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Use of ICT Tools (Mobile Phones) In Technology Dissemination: A Case Study with Farmers of Mahabubnagar District

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Abstract:

Dearth in physical infrastructure, insufficiency with availability of agricultural inputs and poor access to agricultural information are the major constraints in the growth of agricultural productivity in India. The more rapid growth of mobile telephony as compared to fixed line telephony and the recent introduction of mobile-based information services provide a means to overcome the existing information asymmetry. Simultaneously, the mushrooming of ICT-enabled knowledge sharing initiatives urgently needs a thorough investigation to assess the worth of such enterprises. A knowledge delivery platform voice-KVK (Krishi Vigyan Kendras- the Farm Science Centers) was used in the present investigation to provide agro-advisories to farmers on their mobile phones. The paper discusses the results of this study carried out in the most backward district of Andhra pradesh - Mahabubnagar.

Keywords: Agro-advisories, technology dissemination, ICT, technology adoption, mobile phones, voice messages

Introduction

Constraints in effective transfer of technology to farmers among other factors are believed to be responsible for the stagnation in growth in agriculture. It is reported that only 40 per cent of farmers access information about agricultural techniques, inputs and market (NSSO, 2005). The rich and the literate farmers have better access to information. Majority of the small and marginal farmers receive information either from fellow farmers, relatives, or traders and only 5.7 per cent receive information from extension agencies.

The advances in the information and communication technologies (ICTs) in the recent past have changed the way we communicate with each other and they have revolutionized the way we live. Their application in agriculture until recently was limited to the use of radio and television and later extended to include interactions through audio and videoconferences. These efforts however, were not successful due to a variety of reasons including absence of trained manpower and the lack of investments in creating the infrastructure.

However, the introduction and the popularity of mobile phones amongst the masses have brought about a major transformation in the society. The increase in mobile phone connections in India from 95 million in 2000 to over 900 million as on March, 2012 is phenomenal (TRAI, 2012). This phenomenal penetration and ownership of mobiles by the rural community, to a great extent, has addressed one of the major issues facing the extension agencies as to how to reach the unreached. Several agencies and organizations have started using this communication channel to connect with the farmers. Some of the major initiatives are; IFFCO Kisan Sanchar Nigam Ltd (IKSL), Nokia Life Tools and mKRISHI by Tata Consultancy Services. These initiatives have been reviewed and commented upon by Mittal et al (2010) and IFPRI (2012). All these initiatives are by for-profit organizations and none is from the public organization. In this paper, we discuss about a platform developed under a project funded by the ICAR, and its application under a pilot study carried out in the district of Mahabubnagar in Andhra Pradesh involving over 500 farmers.

Methodology

The study area

The study was undertaken in Mahabubnagar district of Andhra Pradesh by adopting Ex-post facto research design. Kothakota, Dharoor, Pebbair, C.C.Kunta mandals were selected purposively where the farmers were receiving the voice and text messages from krishi vigyan Kendra. The *Krishi Vigyan Kendras* (Farm Science Centers) were involved in developing relevant and crop-specific advisories and sending them on farmer's mobile phones.

Developing and issuing agro-advisories

The vKVK (voice KVK) platform developed by the Indian Institute of Technology-Kanpur IIT Kanpur under a consortium project funded by the National Agricultural Innovation Project (NAIP) of the Indian Council of Agricultural Research (ICAR) was used to develop and send advisories to farmers over their mobile phones. Initially, the advisories were sent as text messages, but later the technology was improved to send voice messages. Hence, vKVK is also referred to as voice-KVK. The KVK scientists developed relevant and crop specific advisories in local language. The voice-KVK has three facilities to communicate: 1) Expert to farmer 2) Farmer to expert and 3) Expert to expert, however, in the present study only the first one is implemented. The Expert to farmer (E2F) system allows the subject matter specialist at KVK to create and send voice based advisory from vKVK portal to the farmers' mobile phone. The text messages were partially successful as only literate farmers could access and read the advisories sent in local language using Roman fonts, as very few handsets supported local fonts. The introduction of voice messages thus overcame the above limitations. The facility was set up at the KVK and the scientists were trained in using the platform and in developing and issuing advisories.

The advisories were issued from August 2011 and continued up to March, 2012. The number of farmers covered, total number of advisories issued and the crops covered are given in Table 1. Pebbair issued the maximum number of messages followed by Dharoor, Kothakota and C.C.Kunta. A total of 12 crops are covered.

Table 1: Some details of the study

Particulars	Kothakota	Dharoor	Pebbair	C.C.Kunta
Total number of Farmers	750	833	767	567
No. of Advisories for Farmers				
Voice	37,025	40993	52413	20817
Text	1502	2563	5264	1705
Crops covered	<ul style="list-style-type: none"> • Sorghum • Bengal gram • Groundnut • Paddy • Green gram • Cotton • Red gram • Maize 	<ul style="list-style-type: none"> ➤ Red gram ➤ Cotton ➤ Sunflower ➤ Castor ➤ Chilli ➤ Groundnut ➤ Bengal gram ➤ Sorghum 	<ul style="list-style-type: none"> • Groundnut • Sorghum • Bengal gram • Cotton • Sunflower • Castor 	<ul style="list-style-type: none"> ➤ Paddy ➤ Groundnut ➤ Castor ➤ Cotton ➤ Red gram ➤ Vegetables

Data collection and analysis:

The background information of farmers was collected from all the farmers registered for receiving the agro-advisories, using a standard questionnaire. The feedback and the adoption pattern by the farmers were assessed by sampling a small number of farmers; 99 farmers from Kothakota, 71 from Dharoor, 37 from Pebbair and 50 from Mahabubnagar district. For this study, a well developed, pre-tested and semi-structured interview schedule was executed. Through this questionnaire the information related to extent of awareness of agro-advisories, extent of adoption, farmers' opinion, practice change, information sharing behavior of farmers, satisfaction of the services of agro-advisories, etc was gathered. Data collection was

done from February, 2012 to April, 2012. All the farmer respondents were personally interviewed by the concerned KVK personnel in the study area. The evaluation was focused more towards process impact rather than on end result impact.

Analysis and interpretation of data was done by using Statistical Package for Social Sciences (SPSS) with the help of mean, standard deviation, frequency, percentage, and coefficient of variation, multiple regression for correlation and student 't' test was used as a test of significance.

Results

The analysis of the farmer's profile is given in Table 2. The maximum number of farmers was in the age group of 27-43 years in Dharoor and C.C.Kunta, whereas it was highest in the age group of 30-52 years in Kothakota and 32-49 years in Pebbair. Maximum numbers of farmers were educated up to high school in all mandals except Kothakota, where it was up to primary school. About farm size, maximum number of farmers belonged to small farmer group in all mandals except Pebbair, where 78 per cent of farmers owned land between 5.0ha to 10.0 ha. In all mandals majority of farmers had irrigation facilities except in Kothakota, where 98.0 per cent were rain fed farmers.

Table 2: Profile of farmers involved in the study (N=257)

Background characteristics	Percentage (Majority of Population)			
	Kothakota (N=99)	Dharoor (N=71)	Pebbair (N=37)	C.C.Kunta (N=50)
Age	62.6 Middle (30-52 years)	71.8 Middle (27-43 years)	67.6 Middle (32-49 years)	71.8 Middle (27-43 years)
Education	35.3 Primary	50.7 High School	54 High School	50.7 High School
Gender	95.9 (Male)	100 (Male)	94.6 (Male)	100 (Male)
Annual income	57.6 Medium (20930- 50,594)	80.3 Low (less than 40,119)	64.9 Medium (44,897 - 86,615)	80.3 Low (less than 40,119)
Land holding	57.6 Small farmers (2.51 to 5 ha)	35 Small farmers (2.51 to 5 ha)	78.4 Marginal farmers (5.0 to 10 ha)	35 Small farmers (2.51 to 5 ha)
Land ownership	95.9 Owned	98.6 Owned	75.7 Owned	98.6 Owned
Farming type	98 Rainfed	70 Irrigated	86 Irrigated	70 Irrigated

The analysis on source and information needs of farmers is given Table 3. Farmers from Dharoor, Pebbair and C.C.Kunta had higher level of access to information than Kothakota. Interestingly the major source of information was State Agricultural Department, whereas in other mandals all other sources were comparable to Agricultural Departments. As far as major information needs are concerned, across mandals, production practices ranked first (73.1 per cent), followed by pest management (56.1 per cent) and weather information (54.6 per cent). The

difference in requirement with districts was evident. Pest management ranked first in both Kothakota (81.8 per cent) and Dharoor (88.7 per cent), whereas it was for production practices (100 per cent) in C.C.Kunta and market information (100 per cent) in Pebbair. Interestingly, the need for information on crop insurance was the lowest (35.5 per cent).

Table 3: Source and Information needs of farmers (N=257)

Particulars	Kothakota	Dharoor	Pebbair	C.C.Kunta
Source of information				
TV/Radio/Print media	o 31.3%	o 98.6%	o 94.6%	o 94.0%
Input dealers	o 19.1%	o 95.7%	o 94.6%	o 92.0%
Fellow farmers	o 17.2%	o 92.9%	o 72.9%	o 100%
Agricultural departments	o 66.7%	o 85.9%	o 94.6%	o 100%
Major Information needs				
Government schemes	o 54.5%	o 47.9%	o 86.5%	o 10.0%
Market information	o 48.5%	o 29.6%	o 100%	o 10.0%
Agricultural loans	o 67.7%	o 59.2%	o 83.8%	o 14.0
Pest management	o 81.8%	o 88.7%	o 72.9%	o 100
Crop insurance	o 65.7%	o 1.4%	o 72.9%	o 2.0%
Weather information	o 37.4%	o 23.9%	o 64.9%	o 92.0%
Production practices	o 32.3%	o 81.7%	o 78.4%	o 100%

Farmers are constantly exposed to new technologies and it is quite likely few may even be practicing them before our intervention with mobile phones. Data shown as mean over mandals in Table 4 puts this figure at 18.5 to 59.9%. This claim is questionable and appears generalized. For instance all recommendations on pest control are likely to be treated similar, although the pesticide name, dosage and time of application are perhaps more critical. However, a significant number of farmers (18- 51%) did adopt the advisories following our intervention with mobile phones. The highest was with plant protection (51%), underlining the importance of protecting the crop and the greater need of information in this area. As high as 34 to 54 per cent of the farmers expressed their intention to adopt the recommendations received thru mobile phones from kvk in the future.

Table 4: The extent of adoption of specific practices before and after exposure to agro-advisories (N=257)

Specific Practices	Before exposure to agro-advisories (%)	After exposure to agro-advisory (%)	Intend to practice in future (%)	No plans to adopt (%)
Land preparation	59.9	18.1	36.3	32.7
Seed/Varieties	41.5	20.0	47.8	Nil
Sowing time	32.7	28.0	54.0	Nil
Plant protection	18.5	51.2	34.6	1.7
Harvesting	51.2	43.6	26.8	Nil

By and large the agro-advisories were well received by the farmers (Table 5). Majority of the farmers (more than 90 per cent in all mandals except in Pebbair found the speed of delivery of voice message as appropriate and audio quality as good (fair in case of Pebbair). Majority of farmers from all districts found the content as relevant and moderately useful. While majority of farmers from Kothakota and C.C.Kunta found the content less technical, it was found as moderately technical in the other two mandals.

Table 5: Opinion of the farmers about Agro-advisories (N=257)

S.No.	Category	Percentage (Majority of Population)			
		Kothakota (N=99)	Dharoor (N=71)	Pebbair (N=37)	C.C.Kunta (N=50)
1.	Speed of presentation (voice message)	92.9 (Appropriate)	100 (Appropriate)	43.2 (Fast)	94.0 (Appropriate)
2.	Content Relevance	87.9 (Highly relevant)	97.2 (Somewhat relevant)	67.6 (Somewhat relevant)	84.0 (Somewhat relevant)
3.	Audio quality (voice message)	87.9 (Good)	95.8 (Good)	73 (Fair)	84.0 (Good)
4.	Technical content in the messages	66.7 (Less)	97.2 (Moderate)	48.6 (High)	86.0 (Less)
5.	Usefulness of content	87.9 (Moderately Useful)	95.8 (Moderately Useful)	89.2 (Moderately Useful)	70.0 (Moderately Useful)

Table 6 reveals the association of independent variables with the selected dependent variable. It is clear from the perusal of the data that education, communication media possession and land holding are positively and highly correlated with the dependent variable including began practicing after exposure to agro-advisories and intend to practice in near future. It indicates that more will be the educated farmers with advanced sources of communication more will be the chances of adoption of new technologies.

Table 6: Influence of background characteristics on adoption of advisories (N=257)

Districts	Before exposure to agro-advisory	After exposure to agro-advisory	Intend to practice in future	No plans to adopt
Kothakota				
Education	0.332	0.916**	0.882**	0.004
Annual income	0.606	0.340*	0.573*	0.278
Communication media possession	-0.057	0.916**	0.697**	-0.024
Land holding	0.149	0.200*	0.161	0.131
Dharoor				
Education	0.323	0.301*	0.397*	0.004
Annual income	0.586	0.431*	0.512*	0.278
Communication media possession	-0.057	0.619**	0.597**	-0.024
Land holding	0.149	0.267*	0.161	0.131
Pebbair				
Annual Income	0.586	0.341*	0.381*	0.143
Communication media possession	-0.037	0.211*	0.237*	-0.044
C.C.Kunta				
Education	0.339	0.093	0.289*	0.179
Land holding	0.027	0.230*	0.355**	-0.001

**Significant at 1% level of significance * Significant at 5% level of significance

Conclusion

The study revealed that TV/Radio/Print media, input dealers, fellow farmers and agricultural departments are the most popular sources of information for farmers. Government schemes, market information, agricultural loans, disease management, crop insurance, weather information and crop production practices are the most preferred information needs of the respondents. Most of the vKVK agro-advisories were related to production and protection practices. Respondents opined that the content delivered in the form of agro-advisories was relevant and useful to them. Farmers readily adopted recommendations related to plant protection, harvesting and seed/varieties and practiced them. It is recommended to conduct benchmark and need assessment surveys before issuing of Agro-advisories to the farmers so that need based advisories can be issued for better outcomes. It is also desirable to include women farmers in the study as they play a major role in agricultural activities.

The present study shows that Information and Communication Technology could make a difference if implemented and monitored effectively. Results show that agro- advisories from vKVK had helped the farmers to gain and enrich their knowledge regarding the latest agricultural practices. A significant percentage of farmers (18 to 51%) adopted the recommendations following our intervention with mobiles. Further, a substantial percentage of farmers who received the advisories readily shared with fellow farmers. The percentage of farmers who shared information ranged from 49 in Pebbair to 97 in Dharoor.

On the basis of these findings, it can be recommended that Farm Science Centers (KVKs) should be equipped with more number of computers and internet facility as KVKs are considered as reliable sources of information.

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