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Perceptions of Iranian Agricultural Extension Professionals Toward Sustainable Agriculture Concepts

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ABSTRACT

The purpose of this study was to conduct a descriptive survey to study the attitudes and perceptions of Iranian agricultural extension professionals on the concepts and thoughts of sustainable agriculture. The dimensions were production efficiency, economic viability, social responsibility and environmental sustainability. The target population of this study consisted of faculty members of universities in agricultural extension education, extension chairmen in provinces and extension specialists of deputy of agricultural extension and farming system in the Ministry of Agriculture in Iran. A sample consisting of 87 respondents was selected through random sampling. The instrument used for assessing the attitude of respondents on the concepts of sustainable agriculture was a questionnaire by reliability 0.72. Replies of respondents indicated that the attitude and perceptions of Iranian agricultural extension professionals on the concepts of sustainable agriculture were moderate (M=78.18, SD=7.23). The social responsibility dimension by mean 4 (SD=0.52) and the economic viability by mean 2.91 (SD=0.56) showed the best and poorest attitude of respondents, respectively on the concepts of sustainable agriculture. Responses were grouped based on the differences in standard deviation of mean, which revealed that 73.4% of respondents had moderate attitude towards concepts of sustainable agriculture. The results of Kruskal Wallis test revealed no significant differences in the perceptions of respondents in terms of their age, level of education, years of experiences and organizational post.

Key Words: Agricultural extension; Sustainability; Sustainable agriculture

INTRODUCTION

Currently, the world shows extensive worries on the destructive effects of advanced agricultural technologies on the environment, natural resources and long term sustainability of agronomy systems. Soil degradation, erosion, water pollution, excessive use of chemicals, waste of water, decreasing ground water tables, destruction of natural habitats for wildlife and insects and pests resistance against insecticide and pesticide are only a few of the concerns expressed by environmentalists, ecologists, agricultural professionals, policy makers, farmers and public (Leeuwis, 2004; Al-Subaiee *et al*., 2005). Despite these environmental effects at many places, the modern agriculture has been involved in many economic and social changes both in the industrial and developing countries. Among this involvement one may name: loss of job, transfer of economic opportunities from men to women, increasing specialization in livelihood, the rural institutions becoming governmental and many other cases (Pretty, 1995).

Sustainable agriculture, as a managerial philosophy and a system that provides agricultural needs of both present and future generations has raised as a major challenge of the 21st century to meet these complications and natural and human difficulties; that is, agriculture should be consume less and be sustainable more (Pretty, 1995; Williams, 2000; Qamar, 2002; Rasul & Thapa, 2003; Shariate *et al*., 2003; Leeuwis, 2004; Shahvali *et al*., 2005; Ahmadvand *et al*., 2005). At present, 23 million people are earning directly from agriculture and nearly 3.5 million of active population is working in this sector (Asadi & Shams, 2003). However, how those active in agricultural and natural resource sectors deal with the basic natural resources needed for agriculture? A review on the statistics and official figures of natural resources answers this question. Iran has first rank in soil erosion in the region (Middle East) and second rank in the overall world. It means that, there is 33 tons of soil per hectare under erosion and destruction. The chemical fertilizers use in each hectare is estimated to be 3 tons. More than 57% of recoverable water of Iran is waste without being used. 15% of the farm lands are suffering from a combination of saline, sodium and paldual problems as a result of excessive irrigation. Based on the reports, the annual consumption of pesticides and insecticides in Iran is 21000 tons and these toxic substances are used with no safety system. Excessive use of these toxics is another

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problem. As an example, the consumption of Diazinon poison on the rice farm lands of Guilan is reported to be 5 to 10 times of necessary amount. The wood lands are experiencing similar situation in un-suitability terms and the destruction rate of woods and pastures is 360 m s^{-1} (Makhdoum, 1998).

The first step in sustainability plans is to need educated agents in sustainable agriculture that could develop their understanding, qualification and ability to teach and communicate development concepts (Al-Subaiee *et al*., 2005); nonetheless, researches show that the agricultural extension professionals and experts have problems in the very first step; that is understanding the concept of sustainability (Karami & Hayati, 1998; Chizari *et al*., 1999; Chizari *et al*., 2006). This indicates the necessity of undertaking a research work in this issue.

Many efforts have been made to give a definition on sustainability in an abstract way. The concept of sustainable agriculture became popular in 1987; however, before that in 1940s, it was used as synonyms of terms such as organic, natural, ecological and low input agriculture (Lockeretz, 1990; Koochaki, 1996; Jayaratne *et al*., 2000). The term sustainability was used subsequently after the economic, social and particularly environmental consequences of the human activities (Nikdokht & Zamani, 2002). Since the definition of Brount Land Commission on sustainable development in 1987, at least more than 80 definitions have been made, each with delicate differences from the other and emphasizes on special values, priorities and goals (Pretty, 1995 & 1998). Sustainable agriculture has been defined in many ways and people's views of it depend on their areas of interest and background (Koochaki, 1996). The farmers, environmentalists, protectors of natural resources and rural settlers have various interests and concerns on this issue and thus, each give a separate definition on sustainable agriculture; thus, there is no unique definition for sustainable agriculture (Beus & Dunlap, 1990; Karami & Hayati, 1998; Leeuwis, 2000).

The main purpose of the study was to describe Iranian agricultural extension professionals' perceptions regarding concepts of sustainable agriculture. Specific objectives were to (a) describe agricultural extension professionals in Iran by demographic characteristics, (b) determine Iranian agricultural extension professionals' attitudes about sustainable agriculture concepts, including production efficiency, economic viability, environmental sustainability and social responsibility and (c) determine if differences exist in agricultural extension professionals' attitudes about sustainable agriculture concepts when examined by organizational post, level of education, years of experience and age.

MATERIALS AND METHODS

The population of this study consisted of faculty members of agricultural extension education, extension chairmen in provinces and extension specialists of deputy of agricultural extension and farming system in the Ministry of Agriculture in Iran. Eighty seven were selected by simple random sample. The instrument was adapted from a survey conducted by Connors *et al*. (2004) and Chen (2003) at the Ohio State University, along with a little modification. The survey contained two sections. Section one had 24 statements related to four areas of the sustainable agriculture: production efficiency, economic viability, environmental sustainability and social responsibility. Five point Likert scale ranged from 1= strongly disagree to 5 = strongly agree. Meanwhile, some of the statements were designed negative. The highest possible value for the general perception in this scale was 120 and the lowest 24. Higher values indicated positive perceptions toward sustainable agriculture concepts. Section two contained demographic information, asking agricultural extension professionals age, years of experience, level of education and organizational post. Questionnaire reliability was estimated by calculating Cronbach's alpha, which was 0.72. The data were collected between October 2006 and March 2007 through a questionnaire mailed or e-mailed to the 95 agricultural extension professionals. Those who failed to respond were sent a follow-up letter. A total of 79 (83%) agricultural extension professionals returned questionnaires. An early versus late respondent comparison was made to determine if no responses was a threat to validity of the study (Lindner *et al.,* 2001). Using this procedure, no statistically significant differences between the groups were found ($Z = -0.313$, $P = 0.754$). Therefore, findings from this study were assumed to be generalizable to the overall population. A cut-off mark of 3.0 was used to select statements, which were perceived favorably to sustainable agriculture by the respondents. For all positive statements, a mean score of ≥3.00 displayed a favorable statement to sustainable agriculture. Also, for all negative statements a score of ≥3.0 showed a favorable statement to sustainable agriculture. Group of respondents for their perception regarding sustainable agriculture concepts was used by the interval standard deviation from mean:

A = Very low: A ≤ Mean – 2SD ،
B = Low: Mean – 2Sd < B ≤ Mean - SD ،
C = moderate: Mean - SD < C < Mean +SD
D = High: Mean + SD ≤ D < Mean + 2SD ،
E = Very high: Mean + 2SD ≤ E.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS-14). Appropriate descriptive statistics such as frequencies, Percentage scores, mean scores, standard deviations and non-parametric (Kruskal–Wallis test) statistics were used to analyze the data.

RESULTS

The ages of the respondents ranged from 25 to 63 the mean age was 38 (SD=8.87, N = 79). Majority (39.2%, n =

31) of respondent were 31-40 years old. Most of the respondents in the study were male (93.7%) and only five persons (6.3%) were female. The years of experience of respondents ranged from 2 to 30. The mean years served in extension were 12.4. Nearly 29.1% of agricultural extension professionals had served in extension for 1 to 5 years, 29.1% of extension specialists had a doctoral degree in agricultural extension and education discipline and 62% (n = 49) were a masters degree holders. Only 8.9% of extension specialists had a bachelor's degree (n = 7). About 35.4% (n = 28) were faculty members and 15.25% (n = 12) had a managerial post. Remaining were extension experts (49.35%). A total of 35.4% of the respondents worked in universities, 27.8% (n = 22) were associated with jihad agriculture ministry. About 29% (n = 23) of extension specialists worked in agricultural extension services at provincial level and remaining worked at county level (6.3%).

Table I shows the mean and standard deviations of statements used to evaluate the attitude and perceptions of Iranian agricultural extension professionals on sustainable agriculture. Among statements made on assessment of the production efficiency, the statement number one: "Technology should be used as best as possible to increase efficiency of agricultural production" had the highest mean with 4.08 (SD =1.107) and statements 4, 2 and 3, respectively followed it (Table I). Among the statements used for evaluating the economic viability, statement number 6 "The primary goal of farmers should be to maximize the productivity, efficiency and profitability of their farms" had the highest mean (M = 4.42) and statements 5, 8, 9, 7, 10, 11 were in the next ranks; respectively. Statement number 15 "Farmers should use primarily natural fertilizers/production methods such as manure, crop rotations, compost and biological pest control" had the highest mean among the statements in assess of environmental sustainability by mean 4.21 and statement number 16 on agricultural scientists and policy-makers should expand efforts to develop biotechnology and other innovations in order to increase food supplies by mean 1.81 had the least mean among the above-mentioned statements. A statement "training leaders for agricultural industry and rural communities" by mean 4.56 (SD=0.549) had the highest mean among the statements used for assessing social

Table I. Iranian agricultural extension professionals' perception regarding concepts of sustainable agriculture

Row	Statements about sustainable agriculture	N**	M	SD	Rmk
	Production efficiency:		**3.17**	**0.54**	**A**
1	Technology should be used as best as possible to increase efficiency of agricultural production.	79	4.08	1.107	A
2*	Meeting food needs with fewer farmers is a positive outcome of technological progress.	79	2.43	1.129	DA
3*	Production, processing, and marketing of agricultural products are best done at national and regional level.	76	2.11	1.126	DA
4	Technology should be used to make farm labor more rewarding and enjoyable, but not to replace it.	79	4.04	1.103	A
	Economic viability:		**2.91**	**0.56**	**DA**
5	Farming is first and foremost a business like any other business.	78	3.38	1.23	DA
6	The primary goal of farmers should be to maximize the productivity, efficiency, and profitability of their farms.	79	4.42	0.653	A
7	The successful farmer is one who earns enough from farming to enjoy a good standard of living.	79	2.62	1.304	DA
8*	Farmers should purchase most of their goods and services they use on their farm.	76	2.67	1.113	DA
9*	Large scale farmers can best serve agriculture needs.	78	2.65	1.126	DA
10	Farmers should farm only as much land as they can personally care for.	79	2.39	1.203	DA
11	The amount of farmland owned by an individual/corporation should be limited in order to encourage land ownership by as many people as possible.	78	2.23	1.150	DA
	Environmental sustainability:		**3.24**	**0.43**	**A**
12*	Soil and water are the sources of all life and should therefore be strictly conserved	79	2.51	1.46	A
13*	Farms should be specialized in one or at most a few crops	77	2.77	1.202	DA
14	The key to agriculture's future success lies in learning to imitate natural ecosystems and farm in harmony with nature.	79	4.19	0.769	A
15	Farmers should use primarily natural fertilizers/production methods such as manure, crop rotations, compost, and biological pest control.	79	4.22	0.970	A
16*	Agricultural scientists and policy-makers should expand efforts to develop bio- technologies and other innovations in order to increase food supplies.	79	1.81	0.878	DA
17	Modern agriculture is a major cause of ecological problems and must be greatly modified to become ecologically sound.	79	3.32	1.104	A
18	Most of farms should integrate agronomy and animal husbandry.	78	3.72	1.127	A
19*	Sustainability should consider only at farm level.	79	3.43	1.278	A
	Social responsibility:		**4.00**	**0.52**	**A**
20*	Agricultural education programs should teach students about the interrelationships among the environment, agriculture, and people.	79	4.56	0.57	A
21	An important responsibility of agricultural education programs is to develop future leaders for the agricultural industry and rural communities in Iran.	78	4.56	0.549	A
22	Farm traditions and culture are outdated and of little use in modern agriculture.	78	3.50	1.171	A
23*	Most of people should live in the cities and they should entrust farming to somebody that they can do it in the best manner.	76	3.21	1.340	A
24	Sustainability is the outcome of the collective decision-making that arises from interaction among stakeholders.	79	4.14	0.843	A

* = negative statements, M = Mean, SD = Standard deviation, Rmk = remark, A: agree (favorable) and DA: disagree (unfavorable). Scale: 1= strongly disagree, 2 =disagree, 3 = no opinion, 4 = agree and 5 =strongly agree. Number of replicates

Table II. Regimentation of respondents in terms of their perceptions regarding sustainable agriculture concepts

Level of attitude toward sustainable agriculture	f	%	Cum.%
Very low(A)	1	1.3	1.3
Low (B)	9	11.4	12.7
Moderate (C)	58	73.4	86.1
High (D)	10	12.7	98.7
Very high (E)	1	1.3	100

M = 78/18 SD = 7/23

A = Very low: A ≤ Mean – 2SD، B = Low : Mean – 2SD < B ≤ Mean - SD ، C = moderate: Mean - SD < C < Mean +SD D = High: Mean + SD≤ D < Mean + 2SD ،E = Very high: Mean + 2SD ≤ E

Table III. Comparison of respondents' attitudes regarding four dimensions of sustainable agriculture

dimensions of sustainable agriculture	Faculty members (n = 28)		extension specialists of deputy of agricultural extension(n = 22)		extension chairmen in provinces (n = 28)		All participant (n =79)	
	M	SD	M	SD	M	SD	M	SD
Production efficiency	3.21	0.63	3.06	0.48	3.22	0.50	3.171	0.541
Economic viability	2.89	0.61	3.03	0.5	2.84	0.56	2.91	0.56
Environmental sustainability	3.31	0.55	3.1	0.45	3.28	0.23	3.24	0.43
Social responsibility	4.12	0.57	3.9	0.54	3.98	0.44	4.00	0.52
Total score	**79.82**	**7.51**	**76.23**	**8.13**	**78.07**	**6.09**	**78.18**	**7.23**

Scale: 1= strongly disagree, 2 =disagree, 3 = no opinion, 4 = agree and 5 =strongly agree

Table IV. Kruskal-Wallis test of means for overall participants' perception by demographic characteristics

Factor	df	X^2	p
Organizational post	2	2.226	0.329
Level of education	2	0.574	0.750
Years of experience	5	2.336	0.801
Age	4	5.573	0.233

P ≤ 0.05

responsibility (Table I).

Study of mean and standard deviations of the replies given on the attitude of agricultural extension professionals on the four dimensions of production efficiency, economic viability, environmental sustainability and social responsibility of sustainable agriculture, social responsibility had the highest mean 4.00 (SD = 0.52) follow by environmental sustainability (M =3.24, SD =0.43), production efficiency (M=3.17, SD =0.54) and economic viability (M = 2.91, SD=0.56). Among 24 statements on the theme of the concept, the perceptions and attitudes of respondents on 14 statements showed their agreement with the above-mentioned statements, while response to statements 12, 19, 20 and 23 were negative.

To group the respondents on their attitude towards concepts of sustainable agriculture, the interval of standard deviation from mean was used. Perceptions and attitudes of 73.4% (n =58) of respondents on sustainable agriculture was at the moderate level. In addition, 11.4% (n=9) of respondents had low attitude and 12.7% of them (n=10) had high attitude and perception on the concepts of sustainable agriculture (Table II).

To compare the views of faculty members, extension specialists of deputy of agricultural extension and farming system in the ministry of agriculture and extension chairmen in provinces in respect to any of the statements designed for measuring their attitudes on the concepts, the mean and standard deviations, the scores given to each statements with each group are listed in Table III. The chairmen and experts of agricultural extension of provinces had the highest mean (M=3.22) on the production efficiency dimension, the Experts of Deputy of Agricultural Extension and Farming System had the highest mean (M=3.03) on the economic viability dimension of sustainable agriculture, while the university faculty members had the highest mean in the two dimensions of environmental sustainability (M=3.3) and social responsibility (M=4.12). The range of the overall scores of the responding groups obtained was between 24 and 120. Scores approximate to 120 indicated more appropriate (positive) perception the respondents on the principle and concepts of sustainable agriculture. The mean of overall scores obtained by faculty members was 79.82, the extension specialists of deputy of agricultural extension and farming system: 76.23 and managers and experts of agricultural extension in provinces, 78.07 (Table III). In addition, the mean value of the overall (summated across the 24 items) perceptions of the extension professionals toward sustainable agriculture was 78.18. Overall value to sustainable agriculture indicates that the extension professionals generally had a moderate perception toward sustainable agriculture concepts.

To compare mean of scores obtained by the three mentioned groups, the Kruskal–Wallis test was used (Table IV). The findings did not show any significant differences

between overall means of agricultural extension professional's perceptions toward the concepts and their age (χ^2= 5.573, P=0.233), organizational post (χ^2= 2.226, P= 0.329), years of experience (χ^2= 2.336, P=0.801) and educational level (χ^2= 0.574, P=0.750).

DISCUSSION

Sustainable agriculture, as a system for producing foods and fibers, is more knowledge – intensive than input-intensive and needs knowledge, management and skills (Pretty, 1995; Chizari *et al*., 1999; Cho & Boland, 2004). To transfer this knowledge, skills and management to farmers, it is necessary to generate desirable changes in the attitudes of agricultural experts in general and agricultural extension professionals in particular as first step; therefore, assessing attitudes in connection with the principles and concepts of sustainable agriculture gives a standard of existing status on which basis, planning could be made to achieve desirable status. The findings of this study emphasize that the concept of sustainable agriculture varies in viewpoint of different people in as much that it led to a decrease in overall scores to attitudes of respondents toward sustainable agriculture concepts. The findings of this study indicated that the attitude of Iranian agricultural extension professionals (faculty members of universities, experts of agricultural extension & farming system & agricultural managers in provinces) is not in a favorable situation. On the other hand, despite difference in type of activities and educational level, no significant difference could be seen between the attitudes of the three groups and the findings of this research agree those of Karami and Hayati (1998). This lack of significant differences between overall extension professionals' perceptions toward sustainable agriculture concepts and their age and education level was similar to Jayaratne *et al*. (2001) with extension educators in the North Central region of the United States and AL-Subaiee *et al*. (2005) in the Riyadh region of Saudi Arabia. Similarly, the lack of significant differences between overall means of professionals' perceptions toward sustainable agriculture concepts and their age, educational level and area of specializations was also similar to Sisk (1995) findings in the southern region of the United States.

The subject of sustainable agriculture and necessity of changes in the activities of agriculture sector in a direction that would fit sustainable development is an issue recently raised in our country and many scientific groups have shown interest to it. Today, there are few agricultural experts that would be unfamiliar with the term sustainable agriculture. Contrarily, they all introduce themselves as supporters of the issue and emphasize on the necessity of the execution. The findings of this research show that what the agricultural extension professionals know on the sustainable agriculture as a new issue has a long gap with what they would learn as principles and concepts of sustainable agriculture and practically use in the activities as a new perspective. Unless these attitudes and knowledge are developed among our professionals, one could not expect the farms to show any interest in adopting and using those principles and concepts. Since sustainable agriculture is considered as an instrument to achieve self sufficiency in agriculture (Chizari *et al*., 1999; 2001), it is necessary for government to carefully study the importance of sustainable agriculture and take necessary steps for achieving it. For this propose, it is necessary to consider methodologies in agricultural research and extension. This may include (a) holistic approach to agricultural activities, (b) multi-disciplinary and interdisciplinary projects, (c) networking and team works, (d) need and impact assessment, (e) popular participation and (f) systems research.

CONCLUSION

This study suggests planning for more works to understand the philosophy of sustainability by our specialists and professionals in order to become ready to act. Since the conflict between industrial agriculture and natural resources is a global issue, the implications of this study need to be extended beyond Iran boundaries.

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