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Influence of farmers educational level on comprehending, acting-upon and sharing of agro advisories

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Abstract

Although short messaging service (SMS) through mobile phones has quickly gained popularity among most other sectors in India, its potential is not fully realised in the agriculture sector as a cost effective service to reach farmers and elicit desirable action. Despite the cost effectiveness, mobile messaging has remained a challenge in the farming sector in terms of its end use and action as far as extension systems are concerned. While there could be many influencing factors affecting the utility of mobile messages, this study assumed that educational level of farmers could be a major factor. A telephone survey was conducted to ascertain the influence of farmers' education on the level of utilisation of mobile-based advisories. Farmers with higher education level showed better comprehension of advisories, acted-upon the advisories more promptly and shared the information with fellow farmers more often than those with lower education level. There was a significant association between comprehending, sharing and acting upon advisories. This has implications to achieve enhanced extension reach with higher efficiency in terms of cost and time.

Keywords: mobile advisories, farmers education, extension, telephone survey

1 Introduction

Farming in India is witnessing rapid development while at the same time facing new challenges. As the challenges in agriculture are increasing, choosing the best possible solution requires farmers to be alert and empowered. Farmers' education has an important role to play in receiving and using information on modern agricultural technologies to address local specific problems more efficiently. Therefore, ensuring access to quality education for all, particularly for the poor and rural population, is central to the economic and social development of India (Gille, 2010). Lockheed *et al.* (1980) made a critical review of 18 studies (using 37 sets of farm data) and found education to be having a positive and significant effect on farm efficiency in 31 data sets and a negative but statistically insignificant effect in the other six data sets. After pooling all the results of the studies included in their survey, Lockheed et al. concluded that farm productivity increased on average by seven per cent as a result of a farmer completing four additional years of education. Carrying out a meta-analysis for the relationship between farmer education and farm productivity, covering 30 studies and 59 data sets, Phillips (1994) found that the weighted gain of four years of schooling is six per cent and that the average gain in productivity of farmers in a modern environment exceeds that of farmers in traditional surroundings.

In a study involving 978 households in five Chinese provinces, Nguyen & Cheng (1997) found that the education level of the head of the household had significant effect on farm productivity. So it seems that farm efficiency depends primarily on the education level of the household head, as this person makes almost all farming decisions. Therefore, education is one of the most powerful instruments for reducing poverty and inequality.

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The rapid pace of technological advancement in the area of information and communication is helping to bridge the distance between research and extension systems, and farmers in India. The number of telephone subscribers in India has increased to 933 million at the end of March 2014 leading to an overall tele-density of 75.2 %. The tele-density in rural India is slowly catching up with its urban counterpart and the share of rural subscribers has increased to 40.5 %. The wireless sector is rapidly expanding whereas the wire-line connections are coming down slowly. Total wireless subscriber base stood at 904.51 million, with the share of rural wireless subscribers being 41.1 % (TRAI, 2014).

Realising the immense potential that mobile services can have for agriculture in India, the Government of India has set an ambitious goal of reaching every farmer in the country by establishing and enabling a platform for providing mobile advisory services. The *Kisaan* (Farmers') SMS portal launched by the Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, Government of India is a major initiative in this direction. It uses the strong network of National Agricultural Research System (NARS) comprising Research Institutes, Universities and Farm Science Centres (*Krishi Vigyan Kendras* - KVK) for designing location specific agro-advisories that are season, location, crop and problem specific. Messages being sent to farmers are broadly classified into three categories, *viz.* information, services, and advisories. Timely receipt of relevant expert advice/alert/market information can help the farmers in many ways.

Sending advisories is a one-way communication and has all the disadvantages of impersonal communication *viz.*, limited feedback from receiver, lack of information about understanding of message by the receiver, and little or no control over timing of message. The feedback loop is a critical component of any project that uses Information and Communication Technology (ICT) and updating. Furthermore, the service design that supports it is based on the trends in the sector, which are constantly shifting. Paying attention to this feedback loop increases sustainability and maintains cost-effectiveness (World Bank, 2013).

Keeping this in mind, a telephone survey was conducted as a follow-up to nine advisories sent by *Krishi Vigyan Kendras*. Telephone survey enables data to be collected from geographically scattered samples more cheaply and quickly than by field interviewing. It is possible to avoid cluster sampling, which is used in field survey designs to control interviewer travel costs (Roger & Purdon, 1994). Until now, this method has not been popular in developing countries because of low tele-density. In recent years, with improving density, it is a promising method of data collection. Telephone interviews aid in covering a wider geographical area within less time and with minimal logistics, like transport (Mahalakshmy & Premarajan, 2008).

2 Materials and methods

Respondents were selected through a multi-step random sampling procedure. Random sampling requires a process for selecting members from a determinate population that enables each case to be assigned a probability of selection. Six voice messages and three text messages, sent from *Krishi Vigyan Kendras* located in Southern Indian State of Karnataka, during first fortnight of July (*kharif* season) and second fortnight of November 2013 (*rabi* season) were considered for the study. The farmers' list to which the messages were sent was arranged in an alphabetical order and was given serial numbers to facilitate random selection. The process of feedback collection through telephone survey was targeted to be completed within four days of sending each message as collecting feedback after considerable time gap may get superimposed by messages received subsequently. Within these four days, out of 60 farmers attempted to be contacted for each message, the number of farmers actually contacted varied from 18 to 53. Out of the 540 farmers called, 287 farmers could be reached and 230 of them responded to the questions. Educational status of 20 respondents couldn't be confirmed during the process of data elicitation. Therefore, data elicited from 210 respondents were considered for this study.

Based on the educational level, farmers were categorised as illiterate, school level (up to 10^{th} standard), inter-mediate (pre-university) level, graduate and professionally qualified. Farmers' behaviour on the usage of message/advisories was measured on three parameters namely comprehension, acting-upon and sharing with others. Data related to extent of comprehension, acting upon and sharing was worked out for different categories of educational level of farmers by using frequency and percentage. Association among the three types of behaviour of usage of advisories was assessed using chi-square. Relationship between the three types of behaviour in usage of advisories with that of farmers' educational level was tested using coefficient of correlation.

3 Results

Majority of the farmers included in this study were graduates followed by those educated till intermediate level. Data related to educational status of farmers and the extent of comprehension of the text/voice messages revealed that all the graduate respondents and professionally qualified farmers responded that they comprehended the message. About 19 per cent of the farmers had only school level education and all of them, including some of those educated till intermediate level couldn't comprehend the text/voice messages. In the present study, illiterate respondents had enrolled for receiving voice messages only, and hence did not have to bother about understanding text messages.

Eighty seven of the 210 respondents acted upon (this included those who applied the advice as well as those who decided to apply, at the time of telephone interview) the advice, while 123 didn't. The data related to the extent of action initiated based on the advisories was classified on the basis of educational qualification of farmers (Table 1). All the school level educated farmers and the majority of those educated till intermediate level couldn't act upon the advisory. Farmers with higher education acted more promptly than those with lesser education, be it text or voice message. A clear case is that of the graduates who received both text as well as voice messages. Majority of the respondents who acted upon text messages were graduates. Even when voice and text messages were considered together, more graduates acted-upon the advisories than intermediate and school level educated.

There was a significant association between comprehending the advisory and acting upon it (Table 2). More than half of the persons who understood the advisories also used the advice, which is a good indication, keeping in view the low-cost incurred towards sending mobile advisories. It is also equally important to note that those who didn't comprehend the advisory didn't venture into acting on them. Less than half of those who understood the message also couldn't act upon the advisory, bringing out the fact that mere understanding of the message may not be adequate to trigger action.

Valuable finding of the study is that majority of the respondents shared the advisories with other farmers, leading to a horizontal spread effect (Table 3). More than two-third of the farmers shared the information with fellow farmers. All the illiterate farmers shared the messages with other farmers. Majority of graduate respondents (88.6 %) and 78 % of the professionally qualified respondents shared the advisories with fellow farmers. Among those educated till intermediate level, three-fourth of them shared the advisories with other farmers.

Table 2: *Association between comprehension and acting upon the advisories (n = 210).*

Category	*Acted upon*	*Not acted upon*	*Total*
Comprehended	87	73	160
Not comprehended	0	50	50
Total	87	123	210

χ^2 = 46.42; ** Significant at 0.01 level

Table 3: *Extent of sharing of messages by respondents with others (n = 210).*

Education Level	*Shared with others*	*Not shared with others*	*Total*
Illiterate	13	–	13
School	–	43	43
Intermediate	43	14	57
Graduate	78	10	88
Professionally qualified	7	2	9
Total	141	69	210

Table 1: *Extent of acting-upon by the farmers having different educational level on the advisories received through text and voice messages (n = 210).*

Education categories	*Text Message*			*Voice Message*			*Total*		
	Acted upon (%)	*Not acted upon (%)*	*Total*	*Acted upon (%)*	*Not acted upon (%)*	*Total*	*Acted upon (%)*	*Not acted upon (%)*	*Total*
Illiterate	–	–	–	5.7	0.5	6.2	5.7	0.5	6.2
School	–	19.5	19.5	–	1.0	1.0	–	20.5	20.5
Intermediate	0.5	15.7	16.2	2.4	8.5	10.9	2.9	24.2	27.1
Graduate	3.3	8.6	11.9	25.2	4.8	30.0	28.6	13.3	41.9
Professionally qualified	–	–	–	4.3	–	4.3	4.3	–	4.3
Total	3.8	43.8	47.6	37.6	14.8	52.4	41.5	58.5	100.0

The results of correlation test between education level of farmers and their response to messages in terms of comprehending, acting-upon and sharing with fellow farmers are given in Table 4. The '*r*' values indicated a significant relationship between education and all the three levels of use behaviour of mobile advisories.

Table 4: *Relationship between education and the behaviour of usage of advisories/information received through mobile messages (n = 210).*

Behaviour of usage of advisories	*Correlation (r) with education*
Comprehending the advisory	0.575 **
Acting upon the advisory	0.371 **
Sharing of information	0.414 **

** Significant at 0.01 level

4 Discussion

All respondents who had formal education up to school level only and some of those educated till intermediate level couldn't comprehend the text/voice messages, probably because the messages were too technical for them and contained e.g. names of chemicals they did not know. The major problem with the text messages was language, as many handsets owned by the farmers might not have supported the local language. It is also possible that they might have failed to change the setting of their handsets to enable them receive text messages in local language. Oftentimes, common languages like English are not useful in initiatives in rural spaces. Technology needs to support local and indigenous languages, even if local people are able to directly read or respond to messages, (The World Bank, 2013). In the present study, illiterate respondents had enrolled for receiving voice messages only, and hence did not have issues with understanding text messages.

Understanding of the message itself may or may not lead to action on the advisory. However, it is a prerequisite to act-upon messages in the desired way. Majority of the respondents who acted upon text and voice messages were graduates. Foster & Rosenzweig (1995) argued that education improves information learning. On one hand it gives better access to sources of information, on the other education helps understanding new information. Consequently, education has positive returns where there are learning opportunities. In particular, education facilitates adoption of new technologies. Letha & Khandekar (2012) in their study on the factors affecting adoption of innovations by dairy producers in India, reported that family education level of the respondent is highly positively correlated with adoption of dairy practices.

Replacing text by voice can overcome the limitation of education as evident by the fact that most of the illiterate respondents who received voice advisories were better in initiating action than school level educated farmers who received only text messages. Probably, illiterate respondents listened to the message more intently. Some of them confirmed that they requested their family members also to listen to the voice mail as to be doubly sure of the meaning of the advice. In some cases, younger members of the family first listened to the advisories and then shared the same with their elders thereby resulting in reinforced listening leading to action. On the contrary, farmers with school level of education might have felt embarrassed to ask others to interpret the message for them.

Majority of the respondents shared the advisories with other farmers, leading to horizontal spread effect. Illiterate farmers also shared the messages with other farmers, may be by default, in their efforts to get a clear understanding of the message. Among literates, majority of graduate respondents and professionally qualified respondents shared the advisories with fellow farmers. Education does not induce growth only because it improves individual productivity, but also because it has positive externalities, notably in terms of learning spillovers. Increasing education has a higher social return than its private return (Gille, 2010). This is particularly important for India where neighbourhood progressive farmers and fellow farmers in the same village are the major sources of information for many other farmers. Under these circumstances, presence of educated farmers and their information-sharing tendency will have positive effect on acquisition of new information by the members of the community.

There was significant relationship between comprehension and sharing of messages. Horizontal communication among farmers is vital for enhancing the reach and coverage among the farming community, which is the primary concern of extension systems. This is particularly so in India which has a large constituency of the farming community, mostly of smallholders, who are difficult to reach by the limited number of field functionaries available within the public extension system. It was interesting to note that those respondents who didn't

comprehend the advisories didn't share the information with others, as sharing of information not well understood by the first recipients could be a potential misinformation for secondary and tertiary recipients.

In the overall analysis, 160 farmers could comprehend the message/advisory, thus achieving an effectiveness level of 76.2 %, and 141 shared with other farmers leading to a horizontal spread effect of 67.1 % of the total respondents. As far as acting-upon the advisories was concerned, 54.5 % of those who comprehended, which is equivalent to 41.5 % of total respondents, acted-upon the advisories. Achieving 41.5 % action and 67.1 % horizontal spread within a short span of time could be a huge gain for the extension system. This must be highly inspiring to the extension system which is finding it very difficult to reach many farmers through individual, group and mass extension methods/approaches. The '*r*' values indicated a significant relationship between education and all the three levels of use behaviour of mobile advisories. Urvashi & Bhardwaj (2012) in their study on tribal farmers have revealed the positive influence of education with adoption of new technology and socioeconomic changes.

Communication of information with an intent to motivate receivers to act-upon is indeed challenging, more so when the receivers have varied level of education. This is the precise situation that the Indian agricultural extension is faced with. The present study demonstrated that advanced communication gadgets like mobile phones could be used to achieve this objective.

Rural India, despite serious limitations of physical infrastructure, has witnessed a remarkable growth in the penetration of mobile telephone network. This has been possible with the government's consistent policy of inviting and sustaining private investments in expanding mobile telephone network across the country. A widespread mobile network has turned out to be highly favourable for development communicators who have stakes in bringing about behavioural changes among large sections of rural population. In this context, the findings of the study are particularly of interest and indeed encouraging.

Feasibility of using the tele-network for reaching appropriate and timely messages to a large number of farmers at low cost and high degree of time efficiency has been brought out clearly in the study. Although it has shown that the behaviour of its subjects – both the literate and less/illiterate - is conducive to achieve horizontal spread and impact, it remains to be seen whether the observed behaviour will sustain even after the novelty of the technology (mobile telephony) fades away with the passage of time. Further, the behaviour related to education spillover effect of sharing of information accessed through mobile telephones needs to be better understood in terms of effect and rationale.

Implications of the study point towards the need for higher investments in rural education to fully harness the potential of the information technology. Education is more fundamental to development in general and more particularly in the context of use of new technologies. It is thus not enough to encourage investments in high end technologies like promoting mobile telephone networks, but equally important, if not more, to support fundamental sectors like education in rural society. An educated rural population is more likely to harness the potential of new methods of communication in terms of access, use, and spread.

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