

Application of Information and Communication Technology by Agricultural Advisory Consultants in Iran

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Abstract: *This is a fact that access to information is the main factor for development in any occupation. Information and communication technology were playing important and vital role in agricultural production and marketing. The major purpose of this paper was study the application of information and communication technology by agricultural advisors consultants in Iran. The population of this study consisted of Personnel that were working in the consultants advisory services networks in west Azerbaijan province in Iran (N=1631). Questionnaire reliability was estimated by calculating Cronbach's alpha. Cronbach's Alpha coefficient was 0.91. Finding shows that the application of ICT by Agricultural Advisory consultants was in a good level. Also results show that 92.4 percent of Agricultural Advisory consultants have computer and the average age of respondents' access to the internet was 8.23 and 95 percent of them having an Email. Also agricultural consultants were point that they could use ICT for access to new information. By using multivariate regression analysis, independent variables could explain 68 percent of variance in application of ICT by agricultural consultants.*

Keywords: *Agricultural Advisory Consultants, Information and Communication Technology, application, Agriculture, Iran.*

1. Introduction

Computer-based Information and Communication Technology (ICT) plays an important role for any organization ([Juergen Kai-Uwe](#), 2005). During last decade we could see that progress in ICT affected all spheres of our life. Due to progress in technologies, we could be able to use computers with huge storage capacities with affordable cost. Also, database can be used to store and retrieve large amount of information that can be coupled with Internet technology to deliver information for our needs (Phougat, 2006; Sharma, 2003).

Access and use of information plays a crucial role in any activity (Rasouliazar *et al.*, 2011). The Information Technology could use into many different aspects of our life, especially in agricultural sector (Curtin, 2003). For examples web allows information to be shared across the world. Web sites give farmers to access and use information on anything related to agriculture, including crops, animal husbandry, buying and selling equipment, livestock and different methods of farming.

Agriculture plays a unique role in food safety. Also Information Technology provides new opportunities to improve the utilization and performance of agricultural system such as farm level, farm management, deliver of new methods for cultivation, exchanging information among farmers, researchers and extension educator and suppliers. Then we must improve farmer's ability to use information technology through various education programs responsive to the information age of the 21st century (Rasouliazar, 2011).

In most studies, researchers indicated that there are positive attitudes about application of ICT and their results indicated that the users used ICT in their activities (Yaghobi, 2004; Karimi *et al.*, 2007; Rasouliazar *et al.*, 2006; Movahedmohamadi, 2002; Effatnejad, 2002; Alammr, 2004; Rasouliazar and Sadighi, 2008; Falaki *et al.*, 2007).

Heysung studies (2004) regarding factors that affected the adoption of ICT among educators, showed that using of these technologies has positive effect on their educational performance. Karimi *et al* (2007) stated that

using ICT by agricultural educators considering for some factors such as having information literacy skills. Utilizing the competence of the graduates of agriculture's in the form of Agricultural Advisory Services companies (AASC) is one of the best solutions to transfer knowledge and technology to farmers and accelerating in agricultural development. Despite importance of information, farmers don't have access to new technologies. But new organizations (AASC) should be responsible for transferring information and technologies to the farmers (Lashgarara and Hossini, 2008). Shaffril *et al* (2010) stated that agriculture is generally used as a tool to overcome poverty and unemployment problem in the world. In Iran agriculture is one of the most important economic sectors. The agricultural sector provides about a quarter in employment and 33% of exports in Iran. Also Iran has advantages in producing almost of agricultural goods (Manzoralibadim 2009; Kohansal, 2010).

Benin *et al* (2007) stated that the main purpose of an agricultural consulting service is to increase agricultural productivity by strengthening the technical skills of farmers, and also to monitor their activities through delivery information and consulting services to them. Anderson (2008) believes consulting services are critical elements which provide key information and improve the welfare of farmers. He believes that the term "consulting services" refers to a complete set of agricultural organizations that facilitate and support participation of farmers and solve their problems in agricultural sector with transmission of information, skills and techniques.

The Ministry of agriculture in 2011 reported that West Azerbaijan province has a high capacity in agriculture production. Based on the statistics of Agricultural Engineering Organization over 1900 AASC have been formed and established in Iran. The largest of AASC was based in West Azerbaijan and informed in 162 AASC companies. Considering the important role of AASC in providing extension services to farmers, it is necessary to aware of the application of information and communication technology by agricultural advisors consultants (Rasouliazar *et al.*, 2011). Awareness of the application and usage of ICT by agricultural consultants was necessary for program planners in order to develop effective policies in the field of ICT in agricultural sector. Considering to the issue the main goal of this study was to evaluate the amount of respondents' application of ICT and study status using of ICT by agricultural advisory consultants.

2. Methods

The methodology used in this study involved a combination of descriptive and quantitative research and included the use of correlation and descriptive analysis as data processing methods. A questionnaire was developed based on interviews and relevant literature. The Main purpose of the paper was to study the application of ICT by agricultural advisory consultants. The population of this study consisted of agricultural consultants that were working in the consultants advisory services networks in west Azerbaijan province in Iran (N=1631). Sample size have been selected by using Cochran formula (n=156). Cronbach's Alpha coefficient was 0.91 which demonstrated that the questionnaire was highly reliable. The questionnaire was an instrument to collect data. The data were coded and analyzed by using the Statistical Package for the Social Science (SPSS16) for windows.

3. Results

The results of descriptive statistics show that the average age of Agricultural Advisory consultants was 27.5 years old, and majority of them (54.1 percent) ranged from 26 to 30 years old (Table1). The majority of Agricultural Advisory consultants were male. The average of Advisory service experience was 4.6 years. Also the majority of respondents 92.4 percent have computer. The average years of access to internet by respondents were 8.23 and only 31.8 percent of respondents have access to computer in their advisory office. The average hour of use computer and internet per week by respondents was 14.5 and 4.26. Other characteristics of respondents show in table 1.

Finding shows that 46 percent of Agricultural Advisory consultant's (n= 72) in a high level said that could use Microsoft word office. Also more than 41 percent of respondents (n= 38) stated that in average level has competence in usage Microsoft office access. This point is appearing that consultants must increase their competence in learning Microsoft office access. Also 75 percent of respondents (n= 116) in high level application Microsoft office power point. And about 42 percent of respondents (n= 103) in high level application Microsoft office excel. Also respondents in high level could application Windows. And also about

81 percent of respondents (n= 120) said that they have could usage specially software of their content. Other finding shows in table 2.

TABLE I: : Respondents' personality characteristics

Variables	Items	Frequency (n)	%	Mean	Sd
Age	Less than 25	12	8.3	27.46	4.71
	26-30	84	54.1		
	Upper than 31	58	37.6		
Sex	Male	136	87.2	4.58	1.36
	Female	20	12.8		
Advisory service experience age	Lower than 2	65	42	4.58	1.36
	2-4	70	46.4		
Have computer	Upper than 4	20	11.6	92	8
	Yes	143	92		
Years of access to Internet	No	22	8	8.23	3.27
	Lower than 5	17	11.5		
Access to computer in Advisory office	5-10	67	45.2	31.8	
	Upper than 10	65	43.3		
Access to internet in Advisory office	Yes	49	31.8	68.2	
	No	107	68.2		
Have Email	Yes	19	12.6	95	
	No	137	87.4		
Average hour of use computer per week	Yes	148	95	14.52	6.3
	No	8	5		
	Lower than 5	28	18.5		
	5-10	69	45.2		
Average hour use of Internet per week	11-20	32	21.5	6.49	4.26
	21-30	17	11.6		
	Upper than 30	4	3.2		
	Lower than 2	8	5.6		
	5-2	95	61		
	6-10	43	28		
	Upper than 10	8	5.4		

TABLE II: Respondent's Application and Knowledge about Information and Communication Technologies Competencies

	Very Low		Low		Medium		High		Very High	
	%	n	%	n	%	n	%	n	%	n
Microsoft office word	5.2	8	14.3	22	34.4	54	43.1	67	3	5
Microsoft office access	16.4	25	17.3	27	41.2	64	17.3	26	7.8	12
Microsoft office power point	2	3	7.3	12	15.4	24	56.2	87	19.1	29
Microsoft office excel	9.4	14	24.6	38	24.2	59	39.1	60	2.7	43
Application of windows	2.4	37	8.6	12	15.1	23	47.9	75	27	42
Save and Copy of files	6.2	9	6.1	9	10.3	15	34.9	53	42.5	65
Usage Scanner and printer	-	-	1.3	19	33.7	52	29.4	44	35.6	54
Setup software's	-	-	1.5	3	32.7	51	43.6	68	22.2	34
Find troubleshoot of systems	7	10	10.3	15	33	51	34.2	53	15.5	24
Use necessary software in agriculture	-	-	4.2	6	15.4	23	42.6	64	37.8	56
Use Email	-	-	10.6	16	26	39	32.4	49	31	47
Use Google and yahoo and other engine search motors	3	4	5.9	9	19.5	30	37	57	34.6	53

1=very low, 2=low, 3=medium, 4=high, and 5=very high

Application of ICT by agricultural consultants in their advisory activates were determined as described in the methodology section. For the purpose of characterization, the scores were labeled as: "weak", "mediate", "good", and "excellent". Based on means and standard deviations the four categories were determined by scores that fell within two standard deviations to the left of the mean on a normal curve, and two standard deviations to the right of the mean.

Level of Agricultural Advisory consultant's application of ICT was shown in table 3. In this research finding shows that consultant's application of ICT: 11.2 percent was in weak level, 16.8 percent was in mediate level, 34.4 percent was in good level and 37.6 percent was in excellent level. Finding indicated that Agricultural Advisory consultant's in high level application ICT in their consultant's activities. This is important finding because the level of interaction between agricultural consultants and ICT in their advisory activities was in a high level, therefore extension program planners must be providing ICT devices for them.

TABLE III: Application and knowledge of respondents about ICT Competencies

Variables	Items	F	%
Application of ICT	Weak	17	11.2
	Mediate	26	16.8
	Good	53	34.4
	Excellent	58	37.6

Findings of Bivariate correlation indicated there is a positive and statistically significant correlations were found between the educational level of Agricultural Advisory consultant's, average hour using of internet and computer per week with dependent variable "Application of ICT in their advisory activities by agricultural consultants" (Table 4).

TABLE IV: Correlations between variables and application of ICT

	r_s	Sig.
Age	0.438*	0.043
Education level	0.554**	0.000
Age of Advisory service	0.681*	0.03
Age of access to internet	0.493**	0.000
Average hour of usage computer per week	0.761**	0.000
Average hour of usage Internet per week	0.513**	0.000

**= P<0.001 * = P<0.05

For predicating probability application of ICT by Agricultural Advisory consultant's, the logical of f(x) function was calculated that could be inferred to the population of this study (Table 4). Based on statistically significant variables in the regression analysis, and constant values, the regression equation could be derived as follows for application of ICT by agricultural advisory consultants. The final multivariate regression model by B and β coefficient was:

$$y = 12.62 + 0.716x_1 + 0.571x_2 + 0.427x_3 + 0.612x_4 + 0.638x_5 + 0.303x_6$$

$$y = 0.838x_1 + 0.528x_2 + 0.461x_3 + 0.432x_4 + 0.344x_5 + 0.251x_6$$

The multivariate regression analysis indicated that $R^2_{adj} = 0.683$. Therefore about 68% of variance of application of ICT could be explained by Hour of use computer per week, Age of advisory service, Level of education, Average hour of usage Internet per week, Age of usage Internet and Consultants Age (Table 5).

TABLE V: Variables coefficient in regression analysis

Independent Variables	EXP(B)	SE	Beta	t	P-value
Constant	12.62	1.711	---	7.37	0.001
Hour of use computer per week (X ₁)	0.716	0.069	0.838	10.39	0.000
Age of advisory service (X ₂)	0.571	0.072	0.528	7.59	0.001
Level of education(X ₃)	0.427	0.076	0.461	5.37	0.001
Average hour of usage Internet per week(X ₄)	0.612	0.038	0.432	16.28	0.000
Age of usage Internet(X ₅)	0.638	0.084	0.344	7.56	0.001
Consultants Age(X ₆)	0.303	0.055	0.251	5.51	0.002
R=.843 R ² = 0.710 R ² _{adj} = 0.683 F=147.12 Sig: 0.000					

4. Discussion

The advancements in ICT can be utilized for providing truthful, timely, important information and services to the agricultural experts. ICT has a potential to contribute to achieving significant economical, social and environmental benefits. The purpose of the research was to study the application of ICT by agricultural advisory consultants in their advisory activates.

The application of ICT by respondents was in a good level. Also results show that 92 percent of respondents have computer in home and use it. 31.8 % of respondents' have access to the Internet in their advisory office and 95 % of respondents have Email. These results were showed that a there is a high capacity for enhancing and investment in ICT among agricultural advisory in west Azerbaijan province in Iran. Karani *et al* (2007) in their study showed that access to information by ICT among agricultural students was in high level and they had good competence in this filed. Also Pouratashi and Mokhtarnia (2009) pointed that Agricultural Faculty members have positive opinion toward using Internet.

Bivariate correlation indicated that positive and statistically significant relationship found between the application of ICT by respondents and independents variables. Therefore for enhancing the rate of ICT usage among agricultural advisory consultants, policy makers must pay attention to providing equipments for them. This finding is also pointed by several authors (Yaghoobi, 2004; Karimi *et al.*, 2007; Rasouliazar *et al.*, 2006; Movahedmohamadi, 2002; Effatnejad, 2002; Alammr, 2004; Rasouliazar and Sadighi, 2008; Falaki *et al.*, 2007). Therefore establishment and providing infrastructure to enhance ICT usage among users were necessary. Because about 69 percents of agricultural consultants said that they don't access to computer and ICT equipments in their advisory office.

The multivariate regression analysis indicated that about 68% of variance in application of ICT by respondents could be explained by Hour of use computer per week, Age of advisory service, Level of education, Average hour of usage Internet per week, Age of usage Internet and Consultants Age. Therefore extension managers must point to provide equipments to agricultural advisory consultants for access to computer and internet in their office. Recommendations that emerged from the discussions were focused on: For enhancing application of ICT between consultants's agricultural experts must provide necessary equipment and provide educational courses for enhancing their competence about ICT. Based on the findings of this study, the following suggested were drawn and recommendations:

- Providing necessary ICT tools (computer, scanner and printer) for agricultural consultants.
- Build up the ICT infrastructures for access to Internet in advisory office place.
- Arrangement educational courses for agricultural consultants about access and excel.

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