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Skills, Qualities and Experiences Needed for Future Leaders in Food and Agribusiness Industries of Armenia

Vardan E. Urutyan[Φa] and Kerry Litzenberg[b]

[a]*Director, International Center for Agribusiness Research and Education (ICARE), Agribusiness Department, Armenian State Agrarian University (ASAU), 74 Teryan St,. Yerevan, 0009, Armenia*

[b]*Professor, Department of Agricultural Economics, 340 Blocker Building, 2124 TAMU, College Station, Texas, 77845-2124, U.S.A.*

Abstract

It is widely recognized that academia should prepare students for the job market as well as provide general education. An important aspect of agribusiness education is that industry leaders expect graduates to have several skills that improve the management capacity of the firm. This responsibility means that curriculum development and implementation must not be conducted by academicians in isolation. Industry must participate and play an active role in curriculum design and curricular reforms. The study quantifies agribusiness industry preferences for agribusiness education and identifies the skills, capabilities and experiences the food and agribusiness companies in Armenia look for in their new employees with the potential to become future leaders in their firms.

Keywords: Armenian agribusiness industry, curriculum, skills, employer, education

[Φ]Corresponding author: Tel: + 37410.52.28.39 Ext. 21
Email: vardan@icare.am

Other contact information: K. Litzenberg: litz@tamu.edu

Problem Statement

After the achievement of independence in 1991, Armenia's higher educational system faced several important challenges. As the country's economical and social infrastructure was changing, privatization of land and other production means was undertaken. There was an urgent demand to revise higher education curricula by including new specialties required for the needs of a market economy and excluding old, non-marketable specializations. In early transition years, many agricultural universities of post-socialist countries started reorganization. Armenia also followed the other former Soviet republics and started to implement reforms in the agricultural higher educational system. Initially these reforms were based on the best considerations of higher education faculty and administration and in consultation with international specialists in curriculum development. Several U.S and European agribusiness curriculum were examined and served as the model for these evolving educational programs for managers of agribusiness firms. The newly created Armenian Agricultural Academy (AAA) now Armenian State Agrarian University (ASAU), designed a new curriculum, preparing agricultural specialists with a three-step education system: baccalaureate, graduate and post graduate programs. New specializations were introduced to adjust to the new environment. Additional new specialties are being considered in order to further adapt education to the current needs of the agri-food system of Armenia.

However, overall, the changes in agricultural higher education in Armenia are occurring very slowly. Curriculum changes are always difficult and painstakingly slow. In fact, in the US, agricultural economists spent nearly three decades integrating agribusiness into their curricula (Erven 1987). In addition to this general slowness for curriculum change, Armenia has also undergone dramatic change in their economic structure since 1991. In general, designing and changing of the curriculum in Armenia is being accomplished in isolation by academics only and there is a wide curricular bias caused by existing faculty expertise and interests. US agribusiness Industry representatives have had occasional direct input into the development of agribusiness curriculum (Coffey 1987), but agribusiness curriculum specialists have regularly sought their opinion through several surveys and analysis (Litzenberg and Schneider 1987; Boland and Akridge 2004). Most current academics in Armenia were trained during the period of centrally controlled and planned educational systems. The programs are mostly collections of courses and the existing teaching methods and materials do not foster critical thinking or communication skills. One problem appears to be that curriculum is being developed and revised by academics with no industry input. It is quite possible the agribusiness firms are changing more quickly in Armenia than academic administration has even considered.

It is widely recognized that academia should prepare students for the job market as well as provide general education (Wachenheim and Lesch 2002). An important aspect of agribusiness education is that industry leaders expect graduates to have several skills that improve the management capacity of the firm. This responsibility means that curriculum development and implementation must not be conducted by academicians in isolation. Industry must participate and play an active role in curriculum design and curricular reforms if graduates are to have the capabilities to manage the agribusiness firms in the changed environment. Academics must have unique qualities to understand on-the-job tasks, behaviors, skills and competencies that should describe a new graduate who would be well suited for employment in an agribusiness firm.

These skills and competencies necessary to be successful in their chosen career must be translated to the academic curricula in agribusiness.

Background Information on Armenian Agribusiness Industry

The agribusiness industry is the driving force in the overall development of agriculture in Armenia. During the Soviet period, food processing companies with huge capacities were operating in the system, with the Armenian-produced brandies, wines, canned fruits and vegetables and fruit juices enjoying a very high demand.

Following 1991, during the first phase of the agrarian reform, when Armenia was in the state of economic blockade, processing enterprises almost ceased their activities. In those years, family-size processing operations started to grow since the volumes and prices of raw product supplies had decreased, and the farmers had no other choice but processing their product on their own in homestead conditions just to avoid spoilage of the product. Starting from 1998, through investments from the private sector and supported by international agencies, the situation in the agri-processing industry was remarkably improved. Activation of operations in the food processing system and comparative increase in the volume of export have definitely contributed to the mitigation of the agricultural product marketing problem and enhancement of the level of commercialization of farms. In 2007, the processing companies purchased about 144,000 tonnes of grape and 72,000 tonnes of vegetables; these volumes exceeded those of 1998 for 3.5 and 5.5 times respectively. As a consequence of the 2008-2009 worldwide financial and economic crisis, the volumes of agricultural product purchase have been noticeably reduced (Avetisyan 2010).

In the Soviet period, the produce of the processing industry in Armenia - brandy, wine, tomato paste, canned fruits and vegetables - was mainly marketed in the Soviet Union. Today, the geography of the consumer market has been considerably expanded. To develop this tendency, pronounced efforts are being made to improve the quality and marketability of the products as well as standardization and certification. However, food-processing capacities are not sufficient to process the total potential of farm production in Armenia. Hence, making further investments in this profitable industry, along with development of small and medium size entrepreneurship are the most critical priorities.

From the standpoint of agrarian reform intensification and efficient management, as well as the sustainable development of the agribusiness industry, it is critical to supply the sector with relevant high quality specialists. The Armenian State Agrarian University (ASAU) is the only higher educational institution providing the agri-food sector with university-degree specialists. The ASAU (formerly Armenian Agricultural Academy) was founded in 1994, as a result of merging the Armenian Agricultural Institute and the Yerevan Zoo-Veterinary Institute. ASAU prepares specialists in 36 areas. The University has 7 departments of daytime studies with 46 chairs, master and PhD degree studies and over 10,000 students. Today's food and agriculture sector job market demands new specialties that are now included in the curriculum of ASAU: Agricultural Ecology; Children's and Functional Food Technologies; Expert Examination of Agricultural Raw Product and Foodstuff; Standardization and Certification; Insurance Business, Consultancy and Information in Agri-Food System; and others.

The Ministry of Education and Science of Armenia establishes the framework for higher education (degrees awarded, requirements for admission, fees, etc.) and the universities more or less have freedom for designing curricula and developing courses for each specialization. This allows a particular university to dynamically respond to arising needs if they have the necessary potential and resources. However, many barriers to improvement exist in Armenian universities in particular in the ASAU. Some teachers do not accept the need for improvement in their own teaching. They think that they are already doing a good job in the classroom. This perception reduces their interest in teaching improvement programs. Other barriers include the lack of creativity and drive for improvement, lack of faculty with innovative approaches and new ideas.

Most teachers are unaware of the professional literature in teaching and learning, fresh pedagogical techniques and technological advances; they do not tend to update the resources they use. The current student-centered classroom experience used in other educational systems is virtually unknown in Armenia. The teachers themselves are the main speakers during their classes. Students' input in class discussions and development is absent.

Problems also exist in course and curriculum development. Courses usually lack clear objectives and are not output-oriented. Teachers do not create the best course syllabi, evermore they do not clearly understand the essence of syllabi, they misinterpret it as a mere thematic plan for their lecturing. It is difficult for teachers to move to the new grading system. Students lack knowledge about their progress, and how to improve it. Teachers are also unable to motivate students.

There is a poor feedback from the industry to improve the curricula and maintain it with current needs of the market. No or poor mechanisms of curriculum evaluation exists. Either curricula remain the same or the revisions are done without the involvement of the industry.

This background on the historical and current status of agribusiness education in Armenia makes a clear case for the motivation for the study reported in this research effort.

Objectives

The overall goal of the current study is to establish priorities for Armenian agribusiness education curriculum through a solid partnership with the growing food and agribusiness sector of Armenia using formal surveys. These queries and explicit directives reveal the major revisions and changes needed in the ASAU's current phase of curricular reforms related to agribusiness programs. Baker G.A., Wysocki A.F., and House L.O; Baker G.A., Wysocki A.F, Wachenheim and Lesch, House L.O and Batista J.C; and Litzenberg and Dunne have all described the need and opportunities of academics partnering with industry representatives to develop curriculum. While there may be a synergistic effect between research and teaching in agribusiness (Dooley and Fulton 1999) this study is focused on curriculum. Agribusiness education must be current and meeting the needs of industry. The main objective of this study is to quantify industry preferences for agricultural higher education of Armenia, in particular agribusiness industry preferences for agribusiness education. The study identifies the skills, capabilities and experiences the food and agribusiness companies look for in their new employees with the potential to become future leaders in their firms.

Methodology

Data for this study were gathered using a structured face-to-face interviewing technique with senior executives, business owners and top/middle level managers, representing food and agribusiness industries of Armenia. One or two executives from each company involved in decision making for recruitment and hiring of new employees were interviewed. These companies included agricultural processing companies like wineries and brandy factories, meat, dairy, fruit and vegetable processing companies, companies involved in horticulture, aquaculture, arboculture, firms dealing with trade of agricultural inputs and machinery as well as agricultural banks and credit organizations. International and regional agribusiness companies operating in Armenia also were targeted.

The survey instrument was the same as used in the AGRIMASS survey conducted by Litzenberg and Schneider in the mid 80s with modifications to the Armenian situation and adaptations to modern agribusiness management techniques. The Agribusiness Management Aptitude and Skill Survey (AGRIMASS) was designed to solicit comparative rankings of alternative skills and characteristics of agricultural economics graduates required by a wide array of agribusiness firms (Litzenberg and Schneider, 1987). The AGRIMASS survey methodology was also used by Boland and Akridge in 2004 to identify the progress made by agribusiness education programs in the two decades since the original work by Litzenberg and Schneider and was the basis of the USDA national commission on food and agribusiness management report (see Akridge 2004). The survey instrument focused on total of 78 parameters/variables thought to be important to agribusiness firms in Armenia and based on the historical success by the authors above. The parameters were grouped in the following seven categories:

1. Business and economics
2. Computer, quantitative and management information
3. Technical skills
4. Communication skills
5. Interpersonal qualities
6. Employment and work experience
7. General higher education experience

Most of the skills identified in AGRIMASS are considered of some importance for higher education curricula and certainly make contribution to the skills of the agribusiness manager. The purpose of this study is to rank order these skills so agribusiness curriculum development can prioritize these skills as they are added to existing or new courses. The technical skills listed under section C of the survey instrument were designed to be highly specific so that different types of firms could respond to the technical needs for their specific industry.

A 5-point Likert scale was used to show relative importance of each characteristic as well as the ranking of each category. The survey form also contained questions about the firm size, type, number of employees and sales volume.

Profile of Respondents

A total of 100 executives from 80 quite diverse companies were interviewed and the survey instrument completed. The respondents were grouped into seven categories by firm type with the number of responding firms for each category following the category in brackets:

(1) Wineries and Brandy Factories [10]
(2) Meat and Dairy Processing [19]
(3) Fruit and Vegetable processing [15]
(4) Other agricultural processing [16]
(9) Food Wholesaler/Retailer [9]
(10) Agricultural Banks and Credit Organizations [10]
(13) "Other" category [20]

The other category included seven firms that categorized themselves as "Other" plus the following original firm types identified by their category number and name as per the original survey instrument followed by the number of firms responding in each category: (5) Horticulture and Arboculture [2]; (7) Aquaculture and Fisheries [2]; (8) Firms Dealing with trade of Agricultural Inputs and Machinery [3]; (11) Agricultural Cooperatives [3]; (12) Ministries, International Organizations and NGOs [3]. These thirteen firms (categories 5, 7, 8, 11, 12) were not considered to be representative of the overall firm type due to the low number of responses and were therefore included in the "other" category. Table 2 (See the Annex) presents the data for the seven firm types[1] for each of the seventy-eight variables in the survey (in seven general skill categories). The rank within the category for each skill is also presented. The average rating for all firms for each question is also included for comparison. All results are included in the table since low ratings are as important as high ratings when evaluating curriculum change. The category and skill order are maintained to provide the reader the ability to match to the corresponding survey instrument.

Some respondents were reluctant to provide information about the number of employees of the company and the sales volume. From the data provided it can be summarized that the average firm represented had 165 employees, although the number ranged from 3 to 1,200. About 40% of firms had more than 100 employees. The mean of annual reported sales among firms that provided the data was 9,427,000 AMD (approx. $31,423); the number ranged from 20,000 to 233,333,300 AMD (approx. $778,000).

The average respondent had about 8.8 years of working experience with the firm. Overall, the respondents represented a wide array of years of experience in the firm. Respondents with less than 5 years of employment in the company represented about 32% of the sample; 5-10 years represented 40%, 11-20 years represented 21% and more than 20 years of employment with the company represented about 7% of the respondents. About 94% of the respondents had higher education (included 20% having MS or PhD), only 5 respondents had vocational education which is considered uncompleted (semi-complete) higher education. The majority of the respondents were between 31 and 50 years old (60%) and about 23% were more than 51 years old. There were also young executives in the sample: about 17% of the respondents were between 16 and 30 years old. About 58% of the respondents were male and 42% female.

[1] Note that the number in parentheses is the category number entered in the database from the original survey instrument. These category numbers are preserved in the manuscript to enable the reader to easily match the responses with those used in the actual survey instrument. Categories 5, 7, 8, and 11 were added to the seven firms originally classified as other and entered in the 13 (Other) category. There were no firms surveyed that represented the Grain processing and marketing category. The number following the category description in brackets [ ] is the number of firms in the category that responded to the survey. Note that one firm did not categorize their business activity.

Results

Table 1 shows the numerical results for the 100 respondents of managers of agribusiness firms to the survey for 78 characteristics, skills and experiences in seven general categories. The average response for the Likert scaled responses and overall rank (out of 78) is given for each skill or characteristic. For each category the p-values are calculated at the .01 level of significance using a comparison of the response for each skill relative to the mean for the category. This shows which characteristics within a category are significantly different from the mean response. This identifies which variables within a category are significant. The agribusiness industry representatives ranked the seven general categories in the following order, where the average rating on the five point scale (where 1 = lowest requirement and 5 = highest requirement) for the category is given in brackets:

Personal Qualities [4.19]
Communication Skills [4.12]
General Higher Education Experience [3.38]
Business and Economic Skills [3.31]
Employment and Work Experiences [2.57]
Computer Quantitative and Management Information Skills [2.54]
Technical skills [2.29].

The agribusiness respondents valued personal qualities and communication skills considerably higher than the other skills and experiences included in the survey. See Table 1 in the Appendix.

The four overall highest rated skills were in the personal qualities category and included: loyalty to the organization, positive work attitude/personality/ability to work hard, work with others and be a team player in problem solving situations, high moral/ethical standards. The personal qualities category also contained the sixth, seventh and eighth overall highest rating and included: self motivation, work without supervision, self confidence and ability to "take a chance" and handle stress/failure/rejection. The fifth highest overall rated skill was "to listen to and carry out instructions" from the communication skills category.

The results are surprisingly comparable to those reported by Litzenberg and Schneider in 1978 and to the results presented by Akridge (2004) and by Boland and Akridge (2004). Of special importance is the top ranking of communication and personal skills categories and the relatively low rating of technical skills. These results have remained mostly consistent over the thirty year period. US agribusiness education programs have responded to the results presented by Akridge and Bolan in the national commission of food and agribusiness management education report. For example, Texas A&M's agribusiness program dropped the requirement for technical agriculture courses during their 2004 curriculum redesign.

Analysis by Firm Type

Survey information for each type of skill was reported in Table 2 found in the Appendix. While educational administration focused professionals might only be interested in the statistical *differences* between firms that might be in the target market for the educational program, industry-oriented readers want to see the skill profile for *their* industry type. Therefore all information is reported in Table 2.

In general there was relatively good agreement within each category for all seven firm types. For example, Table 2 (See the Annex) shows that all firm types ranked loyalty to the organization as the highest ranked skill in the personal qualities category which was ranked the highest of all general categories. General business computer software was also ranked as the highest skill required in the computer quantitative and management information skills category. In the communication skills category, the skill listen to and carry out instructions was ranked number one by all but one firm type. There was also general agreement on the least important skill in most categories by most firm types. So in general, the skill rating is consistent across firm types. Therefore, the skills identified as the highest ranked in the categories should be used for general curriculum development.

Some differences were observed by firm types. For example, the skill of marketing administration was ranked first in the business and economic skills category by four firm types (wineries and brandy, meat and dairy, food wholesaler/retailer and our other category) and second by other agricultural processing firms and third by fruit and vegetable firms. It is interesting however, that agricultural banks/credit firms ranked this skill eleventh out of the twenty-one skills in this category. Professional selling techniques were ranked the highest in the business and economic skills category by both fruit and vegetable and other agricultural processing firms and second by food wholesalers/retailers and the other category. However, agricultural banks/credit institutions ranked this skill number ten out of the twenty-one skills in the category. Another unusual ranking was for the objectives and goals skill for the agribusiness firm. Meat and dairy firms ranked this skill as number 2, while other firm types ranked it as low as 10 or even 12 for the other agricultural processors. While general curriculum should be developed considering the highly ranked skills in each category, some care should be taken for specific agribusiness programs focused on a particular firm type.

The authors were surprised with the rankings of the technical skills. Although this general category was ranked the lowest on average (7th out of 7) there was surprising agreement on the individual skills. For example, food transportation and distribution was ranked as the number one skill by all but one of the firm types, agricultural banks/credit. Even the food science and processing technology was ranked second or third by five of the firm types.

Conclusions

The survey results for the AGRIMASS-Armenia will be used to develop curriculum for agribusiness programs in Armenia. Using the results of this study should cause some realignment of the current curriculum with emphasis on areas being changed. For example the survey suggests the de-emphasis of technical skills and the added emphasis for communication and personal skills. Another change that should be made is to dramatically increase the focus on consumer behavior and professional selling skills. This may seem evident as the educational system moves from meeting the needs of a centrally planned to a market driven economy. However, the identification of these two skills as the most important business skills calls for dramatic changes from the historical perspective still taught in most educational programs. Some of the skills required by the agribusiness professionals can be taught in the classroom as subject matter. However, other skills and qualities are more difficult to teach in the context of a course. The authors suggest that administration of agribusiness education programs should develop a list of these characteristics desired by agribusiness professionals and then make it clear that the student must develop these skills to meet the needs of agribusiness industry. For example, the

number one overall ranked quality is for loyalty to the organization. While this might be difficult to teach in a course, other teaching-related activities should be developed to be sure the students know how important the skill is and create learning environments where these skills can be learned or at least practiced. Loyalty to the organization is a topic that could be emphasized through cases and business principles examples. The highly rated communication skill of being able to listen to and carry out instructions is another skill that could be emphasized in the classroom, not necessarily with theory or principles, but with practical applications. For example, instructions in the classroom could be made verbally while the students gain practice and understanding of the importance of this skill. Personal qualities of high moral and ethical behavior should be signaled as important in the educational curriculum and cases where the opportunity presents itself for comment should be used in the programs.

Meeting the needs of Agribusiness Curriculum Reform

Some of the skills highly rated in the top category (Personal Qualities) which are "high moral/ethical standard", "positive work attitude/personality/ability to work hard", etc. can be incorporated in the subjects like Business Ethics, Leadership or Management and the instructors should use such teaching methods that encourage group work, delegating responsibility, motivating students and involve them in various decision making practical cases.

The Communication Skills category was ranked second and under this category skills should be developed within several subjects. In this category top three skills were: listen to and carry out instructions, express creative ideas verbally and professional telephone skills and etiquette. These skills can be taught within the subjects like Negotiations or a new subject Business Etiquette can be developed.

The third category was "General Higher Education Experience". Although the highest rated two skills of this category were ranked very low in the overall skill ranking, it is obvious that industry highly values foreign internship and foreign study experiences. Students with foreign study or internship experiences have more chances to get employed sooner than those without such experiences. The agribusiness program directors should develop / provide international study or internship opportunities for their students. This can be accomplished with the help of agribusiness companies which can support some selected students to pass their internship in international agribusiness firms and upon arrival to get relevant positions in the company. The top rated experience of the category F (ranked number 5) which is "Employment in International Agribusiness Firm" also proves that international experiences are highly valued by local firms.

Category A, Business and Economic Skills, received a number four ranking. Top five skills within this category were: Marketing administration, Consumer behavior analysis, professional selling techniques, Risk management and Financial Statement Analysis. It can be concluded that agribusiness education programs must teach subjects including Consumer Oriented Marketing with an emphasis on Professional Selling. Other required skills in this category can be taught within Strategic Management subject, Monitoring and Evaluation (A6. Identify, monitor and evaluate key performance areas and progress toward the objective and goals of the firm) and Financial Analysis type of subjects.

The highest ranked two skills of the Category B, ranked number six, were General business computer software (overall rank of 21) and accounting software (overall rank of 52). Companies

may realize that other skills in this category are important but not for managers, as many of the companies have technical staff who support the management with the needed computer systems and programs.

The surprising finding was the Technical Skill Category ranking. The overall low ranking of technical skills (ranked 7th out of 7) may suggest that agribusiness firms believe that they can teach the recent graduates the technical skills required for the career in their firm. In Armenia the industry still leads universities on technological developments, innovations and production systems.

Additional Research Needs

This research has provided the basic evaluation of the skill profile needed by agribusiness industry for 78 skills in seven general categories for five different firm types. This study is prescriptive and built on the premise that agribusiness managers know what they need in terms of required skills of agribusiness graduates. Follow-up work is needed to develop an employability "road mapping" of these skills over time as they apply to successful employment after a sizeable group of Armenian students are educated with these skills.

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Appendix 1.

Table 1. Agribusiness skills proficiency for Armenian agribusiness middle managers

Rank Within Category	**Description of Skills**					
A	**Business and Economic Skills**	Average Response*		p-value	Diff. from Mean	Overall Rank
1	Marketing Administration (Systems, Strategy, Organization, Structure, Subject: Management)	3.97	*	0.000	0.66	20
2	Consumer behaviour analysis (economics)	3.90	*	0.000	0.59	24
3	Professional selling techniques	3.89	*	0.000	0.58	26
4	Identify and manage risk and uncertainty	3.79	*	0.000	0.48	30
5	Financial statement analysis	3.71	*	0.000	0.40	33
6	Identify , monitor and evaluate key performance areas and progress toward the objective and goals of the firm	3.70	*	0.000	0.39	34
7	Firm/ industry (micro) economics (supply, demand, and price determination)	3.68	*	0.000	0.37	35
8	Develop business policies and programs for the firm	3.65	*	0.001	0.34	36
9	Objectives and goals for the firm	3.58	*	0.009	0.27	37
10	Business organizational structure and the effect of this structure on business activity	3.57	*	0.006	0.26	38
11	Coordinate human and physical resources	3.30		0.927	-0.01	41
12	Corporate finance (capital structure, formation, and budgeting)	3.25		0.552	-0.06	42
13	Human resources planning and control	3.24		0.476	-0.07	43
14	International macroeconomics (exchange rates etc.)	3.09		0.015	-0.22	45
15	Domestic (ARM) macro economics (interest rates, fiscal and monetary policy, unemployment)	3.05	*	0.004	-0.26	47
16	Accounting concepts and procedures	2.99	*	0.001	-0.32	48
17	Inventory Management Systems	2.99	*	0.000	-0.32	49
18	Current and historical international trade and export policies and procedures	2.95	*	0.001	-0.36	50
19	Process and product layout and design	2.62	*	0.000	-0.69	57
20	National and International Political and Economic forces on business operations	2.59	*	0.000	-0.72	60
21	Historical Armenian agricultural policy	1.98	*	0.000	-1.33	72
	Average for Category	**3.31**				**4**

B	**Computer Quantitative and Management Information Skills**					
1	General business computer software (e.g. spreadsheets, data bases, word processing)	3.95	*	0.000	1.41	21
2	Computerized accounting systems	2.88	*	0.004	0.34	52
3	Use computers in managerial decision-making	2.80		0.016	0.26	53
4	Interpret and use math and statistical methods	2.69		0.214	0.15	56
5	Communicate with computer programmers	2.60		0.598	0.06	59
6	Use Quantitative techniques for managerial decision making (eg. Linear programming, business forecasting)	2.53		0.912	-0.01	62
7	Purchase and implement business computer systems	2.47		0.529	-0.07	65
8	Design and implement management information systems	2.38		0.183	-0.16	66
9	Understand Expert Systems	2.33		0.058	-0.21	68
10	Design computer programs	1.86	*	0.000	-0.68	74
11	Write computer programs	1.48	*	0.000	-1.06	78
	Average for Category	**2.54**				**6**
C	**Technical Skills**					
1	Food transportation and distribution systems	3.11	*	0.000	0.82	44
2	Food science and processing technology	2.72	*	0.000	0.43	55
3	Engineering technology of production/processing machinery	2.48		0.121	0.19	64
4	Computer controlled mechanical processes	2.33		0.710	0.04	69
5	Specialized crop production systems	2.15		0.307	-0.14	70
6	General crop production systems	2.14		0.267	-0.15	71
7	General livestock/meat production systems	1.98		0.014	-0.31	73
8	Bio-science, bio-technology and bio-chemistry	1.85	*	0.000	-0.44	75
9	Soil chemistry and characteristics	1.81	*	0.000	-0.48	76
	Average for Category	**2.29**				**7**
D	**Communication Skills**					
1	Listen to and carry out instructions	4.43	*	0.000	0.32	5
2	Express creative ideas verbally	4.20		0.225	0.09	9
3	Professional telephone skills and etiquette	4.16		0.549	0.05	11
4	Give clear and concise instructions to others	4.13		0.835	0.02	12
5	Listen to and summarize lengthy oral presentations	4.10		0.846	-0.01	13
6	Speak clearly and concisely on technical information	4.09		0.731	-0.02	15
7	Write technical reports, memos and letters	4.05		0.366	-0.06	16
8	Foreign language skills (specify the language)	4.05		0.384	-0.06	17
9	Express creative ideas in writing	4.04		0.353	-0.07	18
10	Read and understand specific technical information	3.90	*	0.007	-0.21	25
	Average for Category	**4.12**				**2**
E	**Personal Qualities**					
1	Loyalty to the organization	4.79	*	0.000	0.60	1
2	Positive work attitude/personality/ability to work hard	4.53	*	0.000	0.34	2
3	Work with others and be a team player in problem solving situations	4.46	*	0.000	0.27	3
4	High moral/ethical standards	4.46	*	0.000	0.27	4
5	Self-motivation	4.38	*	0.005	0.19	6
6	Work without supervision	4.31		0.091	0.12	7

7	Self-confidence and ability "to take a chance" and handle stress/failure/rejection	4.27		0.235	0.08	8
8	Work under varied conditions	4.19		0.955	0.00	10
9	Recognize a business opportunity	4.10		0.201	-0.09	14
10	Take a position and defend it, sell your ideas	4.01		0.013	-0.18	19
11	Provide leadership and make decisions	3.93	*	0.000	-0.26	22
12	Manage people and delegate responsibility and authority	3.92	*	0.000	-0.27	23
13	Apply technical skills and information in problems solving situations	3.86	*	0.000	-0.33	28
14	Raise capital for new and ongoing business ventures	3.51	*	0.000	-0.68	39
	Average for Category	**4.19**				**1**
F	**Employment and Work Experiences**					
1	Employment in International Agribusiness firm	3.07	*	0.000	0.505	46
2	Employment in Financial Institution	2.89	*	0.003	0.325	51
3	Farm Work	2.62		0.677	0.055	58
4	Employment in Non-Agricultural Retail business	2.59		0.813	0.025	61
5	Employment in Domestic Agribusiness firm	2.50		0.587	-0.065	63
6	Government/Public Affaires Positions	1.72	*	0.000	-0.845	77
	Average for Category	**2.57**				**5**
G	**General Higher Education Experiences**					
1	Foreign internship experience	3.87	*	0.000	0.491	27
2	Foreign study experience	3.82	*	0.000	0.441	29
3	General Education in the Classics/Humanities/Arts etc.	3.78	*	0.000	0.401	31
4	Experience in developing a business plan and organizing a business	3.74	*	0.000	0.361	32
5	Local industry internships experiences	3.33		0.668	-0.049	40
6	Extra Curricular activities in university including leadership positions in student clubs and functions	2.74	*	0.000	-0.639	54
7	Work as student teaching assistant or part time in university	2.37	*	0.000	-1.009	67
	Average for Category	**3.38**				**3**

*Significant at the .01 level where the significance tests whether the average response is significantly different from the mean for the category. The p-value given is for a two-tailed test since the deviation from the mean can be both negative and positive.
The survey instrument is available from the authors.

Table 2. AgriMass-Armenia response by firm type

	Firm Type* - Number of firms in each type	1-10		2-19		3-15		4-16		9-9		10-10		13-20		AVG All Firms
		score	R	score	R	score	R	score	R	score	R	score	R	score	R	
	A. Business and Economic Skills (Category Rank 4)															**3.31**
1	Marketing Administration (Systems, Strategy, Organization, Structure, Subject: Management)	4.20	1	3.95	1	3.67	3	4.06	2	4.33	1	3.00	11	4.35	1	**3.97**
2	Consumer behaviour analysis (economics)	3.90	4	3.79	4	3.60	5	3.75	3	4.11	3	4.30	2	4.00	3	**3.90**
3	Professional selling techniques	4.10	3	3.68	6	3.73	1	4.25	1	4.22	2	3.10	10	4.10	2	**3.89**
4	Identify and manage risk and uncertainty	3.60	12	3.84	3	3.53	10	3.69	5	3.44	10	4.30	3	3.95	4	**3.79**
5	Financial statement analysis	4.10	2	3.74	5	3.53	8	3.63	6	3.89	5	4.00	5	3.55	9	**3.71**
6	Identify , monitor and evaluate key performance areas and progress toward objective and goals	3.70	9	3.47	9	3.53	9	3.56	7	3.78	7	4.40	1	3.70	7	**3.70**
7	Firm/ industry (micro) economics (supply, demand, and price determination)	3.90	5	3.68	7	3.73	2	3.50	8	4.00	4	2.90	13	3.85	5	**3.68**
8	Develop business policies and programs for the firm	3.70	8	3.63	8	3.60	7	3.44	9	3.78	6	4.10	4	3.50	12	**3.65**
9	Objectives and goals for the firm	3.70	7	3.84	2	3.67	4	3.31	12	3.56	9	3.40	6	3.55	10	**3.58**
10	Business organizational structure and the effect of this structure on business activity	3.60	11	3.32	12	3.47	11	3.69	4	3.78	8	3.40	7	3.80	6	**3.57**
11	Coordinate human and physical resources	3.00	18	3.47	10	3.20	13	3.44	10	3.33	11	3.00	12	3.50	13	**3.30**
12	Corporate finance (capital structure, formation, and budgeting)	3.70	6	3.21	13	2.93	15	3.25	13	3.00	15	3.30	8	3.40	14	**3.25**
13	Human resources planning and control	3.10	16	3.42	11	3.60	6	3.19	14	3.11	14	2.40	15	3.50	11	**3.24**
14	International macroeconomics (exchange rates etc.)	3.60	10	3.16	15	3.40	12	2.88	16	2.89	16	2.20	20	3.20	17	**3.09**
15	Domestic (ARM) macro economics (interest rates, fiscal and monetary policy, unemployment)	3.50	13	3.16	14	2.93	16	2.81	18	3.22	12	2.40	16	3.20	16	**3.05**
16	Accounting concepts and procedures	2.60	21	2.95	18	2.47	18	3.31	11	3.11	13	3.10	9	3.30	15	**2.99**
17	Inventory Management Systems	3.20	15	3.16	16	2.47	19	2.88	17	2.89	17	2.40	17	3.65	8	**2.99**
18	Current and historical international trade and export policies and procedures	3.50	14	3.05	17	3.07	14	2.56	19	2.78	18	2.60	14	3.15	18	**2.95**
19	Process and product layout and design	3.10	17	2.74	19	1.87	21	3.06	15	1.78	20	2.30	19	3.10	19	**2.62**
20	National and International Political and Economic forces on business operations	2.90	19	2.63	20	2.67	17	2.25	20	2.56	19	2.30	18	2.85	20	**2.59**
21	Historical Armenian agricultural policy	2.70	20	2.00	21	2.07	20	1.50	21	1.33	21	1.40	21	2.55	21	**1.98**

	B. Computer Quantitative and Management Information Skills (Category Rank 6)														**2.54**
1	General business computer software (e.g. spreadsheets, data bases, word processing)	3.80	1	4.05	1	4.00	1	3.81	1	4.11	1	4.00	1	3.90	1	**3.95**
2	Computerized accounting systems	2.20	5	3.26	2	2.27	5	3.63	2	2.56	6	2.40	5	3.15	2	**2.88**
3	Use computers in managerial decision-making	2.50	3	2.53	5	3.13	2	2.69	6	3.33	2	2.70	3	2.95	3	**2.80**
4	Interpret and use math and statistical methods	2.70	2	2.42	8	3.00	3	2.44	8	3.33	3	2.60	4	2.70	5	**2.69**
5	Communicate with computer programmers	2.20	7	2.58	4	2.47	4	2.75	5	2.78	4	3.40	2	2.40	8	**2.60**
6	Use Quantitative techniques for managerial decision making (eg. Linear prog, bussiness forecasting)	2.40	4	2.53	6	2.27	7	2.56	7	2.56	7	2.40	6	2.70	6	**2.53**
7	Purchase and implement business computer systems	2.20	6	2.84	3	2.00	9	3.00	3	1.56	9	2.30	7	2.75	4	**2.47**
8	Design and implement management information systems	2.10	9	2.32	10	2.27	6	2.81	4	2.67	5	2.20	8	2.35	9	**2.38**
9	Understand Expert Systems	2.20	8	2.53	7	2.20	8	2.38	9	2.56	8	1.80	9	2.50	7	**2.33**
10	Design computer programs	1.80	10	2.37	9	1.47	11	1.75	10	1.44	10	1.60	10	2.15	10	**1.86**
11	Write computer programs	1.40	11	1.58	11	1.53	10	1.44	11	1.11	11	1.10	11	1.80	11	**1.48**
	C. Technical Skills (Category Rank 7)														**2.29**
1	Food transportation and distribution systems	3.60	1	3.21	1	3.27	1	3.25	1	3.33	1	2.40	5	2.85	3	**3.11**
2	Food science and processing technology	3.20	2	3.05	2	2.67	2	3.06	3	2.11	2	2.40	4	2.40	9	**2.72**
3	Engineering technology of production/processing machinery	2.50	3	2.53	4	2.40	4	3.19	2	1.33	4	2.00	8	2.75	4	**2.48**
4	Computer controlled mechanical processes	2.20	5	2.32	5	2.47	3	2.44	4	1.78	3	2.20	6	2.60	6	**2.33**
5	Specialized crop production systems	2.00	7	1.84	7	2.00	5	1.94	5	1.11	7	2.70	3	2.95	2	**2.15**
6	General crop production systems	2.10	6	1.84	6	1.80	6	1.81	6	1.11	6	3.00	2	2.95	1	**2.14**
7	General livestock/meat production systems	1.40	9	2.74	3	1.07	9	1.56	8	1.11	5	3.00	1	2.40	8	**1.98**
8	Bio-science, bio-technology and bio-chemistry	2.20	4	1.84	8	1.60	8	1.75	7	1.00	9	1.70	9	2.45	7	**1.85**
9	Soil chemistry and characteristics	1.80	8	1.58	9	1.60	7	1.50	9	1.00	8	2.10	7	2.70	5	**1.81**
	D. Communication Skills (Category Rank 2)														**4.12**
1	Listen to and carry out instructions	4.40	1	4.26	1	4.73	1	4.38	1	4.67	2	4.30	1	4.35	1	**4.43**
2	Express creative ideas verbally	4.30	2	3.89	5	4.33	6	4.13	6	4.67	1	4.00	5	4.25	3	**4.20**
3	Professional telephone skills and etiquette	3.80	9	4.21	2	4.33	7	4.31	2	4.11	8	4.00	6	4.10	7	**4.16**
4	Give clear and concise instructions to others	4.10	5	3.84	6	4.53	2	4.19	4	4.44	4	4.00	4	4.05	8	**4.13**
5	Listen to and summarize lengthy oral presentations	4.00	7	4.11	3	4.40	5	4.25	3	3.67	10	4.20	2	3.90	10	**4.10**
6	Speak clearly and concisely on technical information	4.10	4	3.79	8	4.47	3	3.88	7	4.33	5	3.90	7	4.20	5	**4.09**
7	Write technical reports, memos and letters	4.00	6	3.58	10	4.40	4	4.13	5	4.22	6	3.80	9	4.20	4	**4.05**
8	Foreign language skills (specify the language)	3.90	8	4.05	4	4.27	9	3.69	10	4.11	9	3.90	8	4.35	2	**4.05**
9	Express creative ideas in writing	3.60	10	3.74	9	4.27	8	3.88	8	4.56	3	4.10	3	4.20	6	**4.04**

10	Read and understand specific technical information	4.20	3	3.84	7	3.93	10	3.81	9	4.22	7	3.30	10	4.05	9	**3.90**
	E. Personal Qualities (Category Rank 1)															**4.19**
1	Loyalty to the organization	4.70	1	4.79	1	4.87	1	4.88	1	4.78	1	4.90	1	4.70	1	**4.79**
2	Positive work attitude/personality/ability to work hard	4.60	2	4.58	2	4.60	2	4.63	3	4.56	3	4.70	2	4.25	4	**4.53**
3	Work with others and be a team player in problem solving situations	4.50	3	4.37	5	4.53	3	4.25	6	4.56	2	4.60	4	4.50	2	**4.46**
4	High moral/ethical standards	4.50	4	4.32	6	4.53	5	4.56	4	4.56	4	4.50	5	4.35	3	**4.46**
5	Self-motivation	4.30	6	4.42	4	4.53	4	4.38	5	4.44	5	4.70	3	4.05	8	**4.38**
6	Work without supervision	3.90	9	4.53	3	4.33	9	4.25	7	4.44	8	4.40	7	4.25	5	**4.31**
7	Self-confidence and ability "to take a chance" and handle stress/failure/rejection	4.30	7	4.26	7	4.33	7	4.69	2	4.44	6	4.10	10	3.95	11	**4.27**
8	Work under varied conditions	4.40	5	3.95	10	4.40	6	4.06	8	4.22	9	4.40	6	4.10	7	**4.19**
9	Recognize a business opportunity	3.90	8	4.16	8	4.27	10	3.81	12	4.11	10	4.20	9	4.15	6	**4.1**
10	Take a position and defend it, sell your ideas	3.80	11	3.79	11	4.33	8	4.00	10	4.44	7	4.00	13	3.85	14	**4.01**
11	Provide leadership and make decisions	3.60	12	3.68	13	4.07	11	4.00	9	3.89	12	4.20	8	4.00	9	**3.93**
12	Manage people and delegate responsibility and authority	3.60	13	4.00	9	4.07	12	3.88	11	4.00	11	4.00	11	3.90	13	**3.92**
13	Apply technical skills and information in problems solving situations	3.80	10	3.74	12	4.07	13	3.75	13	3.78	13	4.00	12	3.95	12	**3.86**
14	Raise capital for new and ongoing business ventures	3.00	14	3.58	14	3.73	14	3.19	14	3.56	14	3.30	14	4.00	10	**3.51**
	F. Employment and Work Experiences (Category Rank 5)															**2.57**
1	Employment in International Agribusiness firm	3.80	1	2.79	1	3.73	1	2.88	1	2.56	3	2.30	5	3.20	1	**3.07**
2	Employment in Financial Institution	3.20	4	2.53	2	3.13	4	2.50	2	2.56	2	3.30	1	3.10	3	**2.89**
3	Farm Work	3.40	2	2.16	3	2.73	5	2.25	3	1.33	6	3.10	2	3.15	2	**2.62**
4	Employment in Non-Agricultural Retail business	2.60	5	2.16	4	3.40	2	2.06	5	3.22	1	2.40	4	2.55	5	**2.59**
5	Employment in Domestic Agribusiness firm	3.20	3	2.05	5	3.33	3	2.13	4	1.44	5	2.70	3	2.55	4	**2.50**
6	Government/Public Affaires Positions	2.00	6	1.26	6	1.80	6	1.94	6	1.89	4	1.50	6	1.85	6	**1.72**
	G. General Higher Education Experiences (Category Rank 3)															**3.38**
1	Foreign internship experience	3.70	2	4.00	1	4.13	3	4.13	1	4.22	1	3.60	2	3.35	3	**3.87**
2	Foreign study experience	3.70	3	4.00	2	4.20	2	3.50	4	4.00	2	3.60	3	3.65	1	**3.82**
3	General Education in the Classics/Humanities/Arts etc.	3.40	4	3.79	4	4.60	1	4.13	2	3.33	6	3.70	1	3.35	4	**3.78**
4	Experience in developing a business plan and organizing a business	4.00	1	3.89	3	4.07	4	3.50	5	3.67	3	3.30	4	3.60	2	**3.74**
5	Local industry internships experiences	3.30	5	3.26	5	3.93	5	3.63	3	3.56	4	2.70	5	2.95	5	**3.33**
6	Extra Curricular activities in university including leadership positions in student clubs and functions	2.50	6	3.21	6	2.33	7	2.75	6	3.56	5	2.70	6	2.25	7	**2.74**
7	Work as student teaching assistant or part time in university.	2.40	7	2.79	7	2.33	6	2.13	7	2.44	7	2.00	7	2.30	6	**2.37**