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Analysis of the Training Needs of Agricultural Extension Experts Associated with Environmental Security in Agriculture

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Abstract: The aim of this study was to identify the training needs of extension experts related to Environmental Security in Agriculture (ESA) in Khuzestan Province, Iran. The sustainable use of environment for agriculture has become a global priority of vital importance, requiring urgent solutions in view of intensifying competition. Based on multiple researches training is a key input and requirement, of sustainable resources management in agriculture. The population consisted of all extension experts in the province (N = 96). By census method all of experts were interviewed. Consequently 89 questionnaires were analyzed. Ranking indicated that the six most important training needs related to ESA were: (1) new irrigation systems, (2) water productivity and efficiency in agriculture, (3) food safety and pesticide residues, (4) biological systems, (5) economics of sustainable agriculture and (6) water quality with respect to agrichemicals. As revealed that level of education, perception of experts regarding ESA, social participation and level of job satisfaction may well account for 61% of changes in knowledge of experts regarding ESA.

Key words: Training need, extension experts, environmental security in agriculture

INTRODUCTION

During the past decades, agricultural development policies have been accentuating external inputs as the factor to increase food production. This has led to growth in global consumption of pesticides, inorganic fertilizer and tractors and other machinery (Roling and Pretty, 1997). These processes have caused conditions that promote unsustainability in agriculture (Ommani *et al*., 2008). A necessary condition for sustainable agriculture is that large number of farming must be motivated to use coordinated resource management. Thus, the success of sustainable agriculture depends on motivations, skills, knowledge and action taken by groups or communities as a whole (Roling and Pretty, 1997). It is comfortable to imagine agricultural extension and education as achieving its extreme economic impact and sustainability in agriculture by providing information to induce the following sequence (Evenson, 1997):

A : Farmer awareness
K : Farmer knowledge, through testing and experimenting
A : Farmer adoption of technology or practices
P : Changes in farmers productivity

Agricultural extension is a public service for Human Resource Development (HRD) in the agricultural sector (Van den Ban and Hawkins, 1996) and the role of extension is very important to

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support sustainable agriculture (Karami, 1995; Toness, 2001; Ahmadvand and Karami, 2007). Multiple studies in Iran showed that, nevertheless positive effects, there are difficulties, barriers, misunderstandings and weaknesses in the transference of new technology and information from Agricultural Extension Instructors (AEIs) to farmers (Ommani *et al*., 2008). Lacking the sufficient linkage between extension and research organizations has also influenced human resource development in extension systems in Iran and has been a barrier for transference of new technology to farmers. Also, this obstacle exists in water sector of agriculture. The major consumer of water in Iran is the agriculture sector (Hasheminia, 2004). Considering unsustainable agricultural conditions of Iran (Ommani *et al*., 2008), organizational recession and inability of current supportive policies (Allahyari and Chizari, 2008) to accomplish of sustainability, it seems that agricultural system require a new structure and methods to achieve sustainability objectives.

It seems that knowledge and related information, skills, technologies and attitudes will play a key role in the sustainable agriculture. Consequently, sustainable agriculture system is an information-intensive system because inputs have been replaced by skills, labors and management (Roling, 1994; Pretty, 1995; Garforth and Lawrence, 1997; Chizari *et al*., 1999; Cho and Boland, 2004).

The purpose of this study was to identify and prioritize the training needs of extension experts in Khuzestan Province, Iran regarding ESA. Specifically, the objectives of the study were to:

- Describe extension experts by demographic characteristics
- Identify the training needs of extension experts regarding ESA
- Determine the relationship among selected variables and knowledge of extension experts regarding ESA

MATERIALS AND METHODS

The data were collected between January and April 2008 through a questionnaire mailed to the 110 agricultural extension experts of Khouzestan Province of Iran. Eighty nine agricultural extension experts returned questionnaires yielding an overall response rate of 80.9%. The research method employed was correlative-descriptive. The population consisted all extension experts in Khuzestan Province (N = 89) was selected. By census method all of extension experts were interviewed. A pilot test was conducted with 30 extension experts in Esfahan Province. Questionnaire reliability was estimated by calculating Cronbach,'s alpha. Reliability for the perception and training needs of extension experts respectively were estimated at 0.915 and 0.871. Collected data were analyzed using the Statistical Package for the Social Sciences.

RESULTS AND DISCUSSION

Extension Experts' Demographic Profile

Here, describe extension experts' demographic profile in Khuzestan Province of Iran. Approximately, 38.2% of respondents were between 20 to 30 years of age and 41.6% of them between 30 to 40 years of age (Table 1). Most respondents (52%) reported work experience, including inside of extension, 1 to 10 years.

Training Needs of Extension Experts Regarding ESA

To address training needs of extension experts 12 items were asked from respondents to rate based on their importance and also their potential priority allocated to them by the extension experts in the next years. Ranking based on mean and standard deviation by using coefficient of variation indicated that the six most important training needs of extension experts were: (1) new irrigation

Table 1: Extension experts' demographic profile, Khuzestan Province, Iran, 2008 (N = 89)

Variables	f[1]	%	Cum %[2]
Age (years)			
20 to 30	34	38.2	38.2
31 to 40	37	41.6	79.8
41 to 50	14	15.7	95.5
50<	4	4.5	100.0
Total	89	100.0	
Level of education			
Bachelor of science	77	86.5	86.5
Master of Science	11	12.4	98.9
Doctorate	1	1.1	100.0
Total	89	100.0	
Gender			
Male	75	84.3	84.3
Female	14	15.7	100.0
Total	89	100.0	
Work experience (years)			
5 or less	23	25.8	25.8
6 to 10	20	22.5	48.3
11 to 15	18	20.2	68.5
16 to 20	16	18.0	86.5
21 or more	12	13.5	100.0
Total	89	100.0	

[1]: Frequency, [2]: Cumulative percent

Table 2: Training needs of extension experts regarding ESA, Khuzestan Province, Iran, 2008 (N = 89)

	What areas of ESA do experts desire training?															
	Without		Very low		Low		Average		High		Very high					
Training topics	f	%	f	%	f	%	f	%	f	%	f	%	Mean*	SD[1]	CV[2]	Rank**
New irrigation systems	----	----	----	----	----	----	----	----	47	52.8	42	47.2	4.471	0.502	0.112	1
Water productivity and efficiency in agriculture	----	----	----	----	----	----	7	7.9	47	52.8	35	39.3	4.314	0.614	0.142	2
Food safety and pesticide residues	----	----	----	----	----	----	8	9	22	24.7	59	66.3	4.573	0.665	0.145	3
Biological systems	----	----	----	----	7	7.9	----	----	34	38.2	48	53.9	4.382	0.846	0.193	4
Economics of sustainable agriculture	----	----	----	----	----	----	29	32.6	33	37.1	27	30.3	3.977	0.797	0.200	5
Water quality with respect to agrichemicals	----	----	----	----	----	----	27	30.3	24	27.0	38	42.7	4.123	0.850	0.206	6
Educational, communication/extension in sustainable agriculture	----	----	----	----	----	----	28	31.5	21	23.6	40	44.9	4.134	0.868	0.209	7
Integrated insect pest management	----	----	----	----	7	7.9	9	10.1	42	47.2	31	34.8	4.089	0.874	0.213	8
Organic matter management	----	----	----	----	20	22.5	16	18	33	37.1	20	22.5	3.595	1.073	0.298	9
Identifying appropriate cultivation models	----	----	7	7.9	----	----	21	23.6	15	16.9	46	51.7	4.044	1.214	0.300	10
Crop rotations	----	---	7	7.9	13	14.6	1	1.1	14	15.7	54	60.7	4.067	1.388	0.341	11
Recycling farm waste	----	----	7	7.9	7	7.9	22	24.7	9	10.1	44	49.4	3.853	1.327	0.343	12

*: 0 = Without, 1 = Very low, 2 = Low, 3 = Average, 4 = High, 5 = Very high; **: 1 = Highest rank, 12 = Lowest rank; [1]: Standard Deviation; [2]: Coefficient of Variation

systems, (2) water productivity and efficiency in agriculture, (3) food safety and pesticide residues, (4) biological systems, (5) economics of sustainable agriculture and (6) water quality with respect to agrichemicals (Table 2).

Correlation Coefficients and Regression Analysis between Studied Variables and Knowledge of Extension Experts Regarding ESA

The result of correlation coefficient in Table 3 show that there was significant relationship between the knowledge of extension experts regarding ESA and level of job satisfaction, level of education, perception of extension experts about ESA and social participation ($p<0.01$).

Table 3: Correlation between selected variables with knowledge of extension experts regarding ESA, Khuzestan Province, Iran, 2008 (N = 89)

Variables	r	Significant
Social participation	0.481	0.000***
Income	0.011	0.109
The extend of information seeking motivation	0.028	0.101
Level of job satisfaction	0.612	0.000***
Business size	0.008	0.198
Position	0.049	0.089
Level of education	0.369	0.000***
Perception regarding ESA	0.439	0.000***

***: $p<0.001$

Table 4: Liner regression for predict changes in knowledge of extension experts regarding ESA, Khuzestan Province, Iran, 2008 (N = 89)

Variables	B	SE B	Beta	t-value	t-sig.
Level of education (X_1)	0.410	0.323	0.234	2.761	0.000
Perception of experts regarding ESA (X_2)	0.316	0.531	0.201	3.456	0.000
Social participation (X_3)	0.297	0.347	0.455	3.954	0.000
Level of job satisfaction (X_4)	0.408	0.647	0.852	3.296	0.000
Constant	3.128	1.344	-	4.012	0.000
F = 12.875					Sig. F = 0.0000
R = 0.783					$R^2 = 0.613$

Level of education (X_1), perception of experts regarding ESA (X_2), social participation (X_3) and level of job satisfaction (X_4), may well explain for 61% ($R^2 = 0.613$) changes in knowledge of extension experts regarding ESA. This relationship is described in the following formula (Table 4):

$$Y = a + b_1X_1 + b_2X_2 + \ldots$$
$$Y = 3.128 + 0.410\ X_1 + 0.316\ X_2 + 0.297\ X_3 + 0.408\ X_4$$

CONCLUSION AND RECOMMENDATIONS

Ranking based on mean and standard deviation by using coefficient of variation indicated that the six most important training needs of extension experts were: (1) new irrigation systems, (2) water productivity and efficiency in agriculture, (3) food safety and pesticide residues, (4) biological systems, (5) economics of sustainable agriculture and (6) water quality with respect to agrichemicals. Also, the result of correlation coefficient show that there was significant relationship between the knowledge of extension experts regarding ESA and level of job satisfaction, level of education, perception of extension experts about ESA and social participation ($p<0.01$).

Based on the mentioned results, it can be suggested that during the process of planning and development of educational programs and approaches for delivering information about ESA to experts, taking most important training needs of extension experts and account the related variables in the process of recognizing experts should be consisted as being very important. A focus on targeted training needs can also serve to enhance program effectiveness, by upgrading experts' skills in sustainability.

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