

Role of ICTs in improving food security of Iranian Rural Households

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ABSTRACT

Access to desirable, sufficient and safe food is one of the basic components of the development of a society. Information and communications technologies (ICTs) represent an important strategy that can be used in attaining food security. An increase in the capability of these technologies in different areas and the consideration of the problems that are faced by rural Iranian households regarding food accessibility are areas that need to be investigated. The main purpose of this research, performed in 2006-2007, was to identify the effectiveness of ICTs in improving the food security of Iranian rural households. A descriptive methodology was applied in this research, through questionnaires. The statistical population for the study included 253 agricultural extension experts; from this population, 170 persons were selected. The results showed that, according to the experts' point of view, the situation of food security in Iranian rural households was unfavorable, but that ICTs could play an important role in improving this situation. The results of stepwise regressions showed that providing information about food, increasing food production, helping to market agricultural products, considering clientele needs, improving interactions and communications, ensuring appropriate ICTs, providing access to old technology and accessing the content of this type of technology, were determined to account for 78% of food security of Iranian rural households.

Key words: ICTs, food security, rural households, Iran

INTRODUCTION

Access to desirable, sufficient, safe and nutritious food is a basic component of development and health of a society. Thus, when developing country goals and priorities, food security is of utmost importance. Most observers of rural development believe that, currently, the necessary condition for obtaining food security is information. Knowledge and information are important factors to ensure food security, and ICTs have the ability to present the information required for improving food security. According to the definition determined by the World Food Summit (1996), Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1998). Food security for a household means access

by all members at all times to enough food for an active, healthy life (CTA, 2005). In other words, food security is the guarantee of the physical availability of and economical accessibility to sufficient food (produced with bioenvironmental and sustainable social methods) in terms of quantity (amount, distribution, calories) and quality (safe, nutritious, balanced), while cultural admittance for all people at all times means having healthy and active lives to preserve human places and degrees (Temu., & Msuya, 2004).

Food security can be summarized according to three factors: food availability, food accessibility and food utilization. Food availability is achieved when a sufficient amount of food is constantly available for all members of society. This kind of food can be obtained through household production, local production, imports or food aids.

Food accessibility is obtained when households and individuals have sufficient sources to consume a suitable diet. In other words, food accessibility is possible if the household income allows for the preparation and purchase of enough food (Bakhtiari, & Haghi, 2003). Food utilization refers to suitable biological uses of food that depend on a household knowledge of techniques for storing and processing food and basic principles of nutrition and caring for children (Sustainable Development Department, 2006).

Different strategies exist for obtaining food security; the use of information and communications technology is one of these strategies. ICTs consist of various collections of resources and technical tools that are used for connecting, spreading, storing and managing information (Pitago, 2004). In other words, ICT represents the collection of hardware and software that is used for producing, preparing, transferring and storing data via devices such as computers, radios, televisions, etc., and it includes an extensive scope of traditional and modern media (Norad, 2002).

Many studies have been carried out in relation to the role of ICTs in improving the food security of rural households. The main result of the FAO research (1998) focused on creating an agricultural communication network project in Italy has helped to ensure agricultural inputs and product marketing (FAO, 1998). The results of Indonesia's participatory video project have been considered to help with clientele needs (Norad, 2002). The findings from the research of Fortier and Van Crowder about the electronic diffusion of agricultural information projects in rural communities of Kenya can improve the ability for individuals to acquire information, increase food production and develop the local capacity of rural community building (Van Crowder, & Fortier 2000). The research of Gerster and Zimmermann focused on a radio program project aimed at improving financial decisions and increasing food production (Gerster & Zimmermann, 2003). The findings of Uganda's knowledge system and agricultural information project are related to improving the power of acquiring individual information and attending to clientele needs (Sustainable Development Department, 2006). The results of PCARRD research (2003) regarding the

Philippines' information services and agricultural technology were used to improve the marketing of agricultural products and to increase production. The findings of Bangladesh's rural ICT project resulted in better marketing of agricultural products, decreased costs of accessing information and the creation of jobs (Pigato, 2004). The main results of Malaysia's E-barrio project pertained to the improvement of interactions and communications and responses to clientele needs (Norad, 2002).

In development fourth program of Iran, 10000 ICT rural offices have been predicated, but 2500 ICT office has been mobilized at the present. There was no ICT rural office in Iran in 2000, but the quantity of ICT office in 2005 was 963, in 2006, 2287 and in 2007, 2446 (Information Technology Company, 2007). The results of FAO research in relation to situation of food security in Iran showed that food security indicator in rural households has been decreased during 1985-2005. Therefore, in recent years for ensuring food security in Iran, different programs have been carried out, including increasing food production in 1945-1948, ensuring rate of strategic products in 1973-1981 and investing in agricultural sector in 1983-1987 (Ministry of Hygiene, Remedy & Medical Education, 2004). In addition, above mentioned solutions, using ICT for improvement food security of rural households can be an important option, because information is the key element in rural development in general and food security in particular. The main purpose of this research is the identification of the effective capabilities of information and communications technologies for improving the food security of Iranian rural households. The theoretical framework has been showed in figure 1.

MATERIAL AND METHODS

The methodology of this research was descriptive, and it was carried out as a survey. The instrument that was used for data collection was a questionnaire. The research independent variables consisted of: (A) ICT capability in improving food availability (B) ICT tools (C) implications of the use of ICTs for improving food security (as you see in figure 1) and (D) personal characteristics of extension experts: gender, age, job record, level of

education, major and workplace. The dependent variable was the experts' point of view about food availability; to assess it, forty-four statements were used in the form of a five-point Likert scale (from very unsuitable to very suitable), and the mean score of the answered questions was identified as the respondent's attitude. After computing the statements, they were examined on an interval scale. Some of these statements were related to the rate of food production by rural households, the rate of government investments in agricultural sectors, the amount of farming lands, the yield per hectare of agricultural products, government policies regarding the avoidance of changes in farm operations, government functions related to land consolidation, government policies related to the guaranteed sales of agricultural products, the rate of the application of scientific principles in agricultural production, the amount of foreign food imports, the volume of agricultural waste products, etc. The statistical research personnel consisted of 253 extension experts from agricultural organizations in eight provinces of Iran: Qom, Ilam, Kerman, Semnan, Qazvin, Kordistan, Tehran and Lorestan. The required research sample size was also calculated to be 170 people by using the Cockran formula. Thus, in a pre-test, 30 questionnaires were distributed, and the variance of the dependent variable (food availability) was calculated as $S^2 = 0.26$. Using $N = 253$, $d = 0.05$ and $t = 1.96$, the required sample size was determined to be 155 persons; to increase certainty; it was increased to 170 persons.

$$n = \frac{N^2 t s^2}{N^2 d + t^2 s^2} \quad n = 170$$

The research sampling method was stratified. Thus, initially, among the 30 provinces of Iran, the 8 provinces listed above were chosen randomly.

RESULTS

Assessing the current food security situation of rural Iranian households indicated that most of the respondents (81.2%) assessed the food security situation of rural Iranian households as unsuitable. To determine the role of ICTs in improving the food security of Iranian rural

households, most respondents (36.5%) assigned an important role to ICT capabilities in improving the food security of Iranian rural households.

The practices of providing information about food, assisting in the marketing of agricultural products, improving interactions and communications, considering clientele needs, ensuring appropriate ICTs, providing access and accessing content of old technologies and increasing food production had a positive and significant relationship at the 99% level with improving the food security of rural households, improving individual power, improving decision-making, helping to ensure agricultural inputs, representing educational-sanitary services, decreasing costs, helping to create jobs, informing farmers about market policies, transferring technologies and new methods, improving individual abilities to acquire knowledge, improving the availability of facilitators, promoting rural literacy and informing rural people about ICTs. Meanwhile, the cost-effectiveness of old technologies had a positive and significant relationship at the 95% level with improving the food security of rural households; weaknesses of user capabilities and skills and the incompatibility of ICTs with users had a negative and significant relationship at the 95% level with improving the food security of rural households. The other variables did not have any significant relationships with the improvement of food security of rural households.

Table 1: Stepwise regression analysis in improving food security of Iran's rural households

Steps	R	R Square	Adjusted R Square	Std Error of the Estimate
1	0.56	0.311	0.245	2.86
2	0.63	0.391	0.323	2.53
3	0.66	0.433	0.416	2.28
4	0.73	0.533	0.485	2.11
5	0.77	0.598	0.573	1.97
6	0.82	0.682	0.636	1.83
7	0.87	0.751	0.697	1.67
8	0.91	0.836	0.783	1.54

In order to determine the variance in the improvement of food security of Iranian rural households, all of the variables were entered into a stepwise regression analysis. The analysis results are shown in Tables 1 and 2.

According to table 1, the providing information about food, increasing food production, helping to market agricultural products, considering the clientele needs, improving interactions and communications, ensuring appropriate ICTs, providing access to old technologies and accessing the content of old technologies were entered as stepwise regressions. In total, when entering all of these variables, the result was $R^2 = 0.783$. This coefficient shows that 78.3% of the food security of

rural households' variance changes was related to these eight variables.

The regression significance was also calculated by the F-test; it was significant at the 99% level ($\text{sig} = 0.000$). This research confirmed the results of Fortier (2000), Zimmermann and Gerster (2003), PCARRD (2003), rural ICT of Bangladesh (2001) and E-barrio Malaysia (2003).

The variables that were entered in the regression equation were the main part of the regression analysis and are shown in table 2. The related T-test of regression coefficient showed that these coefficients were significant and in estimate is Y.

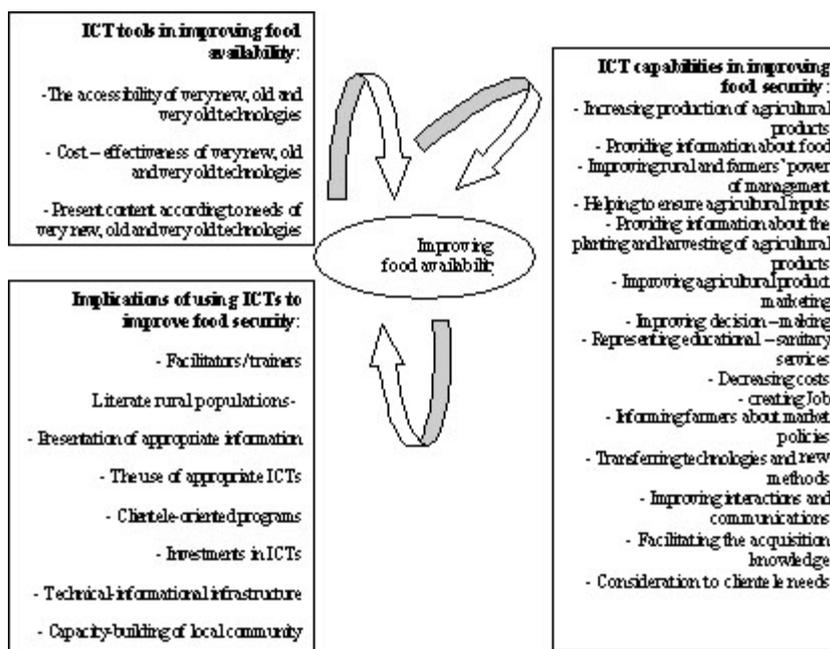


Fig. 1: The theoretical framework of research

DISCUSSION

This research, carried out to study the role of information and communications technologies in improving the food security of rural Iranian households, has shown that the food security situation of rural households is unsuitable. This means that factors such as the rate of unemployment in agricultural sectors, the rate of inflation in the country and also the volume of agricultural waste products are not only problematic

but that they also threaten the food security situation of rural Iranian households. In the experts' view, information and communications technologies can have an important role in improving the food security of rural households. The practices of providing information about food, increasing food production, helping to market agricultural products, considering clientele needs, improving interactions and communications, ensuring appropriate ICTs, providing access to old technologies and accessing the content of old technologies could play an

important role in improving the food security of rural households. Information about food related to the manner of storing food processing food, optimizing food consumption, improving food distribution, supplying food and providing food safety played a direct and important role. On the other hand, the improvement of the food security of rural households was strongly influenced by the improvement of interactions and communications; this rural means that practices such as increasing the quality of

studies in the agricultural section, improving interactions and communications among various production factors, improving presentations of extension services, improving communications among researchers, extension personnel and farmers, and decreasing the gap between rural people and researchers can increase and improve the food security of rural Iranian households. It can be concluded that:

Table 2: Standardized & unstandardized coefficients of improving food security

Variables	Unstandardized	Std.	Standardized		Sig
	Coefficients B	Error	Beta	t	
Constant	89.667	4.428	-	20.251	0.000
Informing about food (X [•])	0.865	0.460	0.794	4.058	0.000
Increasing food producing (X ₁)	0.774	0.414	0.723	2.98	0.002
Agricultural marketing (X _f)	0.694	0.312	0.684	2.67	0.002
Considering to clientele needs (X _n)	0.612	0.294	0.592	2.54	0.003
Improving interactions & communications (X _{...})	0.531	0.212	0.481	2.36	0.002
Ensuring appropriate ICTs (X _†)	0.472	0.174	0.374	2.2	0.003
Accessing to old technologies (X _‡)	0.384	0.132	0.284	1.74	0.004
content of old technologies (X [^])	0.311	0.99	0.211	1.37	0.003

According to the results shown in table 2, the regression equation according to the B and b quantities were, respectively:

$$Y = 89.667 + 0.865x_1 + 0.774x_2 + 0.694x_3 + 0.612x_4 + 0.531x_5 + 0.472x_6 + 0.384x_7 + 0.311x_8$$

$$Y = 0.794x_1 + 0.732x_2 + 0.684x_3 + 0.592x_4 + 0.481x_5 + 0.374x_6 + 0.284x_7 + 0.211x_8$$

To achieve improvements in the food security of rural households, more consideration should be paid to creating jobs in the agricultural section, to controlling and decreasing the rate of inflation in the country and also to managing the agricultural waste products. According to most of the experts' point of view, much more precise considerations regarding the use of information and communications technologies in improving the food security of rural households are completely necessary and logical. Actions such as identifying and assessing appropriate ICTs for fulfilling participatory needs, ensuring appropriate ICTs for improving food security, ensuring appropriate software and hardware, providing equal access to ICTs for all people, considering clientele needs in presenting programs and information, investing in ICTs and promoting technical-information infrastructures for this purpose are essential.

To improve the role of information and communications technologies in increasing the food security of rural households, solutions such as the use of appropriate content from old technologies, for example, radios and televisions, for presenting information about storing food, processing food, optimizing food consumption, ensuring the safety of food, increasing food production, marketing agricultural products and considering clientele needs are highly recommended; this requires that rural households have access to old technologies.

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