



Utilization of Information and Communication Technologies (ICTs) for water management, marketing and weather forecasting

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Received: 13 June 2018; Accepted: 11 July 2018

ABSTRACT

The present study was carried out in randomly selected four districts of Haryana namely, Yamunanagar, Karnal, Hisar and Fatehabad. In total 240 respondents comprising 15 farmers from 16 villages were selected randomly in 2016-17. Majority of the farmers used ICTs to ascertain the water supply in channel before sowing time followed by advance information about time and date of supply of water in canal for complete crop period. Farmers used ICTs to know about place of marketing, marketing price, time of market inflow, quality parameters that eventually affect commodity price, marketing procedure and other facilities available at market. Majority of the farmers used ICTs for the purpose of information, i.e. weather forecasting, crops related government policies, credit/loan facilities for crops cultivation, insurance and subsidies for crop cultivation.

Key words: ICTs, Marketing, Weather forecasting

Indian agriculture has the huge potential in increasing rural income as well as long term stability of its natural resources. Information and communication technologies could play a significant role in getting the latest information and technologies regarding weather, natural resources and other related information (Rao 2007). Agricultural extension services provide critical access to the knowledge, information and technology that farmers require to improve the productivity and thus improve the quality of their lives and livelihoods (Ponnusamy 2013). Despite the availability of several ICT tools including telecenters, the access for farmers in remote villages is restricted due to the lack of infrastructure (UN 2005). The uses of mobile phones among farmers have played positive impact in their income and productivity because before travel communicate with buyers and sell their product in good price (Fafchamps and Vargas Hill 2005).

MATERIALS AND METHODS

The present study was carried out in four randomly selected districts of Haryana state, i.e. Yamunanagar, Karnal, Hisar and Fatehabad. Radaur and Chhachroli blocks from Yamunanagar and Indri and Nilokheri from Karnal district whereas Bakana and Kandroli villages from Radaur

and Bhagwanpur and Shergpur from Chhachroli; Kalri and Kukhnai from Nilokheri were selected. Hisar I and Hisar II and Bhattu and Fatehabad blocks selected with villages Sathrod and Mizapur from Hisar I and Balsamand and Budhak from Hisar II; Dhand and Bnawali from Bhattu and Daulatpur and Hizrawan from Fatehabad were selected. Thus, a total of 240 farmers comprising 16 villages at the rate of two villages from two blocks in each of four districts were selected randomly from eight blocks. In total 240 respondents, viz. 60 farmers from each district, 30 farmers from each block and 15 farmers from each village were constituted the sample size for present study. Frequency, percentage and weighted mean were used to analyse and interpret the data.

RESULTS AND DISCUSSION

Availability/accessibility of ICT tools among farmers

The data for the level of availability and that of accessibility of ICTs among the farmers surveyed were found to be similar. As shown in Table 1 the availability/ accessibility of mobile among the farmers were 100%, while television was found 60% available/access by farmers. 29.58% FM/Radio, 24.17% internet and 19.17% Whatsapp were available/access by the farmers. Mobile phone camera was found 14.17% followed by facebook (7.91%), YouTube (6.25%), computer (5.42%), E-mail (4.58%), E-book (2.50%) and CD/VCD (1.66%) available/access by the farmers. Similar result was found by Adejo *et al.* (2009) who emphasized the use of ICTs in boosting agricultural production among farmers. Farmers who were hooked up to new technologies fared

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better. ICTs promoted access to and sharing of information in agriculture and allied fields. ICTs included the use of radio, television and computer/internet, global system of mobile telecommunication (GSM) and the other fixed telephone network, fax, etc. Studies have shown that most of the farmers had access to a variety traditional information sources (TV, radio, newspapers, other farmers, government agricultural extension services, traders, input dealers, seed companies and relatives), which they regularly access for agricultural information Saravana (2011). Nasiruddin (2003) reported in his study about the level of internet use by university academics for their information and communication need. Findings of the study showed that internet use by academics was useful for some common needs (e-mail, WWW and e-books) and that the academic rank of users was an important factor in determining the priority of needs. The use of WWW was becoming increasingly significant for the teachers of Bundelkhand University and it had an important place among various sources of information because of fix timing of broadcast, limited channel related to agricultural information.

Table 2 indicates the usage pattern of ICTs to know about water supply by canal. Majority of farmers used ICTs for information about water to be supplied in channel before sowing time (1.29) followed by advance information about time and date of supply of water in canal for complete crop

Table 1 Availability/accessibility of ICT tools among farmers (n=240)

Tools	Frequency (Percentage)
Mobile	240 (100)
T.V	144 (60.00)
Mobile camera	34 (14.17)
FM/Radio	71 (29.58)
Internet	58 (24.17)
Whatsapp	46 (19.17)
Facebook	19 (7.91)
Youtube	15 (6.25)
E-mail	11 (4.58)
Computer	13 (5.42)
E-book	6 (2.50)
CD/DVD	4 (1.66)

Figures in parentheses indicate percentages.

period (0.81).The overall impact of ICTs on information of water supply by canal was (1.05) which indicated the positive impact of ICTs. Similar findings by Aker (2011) and Ponnusamy (2013) explained that the use of ICT tools such as mobile phones provide new opportunities for farmers to obtain access to agricultural information, about market prices, weather reports, transport information and agricultural techniques, in various formats like audio (voice), video (internet), and text (SMS). There are many ways to transfer the information about agriculture by newspapers, magazines, brochures as well as electronic media such as radio and television (Rolle and Satin 2002).

The presented data in Table 3 reveals that farmers used ICTs for knowing about place of marketing (1.21), marketing price (1.19), time of market inflow (1.16), quality parameters that affect price (1.12), marketing procedure (0.94) and facilities available at market (0.88). The total impact of ICTs was found 1.08. Different communities use the information and communication technologies in different ways. Television and mobile phones are able to supply marketing information instantly which can empower the farmers to realize the benefits of good marketing (Goyal 2010). such as farmers prefer to watch the television and get the information about weather and markets regularly. However, farmers also use the other communication tools for information. It was showed that many developing countries have established different centres of communication technologies for providing the information about agriculture to farmers. While in some countries government have started information services centres for agriculture information. However, television is one of the good sources of agriculture information among farmers in developing countries (Fara 2009, Goyal 2010).

Data in Table 4 indicate that majority of the farmers' used of ICTs for the purpose of information of weather forecasting (1.05), crops related government policies (1.03), credit/loan facilities for crops cultivation (1.02), insurance of crop (0.95) and subsidies for crop cultivation (0.94). The impact of ICTs on supporting factors was found 0.99. Farmers should be motivated to utilize various ICT tools including expert systems to avail the benefits of different initiatives of development agencies (Ponnusamy *et al.* 2016). Radio is one of the best medium of communication which has played a very vital role in socio, economic, cultural and agricultural information. It is powerful communication tool in rural areas which provides agricultural and marketing

Table 2 Extent of utilization of ICTs on the information about water supply by canal

Area of information	Always (2)	Sometime (1)	Never (0)	Total weighted frequency score	Weighted mean	Average weighted mean
Information about water to be supplied in channel before sowing time	104 (280)	15	121	295	1.29	1.05
Advance information about time and date of supply of water in canal for complete crop period	76 (152)	43	121	195	0.81	

Figures in parentheses indicate weighted score.

Table 3 Utilisation of ICTs for marketing of farm products

Area of information	Always (2)	Sometime (1)	Never (0)	Total weighted frequency score	Weighted mean	Average weighted mean
Marketing price	112(224)	62	66	286	1.19	1.08
Quality parameters that affects price	95(190)	79	66	269	1.12	
Time of market inflow	105(210)	69	66	279	1.16	
Place of marketing	116(232)	58	66	290	1.21	
Marketing procedure	52(104)	122	66	226	0.94	
Facilities available at market	36(72)	138	66	210	0.88	

Figures in parentheses indicate weighted score

Table 4 Utilization of ICTs

Area of information	Always (2)	Sometime (1)	Never (0)	Total weighted frequency score	Weighted mean	Average weighted mean
Weather forecasting	95(190)	62	83	252	1.05	
Crops related government policies	91(182)	66	83	248	1.03	0.99
Credit/loan facilities for crops cultivation	88(176)	69	83	245	1.02	
Insurance of crop	70(140)	87	83	227	0.95	
Subsidies for crop cultivation	69(138)	88	83	226	0.94	

Figures in parentheses indicate weighted score.

information. In present day, FM radio provides information instantly especially weather forecasting to enable the farmers to make better preparedness.

The data presented in Table 5 indicate the correlation and regression coefficient between agricultural practices and personal variables of farmers. The study revealed that correlation out of 10 variables, eight variables education (0.534), socio-economic status (0.611), land holding (0.082), extension contact (0.651), mass media exposure (0.567), scientific orientation (0.312), economic motivation (0.635) and risk orientation (0.217) exhibited positive and significant whereas age (0.541) exhibited negative significant but irrigation facilities (0.095) were non-significant but positively correlated with agricultural practices. Similarly, regression coefficient of variables education (0.645), socio-economic status (2.873), land holding (0.464), extension contact (0.675), mass media exposure (1.778), economic motivation (3.153) and risk orientation (0.477) exhibited positive and significant, however of age (0.583), scientific orientation (1.134) and irrigation facilities (0.769) was found negatively significant with agricultural practices. Mittala *et al.* (2015) showed that socio-economic characteristics of farmers like age, level of education and farm size were significantly related to farmer's use of different sources of agricultural information. These results can be used further to design programmes specific to farmer's profile. More simply, using these results, information providers can better anticipate which types of farmers would use their information in combination with other information sources. These results show the complementarities in the use of different sources of information and role of education in getting farmers connected to new sources of information.

Table 5 Relationship between respondent's personal variables and usages of ICTs for Marketing by farmers

Variables	Correlation coefficient (r)	Regression coefficient	't' values
Age	-0.541*	-0.583	-1.362*
Education	0.534**	0.645	0.214*
Socio-economic status	0.611**	2.873	2.228**
Landholding	0.082*	0.464	0.397*
Irrigation facilities	0.095 ^{NS}	-0.769	-0.580*
Extension contact	0.651**	0.675	0.366*
Mass media exposure	0.567**	1.778	0.786*
Scientific orientation	0.312*	-1.134	0.842*
Economic motivation	0.635**	3.153	1.787*
Risk orientation	0.217*	0.477	0.304*

* Significant at 5% level of significance and, ** Significant at 1% level of significance, $R^2=0.4540$

Also the inferences drawn in this paper need further exploration with farmers through experimental research. Overall, the farmers rely on multiple sources of information, but they still continue to extensively use other farmers and face-to-face interactions. We also do not deny the fact that successful use of information as a resource for agricultural development depends largely on the accessibility and adequacy of the information source, farmers' preference for a particular information source and farmer's ability to use information.

Conclusion

Farmers used ICTs for getting information about

time of water supply in channel before sowing as farmers heavily depended upon the canal water for the purpose of irrigation in states like Haryana. ICT tools also facilitate the farmers to get the timely information on marketing of farm products as they usually face enormous problems related to getting quality and timely marketing information. Farmers largely used ICTs for knowing the market price of commodity and time of market inflow which helped them tremendously. In addition, majority of the farmers also used ICTs for to get the information on weather forecasting, crops related government policies, credit/loan facilities for crops cultivation, insurance of crop and subsidies for crop cultivation.

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