Indian Research Journal of Extension Education

SHORT COMMUNICATION

Role of Mobile Phones in Enhancing Farmers' Information Seeking Behaviour: A Binary Logistic Regression Approach

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ARTICLE INFO

Editor:
Dr. Kausik Pradhan
Dr. Pallavi Bora

Key words:
Information seeking behaviour, ICT, Binary logistic regression

Received : 05.09.2024
Accepted : 25.09.2024
Online published : 01.10.2024

doi:10.54986/irjee/2024/oct_dec/145-148

IRJEE METRICS

Google citations - 9424
h-index - 44
i10-index - 304
NAAS rating - 4.99

ABSTRACT

A mobile phone is quite useful ICT tool, offers real-time information. The study aimed to assess Information Seeking Behaviour (ISB) of farmers through mobile and its determinants. Binary logistic regression model was used for the purpose. In the model, the Nagelkerke's R-square obtained 0.504, indicating 50.40% of the variations in dependent variable, were explained by the selected explanatory variables collectively. Education was found statistically significant at p<0.01, with Wald statistics 6.800 and p = 0.009. Annual family income was also found statistically nearly significant at p<0.10 (10% level of significant), with the Wald statistics value of 2.567 and p = 0.109. Over all model accuracy was observed 81.10%. The study suggesting extension workers and policy makers, by emphasizing the education and digital awareness highlighted in the study.

Mobile phones are the first priority among different ICT tools for farmers. They (mobile phones) have revolutionized access to information and transformed agricultural practices. Several studies have highlighted the significance of mobile phones in agriculture. Mobile phones offer farmers a convenient platform to access a variety of agricultural information, such as weather updates, market prices, pest control methods, government programs, and advanced farming techniques. This valuable information empowers farmers to make informed choices and improve their farming operations. (Sharma *et al*., 2020; Shukla *et al.,* 2022). Mobile phones facilitate direct communication and interaction between farmers and potential buyers, eliminating intermediaries and enabling farmers to access better market prices for their produce. Mobile-based platforms and applications enable farmers to connect with buyers, negotiate prices, and sell their products more efficiently (Mittal *et al.,* 2019). According to Singh *et al*., (2018), mobile phones have significantly contributed to advancing financial inclusion among farmers in India. The mobile-based advisory services provide personalized recommendations and guidance to farmers based on their specific crop, location, and needs. These services offer timely advice on crop management, disease control, and fertilization techniques, helping farmers improve their yields

and productivity (Pal *et al*., 2018). The availability of relevant and reliable agricultural information is crucial for farmers' decision-making. A few studies have explored the factors influencing farmers' use of mobile phones to access agricultural information. In line with this, the present study aims to address the following objective: to analyze the factors determining of information seeking behaviour of farmers through mobile phones.

This study was conducted during 2020 in Sitapur district of Uttar Pradesh to explore the information seeking behaviour of farmers through mobile and the factors determining it. An exploratory research design (Pooja *et al*., 2023) was adopted for the purpose of study. The study comprises a sample of size 90 respondents selected randomly using multistage random sampling procedure. The information seeking behaviour through mobile was measured by a three continua Likert based scale developed by Yadav, (2009) with due modification. The scale comprises four components *viz.* "extent of availability", "frequency of use", "extent of importance" and "extent of satisfaction". To examine the relationship between multiple independent variables and the categorical dependent variable "information seeking behaviour through mobile", binary logistic regression, also known as the logit model, was applied with the help of IBM SPSS software.

In terms of the extent of importance attributed to the information accessed through mobile devices, the majority of the farmers considered it important. 66.67% fell into the "Important" category (with scores between 20.22 and 27.51), while 21.11% found it "Most Important" (with scores above 27.51). Only 12.22% deemed the information "Least Important" (with scores below 20.22). The average ($\bar{x}$) score for importance was found 23.87. When evaluating the extent of satisfaction with the information obtained, most farmers were moderately satisfied. 78.89% of respondents were "Moderately Satisfied" (with scores between 17.61 and 26.57), whereas 7.78% were "Fully Satisfied" (with scores above 26.57). A portion of 13.33% were "Unsatisfied" (with scores below 17.61). The mean ($\bar{x}$) satisfaction score was 22.09. Overall, the data suggested that while the availability and importance of information accessed via mobile devices were generally rated positively, the frequency of use and satisfaction levels varied, with a significant portion of farmers using the devices occasionally and reporting moderate satisfaction.

Table 1. Classification statistics of the binary logistic regression model

Observed		Predicted		
		Binary Logit		Correct %
		0	1	
Binary Logit	0	22	9	71.0
	1	8	51	86.4
Overall Percentage				81.1
The cut value = 0.500				

The classification table, which cross-classifies the observed values of the dependent outcome with the predicted values at a user-defined cut-off point, is a method used to assess the predictive accuracy of a logistic regression model (Peng & So, 2002). In the present study, table 1, revealed classification statistics of the logistic regression model, as all predicted binary logit outcome values were >0.5 (0.5 is cut off value) predicting an event with sufficient accuracy. This table 1, was showcasing the overall model accuracy with 81.10%.

Table 2, shown the Robustness of Binary Logistic Model and Statistical Significance of Individual Variable. The value of likelihood ratio test - explained by Park, (2013) - was obtained 75.072 that shows overall fit of model with quite powerful association among antecedent variables taken jointly, and dependent variable *i.e.,* "ISB through mobile". There were seven independent or explanatory variables considered in the study namely family size, education, experience in farming, annual family income, source of credit, mass media exposure and extension contact. The Nagelkerke's R-square or Pseudo R^2 – explained by Kumari et al., (2022) was obtained 0.504, indicating that 50.40 percent of the variations in dependent variable *i.e.,* information seeking behaviour through mobile, were explained by the selected explanatory variables. While explaining the statistical significance of individual variable, Education was found most important variables to predict mobile use for seeking agricultural information by the respondents. This explanatory variable was observed to be statistically significant at $p<0.01$ (1% level of significant), with the Wald statistics value of 6.800 and $p = 0.009$. The odds in favour states that unit increase in received 'education', increases the odds of information seeking behaviour through mobile phone by 1.844 times (Exp. $\beta = 1.844$ means 84.40% increase in information

Table 2. Robustness of Binary Logistic Model and statistical significance of individual variable

							99% C.I. for EXP(β)	
Variables	B	S.E.	Wald	No.	Sig.	Exp(β)	LB	UB
Family size	-.165	.161	1.044	1	.307	.848	.560	1.285
Education	.612	.235	6.800	1	.009***	1.844	1.007	3.373
Experience in farming	-.015	.031	.232	1	.630	.985	.909	1.067
Annual family income	.000	.000	2.567	1	.109*	1.000	1.000	1.000
Source of credit	.482	.336	2.055	1	.152	1.619	.681	3.847
Mass media exposure	.090	.068	1.789	1	.181	1.095	.920	1.303
Extension contact	.122	.079	2.420	1	.120	1.130	.923	1.384
Constant	-5.248	1.768	8.814	1	.003	.005		
-2 Log likelihood								75.072
Cox & Snell R Square								0.365
Nagelkerke R Square								0.504

*** & *, depict level of significant at 1% & 10% respectively.

LB = Lower Bound; Upper Bound.

Variable(s): Family size, Education, Experience in farming, Annual family income, Source of credit, Mass media exposure, Extension contact.

seeking behaviour through mobile) by respondents. In addition to Education, Annual family income was also found to be statistically significant nearly at $p<0.10$ (10% level of significant), with the Wald statistics value of 2.567 and $p = 0.109$. The odds in favour states that unit increase in 'Annual family income', rises the odds of information seeking behaviour through mobile phone by 1.000 times (Exp. $\beta = 1.000$) by respondents.

The study's findings revealed several key aspects of farmers' information-seeking behaviour through mobile phones, highlighting the nuances in availability, usage frequency, perceived importance, and satisfaction. The majority of farmers found mobile information moderately available and important, with mean scores of 25.27 and 23.87, respectively. Most farmers used their mobile devices occasionally (mean score 23.80) and reported moderate satisfaction (mean score 22.09), indicating a general reliance on mobile phone services, albeit with varying levels of engagement and contentment. A multinomial logistic regression model was employed to determine the socio-economic factors influencing mobile use for information-seeking. The model demonstrated robust predictive accuracy (81.1%) and identified education as a significant predictor ($p<0.01$). Higher education levels significantly increased the likelihood of mobile use, with a unit increase in education raising the odds of mobile use by 4.451 times. It was also observed that respondents with higher annual family income found satisfactory usage of mobile phone for seeking agriculture information. This is because, higher income farmers can easily pay for service charges of mobile phone. These findings align with studies of Alhassan and Kwakwa (2012), Ganesan et al. (2013) and Sajeev (2023).

CONCLUSION

The study concludes that mobile phones play a significant role in farmers' information-seeking behaviour, particularly for agricultural purposes. The analysis reveals that while the availability and importance of mobile-accessed information are moderately rated by most farmers, the frequency of use and satisfaction vary, with a substantial number using mobile devices occasionally. Education emerged as the most critical determinant of mobile phone use, with higher education levels significantly increasing the likelihood of utilizing mobile phones for agricultural information. The logistic regression model showed strong predictive accuracy, with a robust fit indicating that 50.04% of the variation in mobile phone use was explained by the selected variables. These findings suggest that enhancing educational opportunities for farmers could improve mobile phone usage, ultimately supporting better access to agricultural information and decision-making processes.

Funding: The first author received the funding from ICAR-NTS (PGS) Scholarship

Declaration of competing interest: Authors have no conflict of interest.

Data availability: The data is available in the public domain and if demanded will be made available.

Conflict of interest: The authors have no conflicts of interest.

Authors' contribution: First author contributed as collection of primary data and writing of manuscript. Second author supervised and guided whole research. Third author contributed as suggesting appropriate methodology and analysing the data. Fourth and fifth author contributed in writing, proof reading and finalizing the manuscript.

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