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Assessing the Effectiveness of different Mobile Apps in Terms of Knowledge Gain and Adoption Level

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Authors' contributions

This work was carried out in collaboration among all authors. Author SS designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author KY managed the analyses of the study. Author VD managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The use of mobile phones has become an integral part of smallholder farmers' lives in both developed and developing countries. The traditional transfer of technology mechanism had lot of constraints including limited staff, wider coverage and required more cost. The study was conducted to assess the effectiveness of different mobile apps in terms of knowledge gain and adoption level of technologies. Kisan Suvidha Mobile App was taken as technology option 1 (TO 1), Farmer Mobile App was taken as technology option 2 (TO 2) and the e-Nam mobile app was taken as technology option 3 (TO 3). The study was conducted in Villupuram district of Tamil Nadu state. Radom sampling method was adopted to select the farmers. The yield data, knowledge and adoption level of the farmers were assessed before and after usage of mobile apps in getting agro advisory services in crop cultivation from land preparation to marketing. The farmers gained more knowledge

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by using Kisan Suvitha app. The farmers who were using Farmer mobile app and e-Nam mobile apps gained medium level of knowledge in crop cultivation method. Farmers could able to adopt 70 percent of the technologies by following Kisan Suvitha app whereas the farmers followed the Farmer mobile app and e-Nam app adopted the technologies for 64 and 60 percentage respectively. the farmers who followed the Kisan Suvidha app obtained a more yield of 61.1 q/ha. Whereas, the Farmer Mobile App users obtained 57.0 q/ha followed by e-Nam mobile apps users obtained a yield of 55.0 q/ha.

Keywords: Mobile applications; Kisan Suvidha; farmer mobile app; e-Nam; knowledge, adoption.

1. INTRODUCTION

India is one of the major players in the agriculture sector worldwide and it is the primary source of livelihood for 55% of India's population. The vast majority of Indian farmers are small-scale producers who lack access to information and technology resources that could help them boost yields and get better prices for their crops and goods. The widespread use of mobile phones came to the rescue in resolving this issue. International Telecommunication Union reported in 2017 mobile subscriptions reached 7.76 billion [1]. More than one-third of the world's population has owned a smartphone, and for every 100 inhabitants, 87.28 per cent have been using mobile phones in India. Comparing to the other fields, the demand for mobile applications related to agricultural sector is limited but it is emerging [2]. Mobile apps play an important role in expanding timely access to rural extension and advisory services to meet the immediate needs of farmers and other rural residents as they change their production and livelihood systems [3]. It is affordable, easy to adopt, and offer high-configuration technological support [4]. Agriculture related digital services focus on farmers' accessibility to crop management services such as nutrient management, [5,6], crop protection measures [7], financial services, weather updates [8], and market prices [9].

Agriculture related mobile apps are bringing farmers, agri inputs, retail and fulfillment services on a common digital platform. Increasing agricultural productivity, profitability, and sustainability in the developing world depends on the ability of rural populations to adopt changes and innovations in their use of technologies, management systems, organizational arrangements, institutions and environmental resources. In addition, the mobile apps are providing farmer-specific and location-specific information services which improve the productivity and avoid losses due to improper planning [10]. Thus, dynamic information on weather details, market prices, advisory services, encourages many farmers to use smartphone applications.

Emergence of Web 3.0, Web 4.0, and the high speed of the Internet are changing the way of thinking, behaving, communicating, working, and moving from the traditional style and offering various kinds of services that users enjoy [11]. The rapid increase in the uptake and use of mobile phones among smallholder farmers has been attributed to a fall in cost, increased connectivity, and awareness [12,13]. The traditional transfer of technology mechanism had lot of constraints including limited staff, wider coverage and multi diverse cropping system. In this situation the farmers are struggling lot to find instant solution to their farming problems. If the farmers wants to meet the experts personally they have to spend more to reach them. Hence the various organizations have developed mobile applications for agriculture to meet the farmers need. The present study was conducted with the objective of assessing the effectiveness of different mobile apps in terms of knowledge gain and adoption level.

2. MATERIALS AND METHODS

Krishi Vigyan Kendra for Villupuram district of Tamil Nadu state is situated in Tindivanam. It organized various activities mandated by Indian Council of Agricultural Research (ICAR), New Delhi viz. On farm testing (OFT) were organized on specific identified problem to come up with the result that which of the technologies tested is more suitable to the resources available in the district and cost effective. This is a form of participatory study where farmers' perspective is given most importance. To conduct this trial Agoor village of Mailam block was chosen. Agoor block is one of the agrarian based blocks of Villupuram district in Tamil Nadu. The village has wetland, garden land and dry land systems. The

village is noted for erratic monsoon. Bulk of precipitation is received in the North East Monsoon as has been for the district. The village suffers due to intense heat during summer. The crops raised during kharif and summer face intermittent drought. The soil type of the village is Red soil. There is low level of nitrogen, medium level of Phosphorous and Potassium. Paddy, Pulses and Oilseeds are the major crops extensively cultivated in the village. Vegetable and flower crops are also cultivated in the village. Most of the farmers are using smart phones in this block but they are not aware about latest Information and Communication Tools (ICT) available for agriculture. The farmers were randomly selected by adopting simple random sampling technique with the consideration of cultivation sugarcane crop and lack of knowledge on sugarcane trash composting. Totally the trial were conduct in thirty farmers' field.

To conduct this on farm trial, the various mobile applications related to agriculture were taken. Accordingly, Kisan Suvidha Mobile App was taken as technology option 1 (TO 1), Farmer Mobile App was taken as technology option 2 (TO 2) and the e-Nam mobile app was taken as technology option 3 (TO 3). The selected farmers were given with orientation programme and feedback session regarding agricultural based mobile apps. The knowledge level of farmers with improved production technologies of Paddy before and after the interventions of mobile apps was measured by adopting knowledge test. Various items related to Paddy production technologies were selected and administrated to the respondents in the study area.

The pre and post knowledge test was performed by the farmers. In the orientation programme the knowledge test was performed by the farmers and the lecture was given on the benefits of mobile application in agriculture. During this programme how to use the mobile apps that is Kisan Suvidha, Farmer Mobile App and e-Nam mobile apps. Totally 30 farmers were selected and among them 10 farmers were exposed to Kisan Suvidha, 10 farmers were exposed to Farmer Mobile App to and another 10 farmers were exposed to e-Nam mobile apps. The farmers were all followed the respective mobile apps for their crop cultivation from to seed to market. Finally the pre and post evaluation result was compared to find out the effectiveness of mobile apps.

3. RESULTS AND DISCUSSION

The knowledge and adoption level of the farmers were assessed before and after usage of mobile apps in getting agro advisory services in crop cultivation from sowing to marketing. The yield data, net returns and Benefit Cost ratio also assessed and presented the Table 1.

In order to assess knowledge level of the respondents, necessary data were collected and they were categorized into three categories viz., low, medium and high based on the overall score obtained in the knowledge test before and after using of mobile apps. From the Table 1 it could be understand that the farmers gained more knowledge (73%) by using Kisan Suvitha app. The farmers who were using Farmer mobile app (67 %) and e-Nam mobile apps (60%) gained medium level of knowledge in crop cultivation method. Table 2. revealed that the farmers could able to adopt 70 percent of the recommended technologies by following Kisan Suvitha app whereas the farmers followed the Farmer mobile app and e-Nam app adopted the technologies for 64 and 60 percentage respectively. The net returns and the Benefit Cost ratio was also observed high among the users of Kisan Suvitha app.

Kisan Suvitha app helps the farmers in the aspects of cultivation technologies, weather forecast and the government schemes available for the farmers. The district wise details have been given in Kisan suvitha which is highly useful for the Villupuram district farmers. It is also found that the farmers who followed the Kisan Suvidha app obtained a more yield of 61.1 q/ha.

Table 1. Knowledge level of the farmers before and after using mobile app

S. No	Category	Kisan Suvidha				Farmer Mobile App				e-Nam mobile apps			
		Before		After		Before		After		Before		After	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1.	Low	22	73	0	0	20	67	2	7	24	80	4	13
2.	Medium	8	27	2	7	9	30	20	67	6	20	18	60
3.	High	0	0	28	93	1	3	8	27	0	0	8	27
	Total	30	100	30	100	30	100	30	100	30	100	30	100

Table 2. Performance of the various mobile applications

Technology Option	No. of trials	Yield (q/ha)	Net Returns (Rs./ ha)	B:C	Knowledge level		Adoption (%)	
					Before	After	Before	After
Kisan Suvidha	10	61.1	79700	2.8	Low	High	45	70
Farmer Mobile App	10	57.0	71500	2.6	Low	Medium	42	64
e-Nam mobile apps	10	55.0	67500	2.5	Low	Medium	48	60

Whereas, the Farmer Mobile App users obtained 57.0 q/ha followed by e-Nam mobile apps users obtained a yield of 55.0 q/ha. The farmers in the study area also revealed that the e-Nam application was highly useful in getting market information.

4. CONCLUSION

From this study it is concluded that the farmers gained more knowledge by using Kisan Suvitha app. The farmers who were using Farmer mobile app and e-Nam mobile apps gained medium level of knowledge in crop cultivation method. The farmers who followed the Kisan Suvidha app for getting advisory services obtained more yield. The e-Nam application was highly useful in getting market information among farmers in study area. Hence, effort may be taken by the extension officers in all stages to diffuse and to create awareness about the various mobile application in related to agriculture among the farming community which will help them in quick access of information.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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