Use of Information and Communication Technology in Agriculture by Farmers of District Kapurthala

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ABSTRACT

The Information and Communication Technologies (ICTs) are now seen as an important tool for development in agriculture. These can play a big role in pushing the agriculture development in Punjab beyond the plateau on which it seems to stuck during last few years. In a study conducted in district Kapurthala, it was emphasised to numerate the availability of such ICT tools with the farmers and their use in agriculture. This study was conducted using sample survey method and farmers were interviewed to collect data. It was found that 41 per cent farmers had landline phone but only 47 per cent of them used it for agriculture purposes. Similarly, 98 per cent farmers possessed television set but only 49 per cent of them used for watching the agriculture related programs. The mobile phone ownership among farmers was more than 98 per cent which are mostly used by them as a social communication tool, whereas, 78 per cent of farmers said that once in while they use their mobile phone for agriculture advisory liking calling agriculture departments or relatives or commission agents to enquire about the rate of produce. Mobile phones were found to be the most powerful means of communication among farmers for exchanging agriculture information. This was probably due to cost affordability, better network, easy availability and cheap tariff rates. Further, the farmers were observed to be dependent on their large social network and took advice from the agricultural scientists, fellow farmers, relatives, commission agents, pesticide dealers and friends. Interestingly, most of the farmers showed their inability to use the agro-advisory received through short message service (SMS) as they were not able to read those SMS. Eighty nine per cent households subscribe to newspaper and read it regularly but were of the view that the information in newspaper related to agriculture and its subsidiary fields is limited. The radio has far less popularity among the farming community. The various other factors which affected the use of such tools in agriculture were age of the farmer, size of the land holding, educational qualification and the cropping system.

Key words: Information, Communication, Agro Advisory, Agriculture, Farmer, Kapurthala.

INTRODUCTION

The Indian agriculture is today face to face with three challenges: to improve the economic condition of farmers, to improve agriculture productivity to feed ever-increasing population and maintenance of environment. Agricultural extension, which is essentially a message delivery system, has a major role to play in agricultural development. It serves as a source of advice and assistance for farmers to help them improving their production and marketing (Adams, 1988). The task of extension education is accomplished by different extension methods/media, which may come under individual, group and mass contacts. The success of agricultural development programmes in developing countries largely depends on the nature and extent of use of mass media in mobilization of people for development. The planners in developing countries realize that the development of agriculture could be hastened with the effective use of mass media for technology transfer (Md Salleh *et al* 2010).

Transferring of new findings and technologies to rural farmers remains a promising strategy for

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increasing agricultural productivity. The new idea must reach farmers' fields and homes through effective extension, so that they can adopt new technologies and put them into use at their farms (Ekoja, 2003). To reach beyond this plateau and to give a fresh impetus to agricultural productivity, a push towards higher agricultural productivity will require an information-based, decision-making agricultural system. This is often described as the next great evolutionary step in agriculture. The most effective way to deliver knowledge intensive management in agriculture is ICT which is based on information as well as is dynamic in nature.

The Information and Communication Technologies (ICT) is an emerging field and can play a central role in facilitating the exposure of farmers to a variety of information. It involves application of innovative ways to use ICT in the rural domain. Radio and television has been acclaimed to be the most effective media for diffusing the scientific knowledge to the masses. Similarly the increasing penetration of mobile phones and mobile-enabled information services, computers in rural India can complement the role of extension services. There is no doubt that information and communication technologies have influenced educational circumstances more than any other categories (Asnafi and Hamidi, 2008). The advancements in ICT can be utilised for providing accurate, timely, relevant information and services to the farmers, thereby facilitating an environment for more remunerative agriculture. Also ICT could make the greatest contribution by telescoping distances and reducing the cost of interaction between three prime stakeholders of agricultural sector i.e. research, extension, and the farmers, which can uplift this important sector through mutual endeavour. According to Pandey (2003), Information Technology can be used as a great facilitator in agriculture marketing by providing connectivity between marketers and exporters, through a wide area network of national and international linkages in order to provide day-to-day information with regard to commodity arrivals and prevailing market rates.

Given the development scenario in Indian Agriculture, ICT movement is still evolving. However, all the ICT initiatives are not uniform with disparities between regions in the level and quality of telecommunications, information and the effort of individuals, public and private organizations, and differentiated nature of demand of the farmers in different areas. At the same time the actual availability of such tools with farmers and their optimal use in agriculture need to be understood for effective implementation of such initiatives.

Hence, the study discusses about the progressive farmers of Kapurthala district of Punjab state in India who are employing latest tools related to information technology in their daily agricultural practices. The objectives of the study were to identify the sources from which the farmers learned about agriculture technologies, to assess the extent to which the farmers make use of these ICT tools and to understand constraints on realising the potential benefits of these ICT tools on knowledge dissemination.

MATERIALS AND METHODS

Study area

The district Kapurthala is situated in the Bist Doab and comprises two non-contiguous parts, separated by some 32 kilometres. Kapurthala, Sultanpur Lodhi and Bholath Tehsils form one part and Phagwara Tehsil, the second separated portion. The former area lies between North latitude 31.07' and 31.39' and East longitude 74.55' and 75.36'. Phagwara tehsil lies between north latitude 31° 22' and east longitude 75° 40' and 75° 55'.Total geographical area of the district is 1633 Sq.Km. Ninety five per cent to total area of district (1633 sq km) is rural area (1554 sq km). For administrative purpose the district is divided into five blocks Kapurthala, Sultanpur Lodhi, Nadala, Dhilwan and Phagwara.

In 2011, Kapurthala had population of 8,17,668 of which male and female were 4,27,659 and 3,90,009 respectively. Sixty seven per cent of total population of district is rural. The density of population is 501 per sq.km. The literacy rate in the district is around 80 per cent. The total number of agriculture workers is 58,430 of which 55,406 are cultivators.

In order to assess the status of agricultural information being used by the progressive farmers of the district Kapurthala, a survey was performed in all the 5 blocks of district namely, Kapurthala,

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Sultanpur Lodhi, Nadala, Dhilwan and Phagwara. In each block, 2 villages were selected and from each village 12 farmers were interviewed. Thus, a total of 120 progressive farmers were taken in this study. The data regarding possession of radio, television, computer, phone line, mobile phone, newspaper, use of helpline were collected and was related with size of land holding.

RESULTS AND DISCUSSION

i) Source and Type of Information

It was found the most farmers access the information through cell phones and they call fellow progressive farmers, relatives input dealers, traders and government agricultural extension services and Krishi Vigyan Kendra. The other important sources of information were newspaper, radio and television. The internet and helpline telephone number was found to be least preferred sources among the farmer. However, the perceived quality and relevance of the information provided by these sources was highly variable. Also the farmers expressed un-satisfaction at the type of information being transmitted by one way media like television or radio or print media and prefer telephone/ mobile as two-way communication is more satisfying where they can put queries. Further it was concluded from discussions with that they require information on weather, market prices, plant protection (disease/pest control), and seed/ varieties, but don't know where to get reliable information on these aspects and thus use a combination of tools.

ii) Ownership and Use of ICT Tools

Land cultivation:

Based on sample analysis, it was found that in district Kapurthala 5;20.8,30.8,31.7 and 11.7 per cent farmers were cultivating land < 1 ha.,1-2 ha., 2-4 ha.,4-10 ha. and > 10 ha., respectively (Table 1.1). Therefore, they were classified into 5 categories viz., marginal, small, small-medium, medium and large. The data showed that about 26 per cent farmers were cultivating land up to 2 ha. and 62.5 per cent between 2 to 4 ha whereas only 11.7 per cent farmers were cultivating more than 10 ha.

Use of landline phones:

The data presented in Table 1 .1 showed that 64.3 per cent farmers were possessing landline phone who were cultivating > 10 ha. and were considered under large category whereas 47.4 per cent farmers from medium category were keeping land line phones. Thirty three per cent farmers from all other three categories were possessing phones but on analysing the utility of this facility for agricultural purpose, maximum use was made by semi-medium followed by medium, large and small category. Marginal farmers were not making use of this facility for acquiring information about agricultural production technology which might be due to low degree of confidence amongst them.

Use of computer:

A linear correlation trend was observed between the use of computer by the progressive farmers and the size of land cultivated. Fifty per cent of marginal farmers were possessing computers but were not using it for getting information and keeping records related to agriculture and related fields. About 60 to 65 per cent farmers from medium and large category possessed the computers but only 20 to 22 per cent of them were using it to get information through internet and record keeping. It was noticed that the average age of the farmers engaged in the cultivation of field crops was between 40 to 55 years. Therefore, firstly they were ignorant about the use and handling of computers and secondly at this stage of age there was no interest to learn amongst them. In fact, their children studying in different classes in schools or colleges were making use of these computers that's why they have purchased these machines. This was the main reason that even 50 per cent of marginal farmers were possessing computers especially for their children.

The low use of this machine by farmers can be thus attributed to high cost of computers, time required to learn the use of it, lack of knowledge about its potential use, low level of education of farmers, age, size and type of farming operations.

Watching of television:

Television is acknowledged as the most important medium for communicating with the rural population of developing countries (FAO,

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2001). The television set has become commonplace in homes, businesses and institutions, particularly as a vehicle for advertising, a source of entertainment, and news. Since the 1970s the availability of video cassette, laser discs, DVD and now Blue-ray disc, have resulted in the television set frequently being used for viewing recorded as well as broadcast material. In recent years, internet television has seen the rise of television available via the Internet, e.g. iPlayer. Although other forms such as closed circuit television (CCTV) are in use, the most common usage of the medium is for broadcast television, which was modeled on the existing radio broadcasting systems developed in the 1920s, and uses high-powered radio frequency transmitters to broadcast the television signal to individual TV receivers.

In this survey, it was noticed that every farm family was possessing the television set but its use was only about 49 per cent (Table 1) for watching agricultural related programmes. A very famous programme *Mera Pind Mere Khet* is telecasted at 6.00 PM to 7.00 PM daily except Sunday. Majority of the farmers reported that they could not watch the programme due to its scheduled time as at that time they are in their fields for undertaking various field operations. Hence, timing of the programme needs to be changed.

Listening of radio programmes:

The data (Table 1) showed that 57.5 per cent of farmers were possessing radio but only 37.7 per cent amongst them were using this medium for getting information related to agriculture. Interestingly, 42.9 per cent large category farmers were possessing radio but only 16.7 per cent of them were using it for listening to agriculture related program (Table 1.1). Contrary to this, 100 per cent of marginal farmers were possessing radio set and 33.3 per cent of them were listening agricultural related programmes and rest were using it for listening songs on FM stations. In these days, FM radio stations are in service throughout the day and most of the farmers use this medium for entertainment rather than acquiring knowledge. An agricultural related programme *Dehati Programme* is broadcasted daily through All India Radio Station, Jalandhar but its utility seem to be up to only 37.7 per cent.

Reading of newspaper:

Print media were found to be most effective in dissemination information amongst the rural farming community as 90.0 per cent of farming families were getting newspaper and out of them 77.8 per cent were reading about the various techniques and programmes undertaken by various development departments. Moreover, its cost was most affordable i.e. Rs. 2.5 /d and keep the readers aware about the day to day events going on in the society. The highest readership was observed in the marginal category and the lowest in the large category. This might be due to paucity of the time for large category or difference in the educational qualification. However the full potential of this media for dissemination of agriculture information is not yet explored as only once a week agriculture supplement is provided in each newspaper which is not enough to cater all information needs.

Use of mobile phones:

Possession of a mobile phone by an individual can be considered as a status symbol or a necessity as well. In the sample villages 98.3 per cent of the farmers possessed this magic tool and out of it 78.0 per cent were using this device for getting information from dealers, relatives, scientists, extension workers, banks etc. However, only 66.7 per cent of marginal farmers were using it for agricultural purpose whereas possession was 100 per cent. In the market, various mobile models as well as different schemes have been launched by various service providers but due to incapability of handling this device for various purposes, its use is mainly limited to listening of voice messages. It was informed by approximately 70 per cent of the farmers that they were unable to read the messages sent through short message service being sent by different companies as well as by this Krishi Vigyan Kendra from time to time. Thus despite having resources, lack of skill has been major hindrance in use of this service effectively. It can thus, be concluded that still there is a wide gap between the technology generated and its use by the user.

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Use of free helpline service:

A centrally sponsored scheme have been launched for the benefit of farming community in which a farmer has to dial a toll free number 1551 from land line phone and call centre will give the reply of the query posed to it. It was noticed that only 16.7 per cent farmers were making use of this facility (Table 1). The main difficulty reported by the farmers was that most of the time the lines remain busy and could not make contact with the call centre. The other reason may be that since this 1551 number is dialled from the land line phone and the number of land line phone sets is decreasing day by day as 40.8 per cent of the farmers possessed these connections.

Ownership of ICT tools block-wise:

It has been found (Table 2) that 40.8 per cent farmers possessed the landline phones in the district. On computing the data block-wise, it was found that maximum land line phones were present in Nadala block (69.6%) whereas in all other 4 blocks the range varied between 37.5 to 46.7 per cent Kapurthala block was leading in term of farmers possessing computers, television, radio, newspaper and mobile phones in comparison to other blocks. This may be due to the linkages of these farmers with the various line departments at the district headquarter which have enhanced their overall awareness about the ICT tools. Lowest figure for computer and radio sets possessed by the farmers was observed in block Sultanpur Lodhi. This was mainly due to the fact that in this block, farmers belonged to all 5 categories (Table 2.1) whereas in Kapurthala block only medium (35%) and large (65%) category was found as farmer take large chunks of land on lease. Similarly, the cropping scheme followed in both these blocks was also different. In Sultanpur block, farmers prefer to grow vegetables as the land holding is small, besides they grow paddy, muskmelon, potato, watermelon and Sunflower whereas in Kapurthala farmers are cultivating land after taking on lease and are growing mainly Paddy-Potato- muskmelon on a large area.

iii) Constraints in Adoption of ICT Tools in Agriculture

Though the progressive farmers are keen to get relevant and timely information and are in possession of ICT tools, their use in agriculture is low. It was observed that the major gap in adoption of these tools for fetching is non availability of relevant information and lack of skill on part of farmers. The utility of available infrastructure is also an issue e.g. the farmers either don't have computers or those who have , don't have internet connection which limits its utility.

- The information-action ratio indicates the relationship between a piece of information and what action, a consumer is expected to take. It was found that the information-action ratio among the respondent was low. Factors hindering the full exploitation of available information and action on it, is high transaction costs that deter the entry of small farmers into the market For example, even if farmer is able to access information on market price he doesn't go to far off market due to high transport costs involved.
- Language poses barrier to use of mass media,
- Timing of television programme pertaining to agriculture is not suitable for most of the farmers
- Inconsistent power supply in rural areas limits the use of mass media.
- Lack of awareness regarding source of information.
- Other causes are the lack of a policy and regulatory environment and the low progress in research on use ICT and mobile infrastructure for agriculture purposes.

CONCLUSION

ICT can be a powerful tool to help farmers get the information delivered to them at a time and place of their choice. The scope of these tools especially mobile-enabled information services in agriculture is evident by high ownership of these tools in the district. The present study, of course has been more of preliminary study and more rigorous assessment of benefit of these technologies is necessary to help providing policy inputs. The realization of the potential benefits however, is limited by certain set of constraints which prevent the farmers from fully leveraging the information they receive via these tools. Constraints are very limited exploitation of these

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Table 1. Classification on basis of land size (figures in numbers) (N=120)

Farm size	Land holding	Number of farmers	Landline phone		Computer		TV		Radio		Newspaper		Helpline serivce	Mobile phone	
			No.	Agri use	No.	Agri use	No.	Agri use	No.	Agri use	No.	Agri use	Agri use	No.	Agri use
Marginal farms	< 1 ha	6	2	0	3	0	6	3	6	2	6	5	0	6	4
Small	1-2 ha	25	8	2	8	1	25	15	14	2	24	19	2	23	20
Semi-medium	2-4 ha	37	12	10	16	3	35	16	19	9	30	25	7	37	28
Medium	4-10 ha	38	18	8	24	5	38	17	24	12	35	27	8	38	29
Large	>10 ha	14	9	3	9	2	14	7	6	1	13	8	3	14	11
Total (number)		120	49	23	60	11	118	58	69	26	108	84	20	118	92
Percentage			**40.8**	**46.9**	**50.0**	**18.3**	**98.3**	**49.2**	**57.5**	**37.7**	**90.0**	**77.8**	**16.7**	**98.3**	**78.0**

Table 1.1 Ownership of ICT tools and its use for agriculture purpose among the farmers of different land holding categories (figures in percentages)

Farm size	Land holding	Number of farmers	Landline phone		Computer		TV		Radio		Newspaper		Helpline serivce	Mobile phone	
			No.	Agri use	No.	Agri use	No.	Agri use	No.	Agri use	No.	Agri use	Agri use	No.	Agri use
Marginal farms	< 1 ha	5.0	33.3	0.0	50.0	0.0	100.0	50.0	100.0	33.3	100.0	83.3	0.0	100	66.7
Small	1-2 ha	20.8	32.0	25.0	32.0	12.5	100.0	60.0	56.0	14.3	96.0	79.2	8.0	92.0	87.0
Semi-medium	2-4 ha	30.8	32.4	83.3	43.2	18.8	94.6	45.7	51.4	47.4	81.1	83.3	18.9	100.0	75.7
Medium	4-10 ha	31.7	47.4	44.4	63.2	20.8	100.0	44.7	63.2	50.0	92.1	77.1	21.1	100.0	76.3
Large	>10 ha	11.7	64.3	33.3	64.3	22.2	100.0	50.0	42.9	16.7	92.9	61.5	21.4	100.0	78.6

Table 2. Ownership of ICT tools in different blocks of district Kapurthala (% of farmers)

Block	Landline phone	Computer	TV	Radio	Newspaper	Mobile phone
Sultanpur Lodhi	46.7	23.3	100.0	36.7	76.7	96.7
Kapurthala	40.0	80.0	100.0	85.0	90.0	100.0
Dhilwan	37.5	70.8	100.0	41.7	62.5	100.0
Nadala	69.6	52.2	100.0	43.5	60.9	100.0
Phagwara	40.0	60.0	100.0	0.0	70.0	100.0

Table 2.1 Distribution of farmers on the basis of land holding in different blocks of district Kapurthala (% of farmers)

Block	< 1 ha	1-2 ha	2-4 ha	4-10 ha	>10 ha
Sultanpur Lodhi	3.3	10.0	23.3	53.3	10.0
Kapurthala	0.0	0.0	0.0	35.0	65.0
Dhilwan	0.0	0.0	0.0	41.7	58.3
Nadala	0.0	0.0	4.3	43.5	52.2
Phagwara	0.0	0.0	20.0	50.0	30.0

tools for dissemination of agricultural information, lesser awareness among extension agents and farmers regarding range of services available. Further the adoption of information is limited by infrastructural constraints like assess to market and storage. Capacity building of both extension workers and farmers in field of utilization of these technologies, strengthening of extension agencies by equipping them with modern facilities, providing latest customised information in local language are required to harvest the potential of these tools for improving agricultural productivity.

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