

Impact of Information and Communication Technology (ICT) on Agricultural Information Access among Farmers in Haryana, India



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Abstract

Agriculture sector is providing employment to the 48.9 percent of the total workforce of the country. With the total 17.9% contribution in GDP of India, agriculture sector has dependency of 58 percent of the population for their livelihood. Haryana had contributed 14.1 percent share in the total GDP of the India in 2015-16. Information and communication technology is an important medium for accessing and disseminating information via use of telephones, mobiles, internet and other communication devices. Information technologies is a key term in agriculture sector with facilities of access price information, whether information, production information, latest farming technologies, government schemes and demand information. The main objective of the study is to find out the impact of information and communication technology on agricultural information access among farmers of Haryana in India. The data was collected from 100 farmers of Haryana on the basis of multistage sampling. A standardized questionnaire was used for data collection. The descriptive and inferential statistics was used with the help of percentage, mean, standard deviation and ANOVA test to data analysis. The study revealed the positive impact of information and communication technology on agricultural information access among farmers of Haryana. The significant difference was found in case of age, education and income but in case of land holding of the household and experience the difference was insignificant. The perception of the farmers found positive in accessing the agricultural information through use of ICT in rural areas of Haryana.

Keywords: Information and Communication Technology (ICT), Agriculture Sector, Agricultural Information Access, Farmers' Perception, Haryana.

Introduction

With the services of food security, sustainable development and poverty reduction, agriculture sector is providing employment to the 48.9 percent of the total workforce of the country. Along with dependency of 58 percent of the population for their livelihood it contributes 17.9 percent share in GDP (Anand, 2017). As per the report of Wikipedia, Haryana had contributed 14.1 percent share in the total GDP of the India in 2015-16 (Economy of Haryana, Wikipedia). Information and communication technology is an important medium for accessing and disseminating information via use of telephones, mobiles, internet and other communication devices (Parvathi, 2016). Information technologies is a key term in agriculture sector with facilities of access price information, whether information, production information, latest farming technologies, government schemes and demand information (Shyam, 2015). Central, state governments and private organisations have implemented a number of ICT initiatives in agriculture sector which includes e-Choupal, Kisan Call Centre (Ramasubbian, 2015), IFFCO Agri-portal, Village Knowledge Centers (VKS), Village Resource Centers (VRS), to providing the facilities of soil management, water management, seeds management, pest management, fertilizer management, harvest and post harvest management and specially for agriculture information (The Hans India, 2017). In modern time mobile, radio, television, magazines, government agencies, agriculture universities and newspapers are important medium for agriculture information system. A toll free service helpline number

18001803001 offered by CCS Haryana Agriculture University also helps to the farmers in resolving their day to day problems of agriculture sector on real time based information system (Grover et al., 2007). And in case of internet users it increases very rapidly by the reach of 550 million internet users up to June 2018 and out of which 210 will be from rural areas. A study was carried out on Haryana farmers to access the different agricultural information through technology mediums resulted that newspaper is the main source of information in rural areas followed by television, state agriculture department, agriculture universities, radio and internet etc (Duhan and Singh, 2017; Grover et al., 2007). But another study carried out in Haryana highlighted that mobile is the main sources of information in rural areas (Kumar et al., 2017). The Haryana chief minister Manohar Lal Khattar also emphasized on sustainable development of agriculture through use of latest technology adoption in farming sector on the inauguration session of integrated Bee-keeping development centre of Kurukshetra on 10, November, 2017 (www.uniindia.com, 2017). Information and communication is an important medium in agriculture sector with the facilitation of accurate and real time information towards their problem solving tools for fertilizer, quality seeds, price market knowledge, latest farming technologies and harvesting control system in rural areas (Sangwan and Komal, 2015).

Review of Literature

Mugwiri et al. (2015) highlighted the importance of ICT initiatives on improvement of livelihoods, production, marketing and post harvesting activities in rural areas. ICT provides different services of market information, whether information, online information and credit facilities absence of which can makes negative impact on accessing and utilization of information among rural peoples. A study carried by Olajide (2011) at Nigeria also revealed that there is a significant impact of age, gender and educational level on accessing the agricultural information from information and communication technology. Along with demographics characteristics accessibility of information makes significant impact on the production activities also (Olajide, 2011). Another comparative study carried out among researchers, extension agents and farmers revealed the positive effect of ICT use in accessing agricultural information in Nigeria (Oladele, 2011).

Uddin and Mezbah-ul-islam (2012) found the problems of illiteracy and communities barriers in rural area of Bangladesh to accessing the information. They suggested that village information center (VIC) can be the feasible solution of these problems through integration and concentrated rural information system in villages. A different study carried out on women farmers in Haryana state of India revealed the less use of ICT in accessing information due to socio-economic condition, lack of time and low literacy rate (Jain et al., 2012). Another study carried out among 160 dairy farmers in Uttarakhand highlighted the main problem of accessing information through use of ICT was lack of infrastructure availability, less knowledge and awareness of ICT (Tiwari et al., 2014).

Meera et al. (2004) examined the information delivery among farmers through three different ICT based projects named as Gyandoot, iKisan and Warna in India. They suggested the success of the ICT based projects depends upon the faith of the farmers on the firm and their staff. They highlighted that the faith can be generated by the fulfillment of the farmers' information needs and providing the knowledge about projects. Kiplang'at also supported the previous study that information technology is putting more impact on rural development that's why the technology should be based on the need of the farmers rather than advancement of the technology. This can be possible through the farmers centered approach based on appropriate technology adoption. Then the ICT characteristics benefited to the farmers for easy access and declined cost of production in rural development. Oduwole and okorie (2010) highlighted the two main initiatives for the access of agricultural information i.e. libraries and extension center to ensure them with publically access of ICT through adequate infrastructure and accessibility as per the need.

Duhan and singh (2017) examined the main source of information and commutation technology to accessing the agricultural information by the farmers of Haryana. This study found that newspaper is the best medium for the farmers to getting agricultural information in rural areas followed by other sources like as television, radio and internet etc. Some other study carried out in India Highlighted the mobile technology is the best medium for the information accessibility with the help of an Initiative of government named as m-governance in rural areas. Mobile technology provided different facilities with the help of various application in agriculture sector for rural development (Fu and Akter; Tomer et al., 2016; Jain et al. 2015).

Another study carried out by Syiem and Raj (2015) supported the previous studies and found that mobile phone is the important medium of accessing agricultural information in rural followed by other devices such as television and radio. A private firm ITC implemented a ICT based initiatives in rural areas of Madhya Pradesh state of India to the procurement of soyabean produce through direct marketing channel for reduction of transaction cost and awareness of mandi functioning system (Goyal, 2010). Another study carried out in India contradicted the previous studies and found the radio as the important medium for accessing agricultural information in rural areas with the television and newspaper medium of technology.

Information and communication is an important device in disseminating information and socio economic needs of the rural areas through more than 50 projects like as e-choupal, Akashganga, Gyandoot, TARAhaat and warna in Indian agriculture sector (Rao, 2016).

Objective of the study

Agriculture is the dominated sector in Haryana with dependency of more than fifty percent of the population to their livelihood and employment

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activities. In current era latest agricultural information and methods are must be needed towards their sustainable growth.

The main objectives of the study are:

1. To examine the Personal characteristics of the farmers in agriculture sector of Haryana.
2. To find out the impact of Information and communication technology (ICT) on agricultural information access among farmers of Haryana.

Hypothesis of The Study

H1

There is no significant difference in the perception of farmers' regarding access of agricultural information through use of ICT in agriculture sector on the basis of age.

H2

There is no significant difference in the perception of farmers' regarding access of agricultural information through use of ICT in agriculture sector on the basis of education.

H3

There is no significant difference in the perception of farmers' regarding access of agricultural information through use of ICT in agriculture sector on the basis of land holding size.

H4

There is no significant difference in the perception of farmers' regarding access of agricultural information through use of ICT in agriculture sector on the basis of income.

H5

There is no significant difference in the perception of farmers' regarding access of agricultural information through use of ICT in agriculture sector on the basis of Agriculture's experience.

Research Methodology

Research Design

Descriptive and inferential statistics is used in the study.

Sampling Design and Sample Size

The 100 respondents was selected from Haryana who were indulges in agriculture sector on the basis of Multistage sampling (Table 1). At first stage, Haryana was divided in four divisions named as Ambala, Rohtak, Hisar and Gurugram. On second stage one district was selected from each division. One Tehsil was selected at third stage from each selected district and in the fourth stage one village was selected from each Tehsil. Total 25 respondents were selected from each village taken for the study.

Table 1: Multistage Sampling

State	Division	District	Tehsil	Village
Haryana	Ambala	Kaithal	Rajondh	Nimwala
	Rohtak	Sonepat	Kharkhoda	Bidhlan
	Hisar	Jind	Jind	Daryawala
	Gurugram	Rewari	Rewari	Rojhuwas

Survey Instrument

Standardized questionnaire was used for the data collection in Haryana. The standardized questionnaire was used from the study of Oladele (2011). The original scale was consisting of 29 statements out of which only 14 statements were used as per the relevancy and suitability of the study

in Haryana on the basis of five point likert scale ranged from 5: strongly agree to 1: strongly disagree.

Statistical analysis

To analysis the collected data both descriptive and inferential statistics were used. To find out the percentage, mean and standard deviation descriptive statistics was used and in case of ANOVA techniques inferential statistics was used.

Reliability of The Data

The reliability of the scale was checked through cronbach alpha. The reliability coefficient of questionnaire used in accessing agricultural information through ICT in Haryana was found reliable and acceptable with value of .942 as comparison of average level (> 0.6) of accepting a scale (Cronbach, 1951).

Result and Discussion

Table 2: Personal characteristics of Respondents

N=100			
Variables	Category	Frequency	Percent (%)
Gender	Male	98	98.0
	Female	2	2.0
Age	20-30	20	20.0
	31-40	22	22.0
	41-50	27	27.0
	Above 50	31	31.0
Education level	No formal education	7	7.0
	grade 8th or less	20	20.0
	9th to 12th	46	46.0
	graduation	23	23.0
	post graduation	4	4.0
Total land holding of households (in acres)	below 5	53	53.0
	5-10	37	37.0
	11-15	3	3.0
	above 15	7	7.0
Income (yearly)	Below 20000	13	13.0
	20000-50000	17	17.0
	51000-100000	19	19.0
	above 100000	51	51.0
Experience in agriculture sector (in years)	below 5	24	24.0
	6-10	16	16.0
	11-15	5	5.0
	above 15	55	55.0

Source: Surveyed data 2018

Table 2 shows the personal characteristics of farmers in Haryana Agriculture sector. Majority of respondents were male (99%) shows that agriculture is dominated by men in Haryana. The result suggested that majority of farmers falling in age of 50 and above (31%) for the reason that youth contribution in agriculture is decreasing day by day. In case of education 46% of farmers are lies in group of 9th to 12th standard shows that they having basic

knowledge of education up to schooling. Majority of farmers having land holding less than 5 acres (53%) in Haryana due to the reason of fragmentation of land. Many of the farmers earning more than one lakh (51%) from agriculture sector in Haryana. Almost 55% of the farmers had spent more than 15 years in agriculture sector for their earning and livelihood.

Table 3: Reliability Analysis

Variable Name	N of Items	Cronbach's Alpha
Information access through ICT	14	.942

Source: Surveyed data 2018

Table 3 presents the reliability score of the scale from using cronbach alpha. Out of 29 statement of the scale only 14 were taken as per the relevancy and suitability on the basis of areas for this study. The reliability coefficient of information access through use of ICT in agriculture sector has been found above the average level (> 0.6) by the value of .942. Through the value of cronbach alpha scale seems to be reliable and acceptable (Cronbach, 1951).

Table 4: Analysis through ANOVA

Variable	Demographic	Category	N	Mean	SD	F	Sig.
Information access through ICT	Age	20-30	20	3.56	.80	3.22	.026
		31-40	22	3.84	.81		
		41-50	27	4.24	.61		
		Above 50	31	3.99	.81		
	Education	No formal education	7	3.09	.94	6.93	.000
		grade 8 th or less	20	4.41	.53		
		9 th to 12 th	46	4.07	.64		
		Graduation	23	3.55	.81		
		post graduation	4	3.82	1.1		
	Land holding (in acres)	below 5	53	3.80	.79	1.22	.307
		5-10	37	4.12	.74		
		11-15	3	3.86	1.4		
		above 15	7	4.02	.68		
	Income (Yearly)	below 20000	13	3.21	.86	14.41	.000
		20000-50000	17	4.25	.59		
		51000-100000	19	3.38	.80		
		above 100000	51	4.23	.57		
	Experience (in years)	below 5	24	3.62	.76	2.32	.080
		6-10	16	4.24	.64		
		11-15	5	3.84	.83		
above 15		55	4.00	.80			

Source: Surveyed data 2018. significant at 5% level

Table 4 presents the perception of 100 respondents on the basis of different age groups. The respondents divided into different age category of 20-30, 31-40, 41-50 and above the 50 years. As shown in the table, significant difference has been found on the impact of ICT on accessing agricultural information among farmers in Haryana with rejecting the hypothesis of H1. (F= 3.22, p < .05). To know the education level of respondents the different education categories has been divided via no formal education, grade 8th or less, 9th to 12th, graduation and post graduation. On the basis of education the perception of farmers towards access of agricultural information through use of ICT has been found significantly different. The significant difference on the basis of education tends to strongly reject the H2 hypothesis. In case of Land holding no significant difference has been found (F = 1.22, p = .307). It shows that there is no significant difference on impact of accessing agricultural information through use of ICT in case of Land Holding with accepting the H3 hypothesis. The significant difference has been found on basis of

income (sig. value .000). It presents that different income level puts significant difference impact on perception of farmers in accessing agriculture information through use of ICT. So, hypothesis H4 is rejected in case of different income categories. And in context of experience the value has been found insignificant (p = .080) by rejecting hypothesis H5. Along with land holding, experience also not showed significant impact on the perception of farmers to access information through ICT in Haryana agriculture sector.

Table 5: Perceived Impact of Information Access through ICT among Farmers

Information Access through use of ICT	Mean	Std. Deviation
Increases knowledge about farming activities	3.94	.952
Increases information availability	4.03	.989
Increases information flow	4.16	.982

Improves information seeking behavior	3.99	.959
Enhances accuracy of information	3.98	1.035
Enhances timeliness of information	3.91	1.006
Encourages data sharing	3.65	1.077
Improves data management	3.82	1.149
Improves quality of information	4.04	1.109
Improves access to agricultural inputs	4.04	1.053
Improves access to agricultural markets	4.01	1.020
Improves access to credit institutions	3.93	.998
Improves awareness of agricultural events	3.81	1.089
Improves record keeping	3.82	1.086

Source: Surveyed data 2018

Table 5 shows the perception of farmers through the impact of ICT on access of agriculture information in Haryana agriculture sector. The perceptions of farmers were measured on the basis of rating scale ranged from points 1: strongly disagree to 5: strongly agree. The mean score of 3 and above was used to states the agreement through statements and below that level shows their disagreement towards access of agricultural information through use of information and communication technology in Haryana. The scores of the table show that all value is above the minimum level of 3 represent the positive perception of farmers to accessing the agricultural information through use of ICT.

Conclusion

The study found that majority of the farmers are male and belongs to age of fifty or more than that having knowledge up to 12th standard and experience of more than 15 years in agriculture sector are using ICT devices in accessing information in rural areas. The study revealed the positive impact of ICT on agricultural information access among farmers of Haryana. The significant difference was found in case of age, education and income but in case of land holding of the household and experience difference was insignificant. The perception of the farmers found positive in accessing the agricultural information through use of ICT in rural areas of Haryana. ICT provides a number of centralised services like as market information, weather information, real time information, price information, latest farming techniques, harvest management, water management through the use of technological devices such as mobile, newspaper, television, radio and internet to their benefit and sustainable growth in rural areas. Further it needs to mention that farmers are getting access to latest information through different channels but the use of that information presently is not effective up to adequate level. The reason behind this is observed by researcher, that the technical skillful training at grass root level is not provided by the agencies government and non government whom are

involved in this exercise. Therefore farmers are not able to utilise information accessed for their benefits and fail to come out with any significant changes in the growth, since the effectiveness of resources are not there or it may be called as poor implementation and utilization of resources and information.

Scope and Future Research Direction

More than fifty percent population is still based on agriculture sector for their food security and livelihood with major source of employment. This study carried out in Haryana a state of India where majority of the people based in agriculture sector and also contributing with respective place through 14 percent share in GDP. In recent time farmers were based on old techniques of information accessing like as their fellow farmers and middleman at mandi. But this study highlighted that in current scenario farmers are using latest technology in agriculture information system that can helps to the IT companies to invest in rural areas in agriculture and allied sector. This study was carried in Haryana which can be extended at all over India to getting real pictures of the farmer. In this study only one dimension related to access of agricultural information through use of ICT has been taken, the other dimensions like awareness, role and challenges may also to be study for further research.

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