

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 8; August 2026; Page No. 504-507

Received: 24-05-2026
Accepted: 28-06-2026

Indexed Journal
Peer Reviewed Journal

Socio-economic profile and adoption level of farmers towards mobile-based agricultural advisories

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DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i8g.4054>

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Abstract

The present study was conducted to assess the extent of adoption of mobile-based agricultural advisories among farmers in Narsinghpur district of Madhya Pradesh. A descriptive research design was adopted and primary data were collected through personal interviews using a structured interview schedule. Narsinghpur district was purposively selected considering the growing use of mobile phones and digital technologies for accessing agricultural information. Narsinghpur and Kareli blocks were selected purposively, followed by random selection of Bachai, Dhubghat, Barman and Bhugwara villages, with 30 farmers selected from each village, constituting a total sample of 120 respondents. The study considered 18 independent variables to examine their association with adoption. The findings revealed that the majority of farmers (55.00%) had a medium level of adoption of mobile-based agricultural advisories. Education, land holding, annual income, organizational membership, possession of agricultural and comfortable assets, mobile phone usage, internet accessibility, mass media exposure, extension contact and training received were significantly associated with adoption. Training received ($\chi^2 = 19.26$), mobile phone ownership and usage ($\chi^2 = 18.42$) and internet accessibility ($\chi^2 = 16.78$) showed comparatively stronger associations. In contrast, age, gender, family size, occupation, type of house, source of drinking water and irrigation facility exhibited non-significant associations.

Keywords: Mobile-based agricultural advisories, Adoption, Farmers, Digital agricultural information, Mobile technology, Internet accessibility, Agricultural extension

Introduction

The adoption of mobile-based agricultural advisories has emerged as an important component of modern agricultural extension, enabling farmers to access timely information on weather, crop production, pest and disease management, input use, market prices and government schemes. In the present study, conducted among 120 farmers in Narsinghpur district of Madhya Pradesh, mobile connectivity was relatively widespread, with 76.67 per cent of respondents reporting access to mobile phones and the internet. However, technological access does not necessarily translate into effective utilization or adoption of advisory information, as farmers' educational status, digital literacy, extension contact, training exposure, internet accessibility and perceived usefulness may influence their use of mobile-based services. Poor internet connectivity was reported as a major constraint by 73.33 per cent of respondents, indicating that infrastructure and accessibility remain important considerations in promoting digital agricultural extension. Empirical evidence also highlights the potential of mobile communication to improve farmers' use of agricultural recommendations. Singh *et al.* (2023) ^[9], in a cluster-randomized evaluation involving 2,014 farming households across 159 communities in five districts of Andhra Pradesh,

reported that the integration of SMS and interactive voice response (IVR) messages with extension interventions improved farmers' recall, knowledge and adoption of recommended agricultural practices. Similarly, evidence from Haryana showed that SMS-based agrometeorological advisories improved farmers' compliance with recommended crop-management operations. These findings demonstrate that mobile-based advisories can complement conventional extension systems by providing timely and accessible information. Therefore, assessing the extent of adoption and the factors influencing farmers' utilization of mobile-based agricultural advisories is essential for strengthening digital agricultural extension services and improving their effectiveness at the farm level.

Materials and Methods

The present study was conducted to assess the extent of adoption of mobile-based agricultural advisories among farmers in Narsinghpur district of Madhya Pradesh. A descriptive research design was adopted to assess the existing level of adoption without manipulating the study variables. Narsinghpur district was purposively selected considering the increasing use of mobile phones and digital communication technologies for obtaining agricultural information. Primary

data were collected through a structured interview schedule and analyzed using appropriate statistical techniques.

Narsinghpur district is situated in the fertile Narmada Valley and is characterized by productive soils, favourable climatic conditions and adequate irrigation facilities. Agriculture is the major occupation of the rural population, with wheat, soybean, gram, paddy, sugarcane and pulses being important crops. Out of the six development blocks, Narsinghpur and Kareli blocks were purposively selected for the study. From each selected block, two villages were randomly selected, namely Bachai and Dhubghat from Narsinghpur block and Barman and Bhugwara from Kareli block.

A total of 120 farmers were selected as respondents for the study. From each selected village, 30 farmers were selected, making a sample of 120 respondents. Data regarding the adoption of mobile-based agricultural advisories were collected through personal interviews using a well-structured interview schedule. The collected data were systematically classified, tabulated and analyzed using suitable statistical tools to determine the extent of adoption among farmers.

Results and Discussion

The study considered 18 independent variables, namely age, gender, education, family size, occupation, land holding, annual income, type of house, organizational membership, drinking water source, agricultural assets, comfortable assets, irrigation facility, mobile phone ownership and usage, internet accessibility, mass media exposure, extension contact and training received on mobile-based agricultural advisories. Adoption level of mobile-based agricultural advisories was considered as the dependent variable (Table 1).

Socio-Economic Profile of the Farmer

Age: Majority of respondents (55.83%) were middle-aged (36–55 years). Similar findings were reported by Kumar *et al.* (2023) [2] and Rathod *et al.* (2024) [6].

Gender: Majority of respondents (85.00%) were male. This was supported by Singh *et al.* (2023) [9] and Patel *et al.* (2022) [5].

Education: Most respondents (23.33%) had high school education. Similar results were reported by Kumar *et al.* (2023) [2] and Rathod *et al.* (2024) [6].

Family Size: Majority (56.66%) belonged to medium-sized families (5–8 members). Similar findings were reported by Singh *et al.* (2023) [9] and Kumar *et al.* (2024).

Occupation: Agriculture was the main occupation of the majority (43.33%) of respondents. Similar findings were reported by Kumar *et al.* (2023) [2] and Singh *et al.* (2024) [7].

Land Holding: Majority (31.67%) were small farmers (1.01–2.00 ha), followed by marginal farmers (28.33%). Similar findings were reported by Patel *et al.* (2022) [5] and Kumar *et al.* (2023) [2].

Annual Income: Majority of respondents (48.33%) belonged to the medium-income group (₹1,00,001–₹3,00,000). Similar findings were reported by Kumar *et al.* (2023) [2] and Patel *et al.* (2022) [5].

Type of House: Majority of respondents (45.00%) lived in semi-pucca houses, followed by pucca houses (36.67%). Similar findings were reported by Kumar *et al.* (2023) [2] and Singh *et al.* (2024) [7].

Membership of Organization: The findings indicate that

35.00 per cent of the respondents were members of one organization, followed by 33.33 per cent who belonged to two or more organizations, while 31.67 per cent had no organizational membership. Similar findings were reported by Patel *et al.* (2022) [5] and Kumar *et al.* (2023) [3].

Source of Drinking Water: Tap water was the major source of drinking water (28.33%), followed by hand pumps (26.67%) and tube wells (23.33%). Similar observations were reported by Kumar *et al.* (2023) [3] and Singh *et al.* (2024) [7].

Possession of Agricultural Assets: The findings show that 45.00 per cent of the respondents possessed 1–5 agricultural assets, followed by 30.00 per cent having more than five assets, while 25.00 per cent possessed only a few agricultural assets. Similar findings were reported by Kumar *et al.* (2023) [3] and Patel *et al.* (2022) [5].

Possession of Comfortable Assets: Majority of respondents (53.34%) had a medium level of comfortable assets. Similar findings were reported by Patel *et al.* (2022) [5] and Kumar *et al.* (2023) [3].

Irrigation Facility: Majority of respondents (48.33%) had partial irrigation facilities, followed by adequate irrigation (31.67%). Similar findings were reported by Kumar *et al.* (2023) [3] and Patel *et al.* (2022) [5].

Mobile Phone Ownership and Usage: Majority of respondents (56.66%) had a medium level of mobile phone ownership and usage. Similar findings were reported by Kumar *et al.* (2023) [3] and Rathod *et al.* (2024) [6].

Internet Accessibility: Majority of respondents (58.33%) had medium internet accessibility. Similar findings were reported by Kumar *et al.* (2023) [3] and Patel *et al.* (2022) [5].

Mass Media Exposure: Majority of respondents (60.00%) had medium mass media exposure. Similar findings were reported by Patel *et al.* (2022) [5] and Kumar *et al.* (2023) [3].

Extension Contact: Majority of respondents (58.33%) had medium extension contact. Similar findings were reported by Meena *et al.* (2021) [4] and Choudhary *et al.* (2022) [11].

Training Received: Majority of respondents (51.67%) had a medium level of training on mobile-based agricultural advisories. Similar findings were reported by Meena *et al.* (2021) [4] and Yadav *et al.* (2023) [10].

Extent of Adoption of Mobile-Based Agricultural Advisories

The majority of respondents (55.00%) had a medium level of adoption, followed by high (23.33%) and low (21.67%) levels. This indicates that most farmers moderately adopted mobile-based agricultural advisories for farm-related information and decision-making. Similar findings were reported by Meena *et al.* (2021) [4], Choudhary *et al.* (2022) [11] and Yadav *et al.* (2023) [10], who observed moderate adoption and positive influence of mobile-based advisory services on farmers' adoption behaviour (Table 1 & Fig. 1).

Association between independent variables and adoption level

The findings presented in Table 4.2 indicate that education, size of land holding, annual income, membership of organization, possession of agricultural assets, possession of comfortable assets, mobile phone ownership and usage pattern, internet accessibility, mass media exposure, extension contact and training received on mobile-based agricultural advisories were significantly associated with the

adoption level of mobile-based agricultural advisory services. In contrast, age, gender, family size, occupation, type of house, source of drinking water and irrigation facility showed a non-significant association with adoption. Among the significant variables, training received on mobile-based

agricultural advisories recorded the highest χ^2 value (19.26), followed by mobile phone ownership and usage pattern (18.42) and internet accessibility (16.78), indicating their relatively stronger association with farmers' adoption level.

Table 1: Distribution of respondents according to selected socio-economic and communication characteristics (N=120)

S. No.	Variable	Category 1	F (%)	Category 2	F (%)	Category 3	F (%)	Category 4	F (%)	Category 5	F (%)
1	Age	Young (≤ 35)	28 (23.33)	Middle (36–55)	67 (55.83)	Old (> 55)	25 (20.84)	—	—	—	—
2	Gender	Male	102 (85.00)	Female	18 (15.00)	—	—	—	—	—	—
3	Education	Illiterate	12 (10.00)	Primary	18 (15.00)	Middle	24 (20.00)	High school	28 (23.33)	Higher secondary	22 (18.34)
		Graduate & above	16 (13.33)	—	—	—	—	—	—	—	—
4	Family size	Small	32 (26.67)	Medium	68 (56.66)	Large	20 (16.67)	—	—	—	—
5	Occupation	Agriculture Labour	18 (15.00)	Agriculture + Labour	26 (21.67)	Agriculture	52 (43.33)	Agriculture + Business	16 (13.33)	Agriculture + Service	8 (6.67)
6	Land holding	Marginal	34 (28.33)	Small	38 (31.67)	Semi-medium	30 (25.00)	Medium	14 (11.67)	Large	4 (3.33)
7	Annual income	Up to ₹1 lakh	42 (35.00)	₹1–3 lakh	58 (48.33)	Above ₹3 lakh	20 (16.67)	—	—	—	—
8	Type of house	Kachcha	22 (18.33)	Semi-Pucca	54 (45.00)	Pucca	44 (36.67)	—	—	—	—
9	Organizational membership	No membership	38 (31.67)	One organization	42 (35.00)	Two or more than two organisations	40 (33.33)	—	—	—	—
10	Drinking water	Open well	18 (15.00)	Hand pump	32 (26.67)	Tube well	28 (23.33)	Tap supply	34 (28.33)	Purified/filtered	8 (6.67)
11	Agricultural assets	Few	30 (25.00)	Between 1 to 5	54 (45.00)	More than 5	36 (30.00)	—	—	—	—
12	Comfortable assets	Low	28 (23.33)	Medium	64 (53.34)	High	28 (23.33)	—	—	—	—
13	Irrigation facility	Few irrigation	24 (20.00)	Partial	58 (48.33)	Adequate	38 (31.67)	—	—	—	—
14	Mobile phone ownership & usage	Low	26 (21.67)	Medium	68 (56.66)	High	26 (21.67)	—	—	—	—
15	Internet accessibility	Low	24 (20.00)	Medium	70 (58.33)	High	26 (21.67)	—	—	—	—
16	Mass media exposure	Low	22 (18.33)	Medium	72 (60.00)	High	26 (21.67)	—	—	—	—
17	Extension contact	Low	24 (20.00)	Medium	70 (58.33)	High	26 (21.67)	—	—	—	—
18	Training on mobile advisories	Low	36 (30.00)	Medium	62 (51.67)	High	22 (18.33)	—	—	—	—
19	Adoption of mobile advisories (Depended variable)	Low	26 (21.67)	Medium	66 (55.00)	High	28 (23.33)	—	—	—	—

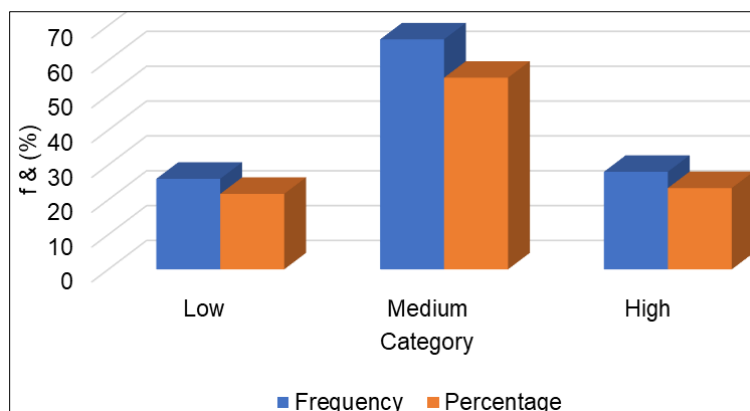


Fig 1: Distribution of respondents according to adoption level of mobile-based agricultural advisories (N=120)

Table 2: Association between independent variables and adoption level of farmers regarding mobile-based agricultural advisory services (N = 120)

S. No.	Independent variables	χ^2 value	Significance
1	Age	6.84	NS
2	Gender	4.26	NS
3	Education	14.72	*
4	Family size	5.38	NS
5	Occupation	8.46	NS
6	Size of land holding	12.65	*
7	Annual income	15.84	*
8	Type of house	7.26	NS
9	Membership of organization	11.38	*
10	Source of drinking water	3.92	NS
11	Possession of agricultural assets	13.56	*
12	Possession of comfortable assets	10.24	*
13	Irrigation facility	9.18	NS
14	Mobile phone ownership and usage pattern	18.42	*
15	Internet accessibility	16.78	*
16	Mass media exposure	14.36	*
17	Extension contact	12.94	*
18	Training received on mobile-based agricultural advisories	19.26	*

Note: NS = Non-significant; * = Significant at 5% level of probability; ** = Significant at 1% level of probability.

Conclusion

The study concluded that the majority of farmers had a medium level of adoption (55.00%) of mobile-based agricultural advisories, indicating moderate use of mobile services for agricultural information and decision-making. Among the 18 independent variables studied, education, land holding, annual income, organizational membership, agricultural and comfortable assets, mobile phone usage, internet accessibility, mass media exposure, extension contact and training received were significantly associated with adoption. Training received ($\chi^2 = 19.26$), mobile phone ownership and usage ($\chi^2 = 18.42$) and internet accessibility ($\chi^2 = 16.78$) showed relatively stronger associations with adoption. In contrast, age, gender, family size, occupation, type of house, drinking water source and irrigation facility were not significantly associated with adoption. Overall, strengthening farmer training, improving digital connectivity and promoting effective use of mobile phones can enhance the adoption of mobile-based agricultural advisories among farmers.

Acknowledgment

The author sincerely thanks the Associate Professor, Department of Technology Transfer, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna (M.P.), for valuable guidance, encouragement and support throughout the research work. The author also gratefully acknowledges the cooperation and assistance of colleagues, field assistants and labourers during data collection and completion of the study.

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