

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 8; August 2026; Page No. 218-221

Received: 24-06-2026
Accepted: 28-07-2026

Indexed Journal
Peer Reviewed Journal

Assessment of farmers' awareness of digital technologies for agricultural information access in Kangpokpi district of Manipur

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DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i8c.4014>

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Abstract

Digital technologies have emerged as an effective medium for improving agricultural productivity by providing timely information on crop production, weather forecasting, pest and disease management, market intelligence, and government support services. However, the extent of farmers' awareness regarding these technologies remains uneven, particularly in remote and hilly regions. The present study was conducted in Kangpokpi district of Manipur during 2025–26 to assess the awareness level of farmers regarding digital technologies used for agricultural information access. A total of 120 respondents were selected through multistage random sampling from three villages of Saitu block. Primary data were collected using a pre-tested structured interview schedule. Descriptive statistical tools such as frequency, percentage, mean and standard deviation were employed for data analysis. The findings revealed that the majority of respondents possessed a medium level of awareness regarding digital technologies, while relatively fewer respondents exhibited high awareness. Farmers were more familiar with commonly used digital platforms such as smartphones, WhatsApp, YouTube and mobile-based advisory services, whereas awareness regarding advanced digital tools and online agricultural platforms remained comparatively low. The study suggests that strengthening digital literacy programmes, improving internet connectivity, enhancing extension services, and providing regular training programmes can significantly improve farmers' awareness and facilitate wider adoption of digital technologies in agriculture.

Keywords: Digital technologies, awareness, agricultural information, ICT, farmers, Manipur

1. Introduction

Agriculture remains the primary source of livelihood for a substantial proportion of India's rural population. Rapid advancements in Information and Communication Technologies (ICTs) have transformed the dissemination of agricultural information by enabling farmers to access real-time advisories related to crop production, weather forecasting, pest management, input availability, market prices, and government welfare schemes. Digital technologies including smartphones, mobile applications, internet portals, social media platforms, and online advisory services have become important tools for improving agricultural decision-making and enhancing farm productivity.

The Government of India has launched several digital initiatives such as Digital India, e-NAM, mKisan Portal, Kisan Suvidha App, PM-Kisan Portal, Soil Health Card Portal and AgriStack to improve farmers' access to information and agricultural services. Despite these initiatives, awareness regarding these technologies remains inadequate among many farming communities, particularly in geographically isolated regions where poor internet connectivity, low digital literacy, and limited extension support continue to restrict effective utilization.

Manipur is predominantly an agrarian state where agriculture contributes significantly to rural livelihoods. Kangpokpi district, characterized by hilly terrain and scattered rural settlements, faces several challenges in information dissemination due to limited communication infrastructure. Farmers largely depend on conventional extension methods and interpersonal communication for obtaining agricultural information. Although smartphone ownership and internet accessibility have increased considerably during recent years, awareness regarding various digital agricultural technologies is still limited among many farmers. Assessment of farmers' awareness serves as the first step towards understanding the effectiveness of digital agricultural interventions. Awareness determines whether farmers recognize the existence, usefulness and applicability of available technologies before actual adoption occurs. Therefore, the present study was undertaken to assess the level of awareness regarding digital technologies among farmers in Kangpokpi district of Manipur.

2. Methodology

The study followed a descriptive research design and was conducted in Manipur of kangpokpi district. three villages were selected randomly from which a total of 120

respondents were drawn through Randoms sampling. Data were collected through personal interviews using pre-structured interview scheduled developed specially for the study. Each statement was scored on a three-point scale (Fully corrected = 3, Partially corrected = 2, Not corrected =1). Total awareness scores obtained by each respondent were summed and respondents were classified into low, medium and high awareness categories using the mean and standard deviation of the scores as class boundaries (Low:

below Mean – SD; Medium: Mean $\pm$ SD; High: above Mean + SD). The data were presented in tabular form and interpreted scientifically.

3. Results and Discussion

A. Socio-economic profile of respondents

The socio-economic profile of the 120 respondents is presented in table 1.

Table 1: Socio-economic profile of the respondents

Sl. No.	Variable	Category	Frequency	Percentage
1	Age	Young age (below 35 years)	25	20.83
		Middle age (36–55 years)	62	51.66
		Old age (above 55 years)	33	27.50
2	Educational Qualification	Illiterate	10	8.33
		Literate	20	16.67
		Primary school	40	33.33
		Junior high school	29	24.17
		Intermediate	19	15.83
		Graduate and above	2	1.67
3	Occupation	Agriculture	41	34.16
		Agriculture + Labour	53	44.16
		Agriculture + Business	19	15.83
		Agriculture + Service	7	5.83
4	Housing Pattern	Hut	70	58.33
		Semi-cemented	41	34.14
		Cemented	9	7.50
5	Land Holding	Up to 1 acre	31	25.83
		1–2 acres	80	66.67
		Above 2 acres	9	7.50
6	Family Type	Nuclear	87	72.50
		Joint	30	25.00
		Extended	3	2.50
7	Marital Status	Unmarried	23	19.16
		Married	94	78.33
		Widowed	3	2.50
8	Annual Income	Up to ₹1,00,000	40	33.33
		₹1,00,000 – ₹2,00,000	70	58.33
		Above ₹2,00,000	10	8.33
9	Cropping Pattern	Monoculture	25	20.83
		Intercropping	62	51.66
		Mixed cropping	33	27.50
10	Farm Experience	Up to 5 years	22	18.33
		5–10 years	67	55.83
		Above 10 years	31	25.83
11	Mass Media Exposure	Low (>6.17)	27	22.50
		Medium (6.17–9.27)	61	50.83
		High (<9.27)	32	26.66
12	Source of Information	Low (>6.12)	21	17.50
		Medium (6.12–8)	70	58.33
		High (<8)	29	24.16
13	Innovativeness	Low (>6.15)	26	21.66
		Medium (6.15–8)	61	50.83
		High (<9.49)	33	27.50
14	Economic Motivation	Low (>6.15)	25	20.83
		Medium (6.15–8)	64	53.33
		High (<9.40)	31	25.83

The profile shows farmers who are predominantly middle-aged (51.66%), married (78.33%), and educated only up to primary school (33.33%), living in nuclear families (72.50%) on modest 1–2 acre landholdings (66.67%), and combining agriculture with wage labour as their main occupation

(44.16%) with moderate farm experience of 5–10 years (55.83%). While annual income (58.33% medium), mass media exposure (50.83% medium), and source of information use (58.33% medium) are moderate, most still live in kutcha housing (58.33%) and show only medium levels of

innovativeness (50.83%) and economic motivation (53.33%). Similar findings were reported by Naga Divya *et al.* (2024), who observed comparable landholding patterns and moderate

socio-economic status among farming households in similar rural settings.

Table 2: Distribution of respondents according to their awareness regarding digital technologies

Sl. No.	Statements	Response		
		Fully awareness F (%)	Partial awareness	Not awareness
1.	Aware that smartphones can be used to access agricultural information	20(16.66)	60(50.83)	39(32.5)
2.	Aware that digital platforms provide real-time weather updates.	40(33.33)	49(40.83)	31(25.83)
3.	Aware of online government portals offering agricultural schemes.	15(12.5)	25(20.83)	80(66.66)
4.	Aware that youtube contains videos related to farming practices.	35(29.16)	63(52.5)	22(18.33)
5.	Knowing that social media can be used to learn about modern agricultural methods.	25(20.83)	34(28.33)	61(50.83)
6.	Aware of websites that provide soil and fertilizer recommendations.	10(8.33)	28(23.33)	82(68.33)
7.	Knowing that digital payments can be used for buying agricultural inputs.	38(31.66)	56(46.66)	26(21.66)
8.	Knowing that agricultural helpline numbers and chat services exist online.	22(18.33)	33(27.5)	65(54.16)
9.	Aware that digital weather forecasts can help plan sowing and harvesting.	19(15.83)	50(41.66)	51(42.5)
10.	Knowing that digital tools can help monitor rainfall patterns in hilly areas.	14(11.66)	38(31.66)	68(56.66)
11.	Knowing that GPS-based tools can be used for mapping farmland.	45(37.5)	34(28.33)	41(34.16)
12.	Knowing that digital tools can save time in searching for agricultural information.	17(14.16)	29(24.1)	74(61.66)
13.	Knowing that digital technologies can help improve income opportunities.	33(27.5)	55(45.83)	32(26.66)
14.	I am aware that many farming communities share information through Facebook groups	50(41.66)	49(40.83)	21(17.5)
15.	I know that digital communication makes sharing farm-related problems easier.	19(15.83)	58(48.33)	43(35.83)

F =Frequency%= figure in parentheses indicate percentage

Discussion

The results presented in Table 2 indicate considerable variation in farmers' awareness of different digital technologies. A majority of respondents were fully aware of commonly used technologies such as smartphones, WhatsApp groups, YouTube agricultural videos and mobile phones. The widespread use of these platforms may be attributed to their ease of operation, affordability and regular utilization for communication and information sharing.

Awareness regarding mobile-based advisory services and weather information applications was also found to be satisfactory, reflecting the increasing dissemination of agricultural advisories through digital media. Farmers reported that these services assisted them in obtaining information on crop management, weather forecasts and pest control measures.

Conversely, awareness regarding advanced digital platforms such as e-NAM, GIS applications, precision agriculture technologies, drones, artificial intelligence-based advisory systems and remote sensing tools was comparatively lower. Limited educational exposure, inadequate extension support, poor internet connectivity and insufficient practical demonstrations may have contributed to the lower awareness of these advanced technologies.

These findings are in agreement with Sharma and Bhatnagar (2018) ^[6], Naik and Patil (2020) ^[4], Singh and Chauhan (2022) ^[7], Patel *et al.* (2023) ^[5], and Verma and Tiwari (2024) ^[8], who reported that farmers generally possess higher awareness regarding commonly used ICT tools than sophisticated digital agricultural technologies.

Overall Awareness Level of Respondents

To obtain an overall assessment, the respondents were classified into three awareness categories using Mean and Standard Deviation.

Table 3: Overall distribution of respondents according to awareness level

Sl. No.	Awareness level	Frequency	Percentage
1.	Low <26.73	23	19.16
2.	Medium 27 to 32	70	58.33
3.	High <33.18	27	22.5
	Total	120	100

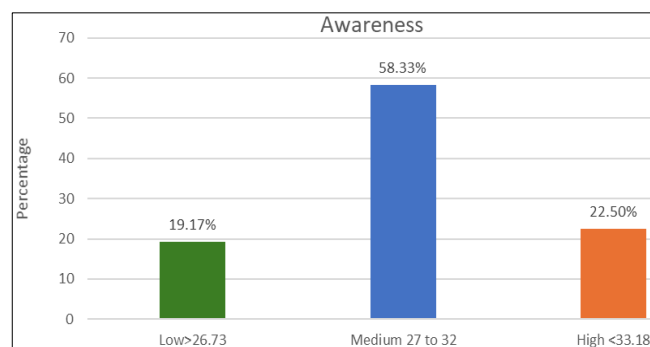


Fig 1: Overall distribution of respondents based on awareness level.

Discussion

The overall awareness analysis revealed that the majority of respondents belonged to the medium awareness category, followed by the low awareness category, whereas comparatively fewer respondents exhibited high awareness regarding digital technologies for agricultural information access.

The predominance of the medium awareness category indicates that although farmers are becoming increasingly familiar with digital technologies, comprehensive knowledge regarding their effective utilization remains inadequate. This may be attributed to moderate educational status, inadequate

digital literacy, poor internet infrastructure and limited participation in digital training programmes.

The comparatively lower proportion of highly aware respondents suggests that only a limited number of farmers possess comprehensive knowledge regarding various digital agricultural platforms and online advisory services. Farmers with higher educational qualifications, better extension contact and greater exposure to mass media generally demonstrated relatively higher awareness levels. These findings corroborate those reported by Kumari and Prasad (2019)^[3], Balasubramanian and Velan (2021)^[11], Patel *et al.* (2023)^[5], and Verma and Tiwari (2024)^[8], who observed that medium awareness levels predominated among farming communities in India.

The present investigation clearly demonstrates that awareness constitutes the foundation for successful adoption of digital technologies in agriculture. Although farmers possess satisfactory awareness regarding widely accessible communication platforms such as smartphones, WhatsApp and YouTube, awareness of specialized agricultural technologies remains limited.

Several socio-economic factors influence awareness, including educational level, extension contact, availability of smartphones, internet accessibility and participation in agricultural training programmes. Farmers residing in remote villages often experience poor network connectivity, limiting their exposure to digital advisory services.

Regular awareness campaigns organized through Krishi Vigyan Kendras (KVKs), State Agricultural Universities, Department of Agriculture and extension agencies can substantially improve farmers' understanding of digital technologies. Demonstrations, practical training, village-level workshops and localized digital content in regional languages can further enhance awareness among farming communities.

Improving rural internet connectivity and strengthening collaboration among extension personnel, research institutions and ICT service providers will facilitate wider dissemination of digital agricultural information.

4. Conclusion

The study assessed the awareness level of farmers regarding digital technologies for agricultural information access in Kangpokpi district of Manipur. The findings revealed that the majority of respondents possessed a medium level of awareness, indicating that digital technologies are gradually becoming familiar among farmers, but their comprehensive understanding remains limited. Farmers exhibited relatively higher awareness regarding smartphones, WhatsApp groups, YouTube agricultural videos and mobile-based advisory services. However, awareness regarding advanced digital agricultural technologies such as e-NAM, artificial intelligence, drones, remote sensing and precision agriculture tools was comparatively low.

The study emphasizes the need for strengthening digital literacy programmes, improving rural internet infrastructure, organizing regular farmer training programmes and increasing extension support to enhance awareness regarding modern digital technologies. These interventions will improve farmers' access to agricultural information and ultimately contribute to enhanced agricultural productivity and rural development.

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