

Identifying Required Competencies for the Agricultural Extension and Education Undergraduates

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ABSTRACT

This study aimed at identifying required competencies for the labor market by the graduates majoring in the agricultural extension education field. The study population included undergraduates, faculty members, and employers, as related to bachelor level in three extension and education departments at Bu Ali Sina, Tehran, and Shiraz Universities of Iran. The study has employed both quantitative and qualitative research methodologies. The quantitative research method used to collect data consisted of a questionnaire and the qualitative research method was semi-structured interviews. According to results, a combination of skills, mechanisms, supportive and collaborative systems with focus on self employment and entrepreneurship should be considered in order to improve students' situation for labour market.

Keywords: Agricultural Extension and Education, Competencies, Iran, Labor Market, Undergraduates.

INTRODUCTION

Agriculture is one of the most important economic sectors in Iran. It not only supplies the country's food but also comprises a considerably high percentage of production and employment. Agriculture accounts for over 25 % of the Gross National Product (GNP), 23 % of employment, more than 80% of the domestic food supply, and 30% of non-oil exports (excluding carpet exports). Statistics show that 92% of the country's food is supplied by 4.3 million farmers- including animal producers- in Iran, of which 97% have not received university education and 4% are illiterate (Alizadeh, 2006). Although there is a large capacity for investment in land, water, and natural resources by both governmental and private sectors, Iran's potential has not been met, as available resources have not been used properly. For instance, only 37% of cultivable land and 58% of acquirable water are currently being utilized (Tahmasebi, 1998). In

addition, sustainable land use- particularly for forests and rangelands- has not yet been achieved (Darvishi, 2003).

The agricultural sector requires skilled human resources who are capable of all aspects of work in agricultural and rural centers, including producing, processing, and marketing agricultural products. Universities and higher education institutes in agriculture usually respond to prepare the main part of specialists, researchers, extension workers, and farmers (FAO, 1997).

One of the biggest problems faced by the higher agricultural education system in Iran is that students are usually trained theoretically and too narrowly. Most of the subjects studied in agricultural extension education departments in Iran are strictly academic and have little relevance to the student's future employment and the labor market needs (Hamdhaidari et al., 2008; Movahedi, 2009). In addition, the absence of much-needed linkages and communication

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between employers and the agricultural higher education system has created a situation, where it is difficult for universities to identify which specific skills and competencies are not only expected, but needed from their employers (Zamani and Azizi, 2006; Hosseini et al., 2008).

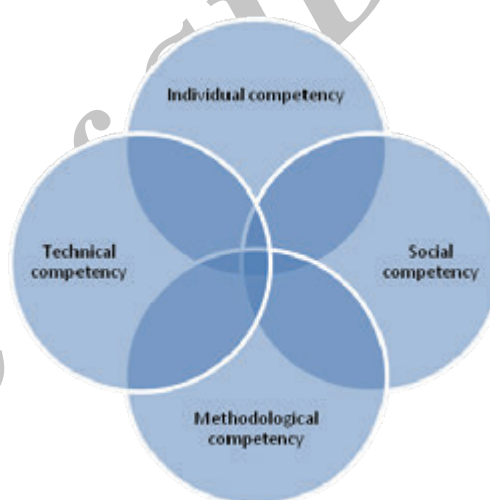
Therefore, the first idea for conducting this research was to study the conditions needed for the identification and introduction of skills and competencies to better prepare students for specific occupations in the field of agricultural extension and education in Iran. The major research problem that will be addressed in this study is, accordingly, to reveal why agricultural extension education programs at universities are not developed and implemented so as to be relevant to real needs of labor market in practice. This study will also explore possible ways to either improve existing linkages or develop new ones between agricultural extension and education programs at universities and potential employers in both public and private sectors.

Competencies Needed for Agricultural Extension and Education Graduates

Competency is defined by Parry (1998) as a cluster of related knowledge, attitudes, and skills that affect a major part of one's job. Similarly, Davis et al. (2004) state: "competencies encompass clusters of skills, knowledge, abilities, and behaviors required for people to succeed". According to Burke (1990), "competencies embody the ability to transfer skills and knowledge to new situations within the occupational area". There is a growing popularity for the notion of competence as integrated capabilities (Biemans et al. 2004). Mulder (2001) summarizes definitions of competencies as: "competencies are capabilities, capacities or potentials and can be understood as characteristics of persons, teams, work units or organizations which enable them to attain desired achievements".

In the holistic idea, competency is considered "a dynamic group of qualities (knowledge, ability, skills) which should be combined, coordinated and integrated in such a way as to enable workers to efficiently carry out the tasks that make up their professional activity" (Tippelt and Amoros, 2003). This approach gives us

dimensions that can be used to determine required competency in order to prepare individuals. Accordingly, four competency areas are needed for professionals: technical competency (capabilities and motor skills inherent to an occupation), methodological competency (the ability to self-inform and assimilate fundamental learning and workplace techniques), social competency (the ability to cooperate and communicate), and individual competency (self-knowledge and responsibility, development of personal interests and life plans). It is through the conjunction of the four dimensions of competency that we can prepare people with professional action skills (Figure 1).



(Source: Tippelt and Amoros 2003, 110)

Figure 1: Required competency for a profession.

There are numerous research studies that have reviewed different competencies, but this study will focus on finding some common competencies for work, by considering competency as "the knowledge and skills that enable students to perform effectively in a certain role in the labor market". Thus, important information related to employability is reviewed in order to support our results and findings. Eventually, an inclusive overview is given on those required competencies that are needed by the agricultural extension and education students in order to be ready for specific jobs or employment.

Competencies such as teamwork, communication, and leadership skills, ability to understand diverse views, cultures and development issues (world view, appreciation of other cultures and people) are especially important for agricultural students to possess in this highly interconnected world (Bruening and Shao, 2005). The three most important employability skills needed by agricultural graduates at the University of Missouri in order to adequately perform their jobs, as perceived by supervisors were: working well with others, functioning well in stressful situations, and the ability to work independently (Robinson et al., 2007).

Various competencies needed by agricultural and extension education undergraduates and graduates to be professionally successful have been identified in related literature. In a study on competencies of agricultural and extension education graduates in 23 countries, Lindner et al. (2003) found that the most important agricultural and extension education competencies varied by country. This study suggested rankings of the competencies in the area of knowledge (theories, principles, and practices related to agricultural development), in terms of skills (technology design, information technologies, and systems skills), and in the area of abilities (communication abilities, time management, and problem solving) (Lindner et al. 2003).

A literature review of competencies required for professionals and graduates in agricultural education reveals that colleges of agriculture are broadly revamping curricula to reflect an industry perspective (Dooley and Lindner, 2002; Graham 2001; Jones, 2004). Accordingly, the most prevalent competencies and skills desired, as noted by agribusiness representatives, include: critical thinking, communication, knowledge of business and economics, and interpersonal and human relations skills (Dooley and Lindner, 2002).

Additionally, findings by Sulaiman and Van Den Ban (2000) show that many of the practical social science skills are also incredibly important for those agricultural extension and education graduates who intend to work as field-level workers. Among these skills are: group formation, development of leadership skills, conflict resolution and negotiation between

different interest groups, management of common property resources, data collection, the use of various communication media, and analysis and documentation.

About competencies needed for agricultural extension agents, Shim (2006) and Karbasioun (2007) have introduced the hexagonal Texas Extension Competency Model as a prominent model in the US agricultural extension area. The model places a relevant list of core competencies in six areas of agricultural extension, including: subject matter expertise, communications, developing and involving others, action orientation, organizational effectiveness, and personal effectiveness (Texas Cooperative Extension, 2003).

Levander (2000) identified a comprehensive list of background theories and competencies relevant to learning about extension education in 15 European universities. The competencies included adult education, business and marketing, communication, counseling, evaluation, teaching and learning, management and leadership, and field theory.

Furthermore, findings by Lindner and et al. (2003) regarding the exploration of competencies for agricultural extension and education graduate students in 23 different countries support our purpose to achieve a list of competencies needed by the extension graduates. These findings show firstly that agricultural extension and education competencies vary by national orientation, and secondly, that some common worldwide competencies can be consisted under a cross-national setting. According to Lindner et al. (2003), the perceived competencies in a cross-national setting include: applications, international, technical, system, communication, and attentiveness and qualitative competencies.

An example of an undergraduate extension education track, in which both core competencies and university curricula have been combined for the benefit of extension professionals, can be seen in the Ohio State University model. The focus of the undergraduate extension education track is to provide a foundation for future extension professionals in general areas of program development, teaching methods, communications, and program management. In addition, students are required to complete early field experiences and an extension internship. Undergraduate students are awarded Bachelor of



Science degrees in agricultural education (Scheer et al., 2006).

To further expound upon this idea, Van Den Ban and Samara (2006), have also pointed out that “every extension system, whether in universities or outside of them, is formed on the basis of an accumulation of new knowledge, useful for clients. This body of new knowledge is the starting point of all extension efforts. In addition to the source of the knowledge, four other basic components are necessary to complete the extension education system. These include, those who need the knowledge (extension clients), an organizational structure to link the two mentioned components, a set of established communication methods, and the infrastructure and support services” (Van Den Ban & Samara 2006).

In Iran, no in-depth study has been conducted as yet on actual labor market competencies for agricultural extension education undergraduates; however, some related studies, such as the one by Zamani and Azizi (2006), looked at competencies and skills needed by general agricultural graduates concerning employment in Iran. These studies identified professional and practical abilities, personality traits (i.e. morality, perseverance, commitment, piety, enthusiasm to work, and self-employment), interest in working in rural areas, and management skills as the most important competencies needed for public jobs. For non-public jobs, Zamani and Azizi found the ability to analyze agricultural issues, the ability to be autonomous, the possession of self-confidence, and capital to be the most important variables.

Similarly, Shahbazi and Alibeigi (2006) analyzed competencies needed by agricultural graduates to enter job markets in Iran. It was revealed that, to meet the demands of job markets and the expectations of managers in different agricultural sectors, agricultural graduates should acquire seven important competencies. These are: communication, professionalism, problem-solving, vocational ethics in agriculture, moral, administrative, and general qualifications.

According to Sharifzade and Zamani (2005), it is entrepreneurship that plays an important role in the employment potential of agricultural students. Sharifzade and Zamani consequently emphasize the need to expose university students

to entrepreneurial thinking and behavior as early as possible. The single most important competency for entrepreneurial success in the Iranian agricultural context was found to be technical and specialized knowledge and skills in the area of business activity (Hosseini et al., 2008).

Compiling an empirical list of competencies and curricula for agricultural extension and education worldwide will prove to identify missing, common or perhaps most importantly, areas of new competencies and skills for agricultural extension and education students in Iran. In this vein, a variety of new competencies is recognized for new forms of extension throughout the world. These competencies need to be aggressively investigated and then incorporated into university curricula. There are also obvious areas missing from existing university curricula in Iranian agricultural extension and education systems, including such entities as international issues on agriculture (Namdar and Pezeshki-Rad, 2010), new knowledge of extension and education, virtual courses as one aspect of distance education, electronic business, applied research, networking of extension, internship with village stay, industry and institutional educational tours, participatory approaches and active learning methods (Hedjazi and Omid, 2008) and entrepreneurship courses.

Research Methodology

The study population in this research included undergraduate students, graduates, faculty members, and employers, as related to bachelor level agricultural extension and education in three provinces of Iran (Figure 2). One-hundred twenty alumni were systematically selected as the graduates' sample, out of the 180 bachelor graduates who graduated from three agricultural extension and education departments in Tehran, Shiraz, and Bu Ali Sina Universities during 2004-2006. The questionnaires were prepared to be posted to regular post addresses, email or delivered through personal visits whenever possible. Ninety four filled questionnaires were gathered and analyzed. Of all 54 employers responsible for employing the graduates, 30 individuals were selected from three provinces in

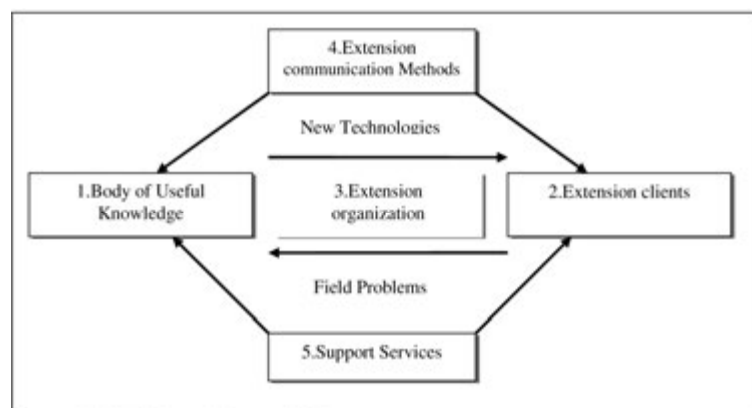


Figure 2: Extension Education Basic Model.

Iran based on the criterion type of purposeful sampling. Purposeful sampling is an approach that assists the researcher in selecting intentionally specific places, people, and phenomena, each of which bear significance in information gathering (Maxwell, 1996). Both having experience (Polkinghorne, 1989) and being closely related to the studied phenomenon (Wretz and Van Zuuren, 1987) are the main criteria for selecting samples in qualitative research; therefore, the employers used in this research study were selected based on experience and close relations with agricultural extension and education activities. Of the 27 faculty members of agricultural extension and education in the three departments, 17 individuals, including heads of departments, were purposefully selected for interview.

This study employs both quantitative and qualitative research methodologies. The quantitative research method used to collect data consisted of a questionnaire whereas the qualitative research method was semi-structured interviews. The survey tools were initially constructed based on an extensive literature review in Germany at Humboldt University of Berlin and finalized after a pre-test in Iran in autumn 2006.

The graduates' questionnaire was divided into five parts (the number of questions for each section is noted between brackets): graduates' individual information (10), level of current and desired technical agriculture competencies (21), extension and education competencies (24), social and communication skills (9), and individual traits (14).

Likert-type responses with five scales were used to assess different sections of the questionnaires. For these types of questions, the questionnaires' reliability was tested by Cronbach's Alpha technique within SPSS statistical software. The total mean reliability of scales for the graduates' questionnaires was 86.3. Descriptive statistics e.g. mean, standard deviation, and valid percent were used to analyze quantitative data.

While a structured interview has a formalized and limited set of questions, a semi-structured interview method, selected in this study, is more flexible, allowing new questions to be brought up during the interview. In this study, two semi-structured interviews developed through different interview guides were constructed in order to collect data from two groups of participants, employers, and faculty members related to agricultural extension and education programs. Questions posed to faculty members and interview guides were structured in terms of three main topics:

- relevance of current extension curricula to employment
- necessary changes in extension curricula
- possibilities to introduce changes in extension curricula
- linkage between academic education and the labor market.

Interview guides used as aids in asking the employers questions included two sections:

- competencies needed by the labor market
- adjustment of graduates' competencies to fit the labor market

The summarizing technique of the content analysis method was employed to analyze data



from semi-structured interviews in the study. The content analysis method includes three techniques- summarizing, explicative, and structuring. In the “summarizing content analysis” technique, items with the same concepts and ideas are reduced (first reduction) and common ideas are summarized and categorized (second reduction). The main idea of this technique is the reduction and summarization of the text (Flick, 2006).

RESULTS AND DISCUSSION

Findings from Graduates' Questionnaires

Descriptive findings from the graduates' questionnaire showed that 61.7% of the agricultural extension graduates were females, and the rest were males. In terms of age, the graduates ranged between 23 and 33 years of age, with an average of 26.5 years. 37.2% of the respondents graduated from Bu Ali Sina University, 32.9% from the University of Tehran, and 29.9% from the University of

Shiraz. Regarding employment status, 51.1% were employed, 26.5% were unemployed, 15% were studying as post-graduate students and the remainder (7.4%) held part-time employment. This shows a considerable rate of unemployment among extension graduates who participated in the study. Of those with jobs, 70.9% were working in the public sector and 18.2% in the private sector. This clearly reveals that graduates have a high interest in finding government services jobs.

Agricultural competencies

Information on 21 agricultural competencies was gathered from the graduates through questionnaires based on a Likert-type scale.

As shown in Table 1, the total mean for current agricultural competencies among the graduates reveals a fairly low level ($TM = 2.43$). This illustrates the inadequacy of agricultural competencies among the extension graduates in the areas of study. Regarding the desired level of agricultural competencies needed for the labor market, the results showed a fairly high total mean level ($TM = 4.02$). Therefore, the graduates believed that agricultural competencies

Table 1. Graduates' perceptions of current and desired agricultural competencies.

Current agriculture competencies			Desired agriculture competencies		
	M	SD		M	SD
Horticulture and gardening	2.90	0.84	Farm management	4.44	0.60
Sustainable agricultural science	2.78	1.06	Agricultural marketing	4.41	0.64
Farming of different crops	2.69	0.95	Sustainable agriculture science	4.33	0.85
Agricultural economic skills	2.65	0.92	Horticulture & gardening	4.30	0.69
Farm management	2.55	1.04	Farm operations	4.30	0.71
Designing agricultural projects	2.55	0.99	Farming of different crops	4.29	0.72
Farm operations	2.53	0.91	Designing agricultural projects	4.26	0.76
Tillage machinery	2.47	1.06	Diagnosis of plant diseases	4.21	0.65
Food processing and conservation	2.47	0.99	Recognize important pests	4.20	0.74
Agricultural marketing	2.45	0.98	Agriculture economic skills	4.11	0.88
Biology and morphology of plants	2.44	0.81	New issues in agriculture	4.10	0.93
Irrigation management	2.40	0.93	Food processing and conservation	3.96	0.78
Weed identification and control	2.39	1.01	Weed identification and control	3.96	0.84
New issues in agriculture	2.36	1.03	Fertilizer application	3.95	0.94
Diagnosis of plant diseases	2.34	0.89	Tillage machinery	3.92	0.78
Identifying major pests	2.26	1.03	Irrigation management	3.82	0.86
Livestock products	2.26	0.94	Soil science	3.76	0.85
Fertilizer application	2.21	1.05	Biology and morphology of plants	3.66	0.97
Animal husbandry	2.20	0.83	Animal husbandry	3.58	0.97
Surveying and topography	2.20	0.88	Livestock products	3.55	0.94
Soil science	2.11	0.75	Surveying and topography	3.40	1.00
Total mean	2.43			4.02	

Note: 1=very low, 2=low, 3=moderate, 4=high, 5=very high, M=mean, SD=standard deviation

are highly needed for the labor market. From the results, the following agricultural competencies for the labor market were ranked by the graduates as the most important, in descending order: farm management, agricultural marketing, sustainable agricultural science, horticulture and gardening, farm operations, farming of different crops, designing agricultural projects, identifying pests and plant diseases, agricultural economic skills, and new issues in agriculture.

Extension and education competencies

The extension and education competencies were divided into 23 items with Likert-type five point questions. More information is presented in Table 2. The results indicated that the total mean of the graduates' conceptions concerning extension and education competencies was higher than moderate at the current status (TM = 3.22).

Calculated mean magnitude depicts the current competency situation differently. Competencies such as audio-visual design, data processing and

analyzing, problem solving skills, and conducting research studies rank lower than other competencies.

For the desired level of extension and education competencies needed for the labor market, the results show a total mean ranked as very high (TM = 4.46). Accordingly, the following extension and educational competencies have been deemed to be most important for the labor market by the graduates: communication in extension, teaching skills, extension programming, apprenticeship, conducting extension courses, rural sociology, agricultural extension, and adult education skills.

Communication competencies

As shown in table 3, currently, the total mean of the graduates' communication competencies is higher than the moderate (TM = 3.47). Although the total mean shows an acceptable level of communication skills, the level of communication skills especially in E-learning, leadership, IT and ICT, and team work skills

Table 2. Graduates' perceptions of current and desired extension and education competencies.

Current extension and education competencies			Desired extension and education competencies		
	M	SD		M	SD
Writing skills	3.61	0.84	Communication in extension	4.71	0.50
Diffusion of innovation	3.47	0.88	Teaching skills	4.64	0.50
Conducting extension courses	3.45	0.89	Extension programming	4.61	0.61
Agricultural extension	3.38	0.79	Apprenticeship skills	4.59	0.58
Writing media design and production	3.36	0.86	Conducting extension courses	4.58	0.58
Teaching skills	3.35	0.81	Rural sociology	4.58	0.60
Management in extension	3.33	0.74	Agricultural extension	4.55	0.73
Adult education skills	3.32	0.88	Adult education skills	4.55	0.58
Current issues in extension education	3.29	1.01	Diffusion of innovation	4.53	0.59
Psychology in extension	3.29	0.75	Psychology in extension	4.52	0.56
Communication in extension	3.27	0.89	Management in extension	4.52	0.63
Rural sociology	3.26	0.79	Participatory approaches in extension	4.50	0.66
Curriculum development	3.25	0.72	Agricultural education	4.48	0.64
Extension programming	3.23	0.83	Current issues in extension education	4.47	0.70
Agricultural education	3.21	0.83	Youth and women education skills	4.45	0.64
Apprenticeship skills	3.19	1.01	Conducting group sessions and problem solving	4.42	0.68
Youth and women education skills	3.14	0.90	Curriculum development	4.41	0.69
Participatory approaches in extension	3.13	0.92	Data processing and analyzing	4.39	0.74
Extension approaches	3.06	0.96	Conducting research studies	4.36	0.65
Conducting research studies	2.97	0.93	Writing media design and produce	4.36	0.67
Conducting group sessions and problem solving	2.96	0.91	Writing skills	4.20	0.81
Data processing and analyzing	2.90	0.98	Audio-visual design and use	4.17	0.86
Audio-visual design and use	2.82	0.89	Extension approaches	4.15	0.96
Total mean	3.22			4.46	

Note: 1=very low, 2=low, 3=moderate, 4=high, 5=very high, M=mean, SD=standard deviation

**Table 3.** Graduates' perceptions of current and desired communication competencies.

Current communication competencies			Desired communication competencies		
	M	SD		M	SD
Individual communication	3.75	0.78	Social communication	4.72	0.49
Internet skills	3.70	0.87	Teamwork skills	4.67	0.54
Computer skills	3.65	0.85	Individual communication	4.63	0.48
Social communication	3.65	0.84	Leadership skills	4.59	0.58
Teamwork skills	3.45	0.86	Internet skills	4.55	0.58
IT and ICT skills	3.26	0.79	Computer skills	4.53	0.62
Leadership skills	3.26	0.85	IT and ICT skills	4.45	0.62
E-learning skills	3.11	1.04	E-learning skills	4.41	0.60
Total mean	3.47			4.56	

Note: 1=very low, 2=low, 3=moderate, 4=high, 5=very high, M=mean, SD=standard deviation

need to be improved. Concerning the desired level of communication competencies needed for the labor market, the results revealed that the total mean is at high level (TM = 4.56). Accordingly, communication competencies such as social communication, team work, individual communication, and leadership skills were felt to be as the most important competencies desired in the labor market.

Personal competencies

According to the theoretical research framework, 19 personal competencies were selected. After validity and reliability processes, 14 personal competencies were chosen for the questionnaire. The extension graduates were asked to indicate their perceptions which ranged from very high (5) to very low (1) in terms of current and desired statuses. As presented in Table 4, the total mean (TM = 3.46) revealed that

the extension graduates felt that they had a relatively satisfactory level of personal competencies needed for the labor market. The results about the desired personal competencies needed for the labor market indicate that the following are seen as the most important ones: decision making, self-confidence, interaction, responsibility, leadership, creativity, critical thinking, and adaptability and adjustability.

Findings from Interviews with the Faculty Members

17 faculty members participated in interview process. They were randomly selected among those faculty members of agricultural extension and education departments, heads of the department, and instructors who were working in the departments of the three universities. The

Table 4. Graduates' perceptions of current and desired personal competencies.

Current personal competencies			Desired personal competencies		
	M	SD		M	SD
Responsibility	4.12	0.87	Decision making ability	4.70	0.50
Interaction	3.91	0.83	Self-confidence	4.70	0.48
Motivation	3.83	0.86	Interaction	4.63	0.55
Adaptability & adjustability	3.79	0.95	Responsibility	4.61	0.63
Enthusiasm	3.56	1.02	Leadership	4.57	0.54
Decision making	3.54	0.79	Creativity	4.57	0.71
Problem solving	3.51	0.91	Critical thinking ability	4.51	0.57
Work ethic	3.45	0.93	Adaptability & adjustability	4.51	0.66
Self-confidence	3.44	0.85	Enthusiasm	4.49	0.57
Leadership	3.42	0.69	Market awareness	4.48	0.52
Personal work experience	3.13	0.84	Personal work experience	4.41	0.64
Creativity	3.07	0.72	Motivation	4.39	0.69
Critical thinking	3.00	0.94	Problem solving	4.38	0.63
Market awareness	2.73	0.90	Work ethic	4.34	0.70
Total mean	3.46			4.52	

Note: 1=very low, 2=low, 3=moderate, 4=high, 5=very high, M=mean, SD=standard deviation

respondents' age ranged from 31 to 54, with an average age of 43.27 years ($M = 43.27$). All faculty members were men and married. Regarding the level of education, 7 % were full professors, 18 % were associate professors, 50 % were Ph.D. holders, and 25 % were M.Sc. holders. Years of job experience ranged from 5 to 26 years, with an average of 15.9 years.

Relevance of extension curricula to employment

Interviewees were asked to give an open response to the question: What are the reasons for irrelevance of extension curricula to employment? The majority of faculty members believed that two reasons rest behind this fact:

inadequate attention by the developers to labor market needs when developing extension curricula

development of extension curricula and programs by incompetent persons.

Poor linkage between the university and the labor market, long intervals between revision of extension curricula, and centralized planning for agricultural extension were mentioned as other contributing factors. A typical response to the question was: *"I believe that those who develop applied curricula for extension students and graduates should have necessary information about agricultural sector, its needs and extension activities. At present, the curriculum development committees in Iran are mostly composed of university professors; while representatives of public and private employers, graduates, and farmers are either entirely neglected or rarely participated."* A few interviewees recognized that centralized planning system is the reason for irrelevance of extension curricula to employment in Iran. One of them argued: *"I think one of the main reasons for irrelevancy of extension curricula to labor market is that the planning system is based on a centralized framework in Iran, whereas extension curricula should be developed according to local needs of each province."* Three other interviewees pointed out the long intervals between changes in extension curricula. One respondent said: *"I imagine changes and revisions in agricultural extension and education system should take place in 3 year intervals maximum. But, traditionally, changes in*

extension curricula occur after 15-20 years in Iran."

In order to improve the employment situation for extension graduates, and to tailor extension curricula to the actual needs of the labor market, some important points are needed to be taken into consideration by the policy makers when planning curricula for agricultural extension: first, identify the actual needs of the labor market and integrate them into extension curricula; second, use competent curricula developers who have both practical experiences and professions in agricultural extension and education; third, involve specialists and employers in both public and private sectors for developing extension curricula; fourth, institute regular and systematic changes in extension curricula; and fifth, use decentralized planning and curriculum development according to regional and local needs of the country.

Necessary changes in the extension curricula

Faculty members were asked to respond to the question "What changes are needed for extension curricula to be more relevant for employment?" Content analysis of answers showed that modification of extension curricula with emphasis on entrepreneurship courses, and instituting relevant training system so that students are linked to working centers and places, are the most common ideas on the changes needed. Focus on skill based education, localization of extension curricula; and integration of research activities into assignments were other necessary changes during developing extension curricula (Table 5).

The following ideas were also expressed in response to this question:

"I believe that some new entrepreneurship courses should be added and taught at all three levels of extension fields (B.Sc., M.Sc., and Ph.D.)."

"New courses should be added to extension curricula based on skill education so that the students can be professionalized at least in one technical agricultural field."

"Some of the old extension curricula should be changed and subjects in terms of new demands and the real needs of each province should be defined."

Therefore, extension subjects need to be changed according to the actual needs of each

**Table 5:** Necessary changes in current extension and education curricula (n=17).

Common ideas	Conclusions
Add entrepreneurship courses	Offer some courses on entrepreneurship in agriculture within extension curricula
Change training system	Strengthen training system in extension by efficient monitoring
Link students to rural or farming areas	Use curricula that engages students in agricultural environments
Develop extension curricula according to competency and skill-based education	Teaching and learning based on competency and skill-oriented methods
Localize extension curricula	Develop extension curricula according to agricultural situation of each region
Integrate research activities and assignments during extension curricula	Emphasize on research activities in extension curricula

region or province and more entrepreneurial skills need to be incorporated into university programs. For example, extension subjects and curricula at universities in the north of Iran can be centered on forestry, while in central Iran subjects can be centered on the desert, and in the south the subjects can focus on fisheries.

Possibilities to introduce changes in extension curricula

According to the faculty members interviewed there are two main possibilities to introduce changes in extension curricula: internal and external possibilities. Most of interviewees believed that internal sources such as professors and human resource specialists, new joint committees of curriculum development, preparation of financial resources, governmental possibilities and resources, and legal and legislation framework possibilities need to be prepared for changes in extension curricula. Some of the interviewees expressed that the following external sources were needed for changes in curriculum development regarding extension and education: foreign professor and student exchange, international extension experiences and models, as well as international agreements and co-operation in extension.

A few typical responses are quoted as follows:

“Resources and possibilities for new changes in extension curricula can be divided into two main sources ... human and financial. Human resources consist of experienced professors both domestic and foreign, extension specialists and experts, and typical farmers. ...effective management and planning should be employed through joint committees of curriculum development regarding extension.”

“I believe that government plays an important role through preparation of facilities, services, and cooperation with the university. Other important possibilities are joint committees of strategic planning for extension in each region and legal and official supports by university and agricultural organizations.”

“Agricultural development strategies at the first step and extension system relevant to Iran’s situation are two important factors to determine necessary possibilities and resources for new changes in extension programs and curricula.”

Therefore, internal and external possibilities for developing changes in extension curricula should be used properly. For instance, professors and specialists, both national and international, are important resources regarding extension and education. Joint curriculum development needs to be regularly organized, thereby incorporating new issues into extension curricula. In addition, the government should execute changes in extension curricula through preparing facilities, opportunities, or even financial supports where necessary. Furthermore, international agricultural extension and education curricula as well as systems and models should be investigated and Iran should utilize these relevant successful international experiences.

Link between academic education and the labor market

Interviewees were asked to answer the question “Which mechanisms can be created for improving the linkage between universities and the labor market?” Results revealed six mechanisms which are presented in Table 6: collaboration, supportive, reinforcement, participatory, information, and research mechanisms for extension graduates. A few

Table 6: Faculty members' attitudes toward mechanisms for improving the linkage between universities and the labor market (n=17).

Common ideas	Conclusion
Collaboration and cooperation mechanisms	Make joint sessions and collaborative offices between universities and the labor market
Supportive mechanisms from extension graduates	Financial support of extension graduates and their productive activities
Reinforcement mechanisms for internship and training courses	Conduct training courses with participation of universities and the labor market
Participatory mechanisms for curriculum development in extension	Develop extension curricula with participation of universities, agricultural organizations and farmers
Information mechanisms for extension graduates	Regular information for extension graduates through associations and media
Research mechanisms for extension graduates	Involve extension graduates in research activities of universities and agricultural institutes

samples of interview responses are quoted as follows:

"I think experts in public and private sectors need to create close collaboration with universities.... University professors and extension specialists in organizations should exchange their useful experiences with extension and education in order to bridge the gap between theory and practice."

"Labor market needs should be continually assessed by universities. Joint centers and offices should be established between universities and agricultural organizations by cooperation of farmers and extension experts at local and regional levels."

"Extension graduates should be supported by public and private sectors as well as universities in order to conduct self-employment and agriculturally productive activities."

People such as farmers, students, and graduates should be involved when operating joint sessions and programs between the university and the labor market. Official agreements need to be reached by both universities and agricultural organizations to enhance the engagement of extension graduates in both research and other productive activities. Encouragement of employers to assist in practical education and training courses at universities can be noted as another important strategy for strengthening relations between academic educations and the labor market.

Findings from Interviews with the Employers

A total of 45 employers, both in the public and private sector engaged in extension and

education activities were asked to share their opinions. Thirty of these employers gave their answers to open questions.

Employers who participated in this research ranged in age from 33 to 49 years. The mean age of respondents was 41.23 years. The majority of employers were males (94%), and only 6% were females. In regard to their highest level of education, 53.3% of employers held a B.Sc. degree, 26.6% had an M.Sc. degree, and 20.1% had a Ph.D. Their years of job experience ranged from 10 to 25 years with an average of 18.2 years. 73.4% of the respondents have been working in public sectors and 26.6% in the private sector or agriculture banks.

Required Competencies for the labor market

The employers both in public and private sectors were asked to express their ideas about competencies needed by the labor market from the extension graduates. The ideas expressed by different employers were summarized step by step and similar ideas and concepts were merged and classified in terms of common subjects. Then, a topic was developed regarding each group of common subjects. From the employers' ideas, four main groups of competencies were found as necessary for graduates' employment: agricultural technical competencies (37%), extension and education competencies (30%), local competencies (20%), and individual competencies (13%).

As presented in Table 7, agricultural competencies are the most frequent responses with regard to what extension graduates should learn during university programs. This result became more and more common during the study. However one may misunderstand when reading this result. It simply shows the weakness

**Table 7.** Employers' responses to competencies needed by the labor market.

Competencies needed by the labor market	Fr.	%
Agricultural technical competencies	11	37
Extension and education competencies	9	30
Knowledge of local and regional agricultural crops	6	20
Individual competencies	4	13
Total	30	100

Fr.= Frequency

of practical experiences in agriculture during university programs in the surveyed area of Iran. Because extension students and graduates have gained relatively good experiences in extension education, especially in communication skills, they usually prefer to acquire more practical agriculture skills during their studies. This does not mean that extension education and communication competencies are not as important as agricultural skills. It can be concluded that different competencies on extension, communication, and agriculture should be practically obtained by extension graduates to prepare them for the labor market. They should also learn more about agricultural technical competencies.

Adjusting graduates' competencies to the labor market

To achieve this objective, employers were asked to give their opinions in regard to the question "How can graduates' competencies be adjusted to the labor market?" Eventually, after analyzing employers' responses, the following themes were developed as the most important results to make graduates' competencies more tailored to the labor market (see Table 8):

conform theory and practice into learning process.

change curricula and syllabus based on needs

of the labor market in agriculture.

focus on skill and competency-based education.

emphasize application of skills.

Different quotations from interviewees are presented as follows:

"I believe that theory and practice must be taught together and incorporated throughout the Agricultural Higher Education System."

"Learning agricultural extension and education issues at universities must be saved from the present situation in which attention is solely paid to theoretical concepts and principles."

"Specific practical classes or labs need to be established to conduct skill based education."

"Extension students should acquire both extension and agricultural competencies and they must be capable of applying the mentioned competencies. Therefore, I think university programs must be completely adapted to the labor market needs. Accordingly, curriculum programs contents as well as teaching and learning methods should be changed."

"The more contact between extension students and working or agricultural areas, the more successfully prepared they are for agricultural related jobs after graduating."

Extension specialists are increasingly being called to conduct special studies to analyze the demand for extension and to suggest new and

Table 8. Employers' ideas about adjusting graduates' competencies for the labor market.

Adjusting graduates' competencies to the labor market	Fr.	%
Conform theory and practice together	6	20
Change curricula and syllabi based on needs of agricultural sector	5	16.7
Skill and competency-based education	5	16.7
Focus on application of competencies	4	13.3
Emphasize on practical evaluation and tests	3	10
Contact between agricultural students and future working places	3	10
Increase practical courses	2	6.65
Conduct pre-service training and vocational courses for new graduates	2	6.65
Total	30	100

Fr.= Frequency

relevant strategies to meet these needs (Sulaiman and Van Den Ban, 2000). Therefore, in order to adjust graduates' competencies for the labor market, real needs of the labor market particularly in the capacities of the agricultural sector, should be continuously assessed and accordingly implemented into curricula at universities. Current curricula and programs in the agricultural extension and education system of Iran must be changed so that theoretical concepts within practical ones are related to real working conditions. Furthermore, specific vocational and technical programs should take place outside of university education for extension students and graduates.

Conclusions and recommendations

The need to change and adapt agricultural higher education curricula is inevitable as a result of improvements in science, technology, and communications. In order to incorporate new changes into curriculum development, new competencies should be deliberately identified for the agricultural labor market, thereby ensuring that agricultural graduates are capable to work in the labor market. When developing curricula for agricultural studies, the most important factor is that various actors involved in curriculum change should collaboratively engage in the curriculum process. For instance, regarding agricultural extension and education curricula, the actors including- faculty, students, administrators, alumni, farmers, and leaders in the agricultural business and industry- should actively participate in different steps of curriculum development. Another important point is the "continuous change", which needs to be considered within systematic curriculum development. The extension students' competencies and abilities need to be continuously adapted to labor market needs. In this vein, agricultural higher education institutes in Iran need to adapt and change their curricula according to new developments in the industry and the labor market, local and regional situations, and scientific progress in the area of agriculture.

Rather than teaching theoretical concepts in disciplinary courses, it would be instead ideal to provide graduates with an understanding of the

characteristics of the rural villages, integrating conceptual learning with real agricultural experiences, so that the graduate will fully understand his role and environment.

Curricula and courses need to be redesigned and taught as applied subjects and should not be used solely for theoretical and academic purposes. In addition to redesigning the curricula, professionals have to aggressively market the extension discipline to its potential consumers.

Regional and local needs should be incorporated during developing curricula for each extension department. Furthermore, curriculum development should be based on need assessment in agriculture and needs of working centers through joint committees. Subjects and syllabi of agricultural extension and education should be changed and updated regularly thereby giving students hands-on, real and practical agricultural experiences during extension curricula. Additionally, practical courses and programs should be added to previous extension curricula.

Curriculum developers for agricultural extension and education should be competent, well-experienced, and well-informed and selected from universities, labor market sectors and other related organizations. Experts, managers, specialists, and employers in agriculture, education, and extension administrators need to be engaged in both developing extension curricula and teaching programs in university.

New entrepreneurship courses should be added at three levels of extension fields BSc, MSc, and PhD, and these courses at universities need to be strengthened by participating well experienced employers.

Apprenticeship system in extension needs to be changed and taken place in farming environments. Internship should be conducted both during studying and at the end of study on farms and working places. One term operational work and living in village might be offered for extension students during their study. Additionally, farm or agro units need to be allocated to the extension students at the beginning of their study accompany with help of the academic staff.

Systematic and operational linkage should be created between extension department, the labor



market and specially farmers whether by joint committee offices, and rooms, or by continuous contact and collaboration between university and employers both at local and regional levels. Additionally, university actors e.g. students, graduates and teachers in extension might be engaged in both agricultural and research activities such as on-farm research, joint research-extension plans, and advisory services.

Practical capabilities and possibilities of other organizations should be used to conduct extension curricula e.g. inviting well-practically experienced ones regarding agriculture or extension programs. Field trip and visit methods during extension curricula can be used in order to familiarize students with farmers' needs.

Successful extension and education experiences and models as well as professors in other countries should be identified and employed in order to develop compatible models to Iran's situation; international conferences, meetings and agreements can be organized in this regard.

Specific employment laws, rules, and policies should be enforced, so that public, non-public, and private sectors employ only extension graduates and students for extension positions as well as new job opportunities to be defined for female extension graduates. In order to update extension graduates with new information, a newsletter specific to extension graduates needs to be published by organization of agricultural and natural engineering system in each province.

There are different mechanisms and strategies that may improve the extension students and graduates' situation for employment. Collaborative, supportive, coordinative, information, managerial, curriculum development and spatial mechanisms need to be established to link Iranian universities and the labor market. Accordingly, the most important strategies to solve employment problem of extension graduates can be suggested: supports of the extension graduates by donors such as government, non-governmental organizations, legislators, and banks; creating associations, NGOs, and cooperatives that enable graduates to work independently; providing students and graduates with both practical and relevant skills and competencies to the labor market needs; keeping a balance between work forces (extension specialists) needed by labor market

and university enrolments; and eventually, conducting technical and training courses and engaging graduates in research or agricultural projects.

Ultimately, in order to increase potential and opportunities for employment of extension graduates, different collective strategies should be adopted. Accordingly, governmental and non-governmental supports from graduates through legislators' centers and channels; organizing graduates by formation of independent organizations, associations, NGOs, cooperatives, and private services centers; relevant and continual changes in university curricula in a manner that the graduates are provided with new skills and competencies; conducting technical and vocational courses for graduates and engaging them in research or executive projects can be concluded to be the most important factors to help solving employment problems of extension graduates.

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شناسایی شایستگی‌های مورد نیاز دانش‌آموختگان رشته ترویج و آموزش کشاورزی

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چکیده

هدف تحقیق حاضر شناسایی شایستگی‌های مورد نیاز دانش‌آموختگان ترویج و آموزش کشاورزی جهت آماده شدن برای بازار کار می‌باشد. جمعیت مورد مطالعه شامل دانش‌آموختگان و اساتید ترویج و آموزش کشاورزی در سه دانشگاه بوعلی سینا، تهران و شیراز، و کارفرمایان مرتبط با این رشته بوده‌اند. در این تحقیق هر دو نوع روش کمی و کیفی به کار گرفته شده‌اند. در روش کمی، جمع‌آوری داده‌ها به کمک پرسشنامه و جمع‌آوری داده‌های کیفی از طریق مصاحبه‌های نیمه ساخت دهی شده انجام گرفته است. بر اساس نتایج تحقیق، دانش‌آموختگان رشته ترویج می‌بایست ترکیبی از مهارت‌های عملی کشاورزی، ترویج و آموزش، اطلاع رسانی و ارتباطات، کارورزی و کارآفرینی، مدیریت و رهبری، و مهارت‌های استفاده از رایانه و اینترنت را برای ورود به بازار کار کسب نمایند.