

ROLE OF ICTS IN IMPROVING FOOD ACCESSIBILITY OF IRAN'S RURAL HOUSEHOLDS

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ABSTRACT

Access to desirable, sufficient, safe and nutritious food is one of the basic components of the development and health of a society. Information and communications technologies (ICTs) represent an important strategy that can be used in attaining food accessibility. The main purpose of this research, performed in 2007-2008, was to identify the effectiveness of ICTs in improving the food accessibility of Iran's 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 accessibility in Iran's rural households was unsuitable, but that ICTs could play an important role in improving this situation. The results of stepwise regressions showed that decreasing costs to access to information, improving the ability to acquire knowledge for individuals, considering clientele needs, clientele-oriented programs and content of old technologies were determined to account for 69% of the variance of food accessibility of Iran's rural households.

KEY WORDS: Information and communications technologies, food accessibility, rural households

INTRODUCTION

Access to desirable, sufficient, safe and nutritious food is a basic component of development and health of a society. 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. Food security can be summarized according to three factors: food availability, food accessibility and food utilization (FAO, 1998). 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 (CTA, 2005). 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 (Balakrishna, 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 (Temu & Msuya, 2004).

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).

1. New ICTs: This group consists of computers, satellites, one-on-one connections, wireless phones (mobile), the internet, e-mail, the web, internet services, video conferences, CD-ROMs, personal computers (PC), distance control systems, informational-geographical systems, global positioning systems (GPS), electronic cameras, databases, etc..

2. Old ICTs: This group consists of radios, televisions, telephones, telegraphs, audio and video cassettes, films and slides. This group of technologies has been used for several decades.

3. Very Old ICTs: This group of technologies has been used for several centuries and includes newspapers, books, photo albums, posters, theater, human interactions, markets and plays (Obayelu & Ogunlade, 2006).

According to Chowdhury (2001), ICTs play an important role in food security through facilitating accessibility to related policies and information for market communication, improving market profitability, helping farmers to make decisions, increasing diversity

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in rural economies and reducing the cost of living. In general, some of the important capacities of ICTs in food security are related to improving communications between research systems, farmers and extension, improving accessibility to information regarding inputs, introducing technologies, providing more rapid accessibility to high quality information, ensuring information about the appropriate times and places for optimized sales of agricultural products, increasing agricultural products and decreasing agricultural waste products (FAO, 1998; Chowdhury, 2001; Gerster & Zimmermann, 2003).

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. 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).

The theoretical framework has been showed in figure 1.

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.

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- 1- The study of personal and professional characteristics of extension experts.
- 2- The study of situation food accessibility in Iran's rural households, from the extension experts' point of view.
- 3- The examination of the role of information and communications technologies in improving food accessibility of Iran's rural households.

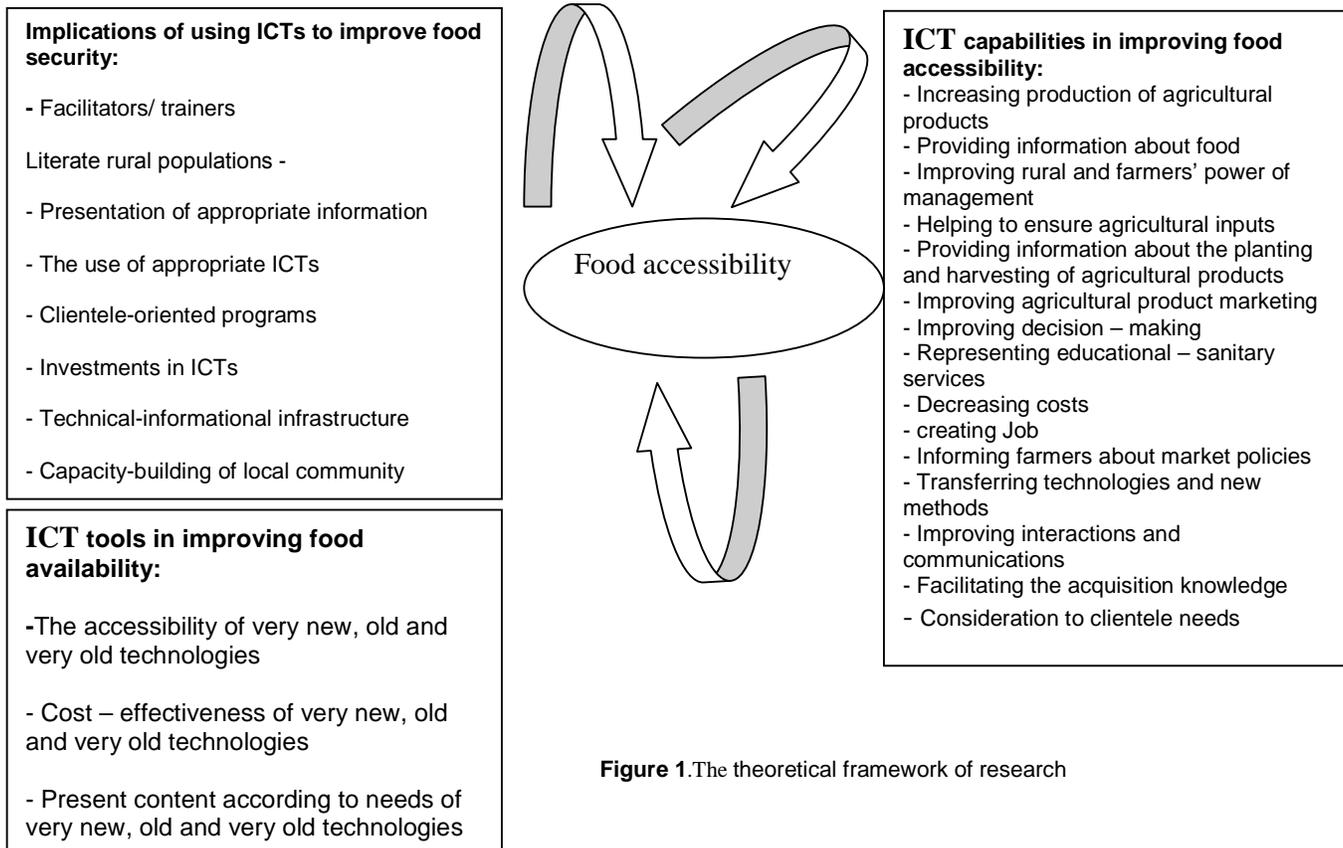


Figure 1. The theoretical framework of research

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 accessibility (B) ICT tools (C) implications of the use of ICTs for improving food accessibility (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 accessibility; 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.

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

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

RESULTS AND DISCUSSION

The study of the personal and technical characteristics of extension experts:

The results of this research showed that 131 of the experts were men (77.1%) and 39 persons were women (22.9%). The major of most respondents was agricultural extension (36%). Most of the experts were working in Tehran (27.67%). Of all the experts, 116 experts (68.2%) had a Bachelor's degree, and 53 persons (31.2%) had Master's degrees. Most respondents (41.8%) had 12 – 17 years of job experience; the mean was 12 years, and the values ranged from 1 to 29 years.

The study of the situation of food accessibility of Iran's rural households according to agricultural extension experts' point of view:

According to the number of statements and the Likert scale for examining food security (1- very unsuitable, 2- unsuitable, 3- medium, 4- suitable, 5- very suitable), the lowest and the highest scores for one respondent were 13 = (13x1) and 65 = (13x5). After

recoding, the score of a very unsuitable situation was (1- 13), the score of an unsuitable was (14- 27), the medium was (28- 41), suitable was (42- 55) and very suitable was (56- 69). The results of the research indicated that most of the respondents (57.6%) assessed food accessibility situation of Iran's rural households as unsuitable (Table 1).

Table 1- Agricultural expert's point of view about food accessibility situation of Iran's rural households (n=170)

Situation	Frequency	Percent	Cumulative percent
Unsuitable(14 – 27)	98	57/6	57/6
Medium (28 – 41)	62	36/5	94/1
Suitable (42 – 55)	10	5/9	100
	Mean: 23	Median: 27	Mode: 24

The examination of the role of ICTs in improving the food accessibility of rural Iran's households

To determine the role of ICTs in improving food accessibility of Iran's rural households, a total of 48 statements were used. These statements were computed and then recoded. According to 48 effective ICT capabilities and the Likert scale for testing the role of ICTs in improving food availability (1- very little, 2- little, 3- medium, 4- much/ many, 5- very much / many),

the lowest and the highest scores for each respondent were 48 (48x1) and 240 (48x5). After recoding, the very little score was (1- 48), little (49- 97), medium (98 – 145), much/ many (146- 194) and very much / many (195 – 243). The results shown in table 2 indicate that most respondents (36.5%) assigned an important role to ICT capabilities in improving food accessibility of Iran's rural households.

Table 2- The role of ICTs in improving food accessibility of Iran's rural households

Role	Frequency	Percent	Cumulative percent
Little	15	8.8	8.8
Medium	60	35.3	44.1
Much	62	36.5	80.6
Very much	33	19.4	100

the presentation of appropriate information, the management power of rural people and farmers, improving decision-making, informing farmers about the market policies and improving interactions & communications had a positive and significant relationship at the 95% level and content of old technologies, clientele-oriented programs, decreasing costs to information, improving individual power of acquiring knowledge and considering to clientele needs had a positive and significant relationship at the 99% level with improving food accessibility of rural households. The other variables did not have any significant relationships with the improvement of food availability of rural households.

In order to determine the improvement of food accessibility of Iran's rural households, stepwise regression analysis was used. The analysis results are shown in tables 3 and 4.

According to table 3, decreasing costs of accessing to information, improving individual power of acquiring knowledge, considering to clientele needs, clientele-oriented programs and content of old technologies were entered as stepwise regressions.

In total, when entering all of these variables, the result was $R^2 = 0.691$. This coefficient shows that 69.1% of the food accessibility of rural households' variance was related to these five variables.

Table 3: Stepwise regression analysis in improving food accessibility of Iran's rural households

Steps	R	R Square	Adjusted R Square	Std Error of the Estimate
1	0	0.345	0.281	3.36
2	.59	0.491	0.414	3.24
3	.7	0.593	0.532	2.86
4	.77	0.693	0.624	2.63
5	.83	0.777	0.691	2.27
	.88			

Table 4: Standardized & unstandardized coefficients of improving food accessibility

Variables	U Standardized Coefficients B	Std.Error	unstandardized Coefficients Beta	t t	sig Sig
Constant	21/562	1/697	-----	12/704	0.000
decreasing costs of accessing to information (X ₁)	0.273	0.241	0.691	4.195	0.000
improving individual power of acquiring knowledge(X ₂)	0.323	0.211	0.611	3.242	0.002
considering to clientele needs (X ₃)	0.394	0.174	0.523	3.114	0.002
clientele-oriented programs (X ₄)	0.482	0.162	0.404	2.495	0.003
content of old technologies (X ₅)	0.574	0.153	0.295	2.746	0.002

According to the results shown in table 4, the regression equation according to B and β quantities were, respectively:

$$Y = 21.562 + 0.273x_1 + 0.323x_2 + 0.394x_3 + 0.482x_4 + 0.574x_5$$

$$Y = 0.691x_1 + 0.611x_2 + 0.523x_3 + 0.404x_4 + 0.295x_5$$

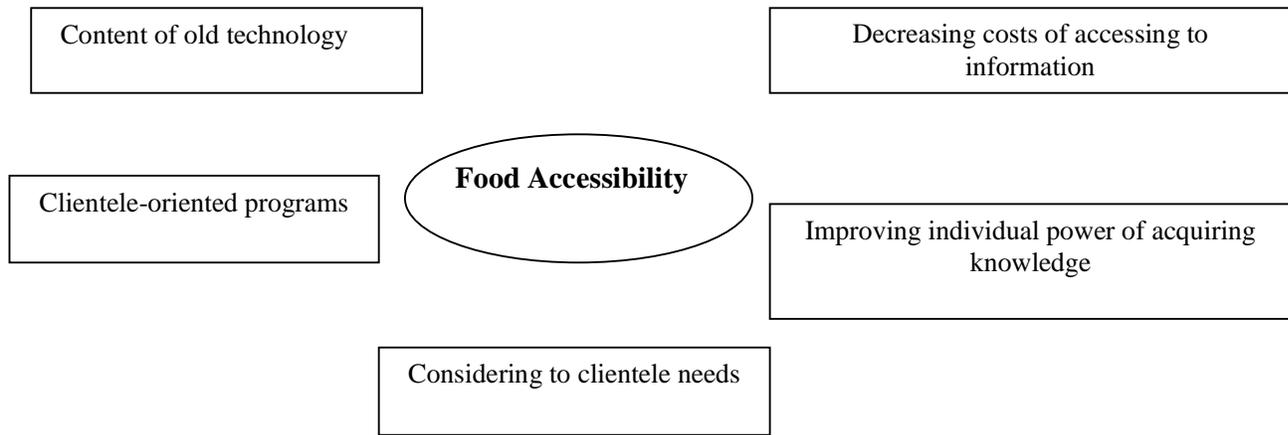


Fig 2: The factors determining food accessibility of Irans rural households

CONCLUSION AND RECOMMENDATIONS

This research has shown that the food accessibility situation of rural households is unsuitable. In the experts' view, information and communications technologies can have an important role in improving the food accessibility of rural households. It can be concluded that:

- In considering that the situation of food accessibility of rural households is unsuitable, to achieve improvements in the food accessibility of rural households, more consideration should be paid to improving poverty alleviation policies, incomes improvements, job creating and harnessing of inflation.
- 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 accessibility 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 accessibility of rural households, solutions such as the use of appropriate content from old technologies, for example, radios and televisions, for increasing individual power for searching accurate information, rapid access to update information, improving the quality of required information, more consideration to needs of rural households and designing mechanisms for decreasing costs of access to new technologies and information and providing equal access to ICTs for all people, are highly recommended.

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