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Attitude of follower farmers towards lead farmer approach in facilitating Conservation Agriculture practices in Kalira Extension Planning Area in Ntchisi District, Malawi

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Abstract

This study explores the attitude of follower farmers (FFs) towards lead farmers (LFs) in facilitating Conservation Agriculture (CA) practices in the Kalira Extension Planning Area of Ntchisi district, Malawi. Despite governmental efforts to promote CA through the National Agriculture Policy of 2016, previous studies have indicated low adoption rates. This research employs a mixed methods approach, utilizing surveys and focus group discussions. Results reveal positive perceptions among FFs regarding LFs' competence in training, demonstrations, problem-solving, and other competencies. The majority of FFs perceive LFs as effective in imparting CA principles and conducting demonstrations. LFs' problem-solving abilities and additional competencies are well-regarded by FFs. The study concludes with a call for further research on socio-economic factors influencing sustained CA adoption and recommends establishing a continuous feedback loop between LFs and FFs to enhance knowledge exchange and address evolving challenges in CA practices. The findings contribute to the existing literature and provide valuable insights for agricultural and rural development initiatives.

Keywords: Conservation Agriculture, Lead Farmers, Follower Farmers, Malawi

1. Introduction

Lead farmers (LF) have been a common feature of agriculture extension service strategies to diffuse new technology or practices among smallholder populations in the developing world (Okori et al., 2022). The Government of Malawi (GoM) defines LF as an individual farmer, trained in good and smart agricultural practices/technologies that are enterprise-specific (Bhatti et al., 2021). This agriculture extension approach is referred to as the lead farmer approach (LFA) and Osumba et al. (2021) asserts that the effective performance of a LF relies on technical support from subject matter specialists and frontline extension workers from public and private sector organizations. These institutions or organisations build the capacity of a LF through training, provision of resources, and technical backstopping. Local leaders and farming communities provide moral support and initiate mechanisms for rewarding a LF in their communities (Kahsay et al., 2023). Taylor and Bhasme (2018) reported that LFs envisaged to play a dual role. First, LFs provide an entry point into a community for the diffusion of a new practice or technology in agriculture. By creating observable field-level demonstrations to be witnessed in real-time by other farmers in the locality, LFs provide a practical example of the innovations and their purported benefits (Hermans et al., 2021). Second, LFs also play a direct educational role in which they instruct community members in the new technology and potentially help troubleshoot problems that arise in the implementation of such agriculture technologies. Finca et al. (2023) further explained that LFs, therefore, serve as community repository of knowledge while also helping to translate and embed an agricultural innovation into local contexts.

The Lead Farmer Approach (LFA) has become an important element of Malawi's public agricultural extension system as a way to extend the reach of agricultural extension services in the face of limited budgets for employing more agricultural extension officers (Thobejane, 2022). The Government of Malawi currently works with more than

12,000 LFs country-wide who train and promote agricultural technologies, including conservation agriculture (CA) technologies/practices, through their networks of follower farmers (FF) and demonstrations (Fisher et al., 2018). National policy support is essential for effective and sustainable farmer-to-farmer extension (F2FE) programmes. In this whole process, having LFs that are motivated, knowledgeable in new technologies, and have good communication skills is very critical in improving agricultural production including CA (Ragasa, 2020).

The Food and Agriculture Organization (FAO) defines CA as a climate-resilient technology and management system that has demonstrable potential to secure sustained productivity and livelihood improvements for millions of climate-dependent farmers (FAO, 2019). According to FAO (2019), in Africa, the simultaneous application of the three principles of CA namely; minimum tillage and soil disturbance, permanent soil cover and crop rotation and intercropping started recently and has emerged in several places, most notably in South Africa, Zimbabwe, Zambia, Kenya, Tanzania, and Malawi. CA is promoted for the positive benefits of increased soil organic matter, improved soil water retention, Improved soil fertility, and increased crop yields (Gadzirayi et al., 2014). The introduction of CA aims at enhancing agriculture to achieve improved and sustained agricultural productivity, increased profits, and ensure food security, while preserving and enhancing the resource base, through the application of new agriculture technologies (FAO, 2019). A study by Fisher et al. (2018) on awareness and adoption of CA in Malawi revealed that LFs play a more critical role in increasing awareness of the CA practices. Nakano et al. (2018) reviewed LFA in diffusing agriculture technologies in rice farming, and concluded that ordinary farmers who were a relative or residential neighbours of LFs were more likely to adopt new technologies than those who were not. As a result, while the LFA technology adoption rates rise immediately after the training, those of the non-trained FFs catch up belatedly (Nakano et al., 2018). Their results further suggest the effectiveness and practical potential of F2FE programs for smallholders in Sub-Sahara Africa as a cost-effective alternative to the conventional farmer training approach (Nakano et al., 2018). Nakano et al. (2018) agree with Chirwa et al. (2008) and Karuhanga et al. (2012) who reviewed the effectiveness of the LFA in technology dissemination in the East African Dairy Development Project in Uganda, and Chabata (2013) who looked at the effectiveness of the LFA in the dissemination of soil fertility management technologies in Zimbabwe. Despite the recorded success of LFA in the dissemination of technologies and the adoption of technologies by FFs particularly in rice farming, dairy cattle production, and soil fertility management technologies in Tanzania, Uganda, and Zimbabwe respectively. The approach has recorded a low or limited rate in CA practices practiced by FFs in Malawi (Fisher et al., 2018).

Studies (Chinseu et al., 2022; Ward, 2018; Franzel et al., 2015; Oyelami et al., 2018) conducted in Malawi have consistently demonstrated low rates of CA principles being practiced, despite the government's efforts, such as the development of the National Agriculture Policy of 2016, aimed at promoting the application of LFA as a strategy for enhancing effective and sustainable agriculture production. While the literature extensively documents the role of LFAs in promoting CA (Franzel et al., 2014; Khaila et al., 2015). Other studies (Fisher et al., 2018; Ragasa, 2020) has revealed that LFs not only organize community meetings and raise awareness about CA but also play a crucial role in facilitating its adoption. However, a comprehensive understanding of their contribution beyond meetings and awareness creation is necessary. Therefore, this study was conducted to assess attitude of FF towards LFA in facilitating CA practices. The significance of this research lies not only in documenting its findings for future reference but also in contributing to the existing body of literature. Furthermore, it serves as a foundation for exploring how cultural factors influence the role played by LFAs in facilitating CA. The anticipated outcomes of this research are expected to provide valuable insights for government and development agencies working towards agricultural and rural development. Moreover, the study's findings are envisaged to inform and enhance the implementation of LFAs in promoting CA.

2. Materials and Methods

The research design employed was a mixed methods approach, utilizing both field household survey and focus group discussions (FGD). The study was conducted in Kalira EPA, located in Ntchisi district, in the central region of Malawi. Kalira EPA consists of 17 sections and falls under the Kasungu agriculture development division. The area is primarily engaged in subsistence and commercial farming, with maize being the dominant crop. The choice of this study area was influenced by the limited number of Agriculture Extension Officers and the reliance on Lead Farmers (LFs). Sampling methods involved purposive selection of the study area due to the reliance on LFs. Simple random sampling was used to select Lead Farmers and Follower Farmers (FFs). The sample size was determined using the Yamane (1967) formula, resulting in the selection of 394 FFs and 104 LFs for interviews. Data collection included quantitative and qualitative approaches. Quantitative data was collected through surveys using a semi-structured questionnaire administered to the sampled FFs and LFs. Qualitative data was gathered through focus group discussions (FGD) with LFs and FFs. Statistical Package for Social Scientists (SPSS) Version 20.0 and Microsoft Excel 2019 were employed for quantitative data analysis. Descriptive statistics in SPSS generated frequencies and percentages, while Microsoft Excel was used for visual representations such as bar graphs and pie charts.

3. Results and Discussion

The study assessed attitude of FFs towards LFA in facilitating the CA practices in the study area. To assess the attitude of FFs towards LFA, the competence of LFs in facilitating CA practices was assessed. Competence of LFs was defined as the capability to apply or use a set of related knowledge, skills, and abilities required to successfully facilitate CA. In order to determine the perception of FFs, data on in this section was collected from FFs. Follower farmers were asked to provide their perception towards LFA in facilitating CA practices through training, demonstrations, and problem-solving.

3.1 Training in conservation agriculture

From the FGD, it was revealed that all LFs consented to have received CA training by government agriculture extension workers and other stakeholders. The LFs were trained on the proper practice and importance of CA technologies that included crop rotation, intercropping, permanent ground cover, minimum soil disturbances, and integration of agroforestry trees. The idea was that after receiving training, LFs were supposed to train their FFs. The study, therefore, attempted to assess the perception of FFs on the topics of the training they had received.

Table 1. Conservation agriculture methods trained in the study area

CA Principles	Percentage					df	X^2	p-value
	Very poor	Poor	Fair	Good	Very good			
Crop rotation	0	0	0	78	22	4	166.580	.001
Intercropping	0	0	0	21	79	4	124.580	.001
Permanent ground cover	0	0	0	23	77	4	276.639	.001
Agroforestry	0	0	0	9	91	4	234.718	.001
Minimum soil disturbance	0	0	0	88	11	4	301.715	.001

A Likert scale of the perception of FFs towards LFs facilitation of training on CA practices was used, in which 5 categories of level of goodness; very poor, poor, fair, good, and very good. Very poor meant the training was not done in FFs satisfaction and very good meant the trainings were done in FFs satisfaction. Significant differences were observed in all the CA principles trained ($p<.001$) as shown in Table 1. High percentages of FFs view perceived that the training on Permanent ground cover, integration of agroforestry trees, and minimum soil disturbance were very important. On crop rotation training, FFs perceived that training was fairly important.

3.2 Demonstrations

Lead farmers agreed that they were involved in setting up demonstration plots and demonstration events. The demonstrations were done on the demonstration plots that were identified and sometimes demonstrations were conducted at any chosen farm of the FFs. The demonstrations greatly assisted FFs in physically appreciating the lessons that LFs were giving them. The results in Table 2 indicate that the performance of LFs on all the demonstration techniques were significantly different in their order of degree of goodness. A Likert scale of degree of goodness was used, in which 5 categories were used: very poor, poor, fair, good, and very good where very poor meant the demonstrations were not done in FFs satisfaction and very good meant the demonstration techniques were done in FFs satisfaction.

Table 2. Demonstration techniques

Aspects of Demonstration	Percentage					df	X^2	p-value
	Very poor	Poor	Fair	Good	Very good			
Establishment of a demonstration plot	0	0	0	53	47	4	1.164	.028
Ability to explain what's on the demonstration plot	0	0	5	80	15	4	372.417	.001
Inviting fellow farmers to visit a demonstration plot	0	0	46	34	20	4	38.823	.001

On the establishment of demonstration plots, there were significant differences in the degree of goodness ($p=.028$). 53% of FFs perceived LFs to be good at facilitating demonstrations while 47% of FFs perceived LFs to be very good at facilitating demonstrations. The ability to demonstrate what's on the demonstration plot was also significantly different in their order of goodness ($p<.001$). 80% of FFs perceived LFs to be good at demonstrating what's on the demonstration plot, 5% and 15% of FFs perceived LFs as fair and very good at demonstrating what's on the demonstration plot, respectively. A significant difference was also observed in inviting FFs to visit demonstration

plots (p<0.001). 46% of FFs perceived LFs as fair at inviting FFs to visit demonstration plots, 34% of FFs perceived LFs as good at inviting FFs to visit demonstration plots, and 20% of the respondents perceived LFs as very good at inviting FFs to visit demonstration plots.

3.3 Problem-solving

Follower farmers revealed that LFs were able to help them solve CA problems. Helping FFs to Solve CA problems was evidence of LF's competence in facilitating CA practices. It was discovered further through FGDs that LFs allowed FFs to discuss problems and challenges that they face in practicing CA. This implies that FFs were given time and allowed to discuss among themselves the problems and challenges that they are facing. This empowered the FFs to be able to decide for them themselves some solutions to their problems even in the absence of the LFs. Results in Table 3 show the perception of FFs on the performance of LFs in problem-solving.

Table 3. Problem-solving techniques

Problem-solving techniques	Percentage					df	X^2	*p*-value
	Very poor	Poor	Fair	Good	Very good			
Ability to solve FF problems	0	0	5	61	34	4	177.963	.001
Allowing FF to discuss their problems	0	0	0	84	16	4	179.739	.001

The results (Table 3) show that the majority of the FFs perceived that the problem-solving exercises were good in helping them solve CA problems (61%) as well as providing them with space for discussing the problems (84%). These results are significant at 1%.

3.3 Other competences

Other LFs competencies which the study looked into were organising meetings, involving FFs in the careful planning of cultivation activities, and championing community-based monitoring and evaluation activities as shown in Table 4. It was observed that LFs were perceived to be competent in all other competencies because FFs ranked them from good to very good. Significant differences (p<.005) were observed in all other competencies except championing community-based monitoring and evaluation activities (p=.572). This implies that LFs were competent in all other competencies.

Table 4. Other competences

Other competences	Percentage					df	X^2	p-value
	Very poor	Poor	Fair	Good	Very good			
Organizing meetings	0	0	0	79	21	4	124.245	.000
Involving FF in Careful planning of cultivation activities	0	0	0	67	33	4	84.541	.000
Championing community-based monitoring and evaluation	0	0	0	51	49	4	.319	.572

3.4 Discussion

The study assessed attitude of FFs towards LFA in facilitating conservation agriculture practices. In this context, the attitude of FFs was assessed by looking at how FFs perceived LFA in facilitating CA practices using training, demonstrations, and problem-solving techniques. Training by LFs to FFs was one of the factors that were used to assess the attitude of FFs towards LFA in facilitating CA practices. FFs agreed to have received training from LFs which covered crop rotation, intercropping, permanent ground cover, integration of agroforestry trees, and minimum soil disturbances. FFs were asked about their perception of the performance of the LFs in facilitating the training by ranking the performance on a Likert as shown in table 1. On crop rotation and minimum soil disturbance, a higher percentage of FFs (78%) and (88%) ranked the performance of the LFs in facilitating training as good respectively. On the training of intercropping, permanent ground cover, and integration of agroforest trees topics, the performance of LFs by FFs was ranked to be very good. This entails that FFs ranked the performance of LFs training in CA as good as shown in Table 1. This means that the concept of CA could be practiced easily by farmers since they know the importance of CA training. These findings are consistent with Bisangwa (2013) and Ntshangase *et al*., (2018), who demonstrated that CA training positively influenced the practice of CA. Similar results were also reported by Chisenga (2015) who claimed that in Malawi, access to farmer training on CA had a positive influence on the practice of CA. This shows that FFs perceived LFs to be competent in facilitating CA practices through training in CA practices.

It was discovered that all LFs conduct demonstrations of CA to FFs in designated demonstration plots. The FFs concurred with LFs that the demonstrations were conducted. The FFs were further asked to rank on a Likert scale the performance of LFs demonstration techniques as shown in Table 2. The performance of establishment of demonstration plots, ability to demonstrate what's on the demonstration plot, and inviting FFs to visit a demonstration plot were ranked from fair to very good. This infers that LFs were able to conduct CA demonstration appropriately making FFs understand what is required to be done for them to achieve maximum satisfaction from practicing CA. A discussion by Khan *et al*., (2009) corresponds with the results and they stated that demonstrations and demonstration plots were not only successful in creating awareness among farmers about modern technologies but also motivated them to apply them in their farming practices. Moreover, farmers participated in these activities to gain practical know-how about improved farming practices. This shows that FFs perceived LFs to be competent in facilitating CA practices through demonstrations of CA practices. Follower farmers pointed out that LFs were able to solve their problems related to CA. On a Likert scale, FFs ranked LFs to be very good (61%) in their ability to solve FFs problems. The Majority (84%) of FFs reported that LFs allowed them to discuss their problems before LFs tackled them as shown in Table 3. Significant differences (p<0.05) were observed in LFs ability to solve FFs CA related problems and LFs allowing FFs to discuss their problems among themselves before LFs tackles them. This entails that LFs were trusted enough by FFs in their endeavours concerning CA. These findings agree with MacMillan (2012) who reported that problem-solving is an important aspect of agriculture projects. This shows that FFs perceived LFs to be competent in facilitating CA practices through trainings of CA practices. This shows that FFs perceived LFs to be competent in facilitating CA practices through problem-solving of CA-related problems.

The study also looked into other competencies of LFs in facilitating CA practices. As shown in Table 4, FFs were asked to rank LFs on competence to organise meetings, involving FFs in the careful planning of cultivation activities, and championing community-based monitoring and evaluation of CA activities. The results (Table 4) showed LFs were competent in all aspects mentioned. These are also among the requirements recommended by the MoG (2015). This shows that FFs perceived LFs to be competent in facilitating CA practices through organizing meetings, LFs interaction with FFs, involving FFs in careful planning of cultivation activities, and championing community-based monitoring and evaluation of CA activities.

4. Conclusion and Recommendation

The study aimed to assess the attitude of FFs towards LFs in facilitating CA practices. The assessment focused on LFs' competence in training, demonstrations, problem-solving, and other related competencies. The findings indicate positive perceptions among FFs regarding LFs' effectiveness in facilitating CA practices. The training provided by LFs to FFs covered essential CA principles, including crop rotation, intercropping, permanent ground cover, agroforestry integration, and minimum soil disturbance. The majority of FFs perceived the training to be good or very good, demonstrating that LFs were successful in imparting crucial knowledge and skills related to CA practices. LFs actively engaged in setting up demonstration plots and events, offering practical insights to FFs. The results revealed that the demonstrations conducted by LFs were well-received by FFs, with positive feedback on the establishment of demonstration plots, the ability to explain the content, and the invitation of fellow farmers to visit these plots. LFs played a significant role in helping FFs solve CA-related problems. The majority of FFs acknowledged the competence of LFs in addressing their challenges, and the allowance for FFs to discuss problems among themselves empowered them to find solutions collaboratively. Beyond training, demonstrations, and problem-solving, LFs exhibited competence in various other aspects, such as organizing meetings, involving FFs in careful planning of cultivation activities, and championing community-based monitoring and evaluation. FFs consistently ranked LFs as good to very good in these competencies.

The current study provides valuable insights into the positive perception of FFs towards LFs in facilitating CA practices, a potential area for further study could focus on exploring the socio-economic factors influencing the sustained adoption of CA. Understanding how socio-economic variables impact FFs' ongoing commitment to CA practices facilitated by LFs would provide nuanced insights for effective policy interventions and extension services. A recommendation stemming from this study is to establish a continuous feedback loop between LFs and FFs, fostering ongoing communication and learning. Implementing a structured mechanism for regular knowledge exchange and updates could enhance the sustainability and effectiveness of CA practices within the farming community, ensuring that evolving challenges are addressed promptly.

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