

Perceptions of Vegetable Growers in Balqa and Mafrq Governorates in Jordan towards Their Training Needs in the areas of Production, Marketing and Management

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ABSTRACT

The study aimed at assessing the extension educational needs as perceived by farmers in the areas of production, marketing and management and to determine whether these perceptions were associated by their socioeconomic characteristics. A random sample of 98 vegetable growers in Balqa and Mafrq Governorates in Jordan was used. Three 4-point Likert-type scales were used as instruments to gather primary data. Cronbach's alpha coefficients (0.88 to 0.91) indicated high internal consistency for the scales. Parametric and nonparametric methods were used to analyze the data based on approximations to normal distribution. Farmers in Mafrq as compared to Balqa were older, more experienced in agriculture, less educated, had less percentage of land owners and part timers and have more than 50% of their income from agriculture. Overall, higher ratings were observed for the need for training in marketing and production fields, and the rates were significantly higher for farmers in Mafrq, while ratings were low for the need of training on management for both governorates. Age, education, farming experience, type of holding, farm size and full time farming were important factors in explaining differences in the educational needs. The involvement of public extension staff in the survey adds to the applicability of needs-based extension programs as an ongoing situational analysis.

Keywords: Needs assessment, production, marketing, management, vegetable growers, Jordan.

INTRODUCTION

The main objectives of the agricultural policy in Jordan are to achieve economic efficiency and to improve farm operator's income (MOA, 1997). The scarcity of land and the increasingly limiting water resources present a long-term constraint on the

development of the agricultural sector (MOW, 2009). This calls for adopting a strategy based on supporting properly targeted farm operators with technically sound and financially feasible technologies (Campbell & Barker, 1997; MOA, 1998).

Needs assessment is the starting point in the extension programming for technology transfer to identify the producers' needs, particularly those with limited resources, in terms of their problems, solutions and possible opportunities for their agricultural development. Traditional practices to needs assessment were based on personal value judgment. Top-down research and extension organizations were not responsive to the needs of farmers. Needs were determined by agents or other public authorities outside

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the targeted communities, and programs were then developed in response to these assumed needs (Swanson, 1997). Professional needs assessment is a process for the purpose of setting priorities and making decisions regarding planning, development, operations and evaluation programs (Caffarella, 1982; Swanson, 1997; Mccaslin & Tibeziinda, 1997; Altschuld & Kumar, 2004). A variety of methods are used to collect information for needs assessment, including: survey questionnaires, focus groups, interviews with key informants, Delphi questionnaires, focus group interviews, meetings and brainstorming (Etling, 1995).

Sofranco and Khan (1988) questioned the ability of people to articulate their "needs" or preferred solutions to the conditions facing their community. Given these possibilities, the results from a survey may be an imperfect indicator of what people truly need. Farmers may find it hard to express what they need (Young, 1998). Distinctions have to be made between needs, wants, and interests which many people tend to confuse. Needs refer to something considered necessary or required to accomplish a purpose, not merely desirable or interesting (Mccaslin & Tibeziinda, 1997). Thus, surveying needs assessment has to be supported and verified by information collection from secondary data, informal contacts with extension staff through observations, key informants, consultation, group meetings, workshops and while carrying out extension activities such as demonstrations and field days (Caffarella, 1982; Caravella, 2006; Swanson, 1997).

In Tennessee, USA, three broad needs of educational needs for small farms were identified: production, marketing and management. These needs areas were comparable to those identified by farmers in other studies in Michigan (Suvedi, et al., 2000; Ekanem, et al., 2001). Farmers need to compete effectively and efficiently by utilizing commercial strategies to ensure business survival (Mcelwe & Bosworth, 2010; Kahan, 2013). Commercial farmers (e.g. in Ohio USA, Jordan...) have generally a high level of agronomic skills, but they need to be backed up by

increased business expertise. Businesses are becoming more technical and specialized in a largely competitive environment. Farmers have to broaden their management and marketing skills (Penrose, et al., 1999; Rimawi, Karablieh and Al-Kadi, 2004). This paper seeks to examine the extension educational needs as perceived by vegetable growers in Jordan in the areas of production, marketing and management.

Objectives

The specific objectives of the study are the following:

1. To describe the socio-economic characteristics of vegetable growers in Balqa and Mafraq Governorates in Jordan.
2. To assess the educational needs as perceived by growers in the areas of production, marketing and management.
3. To determine whether the growers' perceptions were influenced by their socioeconomic characteristics.

METHODOLOGY

The population for this study was comprised of the vegetable farmers in the irrigated areas of the highlands in Mafraq and Balqa Governorates. A random sample of farmers was drawn with the help of the Extension Department of the National Center of Agricultural Research and Extension (NCARE). The sample consisted of 50 vegetable growers in each of the two governorates. Forty seven growers in Mafraq and 51 growers in Balqa were eventually interviewed, and thus 98 surveys were analyzed for the study during March-October 2013.

A semi-structured questionnaire was used as a tool for data collection. It included both closed- and open-ended questions. Four-points Likert-type items were used for ratings with no middle option to avoid the central tendency bias, i.e. the tendency of respondents to avoid taking a stand by not choosing low or high ratings. The ratings are based on a scale from 1-4, with 1 representing "strongly disagree" and 4 "strongly agree". Three scales were used as to rate the farmers' needs to be informed and to improve their skills and practices in the areas of production, marketing and

business management.

Table 1 presents the characteristics of the distributions of these scales. Open-ended questions were used to provide information about their agricultural activities and suggestions about training needs and preferred extension methods. Personal interview were used for conducting the survey. The questionnaire was developed and validated by

a panel of experts from the NCARE to have sufficient content and face validity. The instrument was then field-tested to ensure usability and reliability. Internal consistency reliability was demonstrated with alpha coefficients (Table 1). Tavakol & Dennick (2011) reported that a reliability coefficient of 0.70 or higher is acceptable in most social science research situations.

Table 1: The characteristics of the distributions of the study scales (n =91)

Statistics	Production Scale	Marketing Scale	Management Scale
No. of items (rates range)	10 (10-40)	10 (10-40)	9 (9-36)
Cronbach's Alpha	0.891	0.885	0.908
Mean (standard error)	28.570(0.52)	29.97(0.49)	21.89(0.52)
Standard. Deviation	5.12	4.89	5.13
Coefficient of Variation	18.53	16.57	24.13
Confidence interval (95%)	27.5– 29.6	30.0- 30.9	20.9 – 22.9
Skewness (standard error)	-.059 (0.244)	-.543(0.244)	-.222(0.244)
Kurtosis (standard error)	.234 (0.483)	.809(0.483)	.463(0.483)
KS test of normality *	Z = 0.772 (P <0.590)	Z = 1.237 (P <0.094)	Z = 1.105 (P <0.174)

* KS is the Kolmogorov-Smirnov test of normality. The three scales are normal (P >0.05).

Descriptive and analytical statistics were employed to profile vegetable growers, and to analyze the data using the SPSS software (version 20). Based on approximations of the variables to normal distribution using the Kolmogorov-Smirnov (KS) test (Table 1), the distribution of the three scales were normal (P >0.05). Thus, parametric tests were used to analyze the data to test differences between or among groups such as t, ANOVA, Levene, LSD and Pearson Correlation tests (FCTL, 2009). Levels of the need for training were established on the basis of the rates of need for training. Rates below 24 (< 60% of the maximum rate) for the 10 items production and marketing scales were labeled as low, rates in the range of 24-29 were labeled as medium and rates beyond 29 ($\geq 75\%$) were labeled as high. Similarly for the 9 items management scale, rates in the range of 21.6 thru 26 were labeled as medium. Rates below this range were labeled as low, rates beyond 26 ($\geq 75\%$)

were labeled as high. Chi-square tests were then used to investigate associations between the levels of the need for training and selected farmers' characteristics. Using reasonable cut-off scores provide much more meaningful categorization of the levels of the need for training than the standard deviation (SD) based classification, i.e. low for one SD below the mean, high for one SD above the mean and the rest as medium (Shanfield, Hetherly & Matthews, 2001; Rimawi, 2002). For normally distributed scales, SD based categorization of the training needs levels will almost always result in about 16% with low needs, another 16% as high, and the rest (two thirds) in the middle.

RESULTS AND DISCUSSION

First Objective: Socio-economic characteristics of vegetable growers

The socio-economic factors are important in understanding and shaping attitudes, behavior and decisions

of individuals (Ajzen, 2006). Age, education, years of experience, main employment and income, farm size were investigated and shown in Table 2. The results showed that a majority of vegetable growers were 50 years (Yrs) or older (65%), but 74% of growers in Mafraq (\bar{x} =55.6 Yrs) against 54% in Balqa (\bar{x} =51.4 Yrs), and the difference between means is statistically significant (t -test: $p = 0.011$). These results were consistent with the mean age in irrigated areas (\bar{x} =52 Yrs) according to the Agricultural Census (AC) 2007 (DOS, 2009; Rimawi, 2009). The mean age is also globally in line with case of the EU-27 countries where the mean age in 2010 was 53 Yrs (European Commission, 2013).

Farmers grew vegetables such as tomatoes, potatoes, eggplant, squash, peppers, cucumber and melons. Farm area varies significantly, with a mean of 18.7 ha in Mafraq, but only 2.3 ha in Balqa ($P= 0.0001$). Overall mean area was found to be 10.3 ha, but the median was 4.7 ha, which indicates that the distribution of farmed area is skewed to the right. In the AC 2007, the overall mean farm area was 7.8 ha in Mafraq and 3.7 ha in Balqa (Rimawi, 2009). Mafraq farming area is situated in the arid zone and far

from the main urban areas where the land is relatively cheap and ground water is available for irrigation, while Balqa farming area is situated close to the main urban area where the land is quite expensive. The results showed that a majority of growers were land owners (62%), but 49% of growers in Mafraq against 74% in Balqa, (χ^2 test: $p = 0.033$). Thus, there is statistically significant association between land tenure and governorate. Most of the growers (84%) had off farm work, but all growers in Mafraq and 82% in Balqa had more than 50% of their income from agriculture. Overall, 91% of the growers have farming as their main job, income wise, against 69% in the irrigated holdings in Jordan according to the AC 2007 (Rimawi, 2009). These results showed that aged people with basic education and who are very largely dependent on farm income are still the ones most engaged in vegetable farming. Farmers in Mafraq as compared to farmers in Balqa were found to be older, more experienced in agriculture, less educated, had less percentage of land owners, part time farmers and all of them have more than 50% of their income from agriculture.

Table 2: Selected Socio-economic characteristics of farmers in Mafraq and Balqa

Characteristic by Governorate		Mean	P- Value	CI 95%	SD	CV
Age (years)	Balqa	51.4	0.011	48.50 – 54.08	8.84	17.23
	Mafraq	55.9		53.52 -58.18	7.94	14.21
	Overall	53.6		51.84 – 55.36	8.66	16.15
Education (years)	Balqa	8.88	0.054	8.31 – 10.16	3.25	36.59
	Mafraq	7.67		6.85 – 8.50	2.77	36.15
	Overall	8.30		7.68 – 8.93	3.08	37.05
Experience in agriculture (years)	Balqa	16.33	0.001	13.58 -18.15	7.75	47.44
	Mafraq	21.74		19.44 – 24.05	7.84	36.05
	Overall	18.93		17.28 – 20.58	8.21	43.39
Holding area (ha)	Balqa	2.56	0.000	1.86 – 2.74.	1.88	67.23
	Mafraq	18.71		15.02 – 22.41	12.58	73.42
	Overall	10.30		7.91-12.70	11.94	115.42

Second objective: key areas of educational needs of farmers.

Second Objective: key areas of educational needs of farmers: production related areas

The production scale was used to rate the needs for training in the production related areas. The farmers' ratings of the various needs in Mafraq and Balqa are shown in Table 3. The results showed that items with high ratings ($\bar{x} > 3.00$) include providing information on new crop varieties to promote market-oriented production (better quality, high-yielding, pest resistant, hybrid seeds...) ranked first, followed by training on the production and management skills of greenhouses (e.g. sanitation, tilling, type and timing of fertilizer application, pest control, lightening, harvesting...) and training on pest identification and control (diseases, insects, weeds...) with respect to types of pesticides,

quantities, timing, application methods and appropriate spraying equipment's. Medium rated items ($\bar{x} = 2.4-2.99$) include: developing skills on the use and maintenance of farm equipment's, machines and tools and developing practical farm skills (land preparation, planting seedlings...), creating awareness on the use of organic fertilizers (materials, timing and application methods, composting), creating awareness of the importance and methods of fertilizing based on soil testing (sampling methods, creating awareness on the use of chemical fertilizers such as types, quantities, timing, application methods...), following cropping patterns to promote soil productivity and minimize pest infections and training on sustainable farming methods (conservative and organic farming, IPM...).

Table 3: Mean ratings of farmers perceived educational needs for training in production related areas

Production scale items	Mafraq		Balqa		Overall		
	Mean	SD	Mean	SD	Mean	SD	CV
1 Providing information on new crop varieties	3.77	.428	3.29	.672	3.52	.613	0.174
2 Training on the production skills of green houses	3.45	.619	2.76	.929	3.09	.863	0.279
3 Training on pest identification and control	3.13	.494	2.88	.588	3.00	.556	0.185
4 Creating awareness on the use of chemical fertilizer	2.91	.654	2.86	.633	2.89	.640	0.221
5 Training on sustainable farming methods	3.00	.590	2.78	.832	2.89	.731	0.253
6 Creating awareness on the use of organic fertilizers	2.83	.670	2.73	.666	2.78	.666	0.240
7 Creating awareness of fertilizing based on soil testing	2.83	.670	2.73	.695	2.78	.682	0.245
8 Developing skills on the use and maintenance of farm equipment	2.62	.968	2.57	.700	2.59	.835	0.322
9 Following cropping patterns to promote soil productivity	2.60	.771	2.45	.673	2.52	.721	0.286
10 Developing practical farm skills	2.51	.930	2.53	.731	2.52	.828	0.329
Overall scale	29.64	5.06	27.59	5.01	28.57	5.115	0.179

The study found that, at least, 71% had basic education ($\bar{x} = 8.3$ Yrs), while the rest (29%) were found to be functionally literate with primary school education or they can read and write. Farmers with postsecondary education were 16% in the AC 1997 and 22% in the AC 2007 in the study area (Rimawi, 2009), against 7.7% for growers in this study. Less than 4% were found to have

educational backgrounds in agriculture against 7% of EU farm managers (European Commission, 2013) which suggests that most growers learned their profession through practical experience. Table 2 shows that farming experience varies significantly between Mafraq and Balqa (t -test: $p = 0.001$).

The rating varied in the two governorates. Ratings in

Balqa were systematically lower than Mafraa in almost all items, but none of the items in both governorates were low rated (< 2.4), which implies the need for training in the related aspects of production. As mean ratings for items, were different, the coefficient of variation (CV) was used as a measure of relative dispersion. The overall CV values ($0.17 - 0.33$) indicated that the inter-variations are moderate, and the overall value for the production scale is low (0.18). Based on the Ajzen's Theory of Planned Behavior (Ajzen, 2006), the perceptions of farmers are affected by factors such as age, land tenure, size of the farm, education and farm location which have implications on how resources are allocated by the farmers. Thus, needs are location specific, based on a particular set of farm conditions and socio economic conditions.

Second Objective: key areas of educational needs of farmers: marketing related areas

Farmers need to compete effectively and efficiently by utilizing commercial strategies to ensure business survival (Rodier, 2007; Mcelwe and Bosworth, 2010). An increasing number of farmers in the USA and in many other countries consider marketing as an important issue (Penrose, Smith and Vollborn, 1999; Suvedi, Lapinski and Campo, 2000). Farmers have to be market oriented, i.e. to make decisions on what and when to plant and where to sell in an increasingly competitive environment. The global changes of market liberalization and withdraw of governments support, improved cultivation techniques, urbanization and opportunity for international trade impact directly on farming, making it more market-oriented and thus more competitive. Therefore, farmers need assistance from extension agents to develop management skills and

competencies to cope with a changing farming environment and to run their business for profit (Shepherd, 2011; Kahan, 2013).

The marketing scale was used to rate the marketing needs related areas (Table 4). Introducing new highly demanded products ranked first ($\bar{x}=3.45$), followed by providing market information (prices, markets, expected production quantities...), creating awareness of alternative marketing outlets (contract farming, direct selling, road side, supermarkets and restaurant selling, exhibits and public markets..) and promoting competitiveness among producers to enable them to access and penetrate markets (varieties, types and qualities, packing methods, minimization of production and transportation costs...) with scores ranging from 3.28 to 3.33. Other highly rated item ($\bar{x}= 3.02$) was creating awareness of measures to reduce risk (staging planting timing, crop and market outlets diversification to satisfy specific market needs, contract selling...). Scores for the rest of the items ranged from 2.53 to 2.82 and these include developing post-harvest skills (indicators, timing, tools and harvesting methods...), creating awareness of improved marketing practices for post-harvest handling of products by the use of demonstration methods (improved harvesting timing and methods, containers, storing and transporting products), organizing specialized workshops in the areas of marketing, creating awareness of steps to organize cooperatives (to promote negotiation ability, collective and input supply transportation to reduce costs, access to new marketing outlets, providing finance...) and creating awareness of new income generating activities (direct farm selling, on farm recreation activities...). Other marketing training needs include daily or weekly export marketing information (crops, prices...).

Table 4: Mean ratings of farmers' perceived educational needs for training in marketing related areas

Marketing scale items		Mafraq		Balqa		Overall		
		Mean	SD	Mean	SD	Mean	SD	CV
1	Introducing new highly demanded products	3.68	.471	3.24	.815	3.45	.705	0.204
2	Providing market information	3.51	.547	3.16	.857	3.33	.743	0.223
3	Creating awareness of alternative marketing	3.43	.715	3.20	.800	3.31	.765	0.231
4	Promoting competitiveness among producers to enable them to access and penetrate	3.45	.503	3.12	.739	3.28	.655	0.200
5	Creating awareness of measures to reduce risk	3.15	.551	2.90	.700	3.02	.642	0.213
6	Creating awareness of improved post-harvest handling of products	2.98	.571	2.67	.683	2.82	.648	0.230
7	Organizing workshops in the areas of marketing	2.87	.647	2.71	.672	2.79	.662	0.237
8	Creating awareness of steps to organize cooperatives	2.89	.667	2.69	.707	2.79	.692	0.248
9	Developing post-harvest skills	2.79	.690	2.57	.728	2.67	.715	0.268
10	Creating awareness of new income generating activities	2.70	.749	2.37	.720	2.53	.749	0.296
Overall scale		31.45	4.33	28.61	5.01	29.97	4.89	0.163

Table 4 shows that the rating varied in the two governorates. The overall score and ratings in Mafraq were systematically higher than Balqa in every single item, but almost all the items in both governorates have medium and high ratings ($\bar{x} \geq 2.4$), which implies the need for training in the related aspects of marketing. The overall CV item values range between 0.20–0.30, which indicate moderate inter-variations are, and the overall scale value is low (0.16). The needs are location specific and they are affected by the farm and the socio economic conditions.

Second Objective: key areas of educational needs of farmers: management related areas

The operators' farm management skills are significant to the profitability of farming. In different states in the USA, Canada and many other countries, increasing percentages of farmers regard business management and farm economics as important issues (Penrose et al., 1999; Suvedi et al., 2000; Rodier, 2007). Most commercial farmers in Jordan already have a high level of agronomic skills, but some of them saw a need to build on these with increased business expertise to

help address risks and the threats and opportunities they face. As businesses are becoming more technical and specialized, farmers have to broaden their management and marketing skills in largely competitive environment (Rimawi, Karablieh and Al-Kadi, 2004; Kahan, 2013).

The respondents were asked to rate their needs for training in the management related areas (Table 5). The table showed that improving loan management skills (type and credit sources, assessing interest rates, repayment scheduling...) ranked first with a medium score ($\bar{x} = 2.85$). This was followed by developing agri-business management skills (preparing market plans including identifying marketing mix; what product, variety, quantity, timing, markets and at what price ($\bar{x} = 2.63$), improving financial farm management skills (recording production, prices per crop and field...) ($\bar{x} = 2.55$) and improving technical farm management skills (dividing the farm into fields, recording quantities of inputs, seeds, seedlings, water for irrigation, fertilizers, and pesticides per field ($\bar{x} = 2.54$). The other significant need identified by farmers ($\bar{x} = 2.51$) was the need to create awareness of farm accounting for small producers

(farm records and record-keeping). The rest of the items had low ratings ($\bar{x} < 2.4$) and include the need to train farmers to improve their ability to use management concepts and techniques such as book-keeping, budgeting, and financial statements, developing planning skills in the area of budgeting (enterprise, partial and cash flow budgeting...), developing financial control and analyses skills (loss and profit statements, balance sheets...), creating awareness of laws, regulations, policies and agricultural directives and technical and financial use of computers in agri-business management. Table 5 shows limited variation of the ratings in the two governorates.

The overall CV values are moderate, more close and range between 0.28 – 0.33. This implies that there is general consensus among the respondents regarding the low need for training in the different areas of the management scale. This requires further investigation to understand why

farmers feel this way despite the importance of farm business management skills to business viability in an increasingly competitive market. Thus, efforts have to be made with the growers to realize that they can benefit from improved farm management skills.

The overall score of the management scale ($\bar{x}=21.89$) accounts for 61% of the maximum value, against 71% for the production scale and 75% for the marketing scale. This is also evident in Table 6 as only 19% were in the high level of the need for training in management against 63% for marketing and 44% for production. This is not to be expected, and implies that farmers do not feel the need for training in the management related aspects, in spite of the fact that agri-business management skills have a profound importance to the profitability of farming and are far more valuable and have long-term positive effects. This finding supports previous research in Australia and the USA that many

Table 5: Mean ratings of farmers' perceived educational needs for training in management related areas

Management scale items	Mafraq		Balqa		Overall		
	Mean	SD	Mean	SD	Mean	SD	CV
1 Improving loan management skills	3.13	.741	2.59	.942	2.85	.889	0.312
2 Developing agri-business management skills	2.64	.764	2.63	.720	2.63	.738	0.281
3 Improving financial farm management skills	2.51	.831	2.59	.753	2.55	.788	0.309
4 Improving technical farm management	2.68	.810	2.41	.804	2.54	.814	0.320
5 Creating awareness of farm accounting for small producers	2.53	.747	2.49	.674	2.51	.707	0.282
6 Creating awareness of laws, and agricultural directives	2.23	.698	2.27	.723	2.26	.708	0.313
7 Developing financial control and analyses	2.15	.722	2.24	.710	2.19	.713	0.326
8 Developing planning skills in the area of budgeting	2.19	.680	2.18	.623	2.18	.648	0.297
9 Use of computers in agri-business management	2.11	.759	2.24	.710	2.17	.733	0.338
Overall scale	22.17	5.18	21.63	5.13	21.89	5.133	0.234

producers in different parts of the world do not perceive the need to participate in training activities to upgrade their management skills, and were reluctant to participate in training activities (Murray-Prior & Dymond, 2000; Breazeale, Myer & Hill, 2001; Rimawi, Karablieh and Al-Kadi, 2004). A possible explanation for this behavior is the

degree to which the results of an innovation (improved management practices) are visible to others. Rogers (1995) stated that the observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. The immediate benefits of improved management skills are not clear enough to the growers.

The passive attitude of the operators of the significance of farm management skills to business profitability is an indicator of the complexity of integrating farm management in extension work.

To conclude on the training needs areas, key production educational needs include providing information on new crop varieties, greenhouses skills, pest identification and control. Key areas of marketing educational needs include introducing new highly demanded products, providing market information, creating awareness of alternative marketing outlets and promoting competitiveness among producers to enable them to access and penetrate markets. The rating varied in the two governorates with lower ratings for Balqa in almost all items. Key management educational needs include improving loan management skills, developing agri-business management skills, improving financial and technical farm management skills. Rating scores were generally low and similar in both governorates. Making decisions and setting priorities in the above three related areas have to be based on information gathered from the people likely to be affected by these extension programs (Caffarella, 1982; McCaslin & Tibeziinda, 1997).

Table 6: Distribution of farmers by the levels of training needs (%)

Levels	Production needs	Marketing needs	Management needs
Low	15.3	7.1	45.9
Medium	40.8	30.6	34.7
High	43.9	62.3	19.4
Total	100.0	100.0	100.0
/overall (n-98)			

Third Objective: Statistical analysis of selected characteristics and training needs scales

Table 1 shows that the three scales were normally distributed (KS test: $p > 0.05$). The distributions have negative skew, but the skewness coefficients are much less than the values of 2 standard errors of the skewness coefficient for the three scales. This suggests that the distribution is close to be symmetrical around the mean. Similarly, the kurtosis coefficients are much less than the values of 2 standard errors of the kurtosis for the three scales. These results indicate that the scales distributions have no significant skewness or kurtosis problem (Brown, 1997), and justify the use of parametric data analysis methods to test differences between groups.

Table 7 presents the results of t and ANOVA tests to investigate the differences in the mean ratings of need for training as expressed in the production, marketing and management areas by the farm and farm operator's attributes. Significant differences were observed by governorate, age, education level, type of holding (for sharecroppers) and farmed area. Farmers in Mafraq governorate were more likely to have high rates for the need for training on production ($p = 0.047$) and marketing areas ($p = 0.004$). But, rates for the need for training on management were not significantly different ($p = 0.604$). Age and education were not associated with rates for the need for training in production and marketing areas, but younger farmers below 45 Yrs ($p < 0.009$) and those with secondary education or higher ($p < 0.024$) were more likely to rate highly the need for training on management than older farmers. Significantly higher ratings were observed for the need for training on marketing for large land holders (beyond 5 ha). Higher percentage of the non-full time farmers (time wise) were more likely to be in the high level of the need for training in production and marketing areas, and for training in management areas, but with lower significance.

Table 7: Statistical relationships between perception scales and socio-economic characteristics (n= 98)

Factors	Test	Value	P-value
The production training needs scale tests results			
Governorate (Mafraqa, Balqa) *	t	t = 2.012	0.047
Age (<40, 40-50, >50 Yr.)	F	F = 0.920	0.402
Education level (≤ 6, 7-9, 10-12, >12 Yrs)	F	F = 0.209	0.890
Type of holding (owned, rented and sharecropped)	F	F = 4.126	0.019
Area group (≤ 1, 1.1-3, 3.1-5, 5.1-10, 10.1-19.9, ≥ 20 ha)	F	F = 1.794	0.122
Time spent in agriculture (full time, > 50% & <50% of time)	χ ²	χ ² = 13.641	0.009
The marketing training needs scale tests results			
Governorate (Mafraqa, Balqa)	t	t = 2.988	0.004
Age group (-44, 45-59, ≥60 Yrs)	F	F = 0.339	0.714
Education level (≤ 6, 7-9, 10-12, >12 Yrs)	F	F = 0.302	0.824
Type of holding (owned, rented and sharecropped)	F	F = 1.391	0.254
Area group (≤ 1, 1.1-3, 3.1-5, 5.1-10, 10.1-19.9, ≥ 20 ha)	F	F = 2.477	0.038
Time spent in agriculture (full time, > 50% & <50% of time)	χ ²	χ ² = 6.600	0.002
The management training needs scale tests results			
Governorate (Mafraqa, Balqa)	t	t = 0.521	0.604
Age group (-44, 45-59, ≥60 Yrs)	F	F = 6.653	0.002
Education level (≤ 6, 7-9, 10-12, >12 Yrs)	F	F = 4.663	0.004
Type of holding (owned, rented and sharecropped)	F	F = 0.341	0.712
Area group (≤ 1, 1.1-3, 3.1-5, 5.1-10, 10.1-19.9, ≥ 20 ha)	F	F = 1.629	0.160
Time spent in agriculture (full time, > 50% & <50% of time)	χ ²	χ ² = 9.078	0.059

* ANOVA tests: based on Levene test, equal variances assumed

As expected, strong negative correlation between the management scale and the age was observed (Pearson's $r = -0.401$, $N = 95$, $p = 0.0001$), which indicates that higher ratings on the need for training on farm management was associated with lower age. Similarly, strong positive correlation between the management scale and the years of education was observed (Pearson's $r = 0.312$, $N = 96$, $p = 0.002$), which indicates that higher ratings on the need for training on farm management was associated with more years of education. Weak negative correlation between the management scale and the years of experience was observed (Pearson's $r = -0.159$, $N = 86$, $p = 0.072$), which indicates that higher ratings on the need for training on farm management was associated with

less years of experience in agriculture. This suggests that the less educated, older and more experienced and operators were less likely to value highly the need for training on farm management.

Type of holding was associated with rates for the need for training on production ($p = 0.019$), but not for either of the need for training on marketing or management (Table 7). Sharecropper farmers were more likely to rate highly the need for training on production and to a much lesser extent for the need for training on marketing ($p = 0.10$). Farm size classes was associated with rates for the need for training on marketing ($p = 0.038$), but not for either of the need for training on production or management (Table 7). Farmers with

larger farms (over 5 ha) were more likely to rate highly the need for training on marketing. Strong positive correlation between the marketing scale and the farm area (locally extreme upper farm areas over 20 ha were excluded) was observed (Pearson's r 0.288, N 86, p 0.004), which indicates that higher ratings on the need for training on farm management was associated with larger (but not extreme) farm areas.

By classifying the production, marketing and management scales into low, medium and high levels (Table 6) as explained in the methodology, the t and F test results were consistent with the results obtained by the test of independence (χ^2) with probabilities of less than 0.05. For example, higher percentage of the younger farmers (χ^2 : $p=0.008$) and of those with secondary education or higher (χ^2 : $p=0.013$) were more likely to be in the high level of the training needs in management. Similarly, higher percentage of the non-full time farmers (time wise) were more likely to be in the high level of the training needs in production areas (χ^2 : $p=0.009$), and marketing areas (χ^2 : $p=0.002$) and for training in management areas, but with lower significance (χ^2 : $p=0.059$). Yet, income-wise, no significant relationship was found between farm income and the rating of the need for training on production, marketing and management areas, which indicates that operators were more likely to have similar perception for the need for training irrespective of the income gained from farming. Thus, time may be what really counts for classifying farmers into full and part timers.

Table 7 shows that significantly higher ratings were observed for training needs in production (and in marketing with low p value = 0.10) for farmers in Mafraq and for sharecroppers and farmers with larger farms (Over 5 ha). Similarly, significantly higher ratings were observed for training needs in management for farmers with younger age and secondary education or higher.

Implications and recommendations

The study emphasize the importance of meeting the specific and more pressing extension education needs in two major vegetable areas of Jordan in the fields of production, marketing and management. Training needs of growers vary by their socio-economic characteristic as they are important in understanding and shaping attitudes, behavior and decisions of individuals (Ajzen, 2006). The study also stress the significance of farm management and marketing extension to promote business-like farming, and call for more efforts to integrate farm management component in agricultural extension, to keep agriculture viable and competitive.

The methodology adopted in this study would contribute to the initiation of need assessment surveys to identify farmers' needs in an ongoing situation analysis. This requires integration mechanism of the needs based assessment approach to develop appropriate programs and educational activities. A detailed manual can be made available to help agents and other extension workers on how to conduct needs assessment. A variety of needs assessment techniques have to be outlined and compared to enable the agents to choose the best technique for their purposes (Etleng, 1995). A well thought out and documented needs assessment is not only beneficial to the extension agents, but may also be valuable to others who work with or for similar clientele such as in rural development and nutrition and health care. The actual involvement of the director of extension, senior and field extension agents in the research project contributes to the application of needs-based agricultural extension approach.

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REFERENCES

- Altschuld J & Kumar, D. (2004). Needs assessment. In: Mathison S, editor. *Encyclopedia of evaluation*. Thousand Oaks, CA: Sage Publications. The abstract is available at:
http://www.sage-e-reference.com/evaluation/Article_n368.html
- Ajzen I. (2006). Behavioral Interventions Based on the Theory of Planned Behavior. Available at:
<http://people.umass.edu/aizen/pdf/tpb.intervention.pdf>
- Breazeale, D., Myer, G. & Hill, G. (2001). What do you know about your clients? Implications for extension financial management training. *Journal of Extension* 39(6). Available at <http://www.joe.org/joe/2001december/rb5.html>.
- Brown J. (1997) Shiken: JALT testing & evaluation sig newsletter, 1(1), April, 1997. Statistics corner, questions and answers about language testing statistics: Available at <http://jalt.org/test/PDF/Brown1.pdf>
- Caffarella, R. (1982). Identifying client needs, *Journal of Extension* 20: (July/August) 5-11.
 Available at: <http://www.joe.org/joe/1982july/82-4-a1.pdf>
- Campbell D, Barker St. Clair. (1997). Selecting appropriate content and methods in program delivery. In: Swanson B, Bentz R, Sofranko A, editors. *Improving agricultural extension; a reference manual*. FAO, Rome.
- Caravella, Jennifer. (2006). A needs assessment method for extension educators, *Journal of Extension* 44(1). Available at: <http://www.joe.org/joe/2006february/tt2p.shtml>
- DOS. (2009). General results of the Agricultural Census 2007. Department of Statistics, Amman, Jordan.
- Ekanem, E., Singh, S., Muhammad, S., Tegegne, F. & Akuley-Amenyenu, A. (2001). Differences in district extension leaders' perceptions of the problems and needs of Tennessee small farmers. *Journal of Extension* 39: 4. Available at: <http://www.joe.org/joe/2001august/rb4.php>
- Etling, A. (1995). Needs assessment: A handbook. *Journal of Extension* 33(1). Available at: <http://www.joe.org/joe/1995february/tt1.html%20>
- European Commission. (2013). Rural development in the EU statistical and economic information report 2013. European Commission Directorate-General for Agriculture and Rural Development. Available at: http://ec.europa.eu/agriculture/statistics/rural-development/2013/full-text_en.pdf
- FCTL. (2009). The basics of data management and analysis, a user guide. The Faculty Center for Teaching and Learning, University of Central Florida. Available at: http://www.fctl.ucf.edu/researchandscholarship/sotl/toolsresources/content/spss_manual.Pdf
- Kahan D. (2013). Market-oriented farming: an overview. Farm management extension guide (1). FAO, Rome.
- McCaslin N& Tibeziinda J. (1997). Assessing target group needs. In: Swanson B, Bentz R, Sofranko A, editors. *Improving agricultural extension; a reference manual*. FAO, Rome.
- McElwee, G. & Bosworth, G. (2010). Exploring the strategic skills of farmers across a typology of farm diversification approaches. *Journal of Farm Management* 13(12), pp.819-38. Available at: http://www.academia.edu/972161/Exploring_the_strategic_skills_of_farmersacross_a_typology_of_farm_diversification_approaches
- MOA. (1997). The Agricultural policy, Ministry of Agriculture, Jordan.
- MOA. (1998) National strategy for agricultural extension, Ministry of Agriculture, Jordan.
- Murray-Prior R. & Hart D, Dymond J. (2000). An Analysis of Farmer Uptake of Formal Farm Management Training in Australia. *Australian Journal of Experimental Agriculture* 40(4).
- MOW. (2009). National water strategy, Ministry of Water, Jordan.

- Penrose D, Smith P. & Vollborn E. (1999). Production, processing, and marketing opportunities for Athens county, Ohio farmers: assessing needs and creating solutions. *Journal of Extension*, 37 (6). Available at: <http://www.joe.org/joe/1999december/rb2.php>
- Rimawi A. (2002). The role of Jordanian women farmers in livestock production with implications to agricultural extension education. *Journal of International Agricultural and Extension Education*, 9 (1).
- Rimawi A, Karablieh E & Al-Kadi A (2004) An investigation into the perceived farm management and marketing educational needs of farm operators. *Journal of Agricultural Education*, 45(3).
- Rimawi A. (2009). Agricultural farm structure in Jordan: holding and holder characteristics. A paper presented to the workshop of analyzing 2007 Agricultural Census, Department of Statistics, Amman, Jordan.
- Rodier M. (2007). Farm business management practices of agricultural producers (Ap.). In: O'Reilly S, Keane M, Enright P, editors. In: proceedings of the 16th International Farm Management Association Congress. A vibrant rural economy – the challenge for balance, UCC, Cork, Ireland, pp. 158-165.
- Rogers, Everett. (1995). *Diffusion of Innovations*. 4th edition. New York, USA: the Free Press.
- Shanfield S, Hetherly V. & Matthews K. (2001). Excellent supervision; the residents' perspective. *Journal of Psychotherapy Practice and Research* 10(1): 23–27. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3330630/>
- Shepherd A. (2011). Understanding and using Market Information. Marketing Extension Guide 2, FAO 2011.
- Sofranko J. and Khan, A. 1988. It's not that simple *Journal of Extension* 26 (4).
- Suvedi M, Lapinski K & Campo S. (2000). Farmers' perspectives of Michigan state university extension: trends and lessons from 1996 and 1999. *Journal of Extension* 38 (1). Available at: <http://www.joe.org/joe/2000february/a4.php>
- Swanson, B. (1997). Strengthening research-extension-farmer linkages. In: Swanson B, Bentz R, Sofranko. A, editors. Improving agricultural extension; a reference manual. FAO, Rome.
- Tavakol, M & Dennick, R. (2011). Making sense of Cronbach's alpha. *IJME*. 2011; 2:53-55. ISSN: 2042-6372, DOI: 10.5116/ijme.4dfb.8dfd.53, Available at: <http://www.ijme.net/archive/2/cronbachs-alpha.pdf>
- Young, R. (1998). Determining needs of farmers for management knowledge. *Journal of Extension*, 36 (3). Available at: <http://www.joe.org/joe/1998june/iw1.html>.

تقييم منتجي الخضار في محافظتي البلقاء والمفرق في الأردن لاحتياجاتهم التدريبية في مجالات الإنتاج والتسويق والإدارة

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ملخص

استهدفت هذه الدراسة تقييم الاحتياجات الإرشادية كما يراها مزارعي الخضار في مجالات الإنتاج والتسويق والإدارة . استخدمت ثلاثة مقاييس ليكرت رباعية كأداة لجمع البيانات الأولية من عينة عشوائية من 98 مزارعا في محافظتي البلقاء والمفرق في الأردن. تراوحت قيم معامل ألفا كرونباخ بين 0.88 و 0.91، الأمر الذي يعكس وجود اتساق داخلي عالٍ في مقاييس الدراسة. استخدمت أساليب تحليل البيانات المعلمية وغير المعلمية في ضوء مقارنة توزيع مقاييس الدراسة للتوزيع الطبيعي. أظهرت النتائج أن مزارعي المفرق مقارنة بنظرائهم في البلقاء أكبر عمراً وأكثر خبرة في الزراعة وأقل تعليماً ولديهم نسبة أقل من المالكين في الحيازات الزراعية ومن غير المتفرغين للزراعة ونسبة أكبر من بينهم تشكل الزراعة أكثر من 50% من الدخل. أشارت نتائج الدراسة أن اتجاهات المزارعين جاءت عالية بشكل عام نحو احتياجات التدريب في مجالات التسويق والإنتاج ، وكانت المتوسطات أعلى بشكل جوهري لمزارعي المفرق، بينما كانت الاحتياجات متدنية للمزارعين في كلا المحافظتين في مجال الإدارة. وقد وجد أن متغيرات العمر والتعليم والخبرة في الزراعة ونوع وحجم الحيازة والزراعة المتفرغة من العوامل المهمة التي تفسر الفروق بين الاحتياجات التعليمية. وتسهم مشاركة عاملين في الإرشاد الزراعي العام في زيادة فرص تبني برامج للإرشاد الزراعي في ضوء تقييم وتحليل دوري ميداني لاحتياجات المنتجين من خدمات الإرشاد.

الكلمات الدالة: تقييم الاحتياجات، الإنتاج ، التسويق، الإدارة، مزارعي الخضار، الأردن.

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