

Effect of Information and Communication Technologies (ICTs) on Communication Skills of Agricultural Extension Officials: a case study in Markazi Province of Iran

H. Shabanali Fami¹, M. Rezaie², M. Rahimzadeh³, F. Rostami⁴ and M. Yaghoobi⁵

Introduction

In Iran, sustainable agriculture and rural development are two pivotal issues in the national development programmes. Since food security for the citizens is a constitutional principle to which the entire country is committed, the constitution has given strong emphasis to the key preconditions for national food security such as agricultural development, science and technology, environmental protection, social security, poverty alleviation, protection of women's rights and human dignity. The extension system of the country has the responsibility to attain the above objectives.

In Iran, agricultural extension work started before 1958 (Iravani, 1992). Historically, the extension system of the country was mainly involved in technology transfer. At present, the country pays specific attention to the development of the extension system. Contado (1997) believes that extension is one of the most strategically important policy instruments for achieving the twin goals of food security and sustainable agriculture and rural development (SARD) in developing countries. However, extension systems in developing countries including Iran face many challenges to improve their effectiveness and coverage. To tackle these problems, information and communication technologies (ICTs) can play a crucial role to make extension activities more cost-effective and accessible to different groups of farmers. Today a new paradigm of agricultural development is fast emerging in which old ways of delivering extension services are being challenged all over the world (Meera et al, 2004).

¹Assistant Professor, Dept. of Extension Education, Faculty of Agril. Econ. & Dev. University of Tehran.

²Assistant Professor, Dept. of Extension Education, University of Hamadan.

³MSc. Graduate, Dept. of Rural Development, Esfahan University of Technology.

⁴PhD. Scholar, Dept. of Extension Education, Faculty of Agril. Economics & Development University of Tehran.

⁵Field Work Assistant

In the 1990s, the key actors (UN international agencies, bilateral agencies such as USAID and so on) were the first to address the issue of ICTs in the debates on development (Helvetas, 2003). During the same decade, progress in information technology has affected all spheres of life. Due to the progress in hardware technologies, people are able to procure high-speed reliable computers with huge storage capacities at affordable cost. Database and data warehousing technologies can also be used to store and retrieve large amounts of information, which can be coupled with internet technology to deliver information, instantaneously, to the people who need it. Recent IT developments enable the maintenance of huge information (text, image, audio and video) repositories with negligible down-time. The stored information can be quickly extracted by millions of users, simultaneously. Currently, Internet speed is doubling every nine months (Reddy, 2001). Within a decade, it will be possible to provide instantaneous connectivity (both ways) to millions of people, enabling mass customization and personalized services. Data mining technology can be used to extract useful knowledge from huge databases and simulation technology can be used to predict the future (Wiederhold, 2002). Such IT-based developments provide new opportunities to improve the utilization and performance of livelihood technologies such as agriculture, education, library, health and medical services, and artesian technologies. The research challenge here is to identify the areas where progress in IT could be used to improve the performance of these services and technologies, and build cost-effective IT-based systems that improve the living standards of the rural population. We need to improve the utilization and performance of agricultural technology by exploiting progress in IT. In the backdrop of rapid organizational and social changes in agriculture, new hardware and software devices have to be applied for better responsiveness to increasing farmers demand for timely and accurate information.

Hence, given the role of extension in agricultural knowledge and information management, infusing ICTs in extension programs is quite essential. In fact, the number, complexity and rapid change of information in agricultural extension require the development of a computer- based information and report system to support agricultural extension (Huatzet et al., 1997). In addition, the use of information technology has the potential to reduce the cost of collection and dissemination of necessary information from and to the team members (Migliarese and Paolucci, 1995).

IT can help by enabling extension workers gather, store, retrieve and disseminate a broad range of information needed by farmers thus transforming them from extension workers into knowledge workers. ICT helps the extension system in re-orienting itself towards the overall agricultural development of small production systems (Meer et al, 2004).

As extension has learned to recognize the importance of facilitating increased farmer choices for adopting new technologies, ICTs could also be promoted as open and flexible to enhance information exchange in rural areas and among farming communities based on locally defined priorities (Chapman and Slaymaker, 2002). In other words, it is a means of raising awareness or reinforcing organizational / socio economic status of extension personnel. Hence, it is useful to draw attention of the extension system to some of the major issues related to the application of ICT in agricultural extension.

It is believed in the extension system of Iran that the use of ICT is a strategic move to overcome many of the shortcomings of the earlier extension programs and approaches.

Statement of the problem

Agricultural extension began as a discipline more than a century ago, and has come a long way since then. Much has been learned from the experiences of educating farming communities. The process of learning is an ongoing one, which continually draws attention to a long-lasting challenge: the reform of agricultural extension in such a way as to ensure provision of the best possible services to the rural population (Qamar, 2000). Among new technologies, ICTs are seen as being the most effective tool to change the landscape of rural information exchange and agricultural extension functioning (LEISA, 2002). ICTs can improve cost effectiveness of extension activities by reaching large numbers at a relatively low cost (Feder, 2005). ICTs have the power to affect different components of the extension system particularly communication skills of extension agents. The present study was undertaken to analyze the effect of IT on communication skills of agricultural extension officials with the following specific objectives:

1. To study knowledge and extent of use of ICTs by extension officials.
2. To identify factors influencing communication skills of extension officials particularly those which are IT related.

Methodology

The study was conducted in Markazi province of Iran with the specific objective of examining the effect of ICTs on communication skills of extension personnel. In fact, the present study examines the current effort in promoting the use of information technology by extension experts. This study intends to explore the possibility of using information technology to enhance their communication mechanisms and skills. The data were collected through inventory techniques and personal interview with the respondents. All the 87 extension personnel of the province were covered by the study, applying census

technique. The validity of the questionnaire was proved by experts' panel judgment. The reliability of the main scales of the questionnaire was confirmed employing Alpha Cronbach Formula (Spector, 1992). Alpha coefficients ranged from 0.71 to 0.84.

Findings

Personal Characteristics

According to the findings, a majority of the respondents (32.2 per cent) belonged to the middle age group (38-43 years), the average age being 35 years. The data indicated that 84 per cent of them were male and 16 per cent female. A majority of them (33 per cent) earned diploma in natural sciences followed by bachelor (33.3 per cent) and "Post diploma" (20.7 per cent) in agricultural and animal husbandry disciplines. They had an average 13 years of working experience in agricultural offices. Since English proficiency is a precondition for people to make better use of IT particularly of internet sources, in the present study, this variable was examined.

Table 1 reveals that the English proficiency skill of the respondents is not satisfactory. If they are to make use of the potential of information technologies, they need to improve their proficiency in English. It may be further stated that according to the data they were more skillful in reading than in listening and comprehension and speaking.

Table 1. English Proficiency Skills of the Respondents (Per cent)

Skill type	Skill level						Mean (out of 5)
	Nil	Very low	Low	Medium	High	Very high	
	(0)	(1)	(2)	(3)	(4)	(5)	
Reading	-	16	24.7	38.3	17.3	3.7	2.68
Listening and comprehension	4.7	35.8	21	32.1	3.7	-	1.89
Speaking	10.7	34.5	33.3	20.2	1.2	-	1.75

Table 2 indicates different administrative extension activities for which the respondents used computer. An analysis of the results shows that the skill of the respondents in using computer to perform official tasks are mostly confined to simple activities such as copying, using audio and video CD and so on. With respect to the relatively complex activities such as scanning and statistical operations, they did not have the required skills. This has implication for professional development of the respondents to infuse IT in the extension system.

Table 2. Computer use by respondents in performing different administrative extension activities (per cent)

Administrative extension activities	Knowledge (%)			Extent of use					Mean (out of 5)
	Yes	No	Nil	Very low	Low	Medium	High	Very high	
			(0)	(1)	(2)	(3)	(4)	(5)	
Copying files	59.4	40.6	30.3	7.6	6.1	19.7	19.7	16.7	2.41
Using video CDs	72.3	27.7	24.3	11.4	12.9	24.3	14.3	12.9	2.31
Using audio CDs	66.7	33.3	24.3	16.2	12.2	16.2	18.9	12.2	2.26
Typing Persian letters/materials	60.9	39.1	27.8	15.3	13.9	20.8	12.5	9.7	2.04
Doing simple calculations	49.3	50.7	33.3	15.9	10.1	14.5	15.9	10.1	1.94
Text printing	47.5	52.5	40.6	10.9	12.5	14.1	14.1	7.8	1.73
Drawing tables	47.8	52.2	40.3	13.4	9	19.4	10.4	7.5	1.69
Drawing figures	40.3	59.7	43.9	10.6	9.1	21.2	6.1	9.1	1.62
Typing English letters/materials	40.6	59.4	41.8	16.4	9	20.9	4.5	7.5	1.52
Scanning	36.5	63.5	50.8	13.1	4.9	14.8	6.6	9.8	1.43
Doing statistical operations	39.1	60.9	46.9	14.1	10.9	14.1	9.4	4.7	1.39

A glance at Table 3 shows that the state extension workers had low knowledge level on different computer software. At present, the Iranian government encourages all the government personnel including extension officials to take part in International Computer Driving License (ICDL) training courses which are conducted throughout the country by public financial support.

Table 3. Knowledge of State Extension Workers and Experts on different Computer Software (Per cent)

Software	Knowledge level						Mean (out of 5)
	Nil (0)	Very low (1)	Low (2)	Medium (3)	High (4)	Very high (5)	
DOS operating system	25	8.3	11.9	27.4	19	8.3	2.32
Windows	29.3	12.2	15.9	15.9	18.3	8.5	2.07
Word processing	42.9	9.1	9.1	16.9	14.3	7.8	1.74
Excel	51.3	15.8	11.8	15.8	1.3	3.9	1.12
SPSS	61.8	7.9	13.2	9.2	5.3	2.6	0.96
Power point	1.2	-	1.2	4.7	40.7	52.3	0.85

An examination of Table 4 shows that the extent of knowledge and use of ICTs by the respondents were high in case of traditional ICTs such as telephone and very low in the case of new ICTs such as video-conferencing or internet. Besides, the usage of new ICTs is low as compared to their knowledge level.

Table 4. Extent of knowledge and use of ICTs by state extension workers and experts (Per cent)

Technology	Skill	Knowledge level						Mean (out of 5)
		Nil (0)	Very low (1)	Low (2)	Medium (3)	High (4)	Very high (5)	
Telephone	Knowledge	1.2	-	1.2	4.7	40.7	52.3	4.4
	Use	1.2	2.5	1.2	13.6	30.9	50.6	4.22
Computer	Knowledge	21.2	15.3	10.6	23.5	18.8	10.6	2.35
	Use	41.3	20	12.5	6.3	12.5	7.5	1.51
Internet	Knowledge	47	6	14.5	16.9	7.2	8.4	1.57
	Use	69.7	13.2	3.9	7.9	2.6	2.6	0.68
e-mail	Knowledge	52.4	8.3	10.7	10.7	7.1	10.7	1.44
	Use	71.4	13	3.9	5.2	2.6	3.9	0.66
Video-conferencing	Knowledge	56.1	15.9	9.8	11	6.1	1.2	0.99
	Use	74.7	17.3	2.7	2.7	1.3	1.3	0.43

A look at Table 5 reveals that communication skills of the respondents had positive significant relationship with knowledge on computer software, extent of computer use and knowledge on ICTs.

Table 5. Relationship between communication skills of the respondents with their IT knowledge and use

Random variable-1	Scale	Random variable-2	Correlation coefficient
Knowledge on computer software	Interval	Communication skills	0.267*
Computer use	Interval	Communication skills	0.234*
Knowledge on ICTs	Interval	Communication skills	0.345**

**:Significant at 1 % level

*:Significant at 5 % level

Stepwise Regression Analysis

Results in Table 6 show stepwise regression analysis projecting all the relevant steps involved. In the present analysis, at the third step as much as 60 percent of the variation in communication skills of the respondents was explained by the three variables. "Knowledge of the respondents on ICTs" accounted for 10 percent of the variation on the dependent variable. Integration of ICTs into agricultural extension activities is at its initial step. It is hoped that the role of ICT knowledge in explaining the variations of communication skills of the respondents will rapidly increase. Hence, to be more competent and play a crucial role in agricultural development, extension personnel should be more familiar with ICTs. Training courses on ICTs are necessary for all the extension personnel if they are to play a paramount role in the emerging cyber extension system.

Table 6. Stepwise Regression Analysis of Independent Variables on Communication Skills of Extension Personnel

Steps included	Variables entered	R ²	R ² Ad	Percent of explained variation	Percent of explained variation	Beta	Sig. level
1	Perceived communication difficulty (x1)	0.35	0.31	31	31	-0.508	0.006
2	Skill to develop educational materials (x2)	0.56	0.50	50	19	0.358	0.044
3	Knowledge of ICTs (x3)	0.67	0.60	60	10	0.351	0.044

$$Y = -0.508 x_1 + 0.358 x_2 + 0.351 x_3$$

Conclusion

This study reports the use of ICTs in agricultural extension, focusing on the communication skills of extension staff in Markazi province of Iran. The findings show that despite challenges and limitations faced by extension personnel, the results of ICT applications seem to be promising. Extension personnel need to be provided with new communication skills and tools so that they can better share their knowledge and experiences with other extension actors across large spatial distances, languages and cultures. Setting the device, using email, word processing, use of spreadsheets, presentation software, web browsing, document readers and downloading are examples of new skills required to be learnt by extension personnel for improving their communication skills. In addition, personal computers are to be provided for them so that they will be able to improve their capacity in monitoring of agricultural development programs and processes.

Taking the results into account, extension officials need to be provided with access to both internal and external training opportunities particularly English and ICDL skills. It is hoped that these measures will empower them to work in a more responsive manner.

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