Identifying a new role for agricultural extension to provide service to small food industries in rural areas of Iran

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Abstract: *The structure of agricultural extension in Iran is conventional and service is provided to the limited groups of farmers. The purpose of this study was to investigate the new role for agricultural extension in providing services to small size food industries in the rural areas. In this regard, 60 cases of active small food industries were studied and 111 managers were interviewed. Findings show that advisory service from Ministry of Agriculture is considered to be a source to obtain license for starting the business activities. There has been some advisory service for them in the stage of receiving license, but after that they have problems in different ongoing activities of firm while it is really hard to find a reliable source of information and knowledge. This lack of consultation in addition to special constrains in rural areas and in small businesses, makes competition difficult for managers so about 40 percent of manufactures which received license from MoA were not active at the time of study (2009). According to results, the main challenge was lack of involvement by extension service to collect information gained through experiences by managers. Respondents would rather exchange their experience through extension service. In this study, AIS framework was used to identify ways to increase linkages between extension services and small size food industries, promote knowledge exchange and encourage innovation*.

Keywords: *Agricultural Extension, AIS framework, Small food industries*

Introduction

The thinking and practice about the ways in which agricultural research and extension should be organized and which elements need to be included has constantly changed in the recent decades. A number of different frameworks have been promoted, as the basis for investments in agriculture technology development. In the 1950s and 1960s, the focus was on building public sector research departments and institutes and extension services. This broadened with the National Agricultural Research System (NARS) approach of the 1980s, the Agricultural Knowledge and Information System (AKIS) approach in the 1990s, and the recent Agricultural Innovation System (AIS) approach (Ponniah et al., 2008).

The structure of agricultural extension in Iran is still in NARS framework and follows ToT approach in most of its initiatives. Agricultural extension clients include the group of conventional farmers who work on farms. In this research a group of producers in agricultural sector who need advisory services and are clients of the MoA were studied. Ministry of Agriculture (MoA) has the responsibility of developing rural food industries which have less than 49 staffs.

These industries which receive their license from MoA, receive advisory services just in the stage of establishment. This lack of consultation in addition to special constrains in rural areas and in small businesses, makes competition difficult for managers when competing with other food firms who receive support from different governmental and nongovernmental organizations in urban areas (Roozbehani, 2009).

About 40 percent of manufacturers which received license from MoA were not active in the time we conveyed our survey (2009). There is a lack of awareness in policy makers on the necessity of addressing this group, after establishment as well.

AIS approach has been introduced in MoA but still is not implemented. According to AIS, extension clients are extended to all producers in modern agro industries and duties of extension is not just transferring research findings to farmer, but it includes other activities such as capacity building, reinforcing the links between producers and other source of information, and help to identify diversified sources of knowledge and information.

Therefore, the purpose of this study was to investigate the new role for extension service in providing services to small size food industries in the rural areas. In this regard, 60 cases of small size food industries were selected and 111 managers and members of executive boards were interviewed.

From NARS to AIS framework

In the 1950s and 1960s, the focus was on building public sector research departments and institutes and extension services. This broadened with the National Agricultural Research System (NARS) approach of the 1980s, the Agricultural Knowledge and Information System (AKIS) approach in the 1990s, and the recent Agricultural Innovation System (AIS) approach (Ponniah et al., 2008). More description of the three described approches is available here.

National Agricultural Research System (NARS)

The National Agricultural Research System (NARS) Perspective was founded on the theory of transfer, adoption and diffusion of technologies (Assefa et al., 2007). When agricultural extension was first established in many developing countries, the primary focus was on Transfer of Technology (Swanson, 2008). It has long been used in many countries and its use is not yet "history"; it still continues to dominate in many agricultural development institutions of the developing world (Assefa et al., 2007).

Many national extension systems have been widely criticized for being inefficient, ineffective, poorly linked to agricultural research systems, lacking clear objectives and motivation, not accountable to clients, and lacking relevant technologies.Therefore national extension systems are broadly striving to revitalize themselves to match the 21st century extension needs of farmers and rural households. Extension systems worldwide are being compelled to adopt a broader mandate beyond merely transferring agricultural technologies to farmers(Umali-Deininger, 2007).

Agricultural Knowledge and Information System (AKIS)

The AKIS perspective emerged as a response to the challenges of the theory of adoption and diffusion of innovation, which was preoccupied with studying why and how people come to adopt or not to adopt new agricultural innovations and practices (Leeuwis, 2004). The concept of AKIS was developed by Röling in the early 1990s as a diagnostic framework that helps to discern the organizational forms that enable or constrain knowledge processes such as generation, transformation, and use of knowledge and information (Engel, 1997). It is broadly defined by Röling (1992) as "… the articulated set of actors, networks, and organizations, expected or managing to work synergically to support knowledge processes which improve the correspondence between knowledge and environment and/or the control provided through technologies use in a given domain of human activity…"

There are also some critical overviews on AKIS. For example Hall (2006) comments that (in comparison with NARS), the AKIS concept still focuses on research supply but gives more attention to

links between research, education, and extension to identifying farmers' demand for new technology.

Agricultural Innovation Systems (AIS)

With changing circumstances of agriculture and increasing trends of globalization, commercialization and drive towards sustainability, extension is being looked upon to play an expanded role with a diverse set of objectives, which include:

- better linking of farmers to input and output markets
- reducing the vulnerability and enhancing the voice of the rural poor
- developing micro-enterprises
- poverty reduction and environmental conservation
- strengthening and supporting farmer organizations.

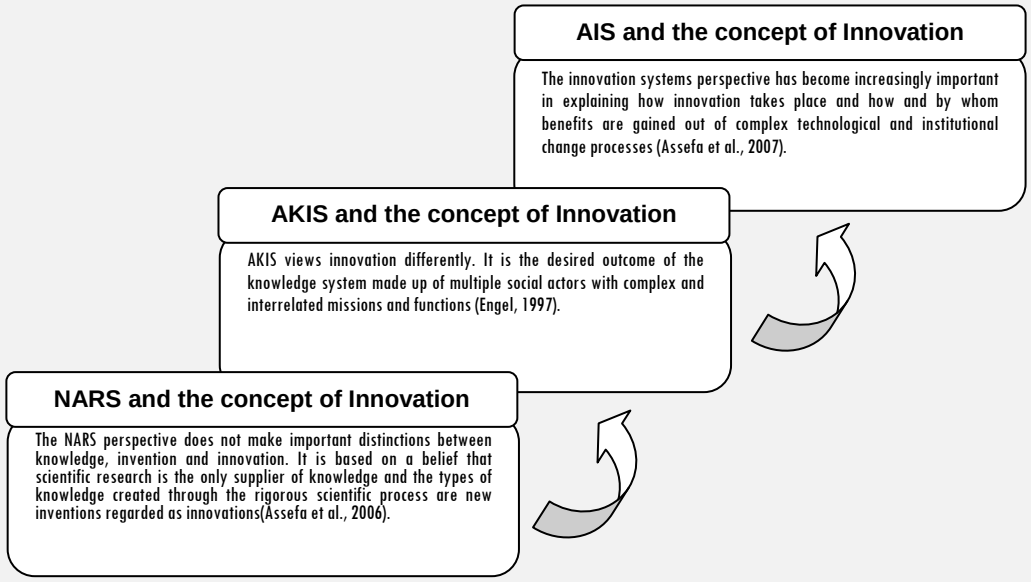
This necessitates adopting systems of innovative extension which is characterized by: recognition and utilization of multiple sources of knowledge; focus on capacity to solve problems rather than just training for technical capacity building; adopting an interactive communication function; viewing extension as a co-learning process and; institutional pluralism(Ponniah et.al., 2008).

The innovation system concept has been applied to agriculture in developing countries only recently, but it appears to offer exciting opportunities for understanding how a country's agricultural sector can make better use of new knowledge and for designing interventions that go beyond research system investment (Rajalahti, et al., 2008).

Innovation is the transformation of an idea into a new or improved product introduced on the market or a new or improved operational process or into a new approach to a social service. Thus, innovation is seen to involve more than research and development; it also entails the workings of the marketplace (Ponniah et.al, 2008).

AIS emphasizes ‘agricultural’ innovations and goes beyond previous knowledge system concepts by incorporating the goals of reform measures, such as decentralization, public sector alliances with the private sector, enabling the private sector, advancing consensus approaches to development and promoting demand-driven services. AIS stress decentralized, demand-driven approaches and broad stakeholder participation in the control, support and implementation of the agricultural technology agenda. AIS differ from previous frameworks by drawing attention not only to the need for innovation but also to the pluralistic involvement of different institutions in agricultural research and extension (Ponniah et.al., 2008).

Box1. The Concept of Innovation in NARS, AKIS and AIS



Extension in AIS framework

Using the AIS framework, an effective agriculture extension system will need to provide a broad range of services (advisory, technology transfer, training and information) on a wide variety of actions (agriculture, marketing and social organization) needed by rural people so that they can better manage their agricultural systems and livelihoods(Ponniah et.al, 2008).

The shift in thinking about extension service delivery over the last few years highlights:

- Seeing extension as a set of functions, to be performed by a variety of players, at different levels;
- Seeing a wider mandate for extension, that also includes farmer mobilization, organization and education;
- Seeing a coherent, comprehensive knowledge system for the generation, transfer and uptake of knowledge and technology, that includes the farmers, research, extension and education;
- Creating a more realistic, cyclical and dynamic model of information exchange and knowledge dissemination whereby farmers, researchers, educators and extension agents are all engaged in the generation of new knowledge, and in its transfer, and in its use;
- Allowing projects to develop a learning mode, engaging all major stakeholders;
- Taking some risks by including experimental information technologies in projects to link research institutes, extension managers, farmer organizations and others to each other and to the rest of the world (Ponniah et.al, 2008).

Considering these changes in mandate of agricultural extension, we studied the requirements of extension in providing services to rural small food industries.

Methodology

The purpose of this study was to investigate the new role for agricultural extension in providing services to small size food industries in the rural areas, since there is not any policy or services for this potential clientele of extension. This paper reports a quantitative research which is conducted in

Tehran province, Iran. Since this area of study is innovative in Iran, we limited the study to a small geographical zone(one single province). According to the most recent formal national statistics published by Statistic Center of Iran (SCI, 2006), 27% of all SMEs are working in Tehran province. From the other hand, Tehran is the capital of Iran and development of SMEs started from Tehran in recent two decades, so SME development is in an appropriate stage of development to be studied.

Small scale manufactures in food sector which have less than 50 staff and are located in rural areas must obtain two licenses from the Ministry of Agriculture; first license is a permission for establishment (of construction) and the other is for starting production. To date, 104 firms in the food industry have registered in MOA formally in Tehran province from which 60 firms were active at the time when the research conducted (2009-2010). Other 44 firms were not in business. All active firms were studied since access to the managers of inactive firms was not possible. We interviewed the managers who were intended to take part in our survey in each firm. The total population of respondents in this study was 111 managers (production managers, marketing managers, human resource managers and vice managers) in 60 small size food industries in Tehran province who agreed to participate in the interview. Data were collected through questionnaires which were administered using face-to-face method. Variables and their measurement scale are presented in table 1.

Table 1. Variables and their measurement scale.

Variables	Scale
X1. Number of training courses	Categorical
X2. The current level of access to information (None, very rarely, rarely, sometimes, often, very often)	Categorical
X_3. The desirable level of access to informarion (None, very rarely, rarely, sometimes, often, very often)	Categorical
X_4. Importance of each channel for communication for users(5 variables)	Categorical
X_5. Firm size (No. of employees)	Categorical
X_6. Firm age	Interval
X_7. Managers' level of education	categorical
X_8. Respondents' level of management	categorical
X_9. Having formal R&D (Yes, No)	Nominal
X_{10}. Having informal R&D (Yes, No)	Nominal
X_{11}. Fixed capital	Interval
X_{12}. Capacity of production	Interval

The main goal of this study has been achieved largely through structured questionnaire survey. The questionnaire was divided into several sections. Respondents were asked if they have attended any training courses and their reasons if they didn't attend or attended in few training courses. Channels for communication were asked, as extension uses means of communication for the exchange of information with clientele.

In AIS framework extension service is supposed to facilitate clientele's access to the sources of information through and after training courses. Therefore in next section respondents were asked about their sources of technical information, including books and magazines, internet, other firms, Universities, and mass media. The variables and their measurement scale are presented in Table 1.

A series of in-depth interviews were conducted with some senior experts in the MOA to examine the validity of questionnaire. Content and face validity were established by a panel of experts consisting of faculty members at Islamic Azad University, Science and Research Branch and some specialists in the Ministry of Agriculture. Minor wording and structuring of the instrument were made based on the recommendation of the panel of experts.

A pretest was conducted with 15 managers to determine the reliability of the questionnaire for the study. Computed Cronbach's Alpha score was acceptable for different parts of the questionnaire

(Alpha> 0.7), which indicated that the questionnaire was reliable. Data analyzed through SPSS/Win software.

Results and discussions

Secondary data about these firms which was taken from MOA shows that the first firm started production in the year 1987. The average age of firms is about 10 years. The average capacity for food production is 5,791 tons, according to the data reported to MOA by firms. The average of capital which is invested in all firms is 8,954 million Rials (895,400 USD), from which 8,445 million Rials (844,500 USD) is reported as fixed capital.

Number of employees in firms varies between 3 to 49 and the average of number of employees is about 21 people. They allocated an area of 3,965 m^2 to their infrastructure on average, from which 1,342 m^2 is allocated to manufacturing (Table2).

Table2. Characteristics of all (active and incactive) firms according to scondary data.

Features	Unit	Minimum	Maximum	Mean	Std. Deviation
Production	Tons	2	53,500	5791.69	8947.752
Fixed capital	Million Rials	60	181,500	8445.91	19181.686
Total capital	Million Rials	119	181,500	8954.48	19045.977
No. of employees	Person	3	49	21.17	10.974
Area for manufacture	Km^2	225	6,000	1342.44	968.272
Total area	Km^2	600	30,000	3965.03	4267.295
Firm's age	Years	0.30	22.00	10.3183	7.20901

Data source: MOA, 2009

Unfortunately forty-four firms have been inactive in the current year, of which 19 firms were working in processing or packaging crop products, 9 firms were processing or packaging livestock products, 14 firms were active in processing or packaging tree products and 2 firms were active in the fishery products. Table 3 shows the frequency of active and inactive firms in four sectors. Chi-square test shows a statistically significant difference between number of active and inactive firms in the four mentioned sectors. As table 3 shows a bigger percentage of firms in livestock sector were inactive. This shows that food manufactures which were working in processing or packaging livestock products were more sustainable in comparison with other groups.

Table3. No. of active and inactive firms in four sectors.

Status of firms		Sector				Total
		Crop	Livestock	Tree	Sea	
Active	No.	22	30	8	0	60
	%	36.7	50	13.3	0	100
Inactive	No.	19	9	14	2	44
	%	43.1	20.4	31.8	4.5	100
Total	No.	41	39	22	2	104
	%	39.4	37.5	21.1	1.9	100

The average age of active firms was 7.6 years. About 70 percent of firms produced other products in the past and changed or advanced their production to new products. Most firms (53 firms) were private firms while 7 firms were established by cooperatives. Twenty four firms (40%) were profitable in past 12 months, but the other 60 percent were not profitable. About 20 percent of the firms had R&D unit, while 60 percent of firms had a person who was in charge of R&D activities(informal R&D), since they were very small firms. The last 20 percent did not have any formal or informal R&D.

About 84% of the interviewed managers were men. Respondents included top managers of firms, production managers, marketing managers, human resource managers and vice managers. About 77 percent of them were graduated from universities.

There has been few advisory services for the managers of SFIs in the stage of receiving license. In other stages there have been very few training courses as described in the next section.

Training courses

Just 23 managers (from 111 interviewed managers) had attended in 36 training courses, from which 9 training courses were organized by MOA (Table 4).There has been almost no training course for employees.

Table 4. No. of training courses and their organizers.

Providers of training courses	No. of training courses
MOA	9
Ministry of Industry	7
Ministry of Trade	3
Standards organization	3
Other similar firms	3
Foreign companies	3
Universities	2
Management organization	2
Insurance fund organization	2
Health organization	2
Total	36

Managers were asked about reasons of not participating in training courses. About 82% of managers pointed out that there are no training courses in their field of activity. Also 32% of respondents ascertained that training courses are not useful for them (Table 5). Respondents could choose more than one reason, therefore the total number in the table is more than total number of managers.

Table 5. Reasons for no or less participation in training courses.

Reasons for no or less participation in training courses	Number	%
There is no training course	91	82.0
I was not aware of the time and place of training courses	2	1.8
I have no time to participate	8	7.2
I am not intended to participate	36	32.4

The Need for facilitatory and advisory services of Agricultural Extension

Respondents were asked to identify the actual and optimal role of extension for facilitating their access to information.

Table 6. The role of extension in current and desirable situation in facilitating access to information.

Access to information about *:*	The facilitatory and advisory role of Extension*				
	Actual situation		Optimal situation		Needs
	Mean	Mode	Mean	Mode	(difference in means)
Registration and license	1.38	2	2.0	3	0.62
Operating the manufacture	0.79	0	1.92	3	1.13
Innovation management	0.02	0	2.96	4	2.94
Technical issues in production	0.05	0	3.14	4	3.09
Risk and crisis management	0.60	0	2.92	4	2.32
Financial resource management	0.05	0	3.34	3	3.29
Human resource management	0.12	0	2.94	4	2.82
Business and marketing	0.02	0	2.82	4	2.8
Entrepreneurship	0.02	0	2.72	4	2.7

* 0=None 1=very little 2=little 3=somewhat 4=much 5=very much

According to table 6, managers receive little (Mode:2=little) advisory services from MOA about registration of firms and receiving license. In other fields, there has been almost no advisory services and information.

It's while in optimal situation, managers are intended to receive more information in all fields, even in area of registration and license.

If we consider the gap between actual and optimal situation as needs, the most important need of managers to information, is the need to know about access to financial resources and managing these resources (Table 6). From respondents' point of view, mechanisms of allocating credits to small industries by government were unclear. Managers did not know how exactly and in which situation they can access which kind of credits and how they can manage it better.

In other fields such as innovation management, technical issues, risk and crisis management, business and marketing and entrepreneurship, most of them expect to receive "much" information from Extension (mode:4).

Channels of communication in SFIs

Managers used multiple channels for communication. We studied these channels to identify ways for extension to communicate with this new group of clientele. Among other channels for communication, most of managers (97%) use the "face-to-face" method. About 93% of managers use telephone for communication. Almost the same number of respondents use mobile phone for communication but the group who "often" use telephone are biger than the group who often use mobile phone(16.2% in comparison with 2.7%).

Although they are familiar with internet and it is a source of information for them (it will be explained later in this paper), but a big group of respondents use it as a means of two-way communication very rarely (mode: 1=very rarely, mean: 2.23).

While 64% of respondents used fax for communication, but a big group of respondents use it as a means to send and receive information very rarely (mode: 1=very rarely, mean: 2.35).

Actually managers of the studied SFIs used multiple channels for exchange of information, while the most important method for communication in order to get information and advice is "face-to-face" communication(table 7).

According to these results, if extension is going to address this group of clientele, it should arrange platforms for meeting and face-to-face communication between SFI managers and different sources of information.

Table 7. Channels for communication.

	*Frequency of usage**										*Mean*	*Mode*
	Very rarely		Rarely		sometimes		Often		Very often			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Face-to-face	0	0	3	3.6	60	54.1	31	27.9	13	11.7	3.94	3
Telephone	20	18.0	36	32.4	29	26.1	18	16.2	0	0	2.44	2
Mobile	20	18.0	39	35.1	40	36.0	3	2.7	0	0	2.25	3
Internet	33	29.7	11	9.9	13	11.7	19	17.1	0	0	2.23	1
Fax	27	24.3	11	9.9	14	12.6	19	17.1	0	0	2.35	1

* 1=very rarely 2= rarely 3=sometimes 4=often 5=very often

Sources of information

As mentioned before, the new role of extension in AIS is facilitating the clientele access to the sources of information and strengthening linkage between sources of information and clientele. As such, we investigated about sources from which managers get information or take advice. These sources can be divided into two main categories of publications/mass media and people/organizations (Table 8).

Table 8. Sources of information and advice for managers of SFIs.

Sources of information and advice		*% of users*	*The importance of source for users**										*Mode*
			Very little		Little		somewhat		much		Very much		
			No.	%	No.	%	No.	%	No.	%	No.	%	
Publications /mass media	Books &Magazines	64.0	0	0.0	0	0.0	49	44.1	22	19.8	0	0.0	3
	Newspaper	9.0	5	4.5	2	1.8	2	1.8	1	0.9	0	0.0	1
	Internet	62.2	0	0.0	5	4.5	27	24.3	25	22.5	12	10.8	3
	TV& Radio	13.5	5	4.5	8	7.2	1	0.9	1	0.9	0	0.0	2
people/ organizations	Universities	27.0	2	1.8	0	0.0	17	15.3	11	9.9	0	0.0	3
	Similar firms	45.0	0	0.0	7	6.3	39	35.1	5	4.5	0	0.0	3
	Consumers	27.9	2	1.8	0	0.0	19	17.1	10	9.0	0	0.0	3
	MOA	19.8	2	1.8	2	1.8	12	10.8	6	5.4	0	0.0	3
	Standard org	28.8	0	0.0	0	0.0	14	12.6	6	5.4	12	10.8	3

* 1. Very little 2. Little 3. Somewhat 4.much 5. very much

As table 8 shows, the most important source is books and magazines. While 64% of respondents used this source, but most of them complained about lack of enough up-to-date and useful books and magazines in their field of work.

Although respondents use internet for two-way communication very rarely (table 6), but they use it as a source of information sometimes (mode: 3).

Among different people and organizations who give information to respondents, "other similar firms" are the most important one (users: 45.0%). They receive information from brochures or meetings which are being hold rarley. The least important source of information is newspaper since 9% of respondents use this source.

Conclusion and recommendations

Moving from NARS to AIS framework, this paper discusses the necessity of addressing the needs of a group of modern practitioners in agricultural sector who engage in food manufacturing in rural areas. Findings show that about 40% of these firms in Tehran province were inactive. This shows that the existing supportive policies and strategies of MOA, which is limited to rather imprecise mechanisms of financial supports, has been ineffective. In our opinion agricultural extension can play a key role in improving the situation. We studied aspects in which agricultural extension should pay attension in providing services for SFIs. Findings show that in current situation advisory services is not sufficient

for SFIs. In AIS framework, linkages are very critical and as a result mechanisms for communication are important. So we studied channels of communication for managers of SFIs. According to results the most important mechanism of communication is fac-to-face communication. Books and magazines are the important sources of information for managers of SFIs.

According to the mentioned findings, we provide recommendations for extension in four sections in short: training, communication methods, fields of working for extension, and reinforcing linkages.

a) Training:

There is a deep gap in training courses and organizing more training courses is necessary for extension. According to findings, trainers should be experienced people in SFIs who have no opportunity to exchange their knowledge and information currently.

The SFI managers expect MOA to organize training courses in which teachers are the experienced and successful managers of firms.

b) Communication methods:

Extension should use a package of different methods for communication with managers of SFIs, among them face-to-face method should be used as main method to convey important information or advice.

c) New fields of extension work:

According to the findings, extension should work in fields of human resource management in SFIs, innovation management, technical issues, risk and crisis management, business and marketing and entrepreneurship… and among them the first and most important issue is financial resource management, which is considered as first priority of SFIs' managers. In order to gain ability to work in these areas, there should be some research project in which the existing situation and information gaps will be identified and as a result needs will be clarified.

d) Strengthening linkages:

The new role of extension in AIS is facilitating the clientele access to sources of information and strengthening linkage between sources of information and clientele.

Provision of books and magazines can be facilitated through books exhibitions and or seminars and conferences. Also extension can provoke research to provide more useful information in form of brochures, booklets or books.

Among different people and organizations who give information to respondents, "other similar firms" are the most important.

Therefore strengthening linkages between SFIs is very important for extension services. This can be achieved through providing platforms for negotiation and exchange of information.

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