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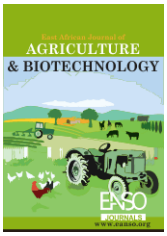

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Original Article

Perceived Benefits and Challenges of Integrating Lead Farmers into Tanzania's Agricultural Extension System: A Case of Kagera Region

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ABSTRACT

This study examined the perceived benefits and challenges associated with integrating Lead Farmers (LFs) into the government agricultural extension system in Tanzania, using Kagera Region as a case study. The continued shortage of extension officers in rural areas has prompted the use of the LFs model, which has mainly been introduced by non-governmental organisations and donor-supported projects to enhance peer-to-peer learning among farmers. Despite its growing relevance at the grassroots level, the model remains informal and has not been fully institutionalised within the national extension framework. A mixed-methods approach was employed, combining household surveys, key informant interviews, and focus group discussions. Respondents included smallholder farmers, extension personnel, NGO representatives, researchers, and local leaders. The findings revealed high levels of awareness and positive perceptions of LFs, particularly in terms of their role in promoting improved agricultural practices, enhancing farmer-to-farmer learning, and expanding access to relevant information. However, key challenges were identified, including irregular interaction with farmers, lack of official recognition, limited logistical and technical support, and weak coordination between actors. The study calls for deliberate policy and institutional efforts to formalise the integration of LFs into the public extension system. Key areas of action include developing clear operational guidelines, improving training and supervision systems, ensuring adequate facilitation and incentives, and strengthening collaboration between government institutions and non-state actors involved in agricultural extension.

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INTRODUCTION

Agriculture remains central to global food systems and rural livelihoods. Smallholder farmers, cultivating less than two hectares, contribute about 30–34% of the global food supply, though they often face limited access to inputs, markets, and extension services (FAO, 2021). In Sub-Saharan Africa, agriculture supports over half of the population and up to 90% of rural livelihoods, yet productivity is constrained by poor infrastructure, limited investment, and weak extension systems (World Bank, 2021; AGRA, 2022). The sector in Tanzania remains a key driver of economic and social development, employing around 65% of the population, contributing 26.1% to the Gross Domestic Product (GDP), and supplying 65% of the raw materials used by local industries (URT, 2023). It supports livelihoods in both rural and peri-urban areas and is central to food security and poverty reduction strategies. Despite these contributions, the agricultural sector continues to face several enduring challenges that limit its productivity and growth potential.

The sector continues to experience low yields, seasonal and unreliable rainfall, limited application of improved agricultural technologies, and weak extension service delivery (FAO, 2022; Urassa *et al*., 2023). Public extension systems, meant to provide critical support to farmers, remain underdeveloped and overloaded. The extension officer-to-farmer ratio is worryingly high, ranging from 1:469 to as much as 1:2,307 (Kaur & Kaur, 2018; URT, 2023). Such limitations have resulted in many smallholder farmers operating with minimal access to new knowledge, technologies, or advisory services, especially in remote areas.

While government efforts have aimed at strengthening extension systems, progress has been slow, and gaps remain. In recognition of these shortfalls, complementary approaches have emerged to support farmers more effectively. Among these is the Lead Farmer (LF) model, which has received growing attention in Tanzania and other countries in the region. This model involves selecting experienced and respected farmers from within communities, who are then trained to support their peers. These farmers serve as a link between agricultural officers and other farmers, offering practical knowledge and guidance (Ringo, 2020).

Evidence from various contexts suggests that the LFs model has the potential to strengthen the extension system. In Tanzania, results from the Rural Initiatives for Participatory Agricultural Transformation (RIPAT) programme have shown that LFs can help bridge the extension gap and promote the adoption of improved agricultural practices (Ringo *et al*., 2023). Similar findings have been documented in Kenya, Malawi, and Ghana, where the model contributed to better technology uptake and knowledge dissemination among smallholder farmers (Franzel *et a*l., 2019; Kiptot & Franzel, 2015; Morgan et al., 2020; Ragasa, 2019; Osei-Kofi et al., 2023).

However, despite these positive experiences, the role of LFs within Tanzania's public extension system remains limited. Most documented cases

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stem from donor-supported or NGO-led initiatives, which often operate on a pilot basis and are not sustained in the long term. There is little evidence to show how the model can be systematically integrated into formal extension structures. Institutional challenges such as inadequate coordination mechanisms, lack of clear policy guidelines, limited government commitment, and poor sustainability planning continue to hinder this integration (Mgumia *et a*l., 2015; Ragasa, 2020).

The Kagera Region stands out for its agricultural diversity and consistent contribution to national food reserves. Despite this potential, the area continues to experience extension-related difficulties similar to those found across other regions. A number of non-state actors have piloted the LFs' approach across various districts. However, these efforts have yet to achieve meaningful integration into government-led extension systems. The public extension infrastructure remains constrained by limited personnel and inadequate resources, which restricts service delivery (URT, 2021; FAO, 2022). As a result, the broader promise of the LFs model, particularly its ability to strengthen community-level knowledge sharing, has yet to be fully realised within formal structures.

Specifically, the study aimed to assess the level of awareness of LFs among farmers and the frequency of their interactions with LFs; to identify the perceived benefits associated with the integration of LFs into the government agricultural extension system; and to examine the institutional and socio-economic challenges that influence the integration process. The study intended to provide empirical evidence to inform national policy and contribute to efforts to institutionalise LFs as an integral part of the public agricultural extension system in Tanzania.

The Role of Lead Farmers and Their Integration into Government Agricultural Extension Systems

Persistent structural limitations within Tanzania's public agricultural extension services have led to the adoption of alternative approaches to support smallholder farmers, particularly in underserved rural areas (FAO, 2022; URT, 2023). Among these, the Lead Farmers (LFs) model has gained recognition as a complementary strategy to bridge the gap between farmers and overstretched extension personnel. LFs are typically selected based on local credibility, practical experience, and community trust, and are subsequently trained to disseminate agricultural innovations at the grassroots level (Khaila *et al*., 2015). Their involvement has been shown to enhance peer-to-peer learning and improve outreach, particularly in areas with limited access to formal extension agents (Morgan *et al*., 2020; Ragasa, 2019). Although awareness of the LF model has increased, levels of interaction between farmers and LFs vary significantly across regions. In the RIPAT programme implemented in Tanzania, increased visibility and structured engagement with LFs led to higher adoption rates of improved agricultural practices (Ringo *et al*., 2023). However, challenges such as irregular communication, seasonal workload conflicts, and limited logistical support have constrained the frequency and quality of interactions (Franzel *et al*., 2019). In other contexts, such as Malawi and Ghana, the success of LFs has been linked to community trust, continuous institutional support, and formalised roles within extension structures (Khaila *et al*., 2015; Osei-Kofi *et al*., 2023). In the absence of these factors, both engagement and impact tend to diminish over time (Oyelami *et al*., 2018).

Integration of LFs into government-led extension systems has shown potential in strengthening agricultural service delivery. In Malawi, LFs formally incorporated into public extension networks demonstrated increased effectiveness in promoting sustainable practices, including soil fertility and irrigation (Maertens *et al*., 2021). Formal integration also enabled coordinated planning with extension officers and improved

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decentralisation of services. Similar experiences in Kenya suggest that LFs supported through official frameworks benefit from improved training, logistical support, and supervisory structures, leading to greater farmer confidence and enhanced accountability (Lamm *et al*., 2020; Masangano *et al*., 2017).

Despite such successes, Tanzania has yet to institutionalise LFs' models at scale. Most initiatives remain pilot-based, driven by NGOs or donor-funded projects, and often lack sustainability once external funding ends (Ragasa, 2020). Considerable structural and operational challenges continue to impede the formal integration of LFs into public extension frameworks. Limited training in facilitation, adult education, and extension methodologies weakens the effectiveness of many LFs (Masangano *et al*., 2017). Additionally, the absence of transport allowances, field tools, or stipends restricts LFs' mobility and reduces coverage in geographically dispersed areas (Lamm *et al*., 2020). The voluntary nature of the role, in the absence of performance-based incentives or formal recognition, often results in demotivation and attrition over time (Chirwa *et al*., 2017). Coordination challenges also persist, with many LFs excluded from district work plans or supervision schedules, thereby weakening alignment with public extension objectives (Ragasa *et al*., 2019).

These systemic barriers are further exacerbated by the lack of harmonised policy guidelines or monitoring frameworks, making it difficult to scale and institutionalise successful LFs practices nationally (Ringo *et al*., 2023). Whereas previous studies have largely concentrated on short-term pilot projects or experiences from other countries, this study adopts a context-specific approach to examine the policy, institutional, and operational conditions necessary for the sustainable and scalable integration of LFs within Tanzania's public agricultural extension system. It seeks to generate practical evidence to inform future policy development and contribute to ongoing efforts aimed at institutionalising the LF model.

METHODOLOGY

Study Area and Design

The study was conducted in Kagera Region, located in the northwestern zone of Tanzania. The region is known for its agro-ecological diversity and predominantly smallholder farming systems, with key crops including bananas, coffee, beans, and tea (URT, 2021). Agriculture provides the primary livelihood for approximately 77% of the regional population. Despite this reliance, access to agricultural extension services remains limited, with an extension officer-to-farmer ratio of approximately 1:1,327 (URT, 2022). Kagera Region has also seen the introduction of the Lead Farmers (LFs) approach by various community-based initiatives and non-governmental organisations (NGOs), such as KADERES, MAVUNO, and Café Africa Tanzania. These interventions have aimed to address gaps in public extension services and offer a relevant context for examining the integration of LFs into the government extension system. A descriptive cross-sectional mixed-methods design was employed, incorporating both qualitative and quantitative components, consistent with Creswell and Creswell (2023). This design enabled the assessment of farmers' awareness and interaction with LFs, identification of perceived benefits linked to their integration into the government extension system, and examination of institutional and socio-economic challenges influencing this process. The combination of qualitative and quantitative methods allowed for the triangulation of data, thereby enhancing the credibility and contextual relevance of the findings.

Sampling Procedure and Sample Size

The study engaged a total of 150 participants drawn from Karagwe, Missenyi, and Bukoba districts in the Kagera Region. These districts were purposively selected due to their active involvement in

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community-based extension initiatives, as well as the presence of both government and non-state actors promoting farmer-to-farmer learning. The selection was further guided by variations in the number of trained Lead Farmers across the districts. For the quantitative component, 100 smallholder farmers were selected through stratified random sampling. The sampling frame reflected the known distribution of trained Lead Farmers in each district: Karagwe (381), Missenyi (215), and Bukoba (187). Proportional allocation was applied, resulting in 38 respondents from Karagwe, 32 from Missenyi, and 30 from Bukoba. This approach was informed by Bailey's (1994) recommendation of a minimum of 30 respondents per stratum to enable subgroup analysis. A response rate of 95 percent was attained, with 95 farmers completing the structured questionnaire. To complement the quantitative data, a qualitative component was incorporated, involving 18 Key Informant Interviews (KIIs). These included district extension officers, representatives from NGOs, village leaders, and experienced farmers directly involved in extension or Lead Farmer activities. Additionally, four Focus Group Discussions (FGDs) were conducted—one in each of the three districts and one across district boundaries. Each FGD comprised 8 to 10 purposively selected participants, ensuring a mix of gender, age, and farming experience. The use of both purposive and stratified sampling techniques allowed for balanced representation and enriched contextual understanding across the selected districts.

Data Collection

A mixed-methods approach was employed to obtain both farmer-level perceptions and institutional insights on the integration of Lead Farmers (LFs) into the government agricultural extension system. This approach allowed for a comprehensive exploration of the perceived benefits as well as the systemic and operational challenges influencing integration. Quantitative data were collected through the administration of structured questionnaires to smallholder farmers. The questionnaire gathered information on farmers' views regarding the potential value of integrating LFs into the formal extension system, including improvements in access to extension services, knowledge sharing, and adoption of agricultural technologies. It also captured perceptions on limitations, such as concerns over the reliability and long-term sustainability of the LFs model within public structures. Demographic and farm-related information was also included to facilitate comparison across farmer groups.

Qualitative data were collected to gain a deeper understanding of institutional dynamics and factors influencing LFs' integration. A total of 18 Key Informant Interviews (KIIs) were conducted with individuals directly involved in the management and delivery of agricultural extension services. The interviews explored institutional perspectives on the added value of LFs, existing coordination mechanisms, policy and resource constraints, and the institutional reluctance or readiness to formalise the LFs' role within government systems. To further complement the data, four Focus Group Discussions (FGDs) were held with farmers across the study districts. Each group consisted of 8 to 10 participants, selected to ensure diversity in terms of gender, age, and farming experience. The FGDs provided community-level insights on the relevance, performance, and acceptance of LFs, as well as farmers' expectations regarding their formal recognition. In addition, a review of relevant secondary sources was conducted. These included government policy documents, NGO and project reports, and previous research studies related to agricultural extension and community-based models. The combination of primary and secondary data sources enabled triangulation, thereby enhancing the credibility and depth of the findings.

Data Analysis

A mixed-methods analytical approach was employed to analyse both quantitative and qualitative data in line with the study's objectives.

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Quantitative data were analysed using the Statistical Package for Social Sciences (SPSS) Version 26. Descriptive statistics, including frequencies and percentages, were used to summarise key variables such as respondents' awareness of Lead Farmers (LFs), frequency of interaction with them, and perceptions regarding the benefits of integrating LFs into the government agricultural extension system. These benefits were examined from a system-level perspective, focusing on contributions such as reduced workload for extension officers, expanded farmer reach, and enhanced trust in extension services.

To examine whether perceived benefits varied by farmer characteristics, the Chi-square test of independence was applied. This inferential test assessed associations between selected demographic variables, namely sex, age, education level, and farming experience, and reported perceptions of LF-related benefits. The chi-square test statistic was calculated using the formula:

experience,

$$\chi 2=\sum \frac{(Oi-Ei)2}{E_i}$$

Where Oi represents the observed frequencies and Ei the expected frequencies. A 5% significance level was used to determine the presence of statistically significant associations.

Qualitative data gathered through Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) were analysed thematically. Manual coding was applied to identify patterns and recurring ideas across responses. Thematic analysis focused on extracting views related to the perceived benefits of integrating LFs and the institutional, structural, and socio-economic barriers that influence this process. Narratives were organised into broad themes for further discussion in the results section.

Ethical Considerations

Ethical guidelines were strictly adhered to throughout the study. Informed consent was obtained from all participants, ensuring they understood the purpose of the study and their right to participate voluntarily. Confidentiality and anonymity were maintained, with all data being stored securely and used exclusively for research purposes. Ethical approval for the study was obtained from the relevant local authorities.

RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

The study involved 95 smallholder farmers across the three selected districts in Kagera Region. The majority of respondents were male, with a relatively small proportion being female. Most respondents had attained primary education, while a smaller number had secondary or higher levels. In terms of age, the sample reflected a mix of younger and older farmers, with a significant proportion aged between 36 and 55 years. Farming was reported as the main livelihood activity for nearly all respondents, with an average farming experience of 15.8 years. This indicates that the majority were not only active in agriculture but had substantial experience in the sector. The average farm size was 2.3 acres, consistent with smallholder production systems commonly found in rural Tanzania. These characteristics suggest that the study drew from a relevant and experienced group of farmers. Such a profile is appropriate for examining awareness and interaction with Lead Farmers (LFs), and for generating reliable insights on the perceived benefits and challenges of integrating LFs into the government agricultural extension system.

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Table 1: Demographic Characteristics of Respondents (n=95)

Characteristic	Frequency	Percentage (%)
Gender (Male)	74	77.9
Gender (Female)	21	22.1
Age 18–35	37	38.9
Age 36–55	41	43.2
Age >55	17	17.9
No formal education	2	2.1
Primary education	63	66.3
Secondary and above	30	31.6
Farming as a primary occupation	87	91.6.8
Farming experience (years)		
1-10	33	34.7
11-30	40	42.1
Above 30	22	23.2
Average farming experience (years)	N=95	15.8 (SD = 2.8)
Mean farm size (acres)		2.3

Source: *Survey Data*

Awareness of Lead Farmers

A significant majority of respondents (94.7%) were aware of the presence of Lead Farmers (LFs) in their communities, with only a small proportion (5.3%) lacking such awareness. This widespread recognition suggests that the LF model has gained considerable visibility among farming households in the Kagera Region. Insights from Focus Group Discussions (FGDs) further support this finding. Participants commonly mentioned that knowledge about LFs was acquired through village meetings, sensitisation sessions organised by NGOs, and practical agricultural demonstrations. Information from Key Informant Interviews (KIIs) also confirmed that raising awareness forms part of the initial strategies during the implementation phase. Several informants pointed out that NGOs and government extension officers introduce LFs through public gatherings, farmer groups, and local agricultural programmes.

> *"Awareness is created through training programmes and hands-on sessions at demonstration plots established by Lead Farmers."—District Agricultural Officer, Missenyi District.*

These findings indicate a broad acceptance and recognition of the LFs' approach among smallholder farmers in the study area.

Interaction of Farmers with Lead Farmers

Nearly one-third of the respondents (30.5%) reported engaging with Lead Farmers (LFs) either frequently or very frequently. In this context, "frequent" interaction refers to contact occurring at least once per week, while "very frequent" denotes interaction several times per week. Conversely, 37.9% of respondents indicated that they rarely interacted with LFs, and an additional 8.4% reported no interaction at all (Table 2).. Thus, interaction with LFs was generally limited despite the high level of awareness. Participants in FGDs commonly reported that interaction with LFs was more noticeable during the planting season or when training sessions were organised. Also, there were concerns that some LFs were less accessible outside these structured activities. This suggests that while the LFs' approach is well recognised, the consistency and frequency of engagement remain limited in certain areas.

Key informants echoed similar observations, attributing irregular interaction to the absence of formal schedules, limited logistical support, and

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weak coordination with government extension staff. One experienced farmer interviewed as a key informant noted:

> *"Many Lead Farmers are willing to help, but they do not have bicycles or any means of reaching farmers regularly. They also do not have clear follow-up structures." —Village Leader, Karagwe, District.*

Such constraints may reduce the effectiveness of the model in delivering timely and sustained extension support.

Table 2: Frequency of Interaction with LFs (n=95)

Frequency of interaction	Frequency	Percentage (%)
Never	8	8.4
Rarely	36	37.9
Occasionally	22	23.2
Frequently	16	16.8
Very frequently	13	13.7
Never	8	8.4
Total	95	100

Scholarly Perspectives on Farmers' Awareness and Interaction with Lead Farmers

The high level of awareness reported in this study aligns with the findings of Ringo et al. (2023), who observed widespread recognition of Lead Farmers (LFs) in areas where community-based agricultural interventions, particularly those implemented under the RIPAT model, had been introduced. This demonstrates that when LFs are actively established and supported within rural communities, farmers generally become familiar with their presence and assigned roles. However, it is important to note that awareness alone does not always translate into regular interaction. As Maertens *et al*. (2021) have indicated, in the absence of structured institutional support, farmer engagement with LFs tends to be irregular and is often influenced by seasonal farming cycles and logistical challenges. The irregular interaction may further be attributed to the informal status of LFs within the public extension system.

For example, Osei-Kofi *et al*. (2023) reported that in Ghana, the lack of formal recognition and clear institutional positioning of LFs contributes to diminished visibility and influence over time. Similar challenges have been noted in Tanzania, where many LFs continue to operate without formal mandates, consistent supervision, or integration into district- and ward-level extension plans. Furthermore, lack of motivation has also been cited as a constraint. Oyelami et al. (2018) found that where incentives are not provided, LFs tend to reduce their outreach activities, especially when faced with competing personal and community responsibilities. The literature therefore underscores that while recognition of LFs may be widespread, meaningful and sustained interaction is largely dependent on institutional factors. These include effective coordination mechanisms, technical backstopping, supervisory arrangements, and the provision of adequate logistical support. Enhancing interaction between farmers and LFs will thus require deliberate policy and programmatic efforts aimed at strengthening operational linkages between community-based actors and the formal extension system.

Perceived Benefits of Integrating Lead Farmers into the Government Agricultural Extension System

Survey results show that a majority of respondents support the formal integration of Lead Farmers (LFs) into the government extension system. The most commonly reported benefit of such integration was the improvement of farming techniques

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(88.6%), followed by increased crop yields (75.0%) and better access to agricultural information (67.0%) (Table 3). Additionally, respondents noted that integration could enhance training quality, improve consistency, and increase the credibility of LFs within their communities. These findings suggest that farmers view formal integration as a way to expand the coverage and reliability of extension services. Focus group participants also indicated that such integration could promote stronger collaboration between LFs and extension officers, improve group mobilisation, and facilitate access to farm inputs and markets. Overall, these perspectives point to a belief that institutionalising the role of LFs would lead to a more decentralised, well-coordinated, and responsive agricultural extension system.

Table 3: Perceived Benefits of LFs Integrations (n=95)

Benefit	Frequency	Percentage (%)
Improved farming techniques	78	88.6
Increased crop yields	66	75.0
Access to information	59	67.0
Strengthened networks	44	50.0
Access to inputs/markets	28	31.8

Source*: Survey Data*

Further analysis using the Chi-square test (Table 4) showed no statistically significant variation in how different groups of farmers perceived the benefits of integrating LFs into the government extension system. This suggests that the added value of integration is broadly recognised across the farming population. However, a modest association was noted to strengthen farmer networks, where farmers with higher education levels were more likely to acknowledge this benefit ($p = 0.024$). Overall, these findings support the view that integration of LFs is widely seen as a system-level advantage, with the potential to enhance coordination, consistency, and outreach within the extension service.

Table 4: Association between Perceived Benefits of LFs Integration and Demographic Characteristics of the Respondents (p<0.05) (Chi-square Test Results)

Perceived benefit of LFs' integration	Sex	Education	Age	Experience
Improved farming techniques	0.257	0.065	0.267	0.593
Increased crop yield	0.449	0.468	0.698	0.842
Better access to info	0.983	0.248	0.877	0.500
Enhanced networking	0.392	0.024*	0.213	0.690
Cost-effectiveness	0.918	0.598	0.796	0.651

Findings from Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) indicated strong agreement that formally integrating Lead Farmers (LFs) into the government agricultural extension system would yield several benefits. The following themes emerged:

Improved Service Accessibility and Timeliness

Lead Farmers were seen as key actors in extending reach to farmers, often underserved by public extension officers. Their consistent presence within communities enhances the availability and timeliness of support.

> *"Lead Farmers are within the village every day; they are the first point of contact when farmers need immediate advice, especially during the planting season."—An experienced farmer, Kargawe District.*

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FGD participants similarly observed that integration would enhance responsiveness by allowing LFs to operate more confidently and be better resourced, especially in villages rarely visited by formal extension staff.

Institutional Strengthening and Coordination

Several stakeholders emphasised that integration could improve coordination between government and non-state actors. Currently, LFs often operate under fragmented project structures.

> "*When Lead Farmers are not part of the government plan, we cannot supervise or include them in our field strategies. If integrated, they can complement our efforts and reduce duplication."*—District Agricultural Officer, Bukoba District Council.

"*We train LFs, but they lack institutional anchoring. Formal recognition would allow for shared responsibilities and data reporting*."—An NGO programme manager, Missenyi District.

Continuity, Community Trust, and Knowledge Retention

Participants highlighted that LFs provide consistency in extension delivery, especially when government staff rotate or projects end. Their embeddedness fosters long-term trust and community learning.

> "*Lead Farmers preserve agricultural knowledge between seasons and projects. They remain in the community even when we [researchers] or extension officers are gone*."— Researcher from TARI, Bukoba District.

A district officer supported this, stating: *"Their role continues after the donor leaves; they are a living memory of what was taught."*—District Agricultural Officer, Karagwe District Council.

Cost-effectiveness and Resource Optimisation

Integration was also seen as a financially strategic move. LFs were described as low-cost, high-impact intermediaries capable of serving many farmers with limited facilitation.

> "*With a small investment in training and transport, a Lead Farmer can reach 50 or more farmers. That's more than what one extension officer can cover in a week*."—An NGO representative, Bukoba District.

Farmers also noted that integration would formalise and support LFs' mobility, enabling them to reach wider areas efficiently.

Scholarly Perspectives on the Benefits of Integrating Lead Farmers into the Public Extension System

Scholarly literature over the past decade has increasingly affirmed the strategic value of integrating Lead Farmers (LFs) into formal agricultural extension systems, particularly within the African context. In settings where government extension services are overstretched and unevenly distributed, the Lead Farmer model has emerged as a practical mechanism to enhance service reach, timeliness, and community ownership (Khaila *et al*., 2015; Kiptot & Franzel, 2015). The findings of this study, which highlight improved access to information, better farming practices, and enhanced yields, are consistent with these observations.

Within the Tanzanian extension landscape, characterised by high farmer-to-extension-officer ratios and limited logistical support, scholars have underscored the importance of institutional collaboration and decentralised delivery mechanisms. Ragasa (2019) argues that the integration of LFs enables more coordinated service provision by bridging formal systems and community-level actors. This perspective is echoed in the current study, where extension personnel noted that official recognition of LFs would strengthen their role in planning, supervision, and

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feedback processes. Moreover, the integration of LFs is not merely a matter of operational convenience but of system resilience. Masangano and Mthinda (2017) contend that LFs often ensure continuity where government capacity fluctuates and where project-driven interventions are short-lived. The ability of LFs to remain active beyond project lifespans adds value to the sustainability of rural advisory services.

Cost-efficiency has also been emphasised. As Maertens et al. (2021) demonstrate in Malawi, integrated LFs models expand outreach with modest resource input, an argument particularly relevant for public extension budgets in Tanzania. Similarly, Kiptot and Franzel (2015) note that LFs, when well-supported, can serve large numbers of farmers with limited institutional expenditure, offering a scalable solution that aligns with national decentralisation policies. Collectively, the literature supports the argument that integrating LFs into public extension structures presents a viable pathway for improving equity, coverage, and continuity of service delivery. For Tanzania, where the goal remains to strengthen community-based extension while maintaining institutional oversight, such integration offers both strategic and developmental dividends.

Challenges to the Integration of Lead Farmers into the Government Agricultural Extension System

Insights from Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) highlighted a number of constraints affecting the effective incorporation of Lead Farmers (LFs) into the government agricultural extension system. The challenges identified were both institutional and operational, cutting across policy, coordination, capacity, and support systems. The following themes emerged:

Lack of Policy and Legal Recognition

The absence of a formal policy or legal framework defining the role, responsibilities, and operational scope of LFs was repeatedly cited. Without a guiding national directive, similar to the one that governs Community Health Workers, public extension systems lack the institutional mandate to recruit, train, supervise, or allocate resources to LFs.

> "*There is no policy that recognises them. So, even if we want to work with them officially, there is no procedure*." — District Agricultural Officer, Misenyi District Council.

This policy vacuum creates hesitation among government actors to institutionalise LFs, fearing accountability risks and a lack of budgetary justification.

Lack of Financial and Logistical Support Mechanisms

LFs often operate without financial incentives, transport, or tools, conditions that are incompatible with formal system expectations. The extension system itself does not have dedicated resources or a budget line to support volunteer-based personnel.

> "*Even our extension staff lack transport. How can we include Lead Farmers when we can't facilitate them?"* — District Agricultural Officer, Karagwe District Council.

This resource gap limits the system's capacity to scale or supervise LFs effectively, thereby discouraging formal integration.

Lack of a Coordinated Framework for Training and Integration

One of the most critical barriers to integrating LFs into the government extension system is the absence of a coordinated institutional framework for their training, certification, and deployment. Currently, most LFs are selected and trained through NGO-led or donor-funded projects, using different methodologies and without alignment to national extension priorities. As a result, the government lacks a mechanism to assess the quality of training or verify the competence of LFs.

> "*The training is project-based, not standard. That makes it hard for the government to certify*

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> *or rely on them*." — District Agricultural Officer, Bukoba District Council.

In addition, weak collaboration between NGOs, government departments, and community leaders leads to fragmented implementation. LFs are often appointed without consultation with district agricultural authorities, making it difficult to incorporate them into formal plans or supervision structures.

> "*We are not informed when NGOs appoint Lead Farmers, so it becomes difficult to include them in our plans*." — Ward Agricultural Officer, Misenyi District Council.

This lack of coordination results in duplication of efforts, confusion in extension messaging, and limited institutional ownership. Without a unified structure that guides how LFs are identified, trained, monitored, and supported, their formal integration into the public extension system remains a distant goal.

Scholarly Perspective on Challenges to Integrating Lead Farmers into Public Extension Systems

The challenges revealed in this study are consistent with scholarly evidence from within and beyond Tanzania. Several studies have highlighted the absence of clear institutional frameworks as a major limitation to the effective incorporation of Lead Farmers (LFs) into national extension systems. For instance, Ragasa (2020) noted that where LFs are not formally recognised in national policy or planning instruments, public extension agents often hesitate to engage them meaningfully in service delivery. In Malawi, Maertens et al. (2021) reported that the success of LF integration was closely tied to the existence of coordinated training systems and continuous oversight, both of which were lacking in many donor-driven initiatives. Without a national-level accreditation or certification mechanism, it becomes difficult for governments to verify the technical competencies of LFs or hold them accountable for the accuracy and consistency of the advisory services they provide. This concern is further supported by Khaila et al. (2015), who observed that informal and inconsistent training structures weaken the credibility of LFs in the eyes of both farmers and frontline extension workers.

Another recurring theme in the literature is the challenge of financial and logistical support. Osei-Kofi et al. (2023) noted that in Ghana, the voluntary nature of the LFs' role often results in high attrition and limited outreach, especially in the absence of transport facilitation and supervision. In Tanzania, Ringo et al. (2023) stressed that while LFs are present in many communities, their contribution remains underutilised due to the lack of an institutionalised support structure. These findings collectively affirm that for LFs to be sustainably integrated into the public extension system, there is a need for deliberate policy action. This includes the development of formal guidelines, creation of a harmonised training and certification framework, and provision of support systems aligned with national extension priorities. Without these foundations, the potential of LFs to enhance coverage, knowledge dissemination, and farmer adoption of innovations remains largely untapped.

Policy and Practical Implications

The findings of this study have important implications for strengthening Tanzania's agricultural extension system. The continued presence and acceptance of Lead Farmers (LFs) within farming communities indicate that they are already playing an extension role, though informally. This presents an opportunity for the public system to expand its reach by building on structures that are already functional at the grassroots level. Formal integration of LFs could help to reduce the workload of extension officers, improve coverage, and enhance the flow of information among smallholder farmers. However, the lack of structured support, coordinated training, and policy guidance limits the system's ability to engage them effectively and sustainably. The positive perceptions from both farmers and

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stakeholders suggest that LFs can serve as a bridge between the formal system and community-level needs. For this potential to be realised, there is a need to address the institutional and operational gaps that continue to affect their recognition and participation within official extension frameworks.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study examined how smallholder farmers and extension stakeholders perceive the integration of Lead Farmers (LFs) into the government agricultural extension system. Findings show that LFs are well recognised at the community level and are already contributing to improved farming practices, knowledge sharing, and increased access to agricultural information. However, their role remains informal and limited by a lack of policy recognition, weak coordination, and inadequate support systems. Challenges such as irregular training, absence of clear institutional frameworks, and limited facilitation reduce their effectiveness and hinder formal incorporation into the public extension structure. Overall, the study demonstrates that LFs have the potential to strengthen extension service delivery if better supported and institutionally recognised. Addressing the identified gaps is essential for enhancing their contribution to a more accessible and responsive extension system in Tanzania.

Recommendations

Based on the findings of this study, the following recommendations are proposed to support effective and sustainable integration of Lead Farmers into Tanzania’s agricultural extension system:

Establish a clear policy framework for lead farmers' integration: The Ministry of Agriculture should develop formal guidelines recognising the role of LFs within the national extension strategy. Such a framework should define selection criteria, responsibilities, coordination mechanisms, and the institutional position of LFs within local government structures.

Develop a Standardised Training and Certification System: To ensure consistency and quality in service delivery, there is a need for a nationally coordinated training model. This should include initial training, refresher courses, and certification, administered through existing agricultural training institutions such as MATIs, in collaboration with LGAs and development partners.

Strengthen Coordination Between Government and Non-State Actors: Harmonisation of efforts between LGAs, NGOs, and other stakeholders is necessary to avoid duplication and ensure that LFs serve within structured plans. District Agricultural Officers should be empowered to supervise and align LFs' activities with ward-level extension targets and reporting frameworks.

Provide Basic Facilitation and Incentive Mechanisms: While LFs may serve voluntarily, minimal facilitation, such as transport support, identity tools (badges or vests), and performance-based recognition, can motivate continued service and improve accountability. These measures can be managed at the ward or district levels to remain cost-effective.

Institutionalise the Monitoring and Evaluation of LFs' Activities: LGAs should incorporate LFs' reporting into routine extension monitoring tools. This would help track their reach, effectiveness, and training needs while ensuring alignment with national agricultural development goals. Such a system would also support planning and resource allocation.

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