

Original Research Article

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## Use of Information and Communication Technologies by Extension Personnel to Disseminate Agricultural Information

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### ABSTRACT

India has been experiencing major changes in agricultural extension system since the beginning of the 21<sup>st</sup> century. The reforms included both demand and supply side measures. Information and Communication Technology (ICT) has become a global tool often used by individuals, organizations, governments and inter-governmental organizations for personal or official activities. Its application cut across all fields of human endeavor like medicine, commerce, engineering, architecture, education, library services, and agriculture. Information and communications technologies have been of great significance in the development agenda of most countries. Information and communications technologies have been of great significance in the agricultural development agenda of most countries due to their critical role in facilitating socio-economic development of farming community. This is because it involves a shift from the traditional resource based method of production to a new science based method and commercialization of agriculture in digital world. The findings indicated that majority of the extension personnel used mobile phone to seek farmers' participation and to deliver timely extension & advisory services to stakeholders, more than 80.00 percent and about 60.00 per cent of the respondents used most popular social media like Whats App and facebook for extension activities respectively. The less knowledge of farmers about ICTs and lack of specialized trainings received on ICTs by field functionaries were very serious constraints in use of these tools. Loss of competitiveness, loss of contact with timely information and loss of extension management efficiency were the major consequences/concerns perceived by field functionaries for not using the ICTs presently or in near future.

#### Keywords

Extension  
Personnel, ICT,  
Constraints and  
consequences

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### Introduction

The Information and Communication Technology (ICT) is not only one of the driving forces of globalization but it played important role in liberalization of world trade in the field of agriculture responsible for agripreneurship development across the world.

Integration of ICT is rapidly transforming the way of agricultural technology transfer. The ICT enabled extension systems are acting as a key agent for changing agrarian situation and farmers' lives by improving access to reliable, timely and relevant information and sharing knowledge as well. Information and Communication Technology (ICT) in

agricultural extension can lead to the emergence of knowledgeable workers that will result in the realization of a bottom-up, demand driven paradigm for technology generation, assessment and refinement and transfer of new and modern technologies (Meera, 2004). A strong agricultural extension linkage complemented by flawless information flow enhanced by the effective use of ICTs will significantly boost agricultural production, productivity, income and improve rural livelihoods in developing countries (Arokoyo, 2005).

India has been experiencing major changes in agricultural extension system since the beginning of the 21<sup>st</sup> century. The reforms included both demand and supply side measures. Information and Communication Technology (ICT) has great potential to revamp agricultural extension in big way. Up until now ICTs offered farmers a channel for communicating directly with distant technicians and experts, many farmers could wait months or years for an extension worker to provide technical advice and often that advice did not address their immediate concerns. ICT have great potential to increase access to advisory services to women, youth, even underprivileged sections of the society into remote and disadvantage areas.

Information and Communication Technology (ICT) has become a global tool often used by individuals, organizations, governments and intergovernmental organizations for personal or official activities. Its application cut across all fields of human endeavor like medicine, commerce, engineering, architecture, education, library services, and agriculture.

The use of information technology in the various sectors has increased rapidly across the world. In the agriculture sector, weather information systems, market information, insect-pest surveillance, internet, e-agriculture,

agricultural information databases and other applications are used commonly in extension services.

Agricultural extension activities are non-formal in nature which helps farmers in improving their farming techniques and methods, increasing production efficiency and income, bettering their standard of living and lifting their social and educational standards. Agricultural extension plays the important role of providing a link between agricultural researches and farming communities to promote the adoption of new technologies and innovations by rural communities.

Compelling need for current Agricultural Knowledge and Information System (AKIS) by farmers in the era of climate change, world globalization and liberalization leading to agri-prenuership, the use of conventional communication channels become less effective. One way to address this is through the adoption of ICTs by both researchers and extension workers to transmit the relevant information to farmers in most effective and efficient way. Since the situation assessment survey of farmers conducted during the 59<sup>th</sup> round of National Sample Survey (NSSO, 2005) provided valuable insights into reach of extension services across India. The public sector extension worker was a source of information for only 5.7 per cent of farmer households interviewed. Survey showed that 60 per cent of farm households did not access any information on modern technology.

The insufficient extension staff and financial constraints make agricultural extension more difficult. Study reveals that extension through contact is difficult as ratio of staffs to farmers varies widely from 1:300 in Kerala to 1:2000 in Rajasthan. The Situation Assessment Survey 2013 posited that traditional and modern ICTs (Newspaper, radio, television and internet) have also assumed important role

as source of information of farmers. At the all-India level, 41% of cultivating households accessed technical help from any source during reference period (July-December 2012). Public extension agencies, including extension workers, KVKs and SAUs were a source of information for around 10 percent of households (NSSO 2014)

At present use of information communication technology in agricultural extension system is far from satisfaction. Keeping in view the aforementioned facts the study was undertaken with the following objectives:

To assess the extent of use of information communication technologies by field functionaries

To identify the constraints in use of ICTs by field functionaries to manage agricultural information.

Field functionaries perception of consequences of not using the ICTs in present and near future

### **Materials and Methods**

To collect the primary data on use of information and communication technologies by extension personnel to disseminate agricultural information, the respondents were selected with multistage sampling. The zone-1 of the country comprising five states (Delhi, Himachal Pradesh, Haryana, Jammu & Kashmir and Punjab) was selected purposively having the food bowl of the nation and from selected zone Haryana was selected purposively due to direct access of the investigators. Hisar and Fatehabad districts of state were selected since being in the vicinity of CCSHAU, Hisar being nodal training centre for imparting monthly trainings to the extension personnel of state department of agriculture and easy access to the

investigators. By census method all field functionaries i.e. Agricultural Development Officers (ADOs) and Block Agricultural Officers (BAOs) working in department of agriculture of both districts was selected. Accordingly there were 44 ADOs and 6 BAOs in Hisar and 40 ADOs in Fatehabad making thus total 90 extension personnel's data complete in all respect was considered for analysis and reporting. The data were collected with the help of well-structured and pretested schedule comprising the items for use of ICTs by field functionaries, constraints encountered by them and perception related to consequences of no use of these tools of communication. The descriptive statistical measures like frequency, percentage, mean, standard deviation, and rank order analysis were used to analyze the data to draw tangible inferences.

### **Results and Discussion**

The results along with relevant discussion have been presented in prime heads as socio-personal attributes profile, extent of use of information communication technologies by field functionaries, constraints faced by them and consequences perceived for no use of these tools.

#### **Socio-personal attributes profile of the extension personnel**

The Socio-personal attributes which were assumed to influence the use of ICTs have been included and presented in Table 1.

Perusal of Table 1 shows that majority of respondents (66.66 %) belonged to the middle age group (36-50 years) followed by 21.11 per cent young category (up to 35 years) and 12.23 percent to old age group (50 and above). In nut shell vast majority (87.77%) belonged to productive age group with in depth knowledge and experience of extension.

**Table.1** Socio-personal attributes profile of the extension personnel

(n=90)

Sr. No	Variables	Category	Frequency	%age
1.	<b>Age</b>			
		Young (20-35 years)	19	21.11
		Middle (36-50 years)	60	66.66
		Old (more than 50 years)	11	12.23
2.	<b>Gender</b>			
		Male	85	94.44
		Female	5	5.56
3.	<b>Educational status</b>			
		B.Sc. Agri.	33	36.67
		M.Sc. Agri.	33	36.67
		Ph.D.	24	26.66
4.	<b>Job Experience</b>			
		Less than 5 years	28	31.12
		6-10 years	26	28.88
		11-15 years	15	16.67
		More than 15 years	21	23.33
5.	<b>Rural-urban background</b>			
		Rural	54	60.00
		Urban	12	13.34
		Rural-urban	24	26.66
6.	<b>Parental Occupation</b>			
		Labour	01	1.11
		Farming	42	46.67
		Service	40	44.45
		Business	07	7.77
7.	<b>Specialized training received on ICT</b>			
		Received	36	40.00
		Not received	54	60.00
8.	<b>ICT skills possessed</b>			
		Data entry	55	61.11
		Internet	79	87.77
		MS Word	69	76.66
		MS Access	20	22.22
		MS Excel	53	58.88
		Power point	54	60
		Networking	19	21.11
		Programming	11	12.22

**Table.2** Extent of use of information communication technologies by field functionaries

Sr. No	Variables	Category	(n=90)	
			Frequency	%age
1	<b>Mobil phone</b>			
		Advisory service	75	83.3
		Contingent service	42	46.7
		Farmers participation	77	85.6
		Awareness Campaign	68	75.6
2	<b>Social media</b>			
		WhatsApp	75	83.3
		Facebook	52	57.8
		Google+	21	23.3
		Twitter	11	12.2
		Gab.ai	0	0
		You Tube	26	28.9
3	<b>Other ICT services</b>			
		E-mail advisory, awareness of new schemes, internet or video clips for demonstrations or dissemination of innovations	42	46.7
		Use the internet to search the information	78	86.7
		Send or receive a text message (SMS)/voice messages	60	66.7
		Use a communication center/common service center/village resource center (In case of no internet access)	47	52.2
		Use of computer for advisory work such as expert system of different crops	21	23.3
		Delivering any radio/TV talk on agricultural topics	20	22.2
		Use of digital camera for diagnostic services	40	44.4
		Use of digital camera for making farmer participatory videos for further dissemination of technologies	50	55.5
		Use of LCD projector for showing films or videos related to trainings or demonstration of various new techniques and technologies	29	32.2
		Use personal prepaid phone cards for mobile phone for extension work or field work or mobile phone provided by the department	60	66.7

**Table.3** Constraints faced in use of ICTs by field functionaries

(n=90)

Sr. No.	Constraints	Degree of seriousness			Total score	Mean score	SD	Rank order
		Very serious (2)	Serious (1)	Not so serious (0)				
1.	Inability of the extension personnel to use ICT tools	24 (26.7)	40 (44.4)	26 (28.9)	88	0.98	0.745	XIII
2.	Lack of technological infrastructure	36 (40.0)	43 (47.8)	11 (12.2)	115	1.27	0.667	VI
3.	High cost and lack of funds for equipments	37 (41.1)	39 (43.3)	14 (15.6)	113	1.25	0.708	VIII
4.	Not enough time to spend on technology	11 (12.2)	36 (40.0)	43 (47.8)	58	0.65	0.688	XIV
5.	Lack of ICT experience and skills	27 (30.0)	44 (44.9)	19 (21.1)	98	1.09	0.709	X
6.	Lack of specialized trainings on ICT	44 (44.9)	35 (38.9)	11 (12.2)	123	1.36	0.690	II
7.	Unsuitable & incompatible, programs or soft wares	24 (25.6)	43 (46.7)	24 (27.8)	91	1.01	0.730	XI
8.	No internet facility in village	39 (43.3)	36 (40.0)	15 (16.7)	114	1.26	0.727	VII
9.	No permanent office or space	41 (45.6)	35 (38.8)	14 (15.6)	117	1.3	0.722	IV
10.	Clients' electricity use problem for operating laptops/computers/projectors	27 (30.0)	36 (40.0)	15 (16.6)	90	1	0.752	XII
11.	High cost of internet facilities in villages	31 (34.4)	45 (50.0)	14 (15.6)	107	1.18	0.681	IX
12.	Lack of farmer's interest in ICT tools	41 (45.6)	37 (41.1)	12 (13.3)	119	1.32	0.704	III
13.	Lack of ICT trainers	36 (40.0)	44 (47.8)	10 (12.2)	116	1.28	0.667	V
14.	Less knowledge of farmers about the ICTs	40 (44.4)	44 (48.9)	6 (6.7)	124	1.38	0.607	I

**Table.4** Consequences for not using ICTs presently and in the near future

(n=90)

Sr. No.	Consequences	Degree of Seriousness			Total score	Mean score	SD	Rank order
		Very serious (2)	Serious (1)	Not so serious (0)				
1.	Loss of relevance, confidence and credibility	26 (28.9)	57 (63.3)	7 (7.8)	109	1.21	0.568	VI
2.	Isolates extension personnel from his team	19 (21.1)	60 (66.7)	11 (12.2)	98	1.08	0.570	VII
3.	Inefficient and inferior extension and advisory service	30 (33.3)	51 (56.7)	9 (10.0)	111.23	1.24	0.616	IV
4.	Loss of contact with timely information	31 (34.4)	51 (56.7)	8 (8.9)	113	1.25	0.607	II
5.	Loss of competitiveness	32 (35.6)	53 (58.9)	5 (5.6)	117	1.3	0.567	I
6.	Loss of extension management efficiency	33 (36.7)	45 (50.0)	12 (13.3)	111	1.13	0.667	V
7.	Problem of survival in career in near future	34 (37.8)	44 (47.8)	13 (14.4)	112	1.24	0.684	III

Similarly 94.44 percent of the respondent field functionaries were male while 5.56 per cent were female illustrating in sufficient women extension personnel to support feminization of agriculture. Educational status of respondents clearly depicts that equal percentage (36.67) of the respondents were B.Sc. Agriculture i.e. graduation in agriculture which is minimum & essential qualification for Agricultural Development Officer followed by post-graduation (M.Sc. in Agri.) followed by 26.66 per cent possessed the Ph.D. while none of them have done post-doctorate. The majority of respondents (60.00 %) had job experience up to 10 years followed by rural background clearly indicate better understanding of farming situation with incremental effect towards job commitment for farmers' welfare. ICT competency of the extension personnel indicated that only 40.00 percent of ADOs and BAOs received specialized training on ICT and remaining 60.00 percent did not receive any training despite that vast majority (87.77 %) of respondents possessed internet using skill followed by 76.66 percent MS Word skill, 61.11 per cent 'data entry, 60.0 per cent power point, 58.88 percent MS excel, 21.11 percent 'networking'. MS access 22.22 percent and finally programming 12.22 per cent. The possible reason might be use of smart phones especially social media along with on line official work nowadays.

### **Extent of use of information and communication technologies by field functionaries**

Data pertaining to extent of use of information and communication technologies by field functionaries presented in Table 2 reveals that vast majority of the extension personnel used mobile phone for getting farmers participation (85.6%) followed by advisory services (83.3%), awareness campaign (75.6%) and for the contingent service (45.6%). The possible reason for less use in case of contingent service might be fewer occurrences of epidemic diseases and natural vagaries in the region. The use of social media indicated that 83.3 percent of the

respondents were using Whats App for advisory work, dissemination of innovation, mobilization of farmers into various groups followed by Facebook (57.8%), YouTube (28.9%), Google+ (23.3%) and Twitter by only (12.2%) but no one used Gab.ai. probably ignorance of this media. It might be concluded that Whats App was most utilized social media followed by Facebook and YouTube. YouTube can be best utilized for universal, ultra-modern and complex technologies requiring demonstration through virtual world nowadays. Participatory videos on the You Tube can be used for farmer to farmer extension. The use of other ICTs further shows that vast majority (86.7%) of the respondents used internet to search the new and useful information followed by sending or receiving text message (SMS)/voice messages (66.7%), personal prepaid phone cards for mobile phone for extension work or field work or mobile phone provided by the department (66.7%), digital camera for making farmer participatory videos for further dissemination of technologies (55.5%), communication center/ common service center/village resource center (52.2% in case of no internet access), e-mail advisory, awareness of new schemes, internet or video clips for demonstrations or dissemination of innovations (46.7%), digital camera for diagnostic services (44.4%), LCD projector for showing films or videos related to trainings or demonstration of various new techniques & technologies (32.2%), computer for advisory work such as expert system of different crops (23.3%) and only 22.2 per cent used to deliver Radio/TV talk on agricultural topics. The findings highlight that digital cameras for diagnostic services, computer use for expert system and mass media are still to be exploited by field functionaries to increase outreach as well solution of plant and animal protection problems

### **Constraints faced in use of ICTs by field functionaries**

The data regarding the constraints/factors limiting the use of ICTs by field functionaries have been presented in Table 3 depicts that less

knowledge of farmers about the ICTs was very serious constraint followed by lack of specialized training on ICTs, lack of farmer's interest in ICT tools, no permanent office or space, lack of ICT trainers along with lack of technological infrastructure were serious constraints faced by field functionaries whereas, unsuitable and incompatible programmes or software, clients' electricity used for operating laptops, inability of the extension personnel to use ICT and spare time to spend on technology were not serious factors limiting the use of ICT by extension personnel in extension and farm advisory services.

Findings are supported by the findings of Ovwigho *et al.*, (2009) which reported inadequate ICTs, lack of funds, high cost of computers and other ICTs, problem of internet connectivity, lack of supportive government policies and lack of on job trainings, low level of education of farmers etc.

### **Field functionaries' perception of consequences of not using the ICTs in present and near future**

The data pertaining to consequences due to no use of ICTs in present and future perceived by extension personnel have been presented in Table 4 depicts that loss of competitiveness very serious consequence followed by loss of contact with timely information, problem of survival in career in near future, inefficient and inferior extension and advisory service, loss of relevance, confidence and credibility, loss of extension management efficiency and isolation from his team were the other consequences. The findings emphasize that they had realized the significance of ICTs in growth of their profession. So government should make sincere

efforts to develop infrastructure as well as competency of extension personnel in changing scenario of world.

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