



Determining the Knowledge Level and Accessibility of Major ICT Tools by Farmers in Madhya Pradesh

Sarvesh Kumar

Associate Professor, Department of Extension Education, Institute of Agricultural Sciences, BHU, Varanasi-221005, Uttar Pradesh, India

Email id: sarvesh84@bhu.ac.in

HIGHLIGHTS

- ICTs use convenes the agricultural practices, economic improvement, and decision-making.
- Majority of farmers possessed a medium level of ICT knowledge (68.45%), Mobile as the most used tool.
- Digital literacy of farmers needed to be improved through campaigns and training.
- Futuristic agricultural solution in remote areas will be possible by both farmers and extension functionaries.

ARTICLE INFO

Keywords: Accessibility, Agricultural knowledge, Awareness, Barriers, Financial benefits, ICTs.

<https://doi.org/10.48165/IJEE.2025.61417>

Citation: Kumar, S. (2025). Determining the knowledge level and accessibility of major ICT tools by farmers in Madhya Pradesh. *Indian Journal of Extension Education*, 61(4), 101-105. <https://doi.org/10.48165/IJEE.2025.61417>

ABSTRACT

Information Communication Technologies are vibrant ways to significantly boost the agricultural sector by providing farmers with access to vital information, input availability, and online financial transactional services like DBT covering PM-KISAN Samman Nidhi, agri-input subsidies, and domestic gas subsidies. The study was conducted in 2024 to find out the major ICTs tools' use, accessibility, knowledge level, and major barriers faced in use by collecting data from 150 randomly sampled farmers of Harda district of Madhya Pradesh. Data were collected by using a pre-tested structured interview schedule and analyzed with appropriate statistical tools. The majority of respondent farmers (68.45%) had a medium knowledge level about ICT tools. Education, annual income, social participation, mass media exposure, and extension contact expressed significant positive correlation with accessibility of major ICT tools among farmers. The major barriers were observed with Garrett's ranking techniques. The farmers, especially young farmers, possessed the ICT tool like a smart mobile only for personal entertainment and interconnectivity, rarely using it to access agricultural knowledge for improvement. The backstopping of farmers to boost digital literacy for agricultural development and ICT adoption could be augmented by organizing educational campaigns and training.

INTRODUCTION

Information and Communication Technology (ICT) tools are very important to obtain the information for decision making in crop planning by farmers. The farmers seek information from ICTs related to weather forecasts, market prices, agricultural advice, e-learning, e-commerce platforms for mobile banking and micro-financing options generally allowing farmers to secure loans and manage transactions easily, supply chain management, social media groups to share experiences, solve problems collectively and

support each other for ensuring food gain production in the country. Innovative agriculture and rural development may be attained by ICT use as it improves communication among agricultural research, extension, farmers and other stakeholders (FAO, 2025). The emerging knowledge-based economy and information revolution is due to ICTs interventions. The timely reliable information provides decision support to farmers through ICTs (Shukla et al., 2024a). The quick delivery of the farm information to faraway regions is possible by ICTs well use (Mishra et al., 2021; Joshy, 2018; Mishra et al., 2020). The telecommunication and Internet services over the

past twenty- five years created an environment for people for greater access around the world. The agricultural development is seen faster with ICT interventions (Patra et al., 2020). Transfer of technology nowadays is being supported by ICTs and blends with field personnel (Lahiri et al., 2017; Panda et al., 2019; Kavaskar & Sharmila, 2020). Farmers benefit from ICT-based information access during critical times (Ravikumar et al., 2015; Kale et al., 2016). ICTs may provide cost cost-effective solution to farmers in remote areas (Lahiri et al., 2020). ICT has benefitted the livestock extension (Chandra et al., 2023). The mobile tools were used more than other mass communication tools in farming like TV, radio etc. (Gangil & Verma, 2018). Tripura state has big scope of ICT in fisheries extension (Nirmalkar et al., 2022). The farmer enhanced their family's educational status and economic by better use of ICT technologies (Anand et al., 2022). ICTs based Kisan mobile advisory services found very fruitful in changing farmers' technical information, crop production and crop diversification planning in Harda district of M.P. (Kumar et al., 2015.) The farmers have exploited the social media platforms for the adoption of best agricultural practices (Nain et al., 2019; Sandeep et al., 2022). Farmers received confidence by using an based app for KVK's activities for the dissemination of information and advisory service in Punjab (Singh et al., 2023). The financial benefits were reaped by farmers utilizing ICTs information in agricultural activities and fertilizer dose management in Madhya Pradesh (Kumar, 2025).

METHODOLOGY

A random sample of 150 farmers as respondents, representing all three blocks, namely Harda, Khirkiya, Timarani and ten villages in each block, with five farmers from each village of Harda district, was selected. The independent variables were social participation, education, mass media exposure, family type, extension contact, age, and annual income. The ICT tool used by farmers, their availability, the knowledge level of farmers, and barriers in ICT tool use and knowledge were assessed as dependent variables. Knowledge scores were obtained on yes/no (yes, score-1, no, score-0) on a pre-tested scale having set of 32 questions on the knowledge level on the usage of different ICT tools. The data were collected in a pre-tested semi-structured interview schedule during January to June 2024. The ownership of particular ICT tools was reflected as accessibility to ICT. The data were compiled, analyzed and interpreted by utilizing statistical tools like percentage, arithmetic means, standard deviation, correlation coefficient, regression coefficient and Garrett's ranking technique for making the findings more rational. The Garrett ranking formula, used to convert ranks into percentages for analysis.

RESULTS

The accessibility to major ICT tools by the farmers under study is represented in Figure 1 in ascending order. The data reflects the majority of respondents accessed the major ICT tool i.e. mobile phone (86.5%) for information sharing in agriculture field through messaging app like WhatsApp, social media platforms such as Facebook & YouTube, followed by television (78%) for watching DD kisan, radio (22.5%) specially in tribal locality, computer (21%), kisan help line (19%) including kisan sarathi toll free number

1551 and least accessed was e-newsletter/literature (13%) in the study area. Farmers used these major ICT tools for improving their agricultural knowledge, innovative ideation, improved variety sharing, new technology, and methodology and practice exchange among each other as part of farmer-to-farmer communication. Farmers exploited these tools to update them regarding weather, marketing, commodity prices, input information, insect-pest management, new varieties, crop diversification, and weed management related information at priority.

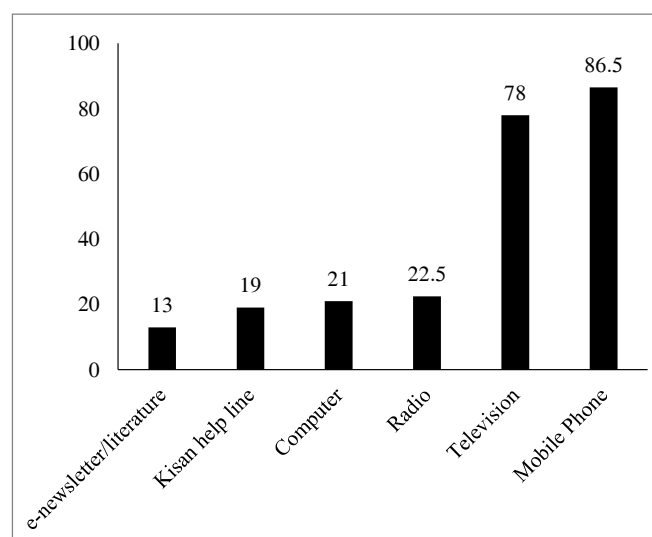


Figure 1. Accessibility of respondent farmers towards major ICT tools

The findings are in line with those by Kumar et al., (2015); Nain et al., (2019); Shashidhara (2020); Anand et al., (2022). These studies reported mobile as the highest accessible tool followed by television in Meghalaya, Haryana, Maharashtra, Karnataka, Rajasthan & Bihar respectively.

Table 1. Knowledge level of practicing farmers on the usage of major ICT tools

Categories	Percentage	Mean	Standard deviation
Low (<14.81)	11.52		
Medium (14.82- to 77.77)	68.45	46.62	32.51
High (>77.77)	20.03		
Total	100		

The mean knowledge score of the respondents was 46.62 ± 32.51 . More respondents (68.45%) had medium knowledge on the use of ICT tools, followed by high knowledge (20.03%) and low knowledge (11.52%). It shows that the farmers would need to be backstopped through training on the use of ICTs and the retrieval skill for needed information online from authentic sources and research institutions. These noble efforts can boost trust and use of ICT tools to a great extent among farmers and other stakeholders. Findings of the present study are in line with the findings of Sharmila & Kavaskar (2017); Lahari et al., (2017); Nirmalkar et al., (2022).

Table 2. Correlation between independent variables and respondents' accessibility to major ICT tools

Independent variable	Correlation coefficient @
Age	-0.153
Education	0.762**
Annual income	0.598**
Social participation	0.384**
Mass media exposure	0.789**
Extension contacts	0.676**

*Significant at 1% level

Age of respondents was found to be negatively and not significantly correlated. The variables under study, like education, annual income, social participation, mass media exposure and extension contact were found to be significantly correlated with accessibility of major ICT tools (Table 2). It reflects that by strengthening these independent variables, the accessibility to major ICT tools among farmers may also be increased or vice versa. Now the positive temperament of farmers towards social media platforms made them keener to exploit major ICT tools in study area. The economically strong farmers found more capable of using major ICT tools and cultivate a good attitude toward ICT use for knowledge and information sharing. Similar findings are reported by Anand et al., (2022); Mukharjee & Jha (2024) in Bihar and West Bengal states, respectively.

Table 3. Multiple regressions between independent variables and accessibility to major ICT tools

Independent variable	Regression coefficient (r)	t value
Age	0.017	-0.276
Education	0.675	4.504**
Annual income	0.022	0.756
Social participation	0.011	0.690
Mass media exposure	0.045	4.218**
Extension contact	0.058	4.957**

R square=0.912; F value=19.785, **Significant at 1% level

Table 3 shows the multiple regressions to test the potency of the linear relationship between the given independent variables with a single dependent variable. The functional relationship between independent variables and their accessibility to major ICT tools among respondents was calculated by using multiple regression analysis. The variables as age, education, annual income, social participation, mass media exposure, and extension contacts, together determined about 91 per cent variation in farmers' accessibility to major ICT tools as evident from R-squared value of 0.912. The regression coefficients found to be positively significant at 1% level of significance for attributes like education, mass media exposure & extension contacts. This implies that by enhancing these three elements, the farmers' access and use of these major ICT tools for agricultural practices would improve or vice versa. The youth engaged in agriculture were seen efficient in handling ICT tools than the aged ones (Kumar et al., 2015). Similar finding was reported by Panda et al., (2019); Anand et al., (2022); Singh & Mathur (2024) with respect to the farmers in West Bengal, Bihar and Rajasthan states of India.

Table 4. Garrett's ranking of the different barriers for ICT tools use in agriculture

Different Barriers	Garrett's ranking score	Percentage	Rank
Possession of ICT tools only for personal entertainment and communication	8703	16.83	1
Difficulty to understand non-speaking language and low retrieval skill	8446	14.16	2
Low digital literacy and awareness	8350	12.32	3
Data privacy and trust issue on online information	8350	11.65	4
Socio-economic aspects	8301	9.32	5
Poor internet connectivity	8029	9.08	6
Lack of motivation to acquire the required ICT tool handling skills	7954	7.94	7
Lack of confidence to use ICT	7682	6.42	8
High cost of good ICT tools as barriers	5924	6.56	9
Unavailability of ICTs device	5348	5.72	10

Barriers connected with the use of major ICT tools by the farmers

The foremost barriers faced by farmers under study are presented in Table 4 in ascending order. The possession of ICT tools only for personal entertainment and interconnectivity (rank-1), difficulty to understand non-speaking language and low retrieval skill (rank-2), low digital literacy and awareness (rank-2), data privacy and trust issue on online information (rank-4), and socio-economic aspects (rank-5) were the barriers found in this study. Similar barriers were reported by Patra et al., (2020); Nirmalkar et al., (2022); Lalthlamuanpuui et al., (2024). Thus, the backstopping on these barriers may streamline the farmer's skill and the enough exploitation of available ICT tools. The regular training and awareness creation among farmers by line departments followed by a meticulous strategy development for organizing virtual farmer's capacity building and training programme to save the time of farmers, ICT for creating mass awareness on crop insurance awareness programmes, FPOs development, organic and natural farming awareness, e-NAM, climate smart agriculture awareness, agri-apps and social media initiatives etc. can improve the situation of ICT tools utility for economic development and motivation of farmers to engage them in agriculture with confidence and trust building.

DISCUSSION

A large number of farmers (68.45%) had medium knowledge about ICT tools for modern agricultural practices. This shows that farmers were aware and keen to learn new technologies for economic progress and crop management in a holistic manner. Young farmers having formal education had higher handling ICT tools literacy. The mobile phone was the most used ICT tool in Harda district of Madhya Pradesh. Mobile phones were used as they can be used to get a wide range of information by making use of different applications. The farmers also revealed a few avoidable barriers in the smooth exploitation of ICT tools for agricultural upliftment, such as weak internet connectivity and, lack of local language content

in ICT platforms. The ICT tools for agricultural use may be increased by organizing education campaigns to boost digital literacy and ICT adoption among farmers.

Education, mass media exposure and extension contacts were correlated significantly and positively at 1% level. This indicates that by enhancing these three attributes, the farmers' access and use of major ICT tools would improve or vice versa. The major challenge was that the farmers, especially young farmers, possessed the ICT tools only for personal entertainment and interconnectivity, thereby using it meagerly to access relevant information for agricultural knowledge improvement and awareness. They were quite reluctant to search for modern farm techniques and information related to the cropping pattern followed for their livelihoods.

CONCLUSION

This study highlights the significance of ICT tools in agricultural development, particularly in Madhya Pradesh. The findings reveal that most farmers possess medium knowledge of ICT tools, with mobile phones being the most widely used tool. Education, mass media exposure, and extension contacts significantly influence farmers' accessibility to ICT tools. However, major barriers include using ICT tools for personal entertainment, difficulty understanding non-speaking languages, and low digital literacy. To overcome these challenges, regular training and awareness programs can be implemented to boost digital literacy and ICT adoption among farmers. Policymakers can promote ICT-based initiatives, develop local language content, and improve internet connectivity to enhance agricultural development. Practically, farmers can benefit from targeted capacity-building programs, enabling them to utilize ICT tools effectively for informed decision-making and improved livelihoods. By addressing these challenges, ICT tools can play a vital role in transforming agriculture in Madhya Pradesh.

DECLARATIONS

Ethics approval and informed consent: Informed consent was sought from the respondents during the course of the research.

Conflict of interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The authors declare that during the preparation of this work, thoroughly reviewed, revised, and edited the content as needed. The author take full responsibility for the final content of this publication.

Publisher's note: All claims expressed in this article are solely those of the author and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and the reviewers. Any product/ process or technology that may be evaluated in this article, or a claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

REFERENCES

- Anand, S., Prakas, S., & Singh, A. K. (2022). Determinants of ICT tools accessibility by farmers in Bihar. *Indian Journal of Extension Education*, 58(3), 186-189, <http://doi.org/10.48165/IJEE.2022.58338>
- Chandra, S., Singh, A. K., Ghadei, K., & Pradhan, S. (2023). Exploring the relationship between socio-economic factors and ICT adoption among farmers. *Indian Journal of Extension Education*, 59(3), 54-57 <http://doi.org/10.48165/IJEE.2023.59310>
- FAO (2025). ICTs for sustainable agriculture: Technologies for agricultural information sharing. <https://www.fao.org/4/i3557e/i3557e01.pdf>, 1-55.
- Gangil, D., & Verma, H. K. (2018). Mobile phone use pattern of the dairy farmers of Punjab. *Livestock Extension*, 1(1), 72-74, <https://epubs.icar.org.in/index.php/IJEE/article/view/106985/42116>
- Josh, C. G. (2018). ICT application in fisheries. In: Suresh, A., Sajeev, M. V., Rejula, K., & Mohanty, A. K. (Eds.), *Extension management techniques for up-scaling technology dissemination in fisheries (e-manual)*, Central Institute of Fisheries Technology, Cochin, India, pp 238-241. Retrieved August 18, 2021, from <https://krishi.icar.gov.in/jspui/handle/123456789/20401>
- Kale, R. B., Meena, M. S., & Rohilla, P. P. (2016). Determining factors and level of e-skills among agriculture experts of Krishi Vigyan Kendras in India. *Journal of Agricultural Science and Technology*, 18(7), 1749-1760, <https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=540633>
- Kavaskar, M., & Sharmila, S. (2020). A Study on utilization of information and communication technologies by the extension personnel of state department of agriculture in Tamil Nadu. *Plant Archives*, 20(2), 1270-1272, http://www.plantarchives.org/SPL%20ISSUE%2020-2/201__1270-1272_.pdf
- Kumar, S. (2025). Analyzing adoption impediments in soil health card based fertilizer application by farmers. *Indian Journal of Extension Education*, 61(2), 114-117, <https://doi.org/10.48165/IJEE.2025.612RN04>
- Kumar, S., Singh, M., Singh, P., & Rohit (2023). Utilization pattern of ICT tools by paddy growers in Uttar Pradesh. *Indian Journal of Extension Education*, 59(2), 135-137, <http://doi.org/10.48165/IJEE.2023.59230>
- Kumar, S., Singh, S. R. K., & Sharma, R. C. (2015). Farmers' attitude mapping towards kisan mobile advisory services, *Indian Journal of Extension Education*, 51(3&4), 145-147.
- Lahiri, B., Anurag, T. S., Marak, B. R., Sangma, A. K., & Sangma, S. M. (2020). Development of Mobile based Fishery Advisory Prototype: An Experience with fisher tribes of garo hills in North-eastern Himalayan region of India. *Indian Journal of Fisheries*, 67(3), 10-17, <http://doi.org/10.21077/ijf.2020.67.3.882>
- Lahiri, B., Borah, S., Marak, N. R., & Anurag, T. S. (2017). Development of mobile phone based agro-advisory system through ICT mediated extension approach in north-eastern himalayan region of India. *Journal of Applied and Natural Science*, 9(3), 1808-1814, <http://doi.org/10.31018/jans.v9i3.1443>
- Lalthlamuanpuui, R., Lalngaizuali, & Jopir, J. (2024). A Case study on farmers' literacy in agriculture information in Lunglei district, Mizoram. *Indian Journal of Extension Education*, 60(2), 17-21, <https://doi.org/10.48165/IJEE.2024.60203>
- Mishra, A., Singh, J., Maurya, A. S., & Malik, J. S. (2021). Effect of socio-personal traits of farmers on their perception towards social media. *Indian Journal of Extension Education*, 57(4), 71-74, <http://doi.org/10.48165/IJEE.2021.57416>
- Mishra, A., Yadav, O. P., Yadav, V., Mishra, S., & Kumar, N. (2020). Benefits of the use of ICT services perceived by farmers for

- acquiring agricultural information in central U.P. *Indian Journal of Extension Education*, 56(1), 86-89.
- Mukherjee S., & Jha, S. K. (2024). Utilization pattern of information and communication technologies among the farming community of West Bengal. *Indian Journal of Extension Education*, 60(1), 7-13, <https://doi.org/10.48165/IJEE.2024.60102>
- Nain, M. S., Singh, R., & Mishra, J. R. (2019). Social networking of innovative farmers through WhatsApp Messenger for learning exchange: A study of content sharing. *Indian Journal of Agricultural Sciences*, 89(3), 556-558.
- Nirmalkar, C., Lahiri, B., Ghosh, A., Pal, P., Baidya, S., Shil, B., & Kurmi, R. K. (2022). Perceived knowledge and attitude of fisheries extension professionals on usage of ICTs in Tripura. *Indian Journal of Extension Education*, 58(2), 58-64 <http://doi.org/10.48165/IJEE.2022.58211>
- Panda, S., Modak, S., Devi, Y. L., Das, L., Pal, P. K., & Nain, M. S. (2019). Access and usage of information and communication technology (ICT) to accelerate farmers' income. *Journal of Community Mobilization and Sustainable Development*, 14(1), 200-205. <https://indianjournals.com/ijor.aspx?target=ijor:jcmsd&>
- Patra, S., Mukhopadhyay, S. D., Raj, R. K., & Mishra, J. R. (2020). Perceived use of computer in extension activities by the extension officials, *Indian Journal of Extension Education*, 56(3), 83-87,
- Ravikumar, K., Nain, M. S., Singh, R., Chahal, V. P., & Bana, R. S. (2015). Analysis of farmers' communication network and factors of knowledge regarding agro-meteorological parameters. *Indian Journal of Agricultural Sciences*, 85(12), 1592-1596.
- Sandeep, G. P., Prashanth, P., Sreenivasulu, M., & Madavilata, A. (2022). Effectiveness of agricultural information disseminated through social media. *Indian Journal of Extension Education*, 58(2), 186-190, <http://doi.org/10.48165/IJEE.2022.58244>
- Sharmila, S., & Kavaskar, M. (2017). Knowledge level of extension personnel on information and communication technology (ICT). *Journal of Global Communication*, 10(2), 91-95, <http://doi.org/10.5958/0976-2442.2017.00016.7>
- Shashidhara, K. K. (2020). Use of ICT's by extension personnel in dissemination of agriculture information in north eastern Karnataka. *Indian Journal of Extension Education*, 56(1), 78-81.
- Shukla, G., Ansari, M. N., & Lal, S. P. (2024b). Assessment of agricultural information needs of farmers: Triangulating reliability of standardized information need index. *Gujarat Journal of Extension Education*, 36(2), 26-29.
- Shukla, G., Ansari, M. N., Lal, S. P., Bandhavya, M., & Singh, P. (2024a). Role of mobile phones in enhancing farmers' information-seeking behaviour: a binary logistic regression approach. *Indian Research Journal of Extension Education*, 24(4), 145-148.
- Singh, D., & Mathur, S. (2024). Consumption pattern of information and communication technology in agriculture: A study of Jaipur district. *Indian Journal of Extension Education*, 60(1), 128-131, <https://doi.org/10.48165/IJEE.2024.601RN2>
- Singh, S., Tanwar, P. S., & Sharma, A. (2023). Determinants for adopting ICTs by livestock farmers in Barnala District, Punjab. *Indian Journal of Extension Education*, 59(4), 157-160, <http://doi.org/10.48165/IJEE.2023.59432>