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### Knowledge and adoption of social media for agricultural information: A case study in Kanpur Nagar district, Uttar Pradesh, India

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#### Abstract

Social media has emerged as an important digital extension tool for disseminating agricultural information, complementing conventional extension services by providing timely, interactive, and accessible advisory support to farmers. The present study was conducted during 2023–24 in Kanpur Nagar district of Uttar Pradesh to assess farmers' knowledge and adoption of social media for agricultural information communication and to examine the relationship between selected socio-economic characteristics and these behavioural attributes. An ex-post facto research design was adopted. Bilhaur block was selected purposively, and six villages were selected through simple random sampling. A total of 120 smartphone-owning farmers were selected using simple random sampling and interviewed using a pre-tested structured interview schedule. Data were analysed using frequency, percentage, mean, standard deviation, and Karl Pearson's correlation coefficient. The findings revealed that 60.83% of the respondents possessed a medium level of knowledge, while 58.33% exhibited a medium level of adoption of social media for agricultural information. Among the platforms studied, WhatsApp ranked first in both knowledge (weighted mean score = 1.80) and adoption (weighted mean score = 1.64), followed by Facebook and YouTube, indicating their widespread acceptance as sources of agricultural information. Correlation analysis revealed that education, annual income, landholding, extension participation, material possession, social participation, social media exposure, economic motivation, and scientific orientation were positively and significantly associated with farmers' knowledge and adoption ( $p < 0.05$  or  $p < 0.01$ ). Among these variables, scientific orientation exhibited the strongest positive association with both knowledge ( $r = 0.360$ ,  $p < 0.01$ ) and adoption ( $r = 0.430$ ,  $p < 0.01$ ), followed by social media exposure (knowledge:  $r = 0.357$ ,  $p < 0.05$ ; adoption:  $r = 0.388$ ,  $p < 0.01$ ). The study concludes that social media serves as an effective complementary extension tool for improving farmers' access to agricultural information. Strengthening farmers' digital literacy, enhancing institutional engagement through authenticated social media platforms, and improving rural digital infrastructure can further promote the effective utilization of ICT-enabled agricultural advisory services and support sustainable agricultural development.

**Keywords:** Social media, adoption, ICT, digital extension, farmers

#### Introduction

Agriculture is a primary sector of the Indian economy, contributing food security, job creation and rural livelihoods. However, farmers face several challenges, including climate variability, rising input costs, declining natural resources, pest and disease outbreaks, and market uncertainties. Addressing these challenges requires timely, reliable and location-specific agricultural information to support informed decision-making and improve farm productivity (FAO, 2022; Government of India, 2021) [6, 7].

Agricultural extension has traditionally served as the primary mechanism for communicating scientific knowledge and improved technologies to farmers through demonstrations, trainings, field visits and mass communication methods. Despite its significant contribution, the conventional extension system is often constrained by limited manpower, inadequate financial resources and a high farmer-to-extension worker ratio, restricting its ability to meet the

diverse information needs of farmers. Consequently, the integration of Information and Communication Technologies (ICTs) into agricultural extension has emerged as an effective approach for enhancing the accessibility, timeliness and efficiency of advisory services. (Davis & Sulaiman, 2014) [5]. The rapid expansion of smartphones, internet connectivity and digital communication technologies has transformed agricultural information dissemination. Government initiatives such as Digital India, e-NAM, m-Kisan and Kisan Call Centres have accelerated the adoption of ICT-enabled extension services by providing farmers with timely information on crop production, weather forecasts, market prices and government schemes. Among various ICT tools, social media has emerged as a powerful platform for facilitating interactive communication among farmers, researchers, extension personnel and agricultural institutions. Platforms such as WhatsApp, YouTube, Facebook and Telegram enable farmers to access advisory services,

exchange experiences, share multimedia content and obtain expert guidance in real time (Ministry of Agriculture & Farmers Welfare, 2021) <sup>[12]</sup>.

Several empirical studies have demonstrated the growing importance of social media in agricultural extension. Mishra *et al.* (2022) <sup>[13]</sup> reported that WhatsApp and YouTube were the most preferred social media platforms among farmers in Haryana, and that education, annual income and extension contact significantly influenced their use of social media for agricultural purposes. Similarly, Sandeep *et al.* (2022) <sup>[18]</sup> observed that agricultural information disseminated through social media was perceived as moderately to highly effective, with digital literacy and social media participation significantly improving information utilization. Meena *et al.* (2022) <sup>[11]</sup> found that social media promoted rapid exchange of agricultural information, strengthened farmer-to-farmer interaction and facilitated the dissemination of improved agricultural technologies. Furthermore, Chandra *et al.* (2023) <sup>[4]</sup> reported that education, extension contact and social participation had significant positive effects on farmers' adoption of ICT-based agricultural information services. Collectively, these studies highlight the increasing contribution of digital communication platforms in strengthening agricultural extension and technology dissemination.

Despite the increasing availability of smartphones and internet connectivity, the effective utilization of social media for agricultural information varies considerably among farmers due to differences in education, digital literacy, income, extension contact, scientific orientation, and communication behaviour. Although previous studies have explored ICT utilization and digital extension, empirical evidence on farmers' knowledge and adoption of social media for agricultural information remains limited, particularly at the district level in Uttar Pradesh. Furthermore, little attention has been given to examining the socio-economic factors influencing these behavioural attributes in Kanpur Nagar district.

Understanding farmers' knowledge and adoption of social media is essential for designing effective digital extension strategies, strengthening ICT-enabled advisory services, and promoting evidence-based agricultural decision-making. Therefore, the present study was undertaken in the Kanpur Nagar district of Uttar Pradesh to assess farmers' knowledge of and adoption of social media for agricultural information dissemination, and to examine the relationship between selected socio-economic characteristics and these behavioural attributes. The findings are expected to provide valuable insights for policymakers, extension agencies, and researchers in enhancing digital agricultural extension and promoting the effective use of social media for sustainable agricultural development.

## Methodology

The present investigation was conducted during 2023–24 in Kanpur Nagar district of Uttar Pradesh using an ex-post facto research design, as the variables under study had already occurred and were beyond the control of the investigator. Kanpur Nagar district was selected purposively because of the increasing penetration of smartphones, internet connectivity, and the growing use of social media among the farming community. Among the ten development blocks of

the district, Bilhaur block was selected purposively due to its agricultural importance and accessibility. Further, six villages were selected from the block through simple random sampling.

A comprehensive list of farmers possessing smartphones and using social media for agricultural purposes was prepared with the assistance of village officials and extension personnel. From this sampling frame, 120 respondents were selected by employing the simple random sampling technique.

Primary data were collected through personal interviews using a pre-tested and structured interview schedule specifically developed in accordance with the objectives of the study. The schedule was pre-tested among non-sample respondents to ensure clarity, reliability, and validity, and necessary modifications were incorporated before the final survey.

The interview schedule consisted of two major sections. The first section elicited information on the respondents' socio-economic and communication characteristics, namely age, caste, family type, family size, annual income, education, occupation, marital status, landholding, housing pattern, extension participation, material possession, social participation, social media exposure, economic motivation, and scientific orientation.

The second section assessed the respondents' knowledge and adoption regarding the utilization of social media for agricultural information. Knowledge was measured using 16 statements pertaining to the awareness and understanding of different social media platforms and ICT-based agricultural information services. Responses were recorded on a three-point continuum, namely Fully Known (2), Partially Known (1), and Not Known (0). Thus, the total knowledge score ranged from 0 to 32.

Similarly, adoption was measured using 16 statements related to the utilization of social media platforms for agricultural purposes. Responses were recorded on a three-point continuum, namely Strongly Agree (2), Agree (1), and Disagree (0), yielding a total adoption score ranging from 0 to 32.

Based on the total scores obtained, respondents were categorized into low, medium, and high levels of knowledge and adoption using the Mean  $\pm$  Standard Deviation (Mean  $\pm$  SD) method.

The collected data were coded, tabulated, and analysed using IBM SPSS Statistics (Version 23.0) and Microsoft Excel. Descriptive statistical measures such as frequency, percentage, mean, weighted mean score, standard deviation, and rank order were used to summarize the data. Karl Pearson's correlation coefficient ( $r$ ) was employed to examine the relationship between the selected independent variables and the respondents' knowledge and adoption levels regarding social media for agricultural information. The significance of the correlation coefficients was tested at the 5% ( $p < 0.05$ ) and 1% ( $p < 0.01$ ) probability levels.

## Results and Discussion

### Knowledge Level of Respondents Regarding Social Media Platforms

The findings presented in Table 1 revealed considerable variation in farmers' knowledge of different social media platforms and ICT-enabled agricultural information services.

Among the platforms studied, WhatsApp secured the highest rank with a weighted mean score of 1.80, followed by Facebook (1.70), Kisan Call Centre (1.63), YouTube (1.45), Kisan SMS Portal (1.44), and e-Choupal (0.71). The predominance of WhatsApp may be attributed to its widespread accessibility, ease of operation, multilingual communication, multimedia-sharing capability, and extensive use by agricultural universities, Krishi Vigyan Kendras (KVKs), extension personnel, and farmer groups for disseminating timely agricultural advisories.

Facebook and YouTube also exhibited high levels of awareness because these platforms provide instructional videos, success stories, live interactions with agricultural experts, and updates on government schemes. In contrast,

comparatively lower knowledge of the Kisan SMS Portal and e-Choupal may be associated with limited promotional efforts, reduced user engagement, and farmers' increasing preference for internet-based interactive platforms over conventional SMS- or web-based advisory systems.

These findings suggest that farmers increasingly rely on interactive and multimedia-based digital platforms for obtaining agricultural information, reflecting the ongoing digital transformation of agricultural extension services. Similar observations have been reported by Mishra *et al.* (2022)<sup>[14]</sup>, Meena *et al.* (2022)<sup>[11]</sup>, and Patabhi *et al.* (2023)<sup>[16]</sup>, who found that WhatsApp and YouTube were the most preferred social media platforms among farmers for accessing agricultural information.

**Table 1:** Item-wise Knowledge of respondents regarding selected social media platforms

| Sl. No. | Programmes        | Fully Known (2) |       | Partially known (1) |       | Not known (0) |       | Total weighted score | Weighted mean score | Rank order |
|---------|-------------------|-----------------|-------|---------------------|-------|---------------|-------|----------------------|---------------------|------------|
|         |                   | F               | %     | F                   | %     | F             | %     |                      |                     |            |
| 1.      | WhatsApp          | 103             | 85.83 | 10                  | 8.33  | 7             | 5.83  | 216                  | 1.80                | I          |
| 2.      | Kisan SMS Portal  | 83              | 69.16 | 7                   | 5.83  | 31            | 25.00 | 173                  | 1.44                | V          |
| 3.      | Kisan Call Centre | 94              | 78.33 | 8                   | 6.67  | 18            | 15.00 | 196                  | 1.63                | III        |
| 4.      | YouTube           | 85              | 70.83 | 4                   | 3.33  | 31            | 25.83 | 174                  | 1.45                | IV         |
| 5.      | Facebook          | 99              | 82.50 | 6                   | 5.00  | 15            | 12.50 | 204                  | 1.70                | II         |
| 6.      | e-Choupal         | 27              | 22.50 | 31                  | 25.83 | 62            | 51.67 | 85                   | 0.71                | VI         |

The results presented in Table 2 revealed that the majority of respondents (60.83%) possessed a medium level of knowledge regarding the use of social media for agricultural information, followed by 20.00% and 19.17% with low and high knowledge levels, respectively. The predominance of the medium category suggests that farmers are generally aware of social media as a source of agricultural information but require greater exposure to advanced digital advisory services. This may be attributed to increasing smartphone penetration, improved internet connectivity, and government-led digital agriculture initiatives. However, differences in education and digital literacy may have limited higher levels of knowledge. These findings are consistent with Meena *et al.* (2022)<sup>[11]</sup> and Sandeep *et al.* (2022)<sup>[18]</sup>, who also reported moderate knowledge levels among farmers regarding ICT-enabled agricultural information services.

**Table 2:** Distribution of Respondents According to Knowledge Level

| Knowledge Category | Score                          | Frequency | Percentage |
|--------------------|--------------------------------|-----------|------------|
| Low                | $\leq \text{Mean} - \text{SD}$ | 24        | 20.00      |
| Medium             | $\text{Mean} \pm \text{SD}$    | 73        | 60.83      |
| High               | $\geq \text{Mean} + \text{SD}$ | 23        | 19.17      |
| Total              |                                | 120       | 100.00     |

Mean = 11.72; SD=2.31

### Adoption Level of the Respondents Regarding Social Media platforms

The results presented in Table 3 revealed varying levels of adoption of different social media platforms among farmers for accessing agricultural information. Among the six platforms evaluated, WhatsApp emerged as the most widely adopted platform, securing the first rank with the highest weighted mean score (1.64). A majority (78.33%) of the respondents strongly agreed that they regularly use WhatsApp for obtaining agricultural information, whereas

only 14.16% disagreed. The high level of adoption may be attributed to its ease of use, instant messaging, multimedia sharing, group communication, and frequent dissemination of agricultural advisories by extension personnel, agricultural universities, and progressive farmers.

Facebook ranked second with a weighted mean score of 1.51, as 74.16% of the respondents strongly agreed that they used the platform for agricultural purposes. The platform provides opportunities to access agricultural videos, success stories, live discussions, and updates on government schemes through official pages and farmer communities, thereby encouraging its adoption.

YouTube secured the third rank with a weighted mean score of 1.38. About 65.83% of the respondents strongly agreed that they used YouTube for agricultural information, while 29.16% disagreed. The platform's popularity can be attributed to its extensive collection of instructional videos demonstrating improved crop production technologies, pest and disease management, farm mechanization, and success stories, which enhance farmers' understanding through visual learning.

The Kisan SMS Portal obtained the fourth rank with a weighted mean score of 1.36. Although 67.50% of the respondents strongly agreed that they utilized the portal, nearly one-third (29.16%) disagreed. This comparatively lower adoption may be due to the increasing preference for internet-based multimedia platforms over conventional SMS-based advisory services.

Kisan Call Centre ranked fifth with a weighted mean score of 1.25. While 60.83% of the respondents strongly agreed regarding its use, 35.00% disagreed. Farmers may prefer social media platforms because they provide instant access to multimedia content, peer interaction, and archived information, whereas call centres require direct communication and are generally used only when specific technical advice is needed.

Among all the platforms, e-Choupal recorded the lowest adoption, ranking sixth with a weighted mean score of 0.46. Only 20.83% of the respondents strongly agreed that they used e-Choupal, whereas 74.16% disagreed. The limited adoption of e-Choupal may be attributed to its restricted

availability, limited awareness among farmers, and the growing preference for smartphone-based social media applications that offer more interactive, convenient, and easily accessible agricultural information.

**Table 3:** Item-wise Adoption of respondents regarding selected social media platforms

| Sl. No. | Programmes        | Strongly Agree (2) |       | Agree (1) |      | Disagree (0) |       | Total Weighted Score | Weighted mean Score | Rank order |
|---------|-------------------|--------------------|-------|-----------|------|--------------|-------|----------------------|---------------------|------------|
|         |                   | F                  | %     | F         | %    | F            | %     |                      |                     |            |
| 1.      | Kisan SMS Portal  | 81                 | 67.50 | 4         | 3.33 | 35           | 29.16 | 166                  | 1.36                | IV         |
| 2.      | WhatsApp          | 94                 | 78.33 | 9         | 7.50 | 17           | 14.16 | 197                  | 1.64                | I          |
| 3.      | YouTube           | 79                 | 65.83 | 6         | 5.00 | 35           | 29.16 | 164                  | 1.38                | III        |
| 4.      | Facebook          | 89                 | 74.16 | 4         | 3.33 | 27           | 22.50 | 182                  | 1.51                | II         |
| 5.      | Kisan Call Centre | 73                 | 60.83 | 5         | 4.16 | 42           | 35.00 | 151                  | 1.25                | V          |
| 6.      | e-Choupal         | 25                 | 20.83 | 6         | 5.00 | 89           | 74.16 | 56                   | 0.46                | VI         |

The results presented in Table 4 revealed that the majority of respondents (58.33%) exhibited a medium level of adoption of social media for agricultural purposes, followed by 21.67% with low adoption and 20.00% with high adoption. The predominance of the medium adoption category indicates that although farmers frequently use social media to access agricultural information, they remain cautious in implementing online recommendations and often validate the information through extension personnel or experienced farmers. This suggests that social media serves as a complementary extension tool rather than a substitute for conventional advisory services.

These observations are consistent with the findings of Mishra (2022) <sup>[14]</sup>, Kaur *et al.* (2019) <sup>[9]</sup>, and Pandey and Mazhar (2023) <sup>[15]</sup>, who reported that the majority of farmers demonstrated a medium level of ICT adoption for agricultural decision-making.

**Table 4:** Distribution of Respondents According to Adoption Level (n = 120)

| Adoption Category | Frequency | Percentage |
|-------------------|-----------|------------|
| Low               | 26        | 21.67      |
| Medium            | 70        | 58.33      |
| High              | 24        | 20.00      |
| Total             | 120       | 100.00     |

Mean 12.38; SD 2.54

#### Relationship between Selected variables with Knowledge and Adoption of Social Media

To determine the association between selected socio-economic characteristics and the knowledge and adoption of social media for agricultural information dissemination, Karl Pearson's correlation coefficient was computed. The results are presented in Table 5.

**Table 5:** Relationship between selected variables with knowledge and adoption of social media (n = 120)

| S. No. | Independent variables   | Knowledge level | Adoption level |
|--------|-------------------------|-----------------|----------------|
| 1.     | Age                     | -0.149 NS       | 0.009 NS       |
| 2.     | Caste                   | 0.070 NS        | 0.010 NS       |
| 3.     | Family type             | 0.338*          | 0.016 NS       |
| 4.     | Size of family          | -0.099 NS       | -0.054 NS      |
| 5.     | Annual income (lakh)    | 0.242*          | 0.287**        |
| 6.     | Education               | 0.313**         | 0.278**        |
| 7.     | Occupation              | 0.026 NS        | 0.215*         |
| 8.     | Marital status          | 0.009 NS        | -0.096 NS      |
| 9.     | Land holding (ha.)      | 0.271**         | 0.275**        |
| 10.    | Housing pattern         | 0.061 NS        | 0.191*         |
| 11.    | Extension participation | 0.326**         | 0.342**        |
| 12.    | Material possession     | 0.282**         | 0.297**        |
| 13.    | Social participation    | 0.218*          | 0.311**        |
| 14.    | Social media exposure   | 0.357*          | 0.388**        |
| 15.    | Economic motivation     | 0.268**         | 0.305**        |
| 16.    | Scientific orientation  | 0.360**         | 0.430**        |

\*Significant at  $p < 0.05$ ;

\*\*Significant at  $p < 0.01$ ;

NS = Non-significant.

Correlation analysis revealed that several socio-economic, communication, and psychological characteristics significantly influenced farmers' knowledge and adoption of social media for agricultural information dissemination. Education exhibited a positive and highly significant relationship with knowledge ( $r = 0.313^{**}$ ) and adoption ( $r =$

$0.278^{**}$ ), indicating that educated farmers were better able to understand, evaluate, and utilize agricultural information available through social media. Similarly, annual income showed a significant positive relationship with knowledge ( $r = 0.242^{*}$ ) and adoption ( $r = 0.287^{**}$ ), suggesting that economically stronger farmers had greater access to

smartphones, internet connectivity, and other digital resources required for effective social media utilization. Landholding was also positively associated with knowledge ( $r = 0.271^{**}$ ) and adoption ( $r = 0.275^{**}$ ), implying that farmers with larger operational holdings were more likely to seek agricultural information and adopt improved technologies.

Extension participation demonstrated a highly significant positive relationship with knowledge ( $r = 0.326^{**}$ ) and adoption ( $r = 0.342^{**}$ ), highlighting the importance of extension programmes in promoting the effective utilization of social media as a complementary source of agricultural information. Likewise, social media exposure was positively associated with knowledge ( $r = 0.357^{*}$ ) and adoption ( $r = 0.388^{**}$ ), confirming that regular engagement with digital platforms enhances farmers' access to timely agricultural information and encourages technology adoption.

Scientific orientation exhibited the strongest positive relationship with both knowledge ( $r = 0.360^{**}$ ) and adoption ( $r = 0.430^{**}$ ), indicating that farmers with a stronger scientific outlook were more receptive to scientific recommendations, modern technologies, and ICT-enabled advisory services. Material possession, social participation, and economic motivation also showed significant positive relationships with both knowledge and adoption, suggesting that farmers possessing better resources, stronger social networks, and higher economic aspirations were more likely to utilize social media for agricultural information. Occupation ( $r = 0.215^{*}$ ) and housing pattern ( $r = 0.191^{*}$ ) exhibited significant positive relationships only with adoption, indicating that these factors influenced the practical use of social media rather than knowledge acquisition.

In contrast, age, caste, family size, and marital status exhibited non-significant relationships with both knowledge and adoption, indicating that these personal characteristics had little influence on farmers' utilization of social media for agricultural information in the study area. The present findings are in agreement with those of Mittal and Mehar (2013), Aker (2011) <sup>[1]</sup>, Feder *et al.* (1985), Swanson and Rajalahti (2010), Anderson and Feder (2007) <sup>[2]</sup>, Pivoto *et al.* (2018), Meena *et al.* (2022) <sup>[10]</sup>, and Chandra *et al.* (2023) <sup>[4]</sup>, who also reported that education, economic status, extension participation, scientific orientation, and digital exposure significantly enhance farmers' adoption of ICT-enabled agricultural information services.

## Conclusion

The present study demonstrated that social media has emerged as an effective complementary agricultural extension tool for disseminating agricultural information among farmers in Kanpur Nagar district of Uttar Pradesh. The majority of respondents exhibited medium levels of both knowledge and adoption, indicating that social media has gained considerable acceptance as a reliable source of information on crop production, plant protection, weather advisories, market prices, and government schemes. Among the various platforms evaluated, WhatsApp was the most widely known and adopted platform, followed by Facebook and YouTube, reflecting farmers' preference for interactive and multimedia-based communication channels.

The study further revealed that education, annual income, landholding, extension participation, material possession,

social participation, social media exposure, economic motivation, and scientific orientation were positively associated with farmers' knowledge and adoption of social media for agricultural information dissemination. Among these variables, scientific orientation exhibited the strongest positive association, followed closely by social media exposure, highlighting the importance of both a scientific outlook and active digital engagement in promoting effective utilization of social media for agricultural decision-making. Occupation and housing pattern were positively associated with adoption but did not significantly influence knowledge, whereas age, caste, family size, and marital status showed no significant relationship with either knowledge or adoption. The findings emphasize the need to strengthen ICT-enabled agricultural extension through targeted digital literacy programmes, promotion of scientific orientation among farmers, enhanced participation of agricultural universities, Krishi Vigyan Kendras (KVKs), and line departments on authenticated social media platforms, and the dissemination of reliable, location-specific advisory services. Improving rural digital infrastructure and fostering collaboration among extension agencies, research institutions, and digital communication platforms will further enhance the effectiveness of social media in agricultural information dissemination and support sustainable agricultural development. Future studies may examine the long-term impact of social media utilization on technology adoption, farm productivity, income enhancement, and climate-resilient agricultural practices.

## Declarations

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## Conflict of Interest

The authors declare that there is no conflict of interest.

## References

1. Aker JC. Dial "A" for agriculture: A review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*. 2011;42(6):631-647.
2. Anderson JR, Feder G. Agricultural extension. In: Evenson R, Pingali P, editors. *Handbook of Agricultural Economics*. Vol. 3. Amsterdam: Elsevier; 2007. p. 2343-2378.
3. Barakabitze AA, *et al.* The use of information and communication technologies among farmers in Tanzania. *Information Development*. 2015;31(3):264-273.
4. Chandra S, Singh AK, Ghadei K, Pradhan S. Exploring the relationship between socio-economic factors and ICT adoption among farmers. *Indian Journal of Extension Education*. 2023;59(3):56-60.
5. Davis K, Sulaiman R. *The New Extensionist: Roles and capacities to strengthen extension and advisory services*. Lindau: Global Forum for Rural Advisory Services; 2014.
6. Food and Agriculture Organization of the United Nations. *The State of Food and Agriculture 2022*:

- Leveraging Automation in Agriculture for Transforming Agrifood Systems. Rome: FAO; 2022. doi:10.4060/cb9479en.
7. Government of India. Digital India Programme. New Delhi: Ministry of Electronics and Information Technology; 2015. <https://digitalindia.gov.in>
  8. Kafura RA, *et al.* Factors influencing ICT utilization among farmers. *Journal of Agricultural Extension*. 2016;20(2):87-98.
  9. Kaur M, Sharma P, Singh J. Utilization of social media by farmers for agricultural information. *Indian Journal of Extension Education*. 2019;55(4):80-85.
  10. Meena MS, *et al.* Digital agriculture and social media adoption among Indian farmers. *Indian Research Journal of Extension Education*. 2022;22(3):14-21.
  11. Meena V, Meena KC, Goyal MC, Meena LK, Kumar R. Social media used by the farmers in sharing farm information. *Asian Journal of Agricultural Extension, Economics & Sociology*. 2022;40(10):954-960.
  12. Ministry of Agriculture & Farmers Welfare. m-Kisan Portal. New Delhi: Government of India; 2021. <https://mkisan.gov.in>
  13. Mishra A. Farmers' perception towards social media for agricultural information. *Journal of Community Mobilization and Sustainable Development*. 2022;17(1):95-102.
  14. Mishra A, Singh J, Malik JS, Maurya AS. Social media use profile of farmers in Haryana. *Indian Journal of Extension Education*. 2022;58(3):51-54.
  15. Pandey S, Mazhar S. Adoption of ICT tools in agriculture: An empirical study. *Indian Journal of Extension Education*. 2023;59(2):101-108.
  16. Pattabhi K, *et al.* Digital extension and social media use among farmers in India. *Indian Journal of Agricultural Sciences*. 2023;93(7):745-751.
  17. Rogers EM. *Diffusion of Innovations*. 5th ed. New York: Free Press; 2003.
  18. Sandeep GP, Prashanth P, Sreenivasulu M, Madavilata A. Effectiveness of agricultural information disseminated through social media. *Indian Journal of Extension Education*. 2022;58(2):186-190.
  19. Supe SV. Factors related to different degrees of rationality in decision making among farmers. New Delhi: Indian Agricultural Research Institute; 1969.