Asian Journal of Agricultural Extension, Economics & Sociology

Volume 42, Issue 5, Page 128-134, 2024; Article no.AJAEES.115097
ISSN: 2320-7027

Analysing Constraints Faced by Extension Personnel in Executing Kerala's Premier Agricultural Development Initiative, LEADS: A Comprehensive Examination

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2024/v42i52420

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/115097

Original Research Article

Received: 18/01/2024
Accepted: 23/03/2024
Published: 29/03/2024

ABSTRACT

This research explores the hurdles encountered by extension personnel during the execution of Kerala's primary agricultural development initiative, LEADS (Lead Farmer-Centered Extension Advisory and Delivery Services). Through thorough examination, it investigates several constraints, including insufficient funding, delayed salary distribution, restricted crop coverage, and climate change challenges. Proposed strategies to enhance LEADS' effectiveness involve improving funding mechanisms, streamlining administrative processes, and incorporating innovative technologies and climate-resilient practices. Addressing these challenges has the potential to

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promote sustainable agricultural development, enhance farmer livelihoods, and bolster food security in Kerala and beyond. The study involved 120 extension personnel across four Kerala districts: Kannur, Kollam, Palakkad, and Wayanad.

Keywords: LEADS; constraints; extension personnel; lead farmers.

1. INTRODUCTION

Agricultural extension serves as a vital bridge connecting the latest research developments, innovative methods, and real-world farming practices, facilitating the transfer of knowledge, technologies, and best practices to farmers. Agricultural development involves shifting from subsistence or traditional methods of production to commercial, modern, or scientifically driven agribusiness practices. Maulu et al*.* [1] opined extension programs must possess sufficient flexibility in their approach to remain pertinent and enduring. Mandala et al*.* [2] suggest that agricultural development is essential not only for achieving self-sufficiency in food production but also for ensuring household food security and generating income through equitable distribution. Effective agricultural advisory and extension services (AES) are positioned to enhance agricultural productivity by enabling farmers to utilize information and knowledge to maximize their use of limited resources [3]. The factors influencing effective service delivery may differ, encompassing aspects such as the appropriateness of consultative approaches, the capacity and quantity of extension workers, and the administrative and governance frameworks of the organizations offering the extension program [4]. Innovative methods of service delivery, such as field schools, are available but are typically implemented separately without much attempt to integrate them to reduce costs and enhance technical effectiveness [5]. According to Norton and Alwang [6], the principal objective of extension services is to enhance farmer decision-making and equip them with the necessary skills to adopt agricultural innovations. Traditionally, this objective has been achieved through face-to-face information delivery. However, the methods and providers of information delivery and support have evolved alongside changes in agricultural sectors, economies, and the availability of new agricultural and information/communication technologies. These changes in extension services have been primarily driven by: (i) structural transformations in agriculture accompanying economic development [7] (ii) the emergence and dissemination of new agricultural technologies and related information [8] (iii) advancements in information and communication technologies [9] (iv) uncertainties and reductions in public-sector funding for extension services [10] (v) the decentralization of government with increased involvement of local governments in funding and delivering extension services [11]. Yet, the effectiveness of these extension services greatly relies on their capacity to adjust and develop in response to the constantly shifting demands and obstacles faced by farming communities. This need for ongoing adaptation is especially significant in dynamic contexts such as Kerala, India. In this scenario, the crucial significance of initiatives driven by lead farmers becomes evident as a powerful agent of change [12]. Lead farmers, respected and knowledgeable figures within their communities, play an essential role as intermediaries linking formal extension services with local farmers. Drawing upon their extensive understanding of local circumstances, expertise, and credibility, lead farmers act as channels for spreading agricultural knowledge, promoting the uptake of innovative methods, and tackling grassroots issues [13]. The involvement of lead farmers in agricultural extension provides several benefits. Primarily, it improves the pertinence and efficiency of extension endeavours by customizing information and guidance to meet the particular requirements and circumstances of local farmers. Lead farmers bring a special understanding of the specific challenges and opportunities present within their communities, enabling precise interventions and resolutions. Additionally, initiatives led by lead farmers promote peer learning and the exchange of knowledge among farmers. As respected figures within their communities, lead farmers encourage and inspire their peers to adopt new technologies and methods through activities such as demonstration plots, farmer field schools, and peer-to-peer extension methods. This collaborative learning approach not only speeds up the adoption of innovations but also fosters a culture of ongoing learning and enhancement among farmers. Moreover, initiatives driven by lead farmers play a role in enhancing the sustainability and expandability of agricultural extension efforts. By nurturing local skills and

leadership within farming communities, these initiatives create a self-sustaining loop of empowerment, wherein farmers take an active role in their own progress. This bottom-up strategy not only boosts the resilience of agricultural systems but also reduces the need for external support over time. In its endeavour to promote agricultural development and empower farming communities, the Government of Kerala launched the LEADS program (Lead Farmer-Centred Extension Advisory and Delivery Services). Serving as a flagship initiative, LEADS seeks to transform agricultural extension services by placing lead farmers in key roles for disseminating knowledge and providing guidance. However, the successful execution of LEADS depends on the active involvement and cooperation of extension personnel, who act as essential intermediaries bridging agricultural research, innovation, and practical farming practices. Nevertheless, navigating the intricacies of implementing such a multifaceted initiative poses numerous challenges for extension personnel operating within Kerala's agricultural sector.

2. METHODOLOGY

2.1 Sample and Location of the Study

The research was carried out in 40 villages across 20 blocks in four districts of Kerala, namely Kollam, Kannur, Palakkad, and Wayanad, where the LEADS program was being implemented. In each Panchayat, three extension personnel associated with LEADS were chosen for the study. These respondents included agricultural officers from the respective Panchayats, additional directors of agriculture at the block level, LEADS field-level assistants, and agricultural assistants, resulting in a total of 120 extension personnel selected from 40 Panchayats across the four districts. The constraints perceived by the extension personnel varied depending on their experience, interactions with farmers, and local conditions.

2.2 Data Collection

Data were gathered from extension personnel using a pretested interview schedule. Initially, the questionnaire was developed and then refined to ensure consistency across all four districts. Constraints were assessed using a 3-point continuum scale, with respondents indicating their agreement level as agree, somewhat agree, or disagree. Each respondent assigned scores based on their perception of various constraints, and mean scores were calculated for each constraint. The qualitative data collected underwent content analysis to extract the perspectives and opinions of respondents regarding the constraints faced during the implementation of LEADS. Data collection was conducted through personal interviews. Statistical analyses included tools such as frequency, mean, and rank analysis.

3. RESULTS AND DISCUSSION

In the context of this study, Table.1 presents the primary obstacles encountered by extension personnel in the implementation of LEADS. The mean scores for the continuum scales, as well as the total scores and constraints identified by the respondents, are utilized to determine the rankings.

The results from the table illustrates the major constraints faced by the extension personnel in the implementation of LEADS programme in Kerala. The primary and most significant constraint identified pertains to insufficient funding for the program, resulting in reduced effectiveness, with a mean score of 2.65. Adequate government funding has not seen an increase over the years since the program's inception. 65 percent of respondents fully agreed with this constraint, 25% somewhat agreed, and 10% completely disagreed. The similar findings of Nannyonjo [14] and Namyenya et al. [15] also confirms the results. The problem of repeating the same technology over the years is also negatively impacting the LEADS program. This repetition of technology diminishes the program's intended impact, making it difficult to achieve desired results, whether in crop production techniques or crop protection strategies. There is a need to refine these technologies. This constraint received a mean score of 2.48, with 60 percent of respondents agreeing, 30 percent somewhat agreeing, and 10% disagreeing with this issue and ranked 2nd. Another significant constraint identified was the restricted number of field demonstrations and other technological showcases that extension personnel were tasked with implementing with a mean score of 2.44 and ranked 3rd. This limitation may be attributed to insufficient funding or infrastructure. The scarcity of technological demonstrations will have adverse effects on lead farmers, who serve as technology ambassadors among regular farmers. This concern was acknowledged by 57 percent

of respondents, somewhat agreed upon by 30 percent, and disagreed with by 13 percent of respondents. The current finding aligns with the observation done by Takahashi et al. [16] in their study of technology adoption impact in developing countries.

The issue of insufficient and delayed salary disbursement to field assistants is another crucial concern affecting the effective implementation of the LEADS program with a mean score of 2.40. Field assistants, who are contract employees, are responsible for timely interventions and advisory services for program implementation. The insufficient salary and its delay is impacting the efficiency and motivation of field assistants towards the program, leading to a trend of job resignations that adversely affect the LEADS program. This concern was acknowledged by 54 percent of respondents, somewhat concurred with by 35 percent, and disagreed with by 11 percent of respondents. The constraint is ranked 4th. The results are in line with the findings of Etim et al. [17] and Ahenkan et al. [18]. Another obstacle impeding the effective execution of the LEADS program is the practice of assigning Krishibhavan duties to field assistants, on top of their LEADS-related responsibilities. This issue garnered a mean score of 2.39, with half of the extension personnel agreeing, 35 percent somewhat agreeing, and 15 percent disagreeing. Given that the number of field assistants is already limited, and they are tasked with additional duties across multiple panchayats, the added burden from Krishibhavan assignments overwhelms field assistants, diminishing their efficiency and hampering the implementation of the LEADS program. This constraint was ranked 5th.

The issue of inadequately addressing climate change challenges within the LEADS program is significant, with a mean score of 2.23. This concern was acknowledged by 45 percent of extension personnel, while 50% somewhat agreed, and 5% disagreed. This constraint was ranked sixth. It is crucial to prioritize addressing climate-related constraints, as the climatic conditions affecting crops are continually evolving. The research conducted by Seddon et al. [19] and Ampaire et al. [20] similarly underscores the significance of addressing climate-related factors in agricultural extension development programs.

Table 1. Constraints faced by extension personnel in the implementation of LEADS

SL.NO	Constraints	Mean	Total Score	Agree (%)	Somewhat Agree (%)	Disagree (%)	Rank
1	Insufficient funding for technological innovation to effectively implement program protocols.	2.65	318	65	25	10	1
2	Continuously utilizing the same technology within LEADS over an extended period obstructs advancement and suppresses innovation in its execution.	2.48	298	60	30	10	2
3	Field demonstrations (FLDs) and other innovative technological showcases were limited in quantity.	2.44	293	57	30	13	3
4	Insufficient and delayed distribution of salaries to the field assistants.	2.40	289	54	35	11	4
5	Field assistants have additional duties at the Krishi Bhavan apart from those associated with LEADS.	2.32	279	50	35	15	5
6	Climate change challenges are not adequately addressed within the LEADS program.	2.23	268	45	50	5	6
7	At present, the LEADS program only covers four crops, leaving other crops that require attention unnoticed.	2.14	257	45	40	15	7
8	The low attendance of farmers during demonstration programs leads to decreased effectiveness of the program.	1.83	220	45	30	25	8

Respondents also identified the limited coverage of crops in the LEADS program as a significant constraint, impeding effective implementation by extension personnel. Currently, only four crops—rice, vegetables, coconut, and banana—are included in LEADS and receive assistance. However, there is a need to intervene and broaden the scope of crops, aiming for a holistic diversification to achieve greater program outcomes. This issue received a mean score of 2.14 and was ranked as the seventh most important constraint. It was fully agreed upon by 45 percent of respondents, somewhat agreed upon by 40 percent, and disagreed with by 15 percent of extension personnel. Another significant constraint faced by extension personnel in effectively implementing the LEADS program was the low attendance turnout of farmers during demonstration programs, leading to reduced program effectiveness. This constraint has a mean score of 1.83 and is ranked as the eighth major constraint. It was agreed upon by 45 percent of respondents, somewhat agreed upon by 30 percent, and disagreed with by 25 percent of respondents. The findings of Jack et al. [21], Kassem et al. [22] and Sutherland and Marchand [23] also support these results.

Addressing constraints in agriculture is crucial to ensure sustainable agricultural development and food security. These obstacles, such as inadequate funding, limited technological innovation, low farmer attendance at demonstration programs, and insufficient crop coverage in extension programs, present significant challenges to agricultural effectiveness. Neglecting these issues can result in decreased productivity, inhibited innovation, and compromised farmer livelihoods. Moreover, given the ongoing challenges of climate change, it is increasingly imperative to address climate-related aspects in agricultural extension efforts. By confronting these constraints directly, stakeholders can promote enhanced agricultural productivity, better farmer livelihoods, and strengthened food security. Furthermore, addressing these challenges can bolster the resilience and sustainability of agricultural systems, enabling them to adapt to evolving environmental, economic, and social conditions. Ultimately, prioritizing the resolution of agricultural constraints is crucial for fostering resilient, inclusive, and sustainable agricultural development.

4. SUGGESTIONS TO ADDRESS THE CONSTRAINTS

The suggestions to address the constraints may be as follows.

- To overcome the constraint of insufficient funding for technological innovation, seeking partnerships with private industries or seeking grants from governmental or non-governmental organizations could be explored as potential solutions [24].
- To address the issue of persistent use of identical technology within LEADS, implementing regular assessments and integrating emerging technologies through research collaborations with agricultural institutions could be pursued as a solution.
- Expand the quantity of innovative technological showcases.
- Addressing the problem of inadequate and delayed salary distribution to field assistants involves implementing an improved and transparent payroll system, ensuring punctual salary disbursement, and allocating sufficient funds for this purpose.
- Field assistants involved in LEADS should exclusively handle activities directly related to LEADS.
- Incorporating climate-smart agricultural practices and technologies, offering resilience training against climate impacts, and forging partnerships with climate experts or organizations could prove effective in addressing this constraint [25]. Climate-smart agricultural practices for LEADS could be integrated into various initiatives, including the "Resilient Kerala Programme" supported by the World Bank, the ongoing "Haritha Keralam Mission," or within climate change adaptation programs administered by the Department of Agriculture. Technical support can be obtained through the NICRA (National Innovations on Climate Resilient Agriculture) project. Broadening the range of crops included within LEADS.

5. CONCLUSIONS

In conclusion, the research findings outlined above illuminate significant hurdles encountered by extension personnel in effectively executing the LEADS program. These challenges span from insufficient funding and delayed salary

disbursement to the imperative of broadening crop coverage and tackling climate change issues. To surmount these barriers and bolster the effectiveness of the LEADS initiative, it is imperative to enact strategies such as refining funding mechanisms, optimizing administrative procedures, and integrating cutting-edge technologies and climate-resilient practices. By confronting these obstacles directly, stakeholders can pave the path towards more sustainable agricultural development, uplifted farmer livelihoods, and fortified food security, both within Kerala and beyond.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/115097