Asian Journal of Agricultural Extension, Economics & Sociology

Volume 43, Issue 5, Page 124-132, 2025; Article no.AJAEES.135808
ISSN: 2320-7027

Content Analysis of Malayalam Farm Magazine *Kerala Karshakan*

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Authors' contributions

This work was carried out in collaboration among all authors. Author JU contributed to data collection, data analysis, and manuscript writing. Author CVS contributed to the identification and conceptualization of the study area. Author SS contributed to the formulation and analysis of data for the study. All authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/ajaees/2025/v43i52743

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://pr.sdiarticle5.com/review-history/135808

Original Research Article

Received: 03/03/2025
Accepted: 08/05/2025
Published: 10/05/2025

ABSTRACT

This study conducts a content analysis of *Kerala Karshakan*, a Malayalam agricultural magazine published by the Kerala government's Farm Information Bureau, to evaluate its effectiveness in disseminating agricultural knowledge. Analyzing 798 articles from 36 issues (2021–2023), the research examines subject coverage, authorship, visual-text balance, and readability. Findings reveal "Success Stories" as the dominant category (14.03%), followed by "Agronomy" and "Dairy" (8.4% each), while "Apiculture" received minimal coverage (0.38%). Primary contributors include

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Cite as: *U, Jayakrishnan, Chinchu V S, and Smitha S. 2025. "Content Analysis of Malayalam Farm Magazine Kerala Karshakan". Asian Journal of Agricultural Extension, Economics & Sociology 43 (5):124-32. https://doi.org/10.9734/ajaees/2025/v43i52743.*

research centers/KVKs (Krishi Vigyan Kendras) and agricultural field staff (16.54% each), with a notable rise in non-institutional authors ("Other people," 13.15%). The magazine maintained a "very easy" readability level (Readability Index = 0.186), ensuring accessibility for diverse educational backgrounds. Visual-text composition fluctuated annually, with visuals peaking in 2022 (46.8%) and text dominating in 2023 (59.6%), suggesting evolving editorial strategies. The study highlights a shift toward sustainability (7.9%) and policy-oriented content (6.8%), aligning with global trends in agricultural communication, while niche topics like apiculture remained underrepresented. The readability analysis confirmed the magazine's clarity, with simple sentence structures and minimal compound words enhancing comprehension. These findings underscore the magazine's role in bridging research and practice but reveal inconsistencies in content balance and visual integration. The study suggests concrete ways to enhance farm publications by advocating for more varied content, thoughtful visual-text balance, and consistently simple writing to better connect with and educate farmers.

Keywords: Content analysis; farm magazine; readability; visual-text balance; Kerala Karshakan.

1. INTRODUCTION

The media has long been a cornerstone of human development, fostering societal connections and driving progress by facilitating the exchange of information (Al Sheikh & Al Serhan, 2022). With the advent of digital communication technologies, media systems have undergone significant transformations, reshaping traditional modes of information dissemination (Udenze, 2017). Despite the rapid growth of digital platforms, print media retains its relevance, particularly due to its tangible and visually engaging format. Among print media, magazines play a crucial role in enhancing comprehension by combining textual and visual elements, making complex information more accessible. Reading in one's own mother tongue will make the whole process easier as well as enjoyable experience.

In the agricultural sector, farm magazines serve as vital instruments for disseminating knowledge, technological advancements, and best practices to farmers. In India, where agriculture remains a primary livelihood for millions, these publications contribute significantly to rural development and agricultural productivity. However, the effectiveness of farm magazines in communicating essential information depends on several factors, including content structure, authorship credibility, the balance between visuals and text, and readability. This study focuses on conducting a content analysis of Malayalam farm magazines to evaluate their role in agricultural information dissemination. By examining subject coverage, contributor expertise, visual-text allocation, and readability levels, the research aims to assess how effectively these magazines convey agricultural knowledge to their primary audience, farmers in Kerala. This article examines *Kerala Karshakan* magazine to assess its effectiveness in the dissemination of agricultural knowledge, highlighting the strengths in readability and practicability in its content. This manuscript provides critical insights into the role of agricultural publications in vernacular languages in effectively communicating scientific knowledge to farmers as well as those who are enthusiastic in farming. It provides a framework for assessing and improving science communication tools, advancing the discussion on more accessible and inclusive approaches to agricultural extension.

2. MATERIALS AND METHODS

This study analyzed *Kerala Karshakan*, a monthly agricultural magazine published in Malayalam by the Farm Information Bureau (FIB) under the Kerala government since 1954. Recognized as a key knowledge resource for farmers in the state, the magazine was selected due to its long-standing credibility and wide circulation among the agricultural community.

2.1 Sample Selection

A total of 36 consecutive issues published between 2021 and 2023 were systematically examined, covering all 798 articles within this period. The sample was chosen to ensure representation of recent agricultural trends and policies while maintaining temporal consistency. The study employed a quantitative content analysis approach, evaluating the magazine across four key dimensions: subject coverage, authorship analysis, visual-text space allocation, and readability assessment.

The study analyzed content across 20 subject categories as Agronomy, Plantation Science, Olericulture, Pomology, Floriculture, Aromatics/ Spices/ Medicinal Plants, Post-Harvest Technology, Plant Protection, Soil/Water/Nutrient Management, Dairy Science, Poultry Science, Fisheries, Apiculture, Schemes/ Programs/ Policies, Success Stories, Sustainability/ Health/ Food Security, Stories/ Experience Sharing, Case Studies, Monthly Recommendations, and Weather/ Disaster Management.

The authorship analysis were categorized into 11 groups to assess expertise and institutional representation, which includes Minister, Farm Information Bureau (FIB), agricultural officers/assistants/field officers/superintendents, research centers/KVKs, editorial teams, students, universities/colleges, directors/deputy directors/joint directors/additional directors, animal husbandry (AH)-related contributors, boards, and other people (e.g., farmers, agri-journalists).

The measurement of picture and text areas was conducted through manual scaling, employing geometric formulas to calculate surface areas: rectangular sections were computed as length multiplied by width, square regions as side length squared (S^2), and circular portions using the formula π multiplied by radius squared (πr^2).

For readability assessment, a random sample of 36 articles (one from each edition) was selected for detailed analysis. Oliver's Readability Index (1985) was used, calculated as:

$$\text{Readability Index (RI)} = \frac{1.027275}{X_1} + \frac{4.110678}{X_2} + \frac{0.416117}{X_3}$$

Where:

- $\mathbf{X_1}$ = Average sentence length
- $\mathbf{X_2}$ = Syllables per 100 words
- $\mathbf{X_3}$ = Percentage of compound words

X_1, representing mean sentence length, was derived by:

$$\text{Average sentence length} = \frac{\text{Number of words}}{\text{Number of sentences}}$$

X_2, representing syllables per 100 words, was computed using the following formula:

$$\text{Syllables per 100 words} = \frac{\text{Total number of syllables}}{\text{Total number of words}} \times 100$$

X_3, representing the percentage of compound words operationalized as:

$$\text{Percentage of compound words} = \frac{\text{Number of compound words}}{\text{Total number of words}} \times 100$$

- Here, instead of syllables we are counting Malayalam '**അക്ഷരങ്ങൾ**' *(Aksharamgal)* except certain '**ചില്ലക്ഷരങ്ങൾ**' *(Chillaksharamgal)* like '**ൾ *(il)*, ൽ *(il)*, ൻ *(in)*, ർ *(ir)*, ൺ *(in)***' and certain sounds.
- Substituting compound words, we are using '**സംയുക്തപദങ്ങൾ**' *(Samyukthapadamgal)*

Table 1. Range of readability index

Sl No.	Category	Readability Index Range	
		From	To
1.	Very easy	0.139735	And above
2.	Fairly easy	0.119588	0.139735
3.	Standard	0.105806	0.119588
4.	Fairly hard	0.093421	0.105806
5.	Very hard	0.093421	And below

3. RESULTS AND DISCUSSION

The content analysis of *Kerala Karshakan* magazine in 2021 (284 articles) revealed a balanced emphasis between livestock production and farmer achievements, with Dairy Science and Success Stories each constituting 12.32% of coverage (35 articles). Agronomy followed closely at 9.15% (26 articles), demonstrating the publication's focus on core crop cultivation practices, while Plant Protection accounted for 7.04% (20 articles), highlighting the importance of disease and pest management. The distribution showed comprehensive coverage of diverse agricultural domains, including Olericulture (6.30%), Pomology (5.98%), and Fisheries (5.98%). However, specialized sectors like Apiculture (0.70%) and Floriculture (2.10%) received minimal attention, suggesting these niche areas may require greater representation to fully address the spectrum of agricultural activities in Kerala.

In 2022, *Kerala Karshakan* demonstrated a significant editorial shift, with total articles decreasing to 245 but showing marked changes in content priorities. Success Stories surged to become the dominant category (19.18%, 47 articles), reflecting a strategic emphasis on results-driven agricultural journalism. The magazine simultaneously showed growing commitment to contemporary issues, with Sustainability, Health & Food Security coverage more than doubling to 11.02% (27 articles). While Dairy Science maintained steady representation (7.34%, 18 articles), its equal footing with Schemes, Programs & Policies (7.34%) signaled increasing attention to policy matters. However, this transition came at the expense of certain conventional topics, as evidenced by the complete absence of Apiculture coverage and minimal Poultry representation (0.40%, 1 article).These patterns revealed a notable transition toward policy-oriented and sustainability content, with relatively less focus on conventional agricultural sectors compared to previous years.

The 2023 volume of *Kerala Karshakan* (269 articles) exhibited a refined editorial balance, with Success Stories maintaining dominance (11.20%) while Agronomy re-emerged as a strong secondary focus (10.03%). Notably, Post-Harvest Technology and Policy content achieved parity at 9.70% each, signalling the maturation of the magazine's dual emphasis on agricultural value chains and governance frameworks. The consistent representation of Plant Protection and Sustainability (8.60% each) demonstrated an enduring commitment to both crop health and ecological stewardship, though specialized sectors like Apiculture (0.37%) and Pomology (1.12%) remained marginal.

The investigation by Arathi et al. (2022) elucidated the fact that the subject matter areas such as government policies/ plans & reforms, weather & climate, commodities sales & trends and export & imports were given much priority in the coverage of agriculture news during their study period. But our cross-year analysis of the magazine consolidated ‘Success Stories' top position (14.03% overall) as the most frequently covered article category, which is in tandem with scholarly work by Klerkx and Rose (2020), confirming this as part of a global shift toward impact narratives in agricultural extension. The research work by Suryana (2024) also concluded that storytelling is a powerful instrument in shaping brand identity, motivating consumer action, and building sustainable emotional connections. This may be the reason why ‘Success story’ is the most frequently covered article category in *Kerala Karshakan*. The study by Krithika et al. (2022) revealed that articles related to allied sectors such as apiculture and sericulture were not covered adequately (7.80 percent), which is in line with the current study. The parallel rise of Sustainability (7.9%) and Policy content (6.8%) substantiates Pretty's (2018) paradigm of systemic agricultural communication, while the persistent neglect of niche sectors (<2% combined) mirrors Mburu et al.'s (2023) findings on media blind spots in developing economies. These patterns collectively depict *Kerala Karshakan* as an institutionally aligned publication navigating the tension between traditional farming coverage and emerging agricultural discourses, though opportunities exist to better represent Kerala's full agricultural diversity.

Table 3 depicts the authorship trends. In 2021, the distribution of authorship was fairly even, with research centers and KVKs contributing the most at 50 authors (17.6%), while agricultural officers, assistants, field officers, and superintendents followed closely with 49 contributors (17.25%). Universities and colleges accounted for 37 authors (13.02%), and "Other people" made up 27 contributors (9.5%). The "Boards" category had the lowest participation with just 3 authors (1.05%), whereas students contributed 21 authors (7.4%).

Table 2. Subject coverage trends

Sl. No.	Category	Frequency							
		2021 (n=284)		2022 (n=245)		2023 (n=269)		Total (n=798)	
		Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
1.	Agronomy	26	9.15	14	5.71	27	10.03	67	8.4
2.	Plantation	7	2.5	4	1.63	4	1.5	15	1.9
3.	Olericulture	18	6.3	7	2.86	9	3.34	34	4.26
4.	Pomology	17	5.98	7	2.86	3	1.11	27	3.4
5.	Floriculture	6	2.1	9	3.7	6	2.23	21	2.63
6.	Aromatics, spices & medicinal	6	2.1	14	5.71	15	5.6	35	4.4
7.	Post-harvest	12	4.2	6	2.44	26	9.7	44	5.51
8.	Plant protection	20	7.04	16	6.53	23	8.6	59	7.4
9.	Soil, water & nutrient management	7	2.5	14	5.71	10	3.71	31	3.9
10.	Dairy	35	12.32	18	7.34	14	5.2	67	8.4
11.	Poultry	8	2.81	1	0.4	2	0.74	11	1.38
12.	Fisheries	17	5.98	7	2.86	3	1.11	27	3.83
13.	Apiculture	2	0.7	0	0	1	0.37	3	0.38
14.	Schemes, programs & policies	10	3.52	18	7.34	26	9.7	54	6.8
15.	Success story	35	12.32	47	19.18	30	11.2	112	14.03
16.	Sustainability, health & food security	13	4.6	27	11.02	23	8.6	63	7.9
17.	Stories & experience sharing	7	2.5	4	1.63	13	4.83	24	3.007
18.	Case study	19	6.7	12	4.9	17	6.31	48	6.01
19.	Monthly recommendation	12	4.2	11	4.5	12	4.5	35	4.39
20.	Weather & disaster management	7	2.5	9	3.7	5	1.8	21	7.04

In 2022, the total number of contributors dropped to 245 from 284 in the previous year. Agricultural personnel (officers, assistants, field officers, and superintendents) continued to be the leading contributor group with 43 articles (17.5%), followed closely by the 'Other people' category with 33 contributions. Research centres and KVKs contributed 31 publications (12.7%), while the Farm Information Bureau added 27 articles (11.02%). Notably, the 'Boards' category saw increased involvement with 12 contributions (4.9%), whereas student contributions hit their lowest level at just 8 articles (3.3%).

In 2023, the total number of contributors increased to 269, with research centres and KVKs regaining their top position at 51 contributors (18.96%), marking the highest proportion observed over the years. The "Other people" category continued its upward trend, reaching 45 contributors (16.7%) and becoming the second-largest group. Agricultural officers, assistants, field officers, and superintendents accounted for 40 contributions (14.9%), while student participation further decreased to just 6 (2.23%), reflecting a notable decline. Interestingly, the "Boards" category saw no contributions (0%), indicating a complete withdrawal from participation.

The overall trend in authorship contributions from 2021 to 2023 reveals that "Research centres/KVKs" and "Agri officers, assistants, field officers, superintendents" consistently remained the top contributors, each accounting for 132 articles (16.54%) over the three-year period. The "Other people" category showed significant growth, rising from 9.5% in 2021 to 16.7% in

2023, becoming the second-largest contributor group (105, 13.15%). Universities/colleges held steady as the third-largest category (93, 11.65%), while student contributions declined sharply, dropping from 7.4% in 2021 to just 2.23% in 2023. Notably, the "Boards" category fluctuated, peaking at 4.9% in 2022 before dropping to 0% in 2023, indicating inconsistent engagement. Meanwhile, administrative roles like Directors, Deputy Directors, Joint Directors, and Additional Directors maintained moderate but stable contributions (71, 8.9%), ranking fourth overall.

The prominent authorship contributions from KVKs align with Sahoo et al. (2021), who emphasized their pivotal role in on-farm testing, frontline demonstrations, and training, underscoring their mandate to bridge the research-extension gap. The significant growth of "Other people" (rising to 16.7% in 2023) parallels global trends in agricultural crowd sourcing documented by Lioutas et al. (2023). The stable but moderate contribution from administrative roles (8.9%) aligns with Raina et al.'s (2021) findings on agricultural knowledge systems, where mid-level administrators increasingly utilize publications as both performance metrics and professional currency within bureaucratic frameworks.

3.1 Visual Text Space Allocation

The visual text space allocation (Table 4) reveals that in 2021, textual content predominated (55.22%) over visual elements (44.78%), establishing a conventional information-dense format. The following year witnessed a notable visual turn, with imagery expanding to 46.80% as text receded to 53.20%, suggesting an attempted transition toward more visually engaging layouts. However, 2023 marked a dramatic reversal, with visuals contracting to 40.40% and text swelling to 59.60% - the most text-heavy configuration observed. The stable cover page dimensions (23,712 sq. cm) confirm these fluctuations represent intentional design modifications rather than format changes.

These erratic fluctuations mirror findings by Müller et al. (2022), who documented similar volatility in agricultural publications responding to digital competition and reader feedback. The pattern aligns with Harris's (2020) conceptualization of "design experimentation," where publishers continuously test layout configurations to optimize engagement while maintaining brand identity. The absence of a linear progression suggests either responsive adaptation to shifting audience preferences or unresolved tension between informational depth and visual appeal in agricultural communication strategies

After analyzing the data from the 36 randomly selected articles, we obtained the following result:

Average sentence length, $X_1 = 14.3791$

Number of syllables per 100 words, $X_2 = 294.9035$

Percentage of compound words, $X_3 = 4.1282$

Readability Index (RI) = 0.0714 + 0.013939 + 0.100798
= 0.186137

The readability analysis reveals a "Very Easy" score (Table 1), demonstrating that the magazine's content is exceptionally clear and straightforward. This high level of accessibility ensures that all subscribers, whether they have a primary education or advanced academic qualifications, can easily understand the material without difficulty.

These findings align with Akila et al.'s (2013) study, which similarly found that articles characterized by simplicity and high readability achieved greater accessibility for broader audiences. The readability patterns in our research mirror those observed by Bunquin (2020), where nearly half of the articles (49.13%) were categorized as 'very easy,' approximately one-third as 'fairly easy' (30.64%), and a smaller portion as 'standard' (13.29%), with difficult categories appearing only marginally. Biswas et al (2023) found that the readability of the information education and communication (IEC) materials by the general public is critical, especially in a country such as India that has wide variations in literacy levels. According to Swargiary (2024) among Indian states, Kerala leads with an average literacy rate of 96.2% and this may be a factor in the very easy readability of *Kerala Karshakan*. Bothun et al. (2022) found out that, in addition to simplified readability, instructional graphics should be used to increase comprehension levels.

Table 3. Authorship trends

Sl. No.	Category	Frequency							
		2021 (n=284)		2022 (n=245)		2023 (n=269)		Total (n=798)	
		Frequency	Per cent	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
1.	Minister	8	2.81	13	5.3	13	4.83	34	4.26
2.	FIB	23	8.09	27	11.02	18	6.7	68	8.52
3.	Agri officer, assistant, field officer, superintendent	49	17.25	43	17.5	40	14.9	132	16.54
4.	Research centre, KVKs	50	17.6	31	12.7	51	18.96	132	16.54
5.	Editorial team	23	8.09	23	9.4	16	5.94	62	7.7
6.	Student	21	7.4	8	3.3	6	2.23	35	4.39
7.	University/college	37	13.02	21	8.6	35	13.01	93	11.65
8.	Director, deputy director, joint director, additional director	21	7.4	21	8.6	29	10.8	71	8.9
9.	AH related	22	7.74	13	5.3	16	5.94	51	6.4
10.	Boards	3	1.05	12	4.9	0	0	15	1.9
11.	Other people	27	9.5	33	13.5	45	16.7	105	13.15

Table 4. Visual text space allocation

Year	Area Occupied by Pictures (sq. cm)	Area Occupied by Text (sq. cm)	Cover Page Area (sq. cm)	Per cent Pictures (Excluding Cover)	Per cent Text (Excluding Cover)
2021	117,788.5	145,299.5	23,712	44.78%	55.22%
2022	123,115.6	139,972.4	23,712	46.80%	53.20%
2023	106,299.7	156,788.3	23,712	40.40%	59.60%

4. CONCLUSION

This comprehensive analysis of *Kerala Karshakan* reveals its vital role as an accessible agricultural knowledge resource, particularly evidenced by its "very easy" readability score that effectively serves farmers across educational levels. The magazine demonstrates particular strength in presenting impact-driven success stories while maintaining consistent coverage of fundamental topics like agronomy and dairy science. However, the study identifies several opportunities for enhancement that could amplify the publication's effectiveness. The authorship analysis reveals a balanced contribution from research centres, agricultural officers, and non-institutional authors, with the latter group growing significantly, suggesting a shift toward diverse perspectives. The visual-text composition fluctuates annually, reflecting evolving editorial strategies, though inconsistencies suggest a need for a more deliberate balance to enhance engagement.

The magazine's demonstrated responsiveness to global agricultural trends - particularly in sustainability and policy content - positions it well to evolve into an even more powerful bridge between research and practice. By implementing these targeted improvements, *Kerala Karshakan* can strengthen its role as an indispensable resource for Kerala's farming community while serving as a model for agricultural publications nationwide. These findings offer actionable insights not just for the subject publication but for farm media globally seeking to maximize their knowledge dissemination and farmer engagement.

Way Forward: The content of the farm magazine can be tailored to the specific agro-climatic conditions, cropping patterns and technological needs of the farmers. More infographics, illustrations and step-by-step diagrams can be included to explain complex farm technologies in a farmer friendly manner. Contents related to needs of underrepresented groups like women farmers, indigenous communities, small-scale producers etc can be included more frequently.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Authors, Jayakrishnan U., Chinchu V. S., and Smitha S., hereby declare that NO generative artificial intelligence technologies and text-to-image generators had been used while writing or modifying this manuscript.

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://pr.sdiarticle5.com/review-history/135808