the Strategic Plan for the Transformation of Agriculture (PSTA V). Implemented as an integrated agricultural

extension system, CAES will ensure effectiveness by deploying crop and livestock technical teams at various administrative levels districts, sectors, cells, and villages. The system will be responsive to farmers' specific needs, as identified through participatory research along various value chains (VC). CAES should much put emphasizes in considering local comparative advantages, delivering specialized support through multiple extension approaches, including agribusiness, marketing, farm management, mechanisation and financial planning, to improve production and productivity across value chains.

➤ **Market-Oriented Extension Approach**

CAES emphasizes not just production but also value chain development and market alignment. Building upon the "*Twigire Muhinzi*," model, which aimed to enhance food security, productivity, and farmer incomes, CAES need to shift toward a market-system approach. This system will support and build linkages for both small-scale and commercial farmers covering food and cash crops as well as livestock. Youth participation in agriculture is also a key focus. By integrating entrepreneurship into extension services, CAES will change farmers' mindset from subsistence production to market-oriented farming, targeting both domestic and export markets.

The market-oriented extension model will promote farmer cooperatives, agribusiness organizations, and value chain associations, enabling collective bargaining and better access to inputs and markets. It will also consider and complement the existing farmer training system, comprising farmer promoters, lead farmers, and extension facilitators by introducing new structures such as supplier-buyer contracting and producer associations.

In addition, there is a need to describe the market players involved in the market segments by knowing:

- What is the number of SMEs /Large enterprises involved in the manufacturing / import / commercialization of the targeted products?
- Are the selected sustainable products locally produced, or imported? If the products are imported, what are the prospects for the future supply of sustainable products and services, in the short, medium and long term?
- Do companies in the targeted sectors have environmental management systems in place and / or other sustainable development credentials?
- What are the companies' strategies in terms of transition to sustainable production methods/products, etc.

➤ **Demand-Driven and Client-Oriented Extension Services**

A demand-driven extension model will ensure responsiveness to farmers' needs, including marginalized groups and by involving farmers in identifying their needs, extension services will enhance accountability and effectiveness. Extension packages need to be developed based on consultations with various agricultural stakeholders such as farmers, service providers, local government and the private sector/consumers of agricultural products. We do believe that organizing actors along value chains and categorizing clients will help ensure service delivery aligns with their expectations.

➤ **Decentralized Extension System**

The customised agriculture extension services (CAES) initiated by the Government of Rwanda follows a decentralized model, coordinated by MINAGRI and implemented by local government entities such as the Rwanda Cooperative Agency (RCA), Rwanda Agriculture and Animal Resources Development Board (RAB), and the National Agriculture Export Development Board (NAEB). Under Rwanda's decentralization policy, which has been in place since 2000, both central and local governments share responsibilities for extension services. The model emphasizes subsidiarity, meaning extension services should be delivered as close to farmers as possible, with well-defined roles for different government levels and stakeholders.

To enhance effectiveness, there is a need to privatize extension services and support the private sector for availability and accessibility. To do so, key support to the private sector is paramount through:

- Capacity building and training for private extension agents
- Financial support for organized extensionists for a maximum coverage at district-level
- Coordination mechanism at national to district level with a strict rule for services provision.
- **Development of Customized Extension Packages**

Recognizing that different agricultural stakeholders require varied types of extension services, CAES through its coordination offices, should focus on creating tailored extension packages. These packages will address production techniques, market access, value addition, and financial services, among other needs.

The process will begin with demand-driven needs assessments along specific value chains, creating a database of certified service providers and potential

service providers, creation of council for both agronomists and veterinarians. The assessments need to be participatory and cover most of the value chains to ensure that farmers and other agricultural actors identify their needs, which will then inform the development of extension materials. Among others, the assessment will look at a range of topics:

- Best agricultural practices
- Entrepreneurship and farm optimization
- Post-harvest management to reduce losses
- Value addition
- Access to domestic and international markets
- Financial access and price negotiation

➤ Lessons from Customizing Marketing Approaches for Future Extension Services

Customization in product and service delivery is a growing trend, aiming to meet diverse customer needs rather than applying a "one-size-fits-all" approach. While businesses have widely adopted product-service system (PSS) customization, agricultural extension services have lagged.

Traditional agricultural extension has primarily focused on model farmers and specific crop commodities, often overlooking the diverse socio-economic realities of farmers. Future agriculture extension services in Rwanda need to learn from the best practices and challenges of the "Twigire Muhinzi" program and shift to a tailored extension approach that considers different farming needs.

Table 1: highlights key differences between conventional and customized agricultural extension services:

Feature	Customized Extension	Conventional Extension
Approach	Tailored to different farmer groups	Standardized, uniform services
Targeting	Segmented by wealth, production orientation, and socio-economic status	Assumes all farmers are similar
Market Engagement	Supports farmer organizations, contract farming, and value chain linkages	Limited market orientation
Results	Improved adoption, increased productivity, and profitability	Lower adoption due to lack of customization

Source: Own analysis through desk review

➤ Systemic Market Constraints and Opportunities

We have highlighted the importance of understanding the structure and dynamics of the specific market system within agricultural service provision. A thorough and urgent assessment is required to pinpoint the root causes of market underperformance and identify potential opportunities for improvement. Key questions to consider include:

- What are the fundamental reasons behind a market system's inefficiencies?
- What are the main challenges and opportunities in addressing these issues?

To effectively answer these questions, stakeholders must examine the various rules and supporting functions that shape and regulate the market chain. Policymakers should go beyond merely describing existing market functions and the actors currently engaged in them. Instead, it is crucial to gain deeper insights into the capabilities and motivations of market participants, as well as how effectively they are fulfilling their roles. This involves understanding:

- The incentives that drive market actors
- The capacity of market participants
- The nature of relationships among market actors

Incentives and capacity play a vital role. Projects must investigate why market actors behave in certain ways, what drives their decisions, and their willingness and ability to adapt. To comprehend these incentives, it is necessary to analyse not only economic factors but also political, legal, social, and cultural influences. This includes understanding what is valued and why, how prevailing norms shape behaviours, and the ways in which social factors either promote or hinder change.

➤ Strengthening Market Engagement

Effective market engagement is vital for farmers' success, ensuring they access credit, aggregation services, and market intelligence. However, financial constraints remain a barrier not only for the service providers but also for the agriculture sector in general, with high interest rates from financial institutions limiting access to credit. The government's need to put in place mechanisms to bring down the interest rates for agriculture projects but also conduct an awareness to financial institutions to considers agri-business as an opportunity and not a risk. This initiative will go along with other market engagement strengthening strategies such as: Encouraging contract farming, linking farmers with agribusiness firms and Improving storage and logistics to reduce post-harvest losses.

➤ **Strengthening Farmer Promoters and Farmer Field School Facilitators Cooperatives**

Farmer promoters and FFS facilitators play a crucial role in agricultural development, with many facilitators currently organized into cooperatives. These cooperatives serve as a vital link between the Government and frontline extension agents, but they often face challenges related to governance and resource availability. To address these issues, the Government, through the Rwanda Cooperative Agency (RCA), need to focus on building the capacities of these cooperatives and supporting the formation of new ones. Additionally, mechanisms need to be established to enable cooperatives to compete for district-level agricultural extension service tenders.

➤ **Development of Private Extension Service Providers; Training and Accreditation of Private Extension Professionals**

There is a need to take an active role in regulating and accrediting private extension enterprises. These enterprises will be empowered to transfer modern agricultural techniques to farmers and entrepreneurs. To ensure professionalism and sustainability, the institution in charge will need to provide support to these companies, helping them meet required service delivery standards.

Furthermore, graduates from universities, IPRCs, TVET schools, and other agricultural and veterinary training institutions will need certification as "agricultural/vets extension agents" by accredited bodies. Specialized training courses need to be developed to prepare them for certification, ensuring they possess the necessary skills to serve as private extension professionals. This shift towards privatized extension services will create significant opportunities for enterprises, necessitating a well-defined regulatory framework for accreditation.

➤ **Establishment of a Private Extension Professionals council**

Private professionals need to be contracted to deliver specialized agricultural extension services where public sector capacity is limited. To facilitate this process, a professional council must be established to oversee operational ethics, regulations, and self-governance among private Extension Service Providers (ESPs). This council will include certified agricultural extension professionals, both individuals and companies, ensuring standardized service quality.

➤ **Incentives for Private Extension Companies**

Currently, donor-funded projects and NGOs often hire extension agents independently, sometimes without ensuring the necessary competencies. The Ministry of Agriculture and Animal Resources must

encourage stakeholders in the agricultural sector to contract qualified and certified private extension companies, based on predefined performance standards. This approach will increase accountability and improve service delivery. Over time, these companies will enhance their operational capacities, leading to greater professionalism and efficiency in agricultural extension services.

5. Conclusion and Recommendations

Tailored agricultural extension services offer a practical solution to the unique challenges faced by Rwandan farmers. By incorporating digital tools, participatory methods, and multi-stakeholder collaboration, these services can significantly boost agricultural productivity and sustainability. To ensure long-term success, policymakers must prioritize investments in customized extension services, enhance digital infrastructure, and promote active farmer participation. Future research should focus on assessing the impact of various customization approaches and identifying best practices for scaling up these models effectively.

Customized agricultural extension services provide a strategic response to Rwanda's agricultural challenges. By integrating digital tools, participatory methods, and multi-stakeholder collaboration, extension services can drive agricultural productivity and sustainability. To ensure long-term success, policymakers should prioritize investment in tailored extension models, strengthen ICT infrastructure, and foster farmer participation.

Key Recommendations:

- Establish clear coordination mechanisms for national extension services.
- Collaborate with research institutions to refine training materials.
- Strengthen capacity-building programs for extension personnel.
- Leverage ICT and artificial intelligence for service enhancement.
- Promote farmer specialization for improved market efficiency.
- Encourage partnerships between public and private sectors.
- Integrate climate-smart agricultural practices into extension strategies.
- Expand financial access and improve market linkages.

By addressing these priorities, Rwanda can establish a resilient, inclusive, and market-driven agricultural

extension system that fosters sustainable development and economic growth.

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