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Effectiveness of mobile based digital farm advisories in dissemination of information: A study in North Karnataka

[1]KC Vismaya, [1]SS Dolli, [1]SV Halakatti, [2]VR Kiresur, [3]MP Potdar and [4]GM Hegde

[1]Department of Agricultural Extension Education, University of Agricultural Sciences, Dharwad, Karnataka, India

[2]Department of Agricultural economics, University of Agricultural Sciences, Dharwad, Karnataka, India

[3]Department of Agronomy, University of Agricultural Sciences, Dharwad, Karnataka, India

[4]Department of Plant Pathology, University of Agricultural Sciences, Dharwad, Karnataka, India

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Corresponding Author: KC Vismaya

Abstract

Mobile based digital farm advisories are revolutionizing the way agricultural information is delivered to farmers by providing timely, location-specific information. Digital advisories have become a powerful tool for technology transfer to the farming community with increased digital literacy. The effectiveness of these advisories becomes a prime importance. The present study was conducted during the year 2024 with 180 farmers using various mobile based digital farm advisories in Belgaum, Haveri and Gadag districts of North Karnataka. The effectiveness was measured using 7 dimensions. Radar chart was used to represent the normalized values of different dimensions which depicts that relevance of technical content and need/problem based information dimensions contribute the most to the effectiveness of the advisories. Relational analysis through regression was done and it was found that innovative proneness was found significant at 1% level whereas, farming experience, accessibility to digital farm advisories and social media utilization were found to be positively significant at 5% level with effectiveness. The R^2 value was found to be 0.56 indicating 56 per cent of the variance in the dependent variable i.e., effectiveness of mobile based digital farm advisories was due to the explained independent variables. Hence these factors to be considered while improving the effective use of the information disseminated through these digital farm advisories.

Keywords: Mobile based digital farm advisory, effectiveness, ICT, Farmer's information needs.

Introduction

Despite of well-organized agricultural extension system, around 60 per cent of farmers in India still remain un-reached, not served by any extension agency or functionary (Singh *et al*., 2017) [8]. The number of extension workers has been reducing while that of farmers number is growing, hence there is need for innovative information systems to address this gap. These digital farm advisories are one of the emerging tools for addressing the gap as they can provide almost instant, personalised communication to farmers over a wide geographic area. These digital advisories deliver fast, reliable and accurate information in a user-friendly manner for practical utilisation by the end user. These new technologies can provide almost instant, personalized communication to farmers (Norton & Alwang, 2020) [5].

Digitalization of communication networks has opened access the information to larger number of people in shortest span of time (Shanmuka *et al.,* 2022) [6] Information provided via ICTs is becoming more varied, ranging from specific technologies, market access, price information, weather information and early warning of drought, floods, and diseases. This allows farmers to make more informed decisions on what to grow and how to improve their agricultural practices (Surabhi *et al*.,2017) [10]. The evolution of Information and Communication Technologies (ICT) has revolutionized the landscape of agricultural extension services, particularly in developing countries where traditional methods of knowledge dissemination are often constrained by limited infrastructure, manpower, and reach.

Among the various ICT tools, mobile phones have emerged as the most accessible, scalable, and widely accepted medium for delivering timely and location-specific agricultural information**.** With the rapid advancement of Information and Communication Technologies (ICTs), particularly mobile-based platforms, the dissemination of agricultural information has become more timely, precise, and farmer-centric. According to the World Bank (2023) [11], over 68 per cent of farmers in developing countries now own mobile phones, presenting a significant opportunity to deliver real-time advisories on weather, crop health, market prices, and best practices. In India alone, the Ministry of Agriculture and Farmers' Welfare reported that digital advisories reached over 1.2 crore farmers through various mobile platforms in 2022.

Smartphone usage in rural areas has reached approximately 67.6 per cent in 2025, driven by rapidly expanding mobile

internet access. Over 90% of rural Indians use WhatsApp—making it the dominant communication tool in villages (Singh *et al*.,2017) [8]. The way in which digital projects access, assess, apply, and deliver content may increase the effectiveness of their use by farmers and thus may become an important factor in a project's success. Hence, present study is proposed to measure effectiveness of mobile based digital farm advisories.

Methodology

The present study was conducted in North Karnataka. The sample consists of 180 farmers selected by purposive random sampling with 60 farmers each from three identified districts namely Haveri, Gadag and Belgaum of North Karnataka. The farmers were selected from the WhatsApp and other digital media users group. Ex-post facto research design was adopted for the study. Data was collected personally through structured interview schedule.

Effectiveness of mobile based digital farm advisories using the existing index used by Singh *et al.* (2019) [9] and Madan *et al.* (2015) [3]. The index includes seven dimensions namely timeliness of information, Ease of understanding of information, Utility of information, Satisfaction level, Quality of information, Need/Problem based information and Relevance of technical content. The measurement of effectiveness of mobile based advisories was explained thrugh three-point, four-point and five-point continuum scale with eight statements each in timeliness and ease of understanding, seven statements each in utility and quality of information, six statements each in satisfaction level and need/Problem based information and five statements in relevance of technical content. The respondents were further classified into low, medium and high categories using mean and standard deviation. Each dimension's total score was derived by adding the scores from it's respective continuum scales, and the overall effectiveness score was obtained by adding the total scores of all dimensions, which was considered for regression analysis. The data collected was scored, quantified, categorized, tabulated and analyzed with frequency, percentage, mean, standard deviation and regression analysis. Normalized values and their standard errors for each of the seven components of effectiveness were computed, and a radar chart was created using these values to identify which component contributes the most to the overall effectiveness of mobile-based digital farm advisories.

Results and Discussion

Effectiveness of mobile based digital farm advisories

The results in table 1 shows the overall distribution of farmers under different dimensions of effectiveness index. The data reveals that in case of ease of understanding almost half of the farmers (40.56%) were found in high category. This could be because the messages were given in simple local language, sometimes with pictures or voice messages, which made them easier for farmers to understand. Using the regional dialect also helped farmers relate better and understand the information more clearly. Followed by timeliness of information (38.89%), quality of information (39.44%), relevance of technical content(41.67%) were found in medium category. The information regarding pests and diseases was not delivered before as precautionary practices to avoid pests. Irregular updates, general information, or late delivery of messages might be the reason behind it. This suggests that even when the advisories generally be well-prepared and relevant, they may not always reach the farmers at the most critical time (e.g., during pest outbreaks or sowing). The utility (42.22%), satisfaction level (46.67%) and need/problem based information (36.11%) were found in low category. This may be because some of the advices given were not matching with the actual problems farmers face in the field. The information regarding seeds and inputs was not received before or during the sowing which affected on utility of information. Some messages regarding nutrient management was not given with reference to specific crop. If the messages are too general and do not focus on specific crops or local conditions, farmers may find them less useful leading to less satification regarding the advisoires.

Table 1: Overall distribution of farmers under different dimensions of effectiveness index (n=180)

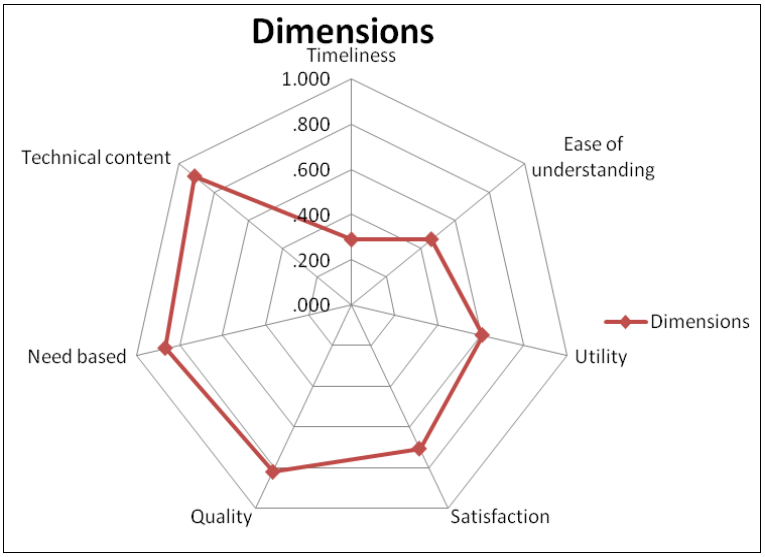
Sl no.	Dimensions	Low	Medium	High
1	Timeliness of information	48 (26.67)	70 (38.89)	62 (34.44)
2	Ease of understanding of info.	53 (29.44)	54 (30.00)	73 (40.56)
3	Utility of information	76 (42.22)	53 (29.44)	51 (28.33)
4	Satisfaction level	84 (46.67)	56 (31.11)	40 (22.22)
5	Quality of information	53 (29.44)	71 (39.44)	56 (31.11)
6	Need/Problem based info.	65 (36.11)	62 (34.44)	53 (29.44)
7	Relevance of technical content	50 (27.78)	75 (41.67)	55 (30.56)

Note: Figures in parentheses are percentage

Radar chart was constructed using standard errors and normalized values of seven dimensions of effectiveness of mobile based advisories (Fig.1) and table 2, as used by Bhanita *et al.* (2023) and Lal *et al.* (2021) [2] in their study. The chart shows that among all the dimensions, relevance of technical content and need/problem based information with 0.911 and 0.883 R^2 values respectively, contribute strongly to effectiveness of mobile based advisories as scientifically accurate information, addressing real-time, location-specific issues faced by farmers increases their practical value and leads to their effective use in field conditions. Other dimensions like timeliness and ease of understanding are with R^2 values 0.291 and 0.468 respectively, are relatively weaker and need attention. They should be further improved to increase the effectiveness of the mobile based farm advisories. The Durbin-Watson statistic of 1.792 indicated no significant autocorrelation in the residuals, affirming the reliability of the model.

Table 2: Contribution of different dimensions to effectiveness of mobile based DFA

Model	R	R^2	Adjusted R^2	SE of the estimate
Timeliness of information	.539[a]	.291	.287	6.157
Ease of understanding of info.	.684[b]	.468	.462	5.347
Utility of information	.783[c]	.613	.607	4.573
Satisfaction level	.845[d]	.714	.707	3.945
Quality of information	.909[e]	.826	.821	3.087
Need/Problem based info.	.928[f]	.883	.865	2.569
Relevance of technical content	.954[g]	.911	.908	2.215
Durbin-Watson value:1.792				



Regression analysis of effectiveness of mobile based digital farm advisories and selected independent variables: A range of independent variables that might act as explanatory variables for effectiveness of mobile based farm advisories were collected. The 14 independent variables include education, land holding, family annual income, area under commercial crops, resource base, farming experience, accessibility to digital farm advisories, research-extension linkage, source consultancy pattern, innovative proneness, social media utilization, organizational participation, scientific orientation and ICT literacy.

The results from table 3 reveals the regression analysis of effectiveness of mobile based digital farm advisories with 14 independent variables. The R^2 (Coefficient of determination) value was found to be 0.56, that means 56.00 per cent of variance in the dependent variable i.e., effectiveness of mobile based digital farm advisories is explained by the independent variables. The variable innovative proneness was found statistically significant at 1 per cent level with t-value of 2.73 explaining that farmer's willingness to try new technologies and adopting modern farming practices enables better understanding and quicker implementation of the advisory content thereby influencing it's effectiveness. The variables farming experience, accessibility to digital farm advisories and social media utilization were found significant at 5 per cent with t-values 2.24,1.97 and 2.07 respectively. Higher farming experience enables better interpretation and application of information based on practical knowledge whereas having more access to the digital advisories and more exposure to social media enables farmers to become efficient in skills to use it for their purpose in an effective manner. Hence, more the farmer gets access and utilizes the digital farm advisories, the more effective the mobile based digital farm advisories becomes in communicating information according to the needs of the farmers. The results found in the study conducted by Shukla *et al.* (2022) [7] stated that the variable mass media exposure significant at 5 per cent level. Similarly, Bhanita *et al.* (2023) in their study had also found that the variable experience in farming significant at 10 per cent and ICT tools used was found significant at 5 per cent level.

Table 3: Determinants of the effectiveness of mobile based DFA

Sl no.	Independent variables	b value	Std. error	t value
1	Education	0.509	0.460	1.94 ^{NS}
2	Land holding	0.321	0.099	0.31 ^{NS}
3	Family annual income	0.762	0.124	0.61 ^{NS}
4	Area under commercial crops	0.122	0.130	0.93 ^{NS}
5	Resource base	0.294	0.426	0.69 ^{NS}
6	Farming experience	0.381	0.193	2.24*
7	Accessibility to DFA	0.427	0.536	1.97*
8	Research-Extension linkage	0.378	0.116	0.27 ^{NS}
9	Source consultancy pattern	0.188	0.241	0.78^{NS}
10	Innovative proneness	1.249	0.457	2.73**
11	Social media utilization	0.108	0.100	2.07*
12	Organizational participation	0.431	0.227	1.90 ^{NS}
13	Scientific orientation	0.112	0.167	0.673 ^{NS}
14	ICT literacy	0.270	0.228	0.18 ^{NS}
	R^2	0.56		
	F value	2.30*		

** - Significant at 1 per cent * - Significant at 5 per cent ^{NS} - Non-significant

Conclusion

The rapid proliferation of social media platforms in India has opened new frontiers in agricultural communication. Social media tools such as YouTube, WhatsApp, Facebook, and Telegram are increasingly being used to share real-time weather alerts, market price updates, pest control tips, thereby making agricultural knowledge more accessible. The study was carried out to assess the effectiveness of the mobile based digital farm advisories in reaching information needs of farmers. Majority of the respondents in the study area were found in low and mediuam category among the dimensions of the effectiveness of mobile based advisories, denoting need for improvement. The results of the study also highlights that among seven dimensions of effectiveness, relevance of technical content and need/problem based information contributes highest to the effectiveness of the mobile based digital farm advisories. The study also revealed that the variables innovative proneness, farming experience, accessibility to digital farm advisories and social media utilization were found to be positively significant with effectiveness. Therefore these factors can considered while selecting a beneficiary of mobile based advisories. The study recommends that crop-specific and seasonally relevant advisory content must be developed, technical quality of the content need to be improved by collaborating with agricultural experts to validate the advisories for accuracy and applicability. Regular monitoring and evaluation of the advisories is necessary for refining the advisories.

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