ShodhAI: Journal of Artificial Intelligence
October-December 2026 3(3)
https://shodhai.org

Original Article

SOCIAL MEDIA AND ARTIFICIAL INTELLIGENCE IN AGRICULTURAL COMMUNICATION IN INDIA: A SYSTEMATIC REVIEW AND BIBLIOMETRIC ANALYSIS, 2010–2025

Satyendra Kumar Manjhi [1*]
[1] Babasaheb Bhimrao Ambedkar University, Lucknow, Uttar Pradesh, India

ABSTRACT

Social media and artificial intelligence (AI) are changing the way agricultural information is shared in India; however, research on these two tools of communication has not been reviewed together. The present review examined the publication profile of Scopus-indexed research on social media and AI in Indian agricultural communication, the way this research has studied the two tools, and what the evidence shows about them. Following PRISMA 2020, Scopus and OpenAlex were searched for the period 2010–2025, and every eligible study was checked for Scopus indexing one by one. Out of 2,735 records, 33 studies were included, coded by tool, research design, theme and actor, and synthesised narratively. The research is very recent, as 82% of the studies appeared in 2021–2025. Sixteen studies examined social media, mainly WhatsApp, 14 examined AI, mainly machine-learning analysis of Kisan Call Centre queries, and three applied AI to agricultural tweets. Content and data analytics was the most common design (52%), and none of the studies was a randomised trial. Scopus indexed 54% of the eligible AI studies but only 14% of the eligible social media studies. Farmers preferred WhatsApp and familiar tools and created as well as received content, whereas AI was mostly used to analyse farmers' questions and was rarely tested with farmers. The review concludes that the evidence is recent, descriptive and thin on effects, and that future research should test both tools with farmers in the field.

Keywords: Social media, Artificial Intelligence, Agricultural Communication, Kisan Call Centre, Systematic Review, Bibliometric Analysis

INTRODUCTION

BACKGROUND AND CONTEXT

Agricultural extension in India faces a problem of scale. According to the Agriculture Census 2015-16, the country has 146.45 million operational holdings, and about 68% of them are smaller than one hectare Department of Agriculture, Cooperation and Farmers Welfare (2019). Public extension has long reached only a minority of these farmers, and small and marginal farmers the least Glendenning et al. (2010). Two waves of digital communication now promise to close this gap. Social media platforms such as WhatsApp, YouTube and Facebook allow farmers, extension workers and Krishi Vigyan Kendras (KVKs) to share text, photographs, voice notes and videos at almost no cost, and farmers become producers and spreaders of information and not only its receivers. Artificial intelligence (AI), in the form of chatbots, voice assistants, crop-diagnosis apps and machine analysis of farmers' questions, promises advice that is personalised, available at any hour and offered in local languages.

*Corresponding Author:
Email address: Satyendra Kumar Manjhi (informtosatyam@gmail.com)

Received: 20 August 2026; **Revised:** 25 September 2026; **Accepted:** 09 October **2026; Published:** 17 October 2026
DOI: 10.29121/ShodhAI.v3.i3.2026.120
Page Number: 21-32
Journal Title: ShodhAI: Journal of Artificial Intelligence
Journal Abbreviation: ShodhAI J. Artif. Intell.
Online ISSN: 3048-9245, **Print ISSN:** 3108-1940
Publisher: Granthaalayah Publications and Printers, India
Conflict of Interests: The authors declare that they have no competing interests.
Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.
Authors' Contributions: Each author made an equal contribution to the conception and design of the study. All authors have reviewed and approved the final version of the manuscript for publication.
Transparency: The authors affirm that this manuscript presents an honest, accurate, and transparent account of the study. All essential aspects have been included, and any deviations from the original study plan have been clearly explained. The writing process strictly adhered to established ethical standards.
Copyright: © 2026 The Author(s). This work is licensed under a Creative Commons Attribution 4.0 International License.
With the license CC-BY, authors retain the copyright, allowing anyone to download, reuse, re-print, modify, distribute, and/or copy their contribution. The work must be properly attributed to its author.

The international evidence gives reasons for both hope and caution. A meta-analysis found that digital advisory services increased yields by about 4% and the odds of adopting recommended inputs by 22% Fabregas et al. (2019). However, the effects vary with the design of the service, and the benefits can bypass poorer, less educated and women farmers Nakasone et al. (2014), Spielman et al. (2021).

STATEMENT OF THE PROBLEM

Indian research on social media and AI in agricultural communication is growing but scattered. Studies of social media appear mostly in national extension journals, while studies of AI are recent and are divided between engineering and extension science. This creates three problems. Firstly, the size, growth and visibility of this research are not known, including how much of it reaches the international indexes on which readers and funders rely (RQ1). Secondly, it is not clear how the research has studied the two tools, that is, which tools, research designs and actors it has covered (RQ2). Thirdly, the findings on the use, effects and constraints of the two tools have not been brought together, although the tools now meet in practice, for example when an AI system reads farmers' queries or answers them on a messaging platform (RQ3).

OBJECTIVES AND RESEARCH QUESTIONS

In this review, social media mean many-to-many channels for sharing farm information, and AI means tools that generate, personalise or analyse agricultural messages. The study has three objectives, each with one research question:

1) To describe the publication profile of Scopus-indexed research on social media and AI in Indian agricultural communication from 2010 to 2025.
2) To examine how this research has studied social media and AI as communication tools.
3) To synthesise what the evidence shows about social media and AI as tools of agricultural communication.

- RQ1. What is the publication profile of Scopus-indexed research on social media and AI in Indian agricultural communication from 2010 to 2025?
- RQ2. How has this research studied social media and AI as communication tools?
- RQ3. What does the evidence show about social media and AI as tools of agricultural communication?

LITERATURE REVIEW

SOCIAL MEDIA IN AGRICULTURAL EXTENSION

Indian farmers draw on several sources of information at once, as no single source meets all their needs, and their choice of source depends on age, education and farm size Mittal and Mehar (2016). Early reviews of information and communication technologies (ICTs) in extension focused on radio, call centres, text messages and voice services Aker (2011), Nakasone et al. (2014). In Gujarat, a voice-based advisory service won the trust of cotton farmers, who adopted the inputs it recommended Cole and Fernando (2021). These channels send advice from one source to many farmers, whereas on social media farmers can ask, answer, post and forward, and communication becomes many-to-many. Suchiradipta and Saravanan (2016) described social media as a means for advisory services to reach farmers faster and to hold a dialogue with them, but they also warned about digital literacy and the overload of information.

ARTIFICIAL INTELLIGENCE AS A COMMUNICATION TOOL

Most reviews of AI in agriculture treat it as a technology of production, such as yield prediction and disease detection Kamilaris and Prenafeta-Boldú (2018), Liakos et al. (2018). In communication, its role is growing in two directions. Firstly, AI can speak, as conversational agents can answer farmers' questions by voice and in local languages, which the FarmChat prototype showed with potato farmers in Jharkhand Jain et al. (2018). Secondly, AI can listen, as the call logs of the Kisan Call Centre (KCC) hold millions of farmers' questions that machine learning can sort into needs, problems and trends. Both roles raise questions of transparency, fairness, privacy and trust, which are among the issues mapped in a review of agricultural AI Ryan (2023).

THEORETICAL FRAMEWORK

The review uses a simple communication framework (Figure 1). It follows the view that innovation is a collective process of re-ordering relations in social networks, in which everyday exchanges among actors are critical Leeuwis and Aarts (2011). Social media represent many-to-many communication among farmers, extension workers and institutions, in which farmers both receive and create content. AI adds two new roles to the flow of information, namely a listening role, in which machines read farmers' questions and social media posts in aggregate, and a speaking role, in which chatbots and advisory apps answer individual farmers. Both tools work through the conditions that decide whether advice is used, that is, access, relevance, cost and trust Spielman et al. (2021), and

they may fail where their design does not match the local reality of their users Heeks (2002). The framework guided the profile of the research (RQ1), the coding of the studies (RQ2) and the synthesis of the evidence (RQ3).

Figure 1

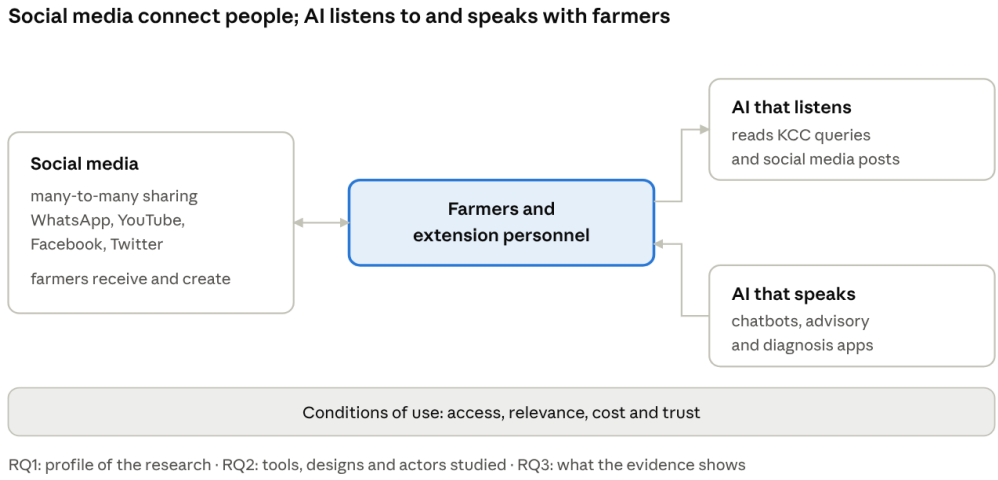

Figure 1 Conceptual Framework of the Review: Social Media and the Two Communication Roles of AI.

RESEARCH GAP

Reviews of Indian digital extension usually treat social media as one channel among many and rarely consider AI. Few reviews have measured how much of this research is indexed in Scopus (RQ1), classified the tools, designs and actors studied (RQ2), or brought the evidence on the two tools together (RQ3). The first point matters because Scopus and Web of Science under-represent regional journals Mongeon and Paul-Hus (2016), in which much Indian extension research is published.

RESEARCH METHODOLOGY

RESEARCH DESIGN

The study combined a systematic review, reported according to the PRISMA 2020 statement Page et al. (2021), with a bibliometric performance analysis Donthu et al. (2021). The findings were synthesised narratively, because the designs and outcomes of the studies were too varied for meta-analysis Popay et al. (2006). The review was limited to journal articles indexed in Scopus, so that every included study met a common and verifiable quality threshold.

INFORMATION SOURCES AND SEARCH STRATEGY

The population of the review consisted of journal articles on social media or AI in Indian agricultural communication published from 2010 to 2025. Jasani (2022). Scopus was the main database, and OpenAlex, an open bibliographic index with wider coverage, was searched as a supplementary source to find Scopus-indexed articles missed by the Scopus query and to measure how much eligible research lies outside Scopus. Both databases were searched on 1 October 2026 through their application programming interfaces, on titles, abstracts and keywords. Two searches were run, each combining a setting block (India or the names of 24 states) and an agriculture block with either a social media block (such as WhatsApp, YouTube and Facebook) or an AI block (such as chatbot and machine learning). Jasani (2024). The AI search also required a communication term, because AI terms alone mostly retrieve studies of crop modelling and image recognition. The exact search strings are given in Supplementary Table S3. Both searches were limited to English-language journal articles and reviews.

ELIGIBILITY CRITERIA

A study was included if it (a) was a peer-reviewed journal article indexed in Scopus, checked article by article; (b) was published between 2010 and 2025; (c) had India as its main setting; (d) analysed social media used to share or access agricultural information, or AI used as a communication tool, including chatbots, voice assistants, advisory or diagnosis apps, AI analysis of farmers' queries or agricultural social media content, and farmers' perception of AI; and (e) reported empirical data or was a structured review. Studies were excluded if social media or AI was only listed among sources of information, if an AI model served production rather than communication, if a system was described without users or real farmer data, or if the paper was an opinion piece.

SCREENING AND DATA COLLECTION

Duplicates were removed by DOI and normalised title, and two automated rules removed non-English records and conference papers. Titles and then abstracts were screened against the criteria; where Scopus had no abstract, it was taken from OpenAlex, Crossref or the publisher's page. The written criteria and codebook were applied to each record, and every record that could not be classified was checked individually. Each included study was coded for year, journal, state, tool, research design, theme and actor (farmers, extension personnel, or communication content and query data). Scopus citation counts and author affiliations were retrieved on 1 October 2026, and one study without an abstract in any source was coded from its title. Out of 2,735 records identified, 33 studies were included (Figure 2).

Figure 2

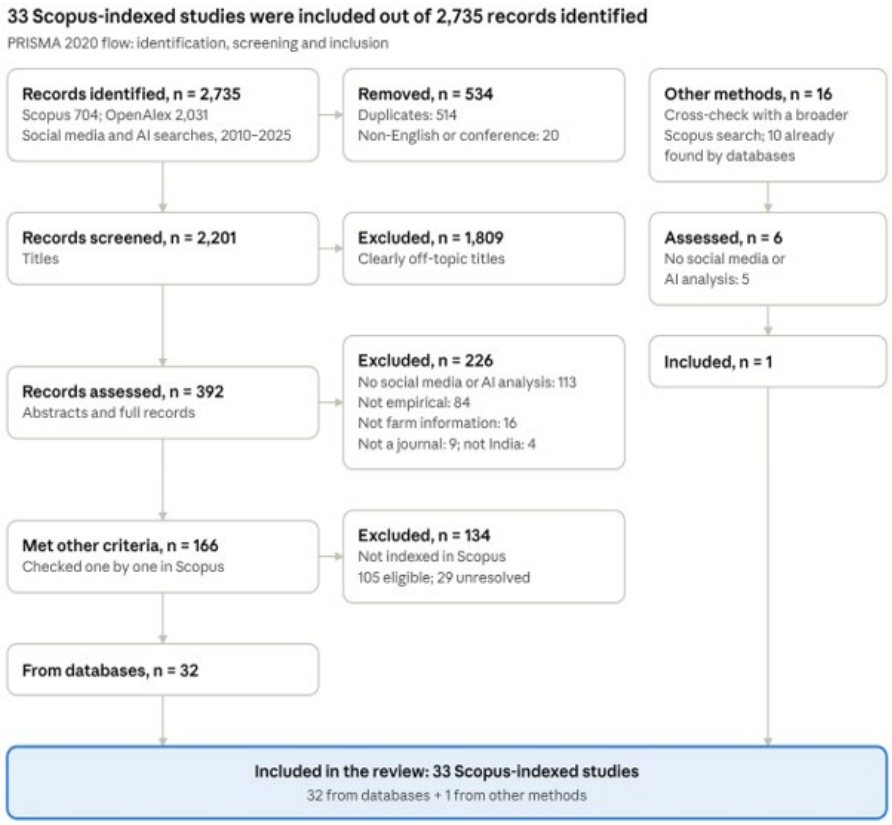

Figure 2 PRISMA 2020 Flow Diagram of the Review.

TOOLS AND TECHNIQUES OF ANALYSIS

For RQ1, the studies were described by year, journal, state, authorship and Scopus citations, and the Scopus coverage of all 137 eligible studies was compared between the two strands with Fisher's exact test. For RQ2, the studies were cross-tabulated by tool, design and actor. For RQ3, the findings were synthesised narratively by theme, and the strength of evidence in each theme was judged from the number of studies and their designs. The analysis was done in Python (pandas and SciPy).

RESULTS AND DATA ANALYSIS

PUBLICATION PROFILE OF THE RESEARCH (RQ1)

Scopus-indexed research on the topic is very recent (Figure 3). The first included study appeared in 2017, and 27 of the 33 studies (82%) were published between 2021 and 2025. Social media studies came first, as four of the six studies published up to 2020 were on social media, whereas 13 of the 14 AI studies were published from 2022 onwards, nine of them in 2024 and 2025 alone.

Figure 3

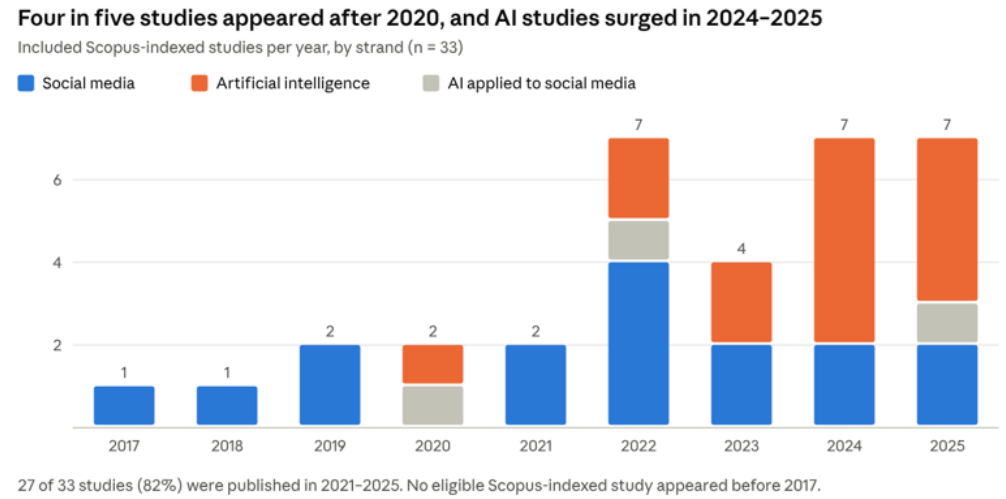

Figure 3 Included Studies Per Year, by Strand (n = 33).

The 33 studies appeared in 26 journals, which shows that the field has no core journal. *Computers and Electronics in Agriculture* published the most studies (four, all on AI), followed by *Current Science*, *Indian Journal of Extension Education*, *Scientific Reports* and *Sustainability* with two each. The OpenAlex search shows how much eligible research lies outside Scopus (Figure 4). Out of 137 studies that met every other criterion, only 32 (23%) were indexed in Scopus. The gap differed sharply between the two strands, as Scopus indexed 54% of the eligible AI studies but only 14% of the eligible social media studies (Fisher's exact $p < .001$). Most eligible studies outside Scopus appeared in Indian and regional journals, such as the *Asian Journal of Agricultural Extension, Economics & Sociology* (13 studies), the *International Journal of Current Microbiology and Applied Sciences* (12) and the *International Journal of Agriculture Extension and Social Development* (11).

Figure 4

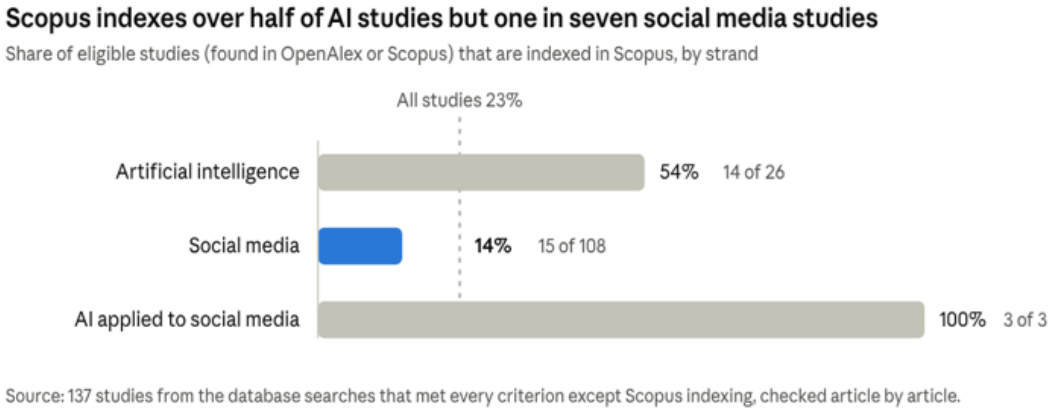

Figure 4 Share of Eligible Studies Indexed in Scopus, by Strand (n = 137).

Sixteen studies (48%) were national in scope, and most of them analysed national data such as KCC call logs or Twitter posts. Fourteen studies were set in nine named states, led by Tamil Nadu (three studies) and Bihar, Odisha and Telangana (two each), one covered several states and two did not name a state. None of the included studies was set in Uttar Pradesh, Madhya Pradesh or Maharashtra, three of the largest farming states. Authorship was largely domestic, as 26 studies had only Indian-affiliated authors, six involved authors from other countries and affiliation data were missing for one. AI research was highly concentrated, since eight of the 14 AI studies came from one research group (Godara and colleagues), and all eight used KCC data. The 33 studies had received 387 Scopus citations by October 2026, with a median of five per study, and AI studies had a higher median (seven) than social media studies (4.5). The most cited were a multi-country study of digital extension tools Coggins et al. (2022) and a study of a WhatsApp group of innovative farmers Nain et al. (2019). Hence, in answer to RQ1, the research is small, recent and unevenly visible in Scopus.

HOW THE RESEARCH STUDIED THE TWO TOOLS (RQ2)

Table 1 shows the tools studied. WhatsApp was the most studied platform, either alone (seven studies) or along with YouTube and Facebook (seven). Among AI tools, the analysis of farmers' helpline queries was the most common (eight studies), and three studies joined both strands by applying machine learning to agricultural tweets.

Table 1

Table 1 Communication tools studied (n = 33)

Strand	Tool studied	Studies	Examples
Social media (16)	WhatsApp	7	Thakur and Chander (2017), Nain et al. (2019), Coggins et al. (2025)
	Several platforms (WhatsApp, YouTube, Facebook)	7	Rama Devi and Venugopal (2022), Kumar (2023)
	YouTube	1	Burman et al. (2022)
	Twitter	1	Jayashree (2018)
AI applied to social media (3)	Machine learning applied to agricultural tweets	3	Kumar and Sharma (2020), Singh et al. (2022), Rai et al. (2025)
Artificial intelligence (14)	Analysis of farmers' helpline (KCC) queries	8	Godara and Toshniwal (2020), Godara et al. (2022)
	Automated query-answering systems	2	Rehman et al. (2023), Godara et al. (2024)
	AI advisory or diagnosis apps	2	Karthikeyan et al. (2024), Kumar et al. (2025)
	Farmers' perception and adoption of AI	2	Vasan and Yoganandan (2024), Amalan and Aram (2025)

The designs were mostly descriptive (Table 2). Content and data analytics was the most common design (17 studies, 52%), followed by cross-sectional surveys and mixed methods (six each). There was one field trial, one quasi-experimental study and no randomised controlled trial. More than half of the studies (18) analysed communication content or query data rather than people, 13 studied farmers and only two studied extension personnel. Hence, in answer to RQ2, social media research has mainly surveyed people, whereas AI research has mainly modelled data, and few studies have measured effects.

Table 2

Table 2 Research Designs and Actors Studied, by Strand

	Social media	AI	AI applied to social media	Total
Design				
Content or data analytics	3	11	3	17
Cross-sectional survey	5	1	0	6
Mixed methods	4	2	0	6
Qualitative	2	0	0	2
Field trial	1	0	0	1
Quasi-experimental	1	0	0	1
Actor studied				
Content or query data	5	10	3	18
Farmers	9	4	0	13
Extension personnel	2	0	0	2
Total studies	16	14	3	33

WHAT THE EVIDENCE SHOWS (RQ3)

Use of social media. Across states, WhatsApp was the social media channel preferred by farmers for farm information. Livestock keepers in Himachal Pradesh preferred WhatsApp to other channels for livestock information and used it to seek timely help Thakur and Chander (2017). In Haryana, WhatsApp and YouTube were widely used and considered effective, although helplines and text messages still reached more farmers Kumar (2023). Farmers in Telangana used social media mainly for weather, policy and input information Rama Devi and Venugopal (2022), and farmers in southern India rated WhatsApp-based social marketing among the best ways to change farm behaviour Das and Pradip (2021). Farmers also preferred familiar tools, using phone calls and chat apps more than specialised advisory apps Coggins et al. (2022), and the perceived credibility of content and the influence of peers were related to their use of social media for marketing Palaniswamy and Raj (2022). Extension workers have also taken up these platforms Das (2021). In Bihar, they shared wheat agronomy videos over WhatsApp in 70% of the cases, but the exchange was mostly one-way and the advice was seldom localised Coggins et al. (2025).

Effects of social media. Evidence on effects is limited and mostly self-reported. Farmers in Telangana scored higher on knowledge of farm technologies after using social media, and their knowledge rose with digital literacy Guntukogula Pattabhi et al. (2023). In Rajasthan, ICT training increased farmers' use of social media apps, government websites and the national e-market platform, but not of pest-control apps Babu et al. (2025). In Odisha, weekly agriculture and nutrition videos sent through WhatsApp and voice calls were feasible and acceptable and engaged whole families, but they missed mothers with limited access to a phone Fivian et al. (2024). None of the included studies measured effects on yield or income.

Content and networks. Content studies show that farmers create as well as receive information on social media. A WhatsApp group in remote Gujarat villages became a local information ecosystem in which members posted their own farm content Mishra and Shah (2019), and innovative farmers used a WhatsApp group to exchange knowledge-intensive content mixed with personal experience Nain et al. (2019). YouTube analytics of the Pusa Samachar advisory showed that views depended on the length and format of episodes Burman et al. (2022), online agricultural media were judged by their relevance, reach, quality and audience interaction Geethalakshmi et al. (2024), and a case study of M. S. Swaminathan's Twitter use showed social media as an entry point for discussion on science and development Jayashree (2018). Machine learning has begun to read this content at scale, by classifying tweets on an agricultural policy Kumar and Sharma (2020), tracking the emotions of farm stakeholders during the COVID-19 lockdown Singh et al. (2022) and identifying obstacles to the adoption of new technologies and e-agriculture schemes from 1,390 tweets and 491 reviews Rai et al. (2025).

AI that listens. The largest body of AI research analysed calls to the Kisan Call Centre. Early work mined patterns from KCC queries to identify farmers' main problems Godara and Toshniwal (2020), and later studies used deep learning to forecast the number of queries from 1.3 million call logs Godara and Toshniwal (2022), to map crop-wise problems from more than 26 million logs Godara et al. (2022) and to profile plant-protection problems across space and time Godara et al. (2023). One study grouped 28.6 million calls into topic-wise trend clusters Godara et al. (2024), two linked farmers' information demand with wheat yields Godara et al. (2024), Godara et al. (2025), and another applied machine learning and natural language processing to KCC data from 2020 to 2023 Kiruthiga and Dharmarajan (2025). Two systems answered queries automatically. KisanQRS matched new queries to past ones with an F1-score of 96.58% Rehman et al. (2023), and AgriResponse was validated on 755 queries covering 151 crops Godara et al. (2024), but both were evaluated against stored expert answers and not with farmers.

AI that advises. Only four studies observed farmers using or judging AI. In Odisha, 79% of 1,422 farmers received AI-enabled pest advisories, but only 49% of the advisories were acted upon, and adherence fell as pest severity and the cost or complexity of control rose Kumar et al. (2025). Users of a cattle expert system in Tamil Nadu gave mostly positive feedback, although about one in six were critical Karthikeyan et al. (2024). Farmers' intention to adopt AI-based smart farming depended mainly on their attitude, which was related to perceived usefulness, ease of use and confidence Vasan and Yoganandan (2024). Among farmers practising non-chemical agriculture in Tamil Nadu, labour shortage, mobile phone use and cost savings favoured the adoption of AI, but these were not enough without extension support Amalan and Aram (2025).

Constraints and trust. Constraints recur in both strands. They include unequal access to phones, especially for women Fivian et al. (2024), one-way and poorly localised messages Coggins et al. (2025), a preference for familiar tools over specialised apps Coggins et al. (2022) and advice that is too costly or complex to follow Kumar et al. (2025). Trust appears in every strand, as farmers act on content that they find credible Palaniswamy and Raj (2022) and on advice that fits their means. Table 3 summarises the evidence for RQ3.

Table 3

Table 3 Summary of the evidence (RQ3)

Area	Main finding	Strength of evidence
Use of social media	WhatsApp is the preferred channel; farmers favour familiar tools over specialised apps	Moderate: surveys and mixed methods in several states
Effects of social media	Gains in self-reported knowledge and digital use; no data on yield or income	Weak: one field trial, one quasi-experiment, no randomised trial
Content and networks	Farmers create and share content; machine learning can read sentiment at scale	Moderate: eight content studies
AI that listens (KCC analytics)	Shows what, where and when farmers ask	Strong data base (millions of calls), but untested with users
AI that advises	Advice is received more often than it is followed; adoption depends on attitude, cost and extension support	Weak: four studies
Constraints and trust	Phone access, relevance, cost and credibility limit both tools	Consistent across strands

SUMMARY OF ANSWERS TO THE RESEARCH QUESTIONS

The answers to the three research questions are summarised in Table 4.

Table 4

Table 4 Summary of Answers to the Research Questions

Research question	Answer	Evidence
RQ1: What is the publication profile of the research?	Small, recent and unevenly visible in Scopus	33 studies; 82% in 2021–2025; Scopus coverage 14% for social media and 54% for AI ($p < .001$)
RQ2: How has the research studied the two tools?	Social media through surveys of people, AI through models of data	17 of 33 studies used content or data analytics; one field trial, no randomised trial
RQ3: What does the evidence show?	Strong on use, weak on effects; AI mostly listens and rarely advises	WhatsApp preferred; only four studies tested AI with farmers; access, relevance, cost and trust limit both tools

DISCUSSION

The review shows that Scopus-indexed research on social media and AI in Indian agricultural communication is small and recent (RQ1), that the two strands study different things in different ways (RQ2), and that the evidence is strong on use but weak on effects (RQ3).

PUBLICATION PROFILE (RQ1)

The field is still forming, but more important is what lies outside Scopus. Only one in seven eligible social media studies is indexed in Scopus, as against more than half of the AI studies. The international picture of Indian social media extension, therefore, rests on a small and possibly unrepresentative fraction of the evidence, which agrees with the known under-representation of regional journals in international indexes Mongeon and Paul-Hus (2016).

HOW THE RESEARCH STUDIED THE TWO TOOLS (RQ2)

The two strands study different things. Social media research studies people, mostly farmers, through surveys, whereas AI research studies data, mostly KCC call logs, through models, and very few studies lie between the two. AI research is also concentrated in one research group and one data source. This has produced a strong body of work on the national helpline, but it leaves other AI tools of communication, such as voice-based chatbots, image-based diagnosis apps and the government's Kisan e-Mitra assistant, largely unstudied. The scarcity of field trials agrees with the wider observation that rigorous evidence on digital extension is still limited Spielman et al. (2021).

WHAT THE EVIDENCE SHOWS (RQ3)

Three conclusions follow from the evidence. Firstly, social media, and WhatsApp above all, has become an everyday channel for farm information, and farmers use it to create and share content as well as to receive it, which fits the shift from one-to-many to many-to-many communication Suchiradipta and Saravanan (2016). Secondly, AI is so far mainly a tool that listens to farmers in aggregate. It has shown what farmers ask, where and when, but it has rarely been tested as a tool that speaks to individual farmers, and where it was tested, the advice was received more often than it was followed. Thirdly, the limits of both tools lie less in the technology than in access, relevance and trust. Farmers act on advice that is credible, local and affordable, which is consistent with the wider evidence that digital advice works through the institutions that deliver it Fabregas et al. (2019), Spielman et al. (2021).

AGENDA FOR FUTURE RESEARCH

The findings point to five research priorities: (1) field experiments that measure the effect of social media and AI advice on practices, yields and income; (2) evaluation of AI chatbots and voice assistants with farmers, in local languages and with attention to errors; (3) studies that link the two strands, for example AI tools that answer questions within WhatsApp groups; (4) research in large farming states such as Uttar Pradesh and among women, tenant and marginal farmers; and (5) studies of misinformation, data privacy and trust in automated advice.

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

The review reveals that Scopus-indexed research on social media and AI in Indian agricultural communication is small, recent and unevenly visible. Firstly, 27 of the 33 studies appeared in 2021–2025, and Scopus indexed only 14% of the eligible social media studies as against 54% of the AI studies (RQ1). Secondly, social media research mainly surveyed farmers, whereas AI research mainly modelled KCC data, and none of the studies was a randomised trial (RQ2). Thirdly, WhatsApp has become an everyday channel through which farmers receive and create farm information, while AI has so far served mainly to read farmers' questions at national scale and has rarely been tested as a direct adviser; access, relevance, cost and trust limit both tools (RQ3).

IMPLICATIONS

Theoretical. AI adds two roles to agricultural communication, listening and speaking, and the review shows that research has so far favoured listening. *Methodological.* Reviews limited to Scopus may miss most Indian social media research, and they should report how much eligible research lies outside the index. *Practical.* Social media should be used for dialogue, and AI tools should be tested with farmers before scaling.

RECOMMENDATIONS

1) **Use social media for dialogue (RQ3).** Extension agencies and KVKs should use WhatsApp groups and YouTube channels for two-way dialogue, moderate the groups, localise the content and answer farmers' questions.
2) **Use KCC analytics to plan advice (RQ2, RQ3).** The Ministry of Agriculture and Farmers Welfare should use KCC query analytics to plan advisory content and campaigns, and should make anonymised KCC data more widely available to researchers.
3) **Test AI with farmers before scaling (RQ3).** Developers should test chatbots and advisory apps with farmers in local languages and by voice, and should report their accuracy openly.
4) **Strengthen research designs (RQ2).** Researchers should use experimental and mixed-method designs and should include extension personnel, women and marginal farmers.
5) **Improve the visibility of Indian research (RQ1).** Indian journals should strengthen peer review and metadata and seek indexing in international databases.

LIMITATIONS AND FUTURE SCOPE

The review has certain limitations. Firstly, restricting it to Scopus-indexed studies gives a common quality threshold but excludes most social media research. Secondly, only English-language journal articles were searched, and studies in Hindi or other Indian languages may have been missed. Thirdly, the screening and coding were assisted by generative AI; uncertain records were checked individually, but some error of classification remains possible. Fourthly, citation counts favour older studies and are a weak measure of quality for very recent AI research. Future reviews should include Indian journals outside Scopus and studies in Indian languages, and should be updated as field trials of AI advisory tools appear.

ACKNOWLEDGMENTS

None.

REFERENCES

Aker, J. C. (2011). Dial "A" for Agriculture: A Review of Information and Communication Technologies for Agricultural Extension in Developing Countries. Agricultural Economics, 42(6), 631-647. https://doi.org/10.1111/j.1574-0862.2011.00545.x

Amalan, A. A., and Aram, I. A. (2025). Artificial Intelligence Adoption in Non-Chemical Agriculture: An Integrated Mechanism for Sustainable Practices. Sustainability, 17(19), Article 8865. https://doi.org/10.3390/su17198865

Babu, J. M., Yadav, A., and Shivnani, T. (2025). A Step Toward Digital Inclusion in Agriculture: Managing ICT Capacity-Building and Measuring Outcomes Among Smallholder Farmers. Indian Journal of Finance, 19(8), 68-88. https://doi.org/10.17010/ijf/2025/v19i8/175234

Burman, R. R., Mahra, G. S., Singh, A. K., Mallick, S., Anand, A., Vashisth, A., Mishra, G., Shekhawat, K., Somvanshi, V., Rudra, S. G., Sangwan, S., Kumar, B., and Das, A. K. (2022). 'Pusa Samachar': An Innovative Multimedia-Based Extension Advisory Model. Current Science, 123(4), 574-582. https://doi.org/10.18520/cs/v123/i4/574-582

Coggins, S., McCampbell, M., Sharma, A., Sharma, R., Haefele, S. M., Karki, E., Hetherington, J., Smith, J., and Brown, B. (2022). How Have Smallholder Farmers Used Digital Extension Tools? Developer and User Voices From Sub-Saharan Africa, South Asia and Southeast Asia. Global Food Security, 32, Article 100577. https://doi.org/10.1016/j.gfs.2021.100577

Coggins, S., Munshi, S., Smith, J., Yadav, A. K., Poonia, S. P., Patil, S., Singh, N. K., Sawarn, A., Ireland, D. C., McDonald, A. J., Singh, D. K., Sherpa, S. R., and Craufurd, P. (2025). How Do Chat Apps Support the Use of Farming Videos in Agricultural Extension: A Case Study From Bihar, India. NJAS: Impact in Agricultural and Life Sciences, 97(1), Article 2420803. https://doi.org/10.1080/27685241.2024.2420803

Cole, S. A., and Fernando, A. N. (2021). 'Mobile'izing Agricultural Advice: Technology Adoption, Diffusion and Sustainability. The Economic Journal, 131(633), 192-219. https://doi.org/10.1093/ej/ueaa084

Das, P., and Pradip, D. (2021). Usability and Effectiveness of New Media in Agricultural Learning and Development: A Case Study on the Southern States of India. Journal of Social Marketing, 11(4), 357-377. https://doi.org/10.1108/JSOCM-11-2019-0203

Das, S. (2021). Influence of Social Media on Agricultural Advisory Service: Analytical Study on the Agricultural Extension Specialists of Uttar Banga Krishi Vishwavidyalaya, West Bengal. Library Philosophy and Practice, 1-17.

Department of Agriculture, Cooperation and Farmers Welfare. (2019). All India Report on Number and Area of Operational Holdings: Agriculture Census 2015-16. Ministry of Agriculture and Farmers Welfare, Government of India.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., and Lim, W. M. (2021). How to Conduct a Bibliometric Analysis: An Overview and Guidelines. Journal of Business Research, 133, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Fabregas, R., Kremer, M., and Schilbach, F. (2019). Realizing the Potential of Digital Development: The Case of Agricultural Advice. Science, 366(6471), Article eaay3038. https://doi.org/10.1126/science.aay3038

Fivian, E., Parida, M., Harris-Fry, H., Mohanty, S., Padhan, S., Pradhan, R., Das, P., Odhiambo, G., Prost, A., Roopnaraine, T., Behera, S., James, P., Mishra, N. K., Rath, S., Nair, N., Rath, S., Koniz-Booher, P., Danton, H., Allen, E., and Kadiyala, S. (2024). Feasibility, Acceptability and Equity of a Mobile Intervention for Upscaling Participatory Action and Videos for Agriculture and Nutrition (m-UPAVAN) in Rural Odisha, India. PLOS Global Public Health, 4(5), Article e0003206. https://doi.org/10.1371/journal.pgph.0003206

Geethalakshmi, K., Thaloor, S., and Gajare, P. (2024). Investigating the Impact of Online Media on Agricultural Practices and Rural Development: A Content Analysis. Indian Journal of Extension Education, 60(3), 42-48. https://doi.org/10.48165/ijee.2024.60309

Glendenning, C. J., Babu, S., and Asenso-Okyere, K. (2010). Review of Agricultural Extension in India: Are Farmers' Information Needs Being Met? (IFPRI Discussion Paper No. 01048). International Food Policy Research Institute. https://hdl.handle.net/10568/154873

Godara, S., and Toshniwal, D. (2020). Sequential Pattern Mining Combined Multi-Criteria Decision-Making for Farmers' Queries Characterization. Computers and Electronics in Agriculture, 173, Article 105448. https://doi.org/10.1016/j.compag.2020.105448

Godara, S., and Toshniwal, D. (2022). Deep Learning-Based Query-Count Forecasting Using Farmers' Helpline Data. Computers and Electronics in Agriculture, 196, Article 106875. https://doi.org/10.1016/j.compag.2022.106875

Godara, S., Batra, K., Bana, R. S., Marwaha, S., and Bedi, J. (2025). AgriFact Framework for Modelling the Impact of Farmers' Information Demand on Nationwide Wheat Productivity in India. Scientific Reports, 15(1), Article 33621. https://doi.org/10.1038/s41598-025-19133-0

Godara, S., Bedi, J., Parsad, R., Singh, D., Bana, R. S., and Marwaha, S. (2024). AgriResponse: A Real-Time Agricultural Query-Response Generation System for Assisting Nationwide Farmers. IEEE Access, 12, 294-311. https://doi.org/10.1109/ACCESS.2023.3339253

Godara, S., Begam, S., Bana, R. S., Bedi, J., Jain, R., Haque, Md. A., Parsad, R., Marwaha, S., Patial, M., Shirzad, S., and Nirmal, R. (2024). TPTC: Topic-Wise Problems' Trend Clusters for Smart Agricultural Insights Extraction and Forecasting of Farmer's Information Demand. Scientific Reports, 14(1), Article 29272. https://doi.org/10.1038/s41598-024-80488-x

Godara, S., Birthal, P. S., Avinash, G., Ahmad Faiz, M., Bana, R. S., Jhajhria, A., Parsad, R., and Marwaha, S. (2024). Quantifying Effects of Climate Change and Farmers' Information Demand on Wheat Yield in India: A Deep Learning Approach With Regional Clustering. Frontiers in Sustainable Food Systems, 8, Article 1357201. https://doi.org/10.3389/fsufs.2024.1357201

Godara, S., Toshniwal, D., Bana, R. S., Singh, D., Bedi, J., Parsad, R., Dabas, J. P. S., Jhajhria, A., Godara, S., Kumar, R., and Marwaha, S. (2023). AgrIntel: Spatio-Temporal Profiling of Nationwide Plant-Protection Problems Using Helpline Data. Engineering Applications of Artificial Intelligence, 117, Article 105555. https://doi.org/10.1016/j.engappai.2022.105555

Godara, S., Toshniwal, D., Parsad, R., Bana, R. S., Singh, D., Bedi, J., Jhajhria, A., Dabas, J. P. S., and Marwaha, S. (2022). AgriMine: A Deep Learning Integrated Spatio-Temporal Analytics Framework for Diagnosing Nationwide Agricultural Issues Using Farmers' Helpline Data. Computers and Electronics in Agriculture, 201, Article 107308. https://doi.org/10.1016/j.compag.2022.107308

Guntukogula Pattabhi, S., Prashanth, P., Sreenivasulu, M., and Madavilata, A. (2023). Effectiveness of Social Media Agricultural Information on Farmer's Knowledge. Environment Conservation Journal, 24(1), 123-129. https://doi.org/10.36953/ECJ.11432297

Heeks, R. (2002). Information Systems and Developing Countries: Failure, Success, and Local Improvisations. The Information Society, 18(2), 101-112. https://doi.org/10.1080/01972240290075039

Jain, M., Kumar, P., Bhansali, I., Liao, Q. V., Truong, K., and Patel, S. (2018). FarmChat: A Conversational Agent to Answer Farmer Queries. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, 2(4), Article 170. https://doi.org/10.1145/3287048

Jasani, D. (2022). Technology adoption barriers in construction: Behavioral, operational, and training perspectives. International Journal on Recent and Innovation Trends in Computing and Communication, 10(12), 607–616.

Jasani, D. (2024). Understanding the digital skills gap in the AI forward construction workforce: A data-driven study. Applied Science and Engineering Journal for Advanced Research, 3(3), 46–51.

Jayashree, B. (2018). Social Media and Communication by Scientists: M. S. Swaminathan on Twitter. Current Science, 114(9), 1840-1845. https://doi.org/10.18520/cs/v114/i09/1840-1845

Kamilaris, A., and Prenafeta-Boldú, F. X. (2018). Deep Learning in Agriculture: A Survey. Computers and Electronics in Agriculture, 147, 70-90. https://doi.org/10.1016/j.compag.2018.02.016

Karthikeyan, C., Rangasami, S. S., Kumar, S. A., Ajaykumar, R., Harishankar, K., Thirunavukkarasu, M., and Karthika, R. (2024). Digital Revolution in Livestock Farming: Empowering Indian Farmers With TNAU Cattle Expert System and User Feedback Insights. Indian Journal of Animal Research, 58(9), 1622-1629. https://doi.org/10.18805/IJAR.B-5383

Kiruthiga, C., and Dharmarajan, K. (2025). Data-Driven Insights: A Critical Analysis of Farmer Call Centre Data Using Machine Learning Techniques. International Journal of Computational and Experimental Science and Engineering, 11(2), 1781-1793. https://doi.org/10.22399/ijcesen.1348

Kumar, A., and Sharma, A. (2020). Socio-Sentic Framework for Sustainable Agricultural Governance. Sustainable Computing: Informatics and Systems, 28, Article 100274. https://doi.org/10.1016/j.suscom.2018.08.006

Kumar, A., Kumar Prusty, A., Naik, A., Kumar P, N., Kumar Ojha, P., and Mounika, T. (2025). Adoption and Compliance of AI-Enabled Pest Advisories: Evidence From the National Pest Surveillance System (NPSS) in Odisha, India. Indian Journal of Extension Education, 61(4), 78-83. https://doi.org/10.48165/ijee.2025.61413

Kumar, R. (2023). Farmers' Use of the Mobile Phone for Accessing Agricultural Information in Haryana: An Analytical Study. Open Information Science, 7(1), Article 20220145. https://doi.org/10.1515/opis-2022-0145

Leeuwis, C., and Aarts, N. (2011). Rethinking Communication in Innovation Processes: Creating Space for Change in Complex Systems. The Journal of Agricultural Education and Extension, 17(1), 21-36. https://doi.org/10.1080/1389224X.2011.536344

Liakos, K. G., Busato, P., Moshou, D., Pearson, S., and Bochtis, D. (2018). Machine Learning in Agriculture: A Review. Sensors, 18(8), Article 2674. https://doi.org/10.3390/s18082674

Mishra, G., and Shah, R. (2019). Community Building Through Social Media in a Rural Context. International Journal of Advanced Media and Communication, 7(4), Article 111167. https://doi.org/10.1504/IJAMC.2019.111167

Mittal, S., and Mehar, M. (2016). Socio-Economic Factors Affecting Adoption of Modern Information and Communication Technology by Farmers in India: Analysis Using Multivariate Probit Model. The Journal of Agricultural Education and Extension, 22(2), 199-212. https://doi.org/10.1080/1389224X.2014.997255

Mongeon, P., and Paul-Hus, A. (2016). The Journal Coverage of Web of Science and Scopus: A Comparative Analysis. Scientometrics, 106(1), 213-228. https://doi.org/10.1007/s11192-015-1765-5

Nain, M. S., Singh, R., and Mishra, J. R. (2019). Social Networking of Innovative Farmers Through WhatsApp Messenger for Learning Exchange: A Study of Content Sharing. The Indian Journal of Agricultural Sciences, 89(3), 556-558. https://doi.org/10.56093/ijas.v89i3.87605

Nakasone, E., Torero, M., and Minten, B. (2014). The Power of Information: The ICT Revolution in Agricultural Development. Annual Review of Resource Economics, 6(1), 533-550. https://doi.org/10.1146/annurev-resource-100913-012714

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. BMJ, 372, Article n71. https://doi.org/10.1136/bmj.n71

Palaniswamy, V., and Raj, K. (2022). Social Media Marketing Adoption by Agriculturists: A TAM Based Study. International Journal of Professional Business Review, 7(3), Article e0537. https://doi.org/10.26668/businessreview/2022.v7i3.537

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., Roen, K., and Duffy, S. (2006). Guidance on the Conduct of Narrative Synthesis in Systematic Reviews: A Product From the ESRC Methods Programme. Lancaster University.

Rai, S. K., and Singh, J. P. (2025). Identification and Analysis of Indian Farmers' Behavior Toward Adoption of New Farming Technologies and E-Agriculture Schemes Through Twitter. International Journal on Smart Sensing and Intelligent Systems, 18(1), Article 20250019. https://doi.org/10.2478/ijssis-2025-0019

Rama Devi, V., and Venugopal, M. (2022). The Role of Social Media in Rural Development: A Study in Telangana State. Journal of Rural Development, 41(1), 136-152. https://doi.org/10.25175/jrd/2022/v41/i1/172467

Rehman, M. Z. U., Raghuvanshi, D., and Kumar, N. (2023). KisanQRS: A Deep Learning-Based Automated Query-Response System for Agricultural Decision-Making. Computers and Electronics in Agriculture, 213, Article 108180. https://doi.org/10.1016/j.compag.2023.108180

Ryan, M. (2023). The Social and Ethical Impacts of Artificial Intelligence in Agriculture: Mapping the Agricultural AI Literature. AI and Society, 38(6), 2473-2485. https://doi.org/10.1007/s00146-021-01377-9

Singh, M., Singh, A., Bharti, S., Singh, P., and Saini, M. (2022). Using Social Media Analytics and Machine Learning Approaches to Analyze the Behavioral Response of Agriculture Stakeholders During the COVID-19 Pandemic. Sustainability, 14(23), Article 16174. https://doi.org/10.3390/su142316174

Spielman, D. J., Lecoutere, E., Makhija, S., and Van Campenhout, B. (2021). Information and Communications Technology (ICT) and Agricultural Extension in Developing Countries. Annual Review of Resource Economics, 13(1), 177-201. https://doi.org/10.1146/annurev-resource-101520-080657

Suchiradipta, B., and Saravanan, R. (2016). Social Media: Shaping the Future of Agricultural Extension and Advisory Services (GFRAS Interest Group on ICT4RAS Discussion Paper). Global Forum for Rural Advisory Services.

Thakur, D., and Chander, M. (2017). Use of Social Media for Livestock Advisory Services: The Case of WhatsApp in Himachal Pradesh, India. The Indian Journal of Animal Sciences, 87(8), 1034-1037. https://doi.org/10.56093/ijans.v87i8.73531

Vasan, M., and Yoganandan, G. (2024). Does the Belief of Farmers on Land as God Influence the Adoption of Smart Farming Technologies? Benchmarking: An International Journal, 31(7), 2338-2359. https://doi.org/10.1108/BIJ-10-2022-0645