The Perception of Greenhouse Owners about Environmental, Economical and Social Aspects of Sustainable Agriculture in Iran

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ABSTRACT

Emphasis on sustainable agriculture in Iran like the other developing countries, is responsed to the adverse environmental and economic impacts of conventional agriculture. This problem, particularly about "greenhouse production" is considerable. The perceptions of greenhouse owners about the environmental, economical and social aspects of sustainable agriculture was discussed in this article. The research in terms of nature is a kind of quantitative research and in terms of goal is applied research, in terms of controlling the variables is descriptive and correlation kind, which has been carried out in a survey way. The target population for this study consisted greenhouse owners in the Province of Tehran (N=1787). By multi-stage cluster sampling technique, 306 were selected. Data were collected through interview schedules. The regression analysis showed that the farming and policy making factors determined 26 percent of variance on the perception of respondents regarding the environmental aspect of sustainable agriculture. Also, 19 percent of the variance on perception of respondents about economical aspect of sustainable agriculture could be explained by economical and policy making factors. In addition, 33 percent of the variance on perception of respondents about social aspect of sustainable agriculture could be explained by farming and extension/education factors.

Keywords: Economic Aspect; Environmental Aspect; Social Aspect; Sustainable Agriculture.

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INTRODUCTION

Agriculture is considered as a critical sector in the world economy. It contributes 24percent of global Gross Domestic Product and provides employment to 1.3 billion people or 22percent of the world's population (Smith *et al*., 2007). In many of the developing countries, increasing agricultural production has been one of the most important priorities for agricultural development programs.

(Subedi *et al*., 2009)

This is no exception for Iran and agriculture comprises a considerably high percentage of production and employment in this country. It provides employment to about 25 percent of the labor force, accounts for 25 percent of the Gross National Product (GNP), contributes over 4/5 of total domestic food supply, 1/3 of non-oil exports (excluding carpet exports), and 9/10 of the raw material demand of national industries (Karbasiyoon, 2007).

In many developing countries, the emphasis has been on achieving higher agricultural productivity, with little regard for sustainability (Brady, 1990; Pretty, 1995). This resulted in increasing production without any attention to preserving basic and natural resources. Therefore, large areas of the world have faced sever soil degradation, water erosion, groundwater pollution and natural resource depletion (Hurni, 2000; Rigby *et al*., 2001; Rasul & Thapa, 2004; Roling, 2005). This condition is more obvious in poor and developing countries, which rely on a large extent on agriculture and natural resources for their living (Subedi *et al*., 2009).

Iran, like other developing countries, depends on agriculture sector to fulfill demand for more foods. In order to increase production, a large amount of chemical inputs have been used by farmers in Iran (Allahyari, 2008). This problem particularly is very serious in production of greenhouse products. Currently greenhouse producers are consuming more than 64 type of chemical pesticide for producing cucumber, tomato, strawberry and other products (Baniameri & Sheikhi, 2006).

Government of Iran in response to the adverse environmental and economic impacts of high chemical usages has proposed several strategies and among them has recommended the adoption of low input sustainable agriculture.

Sustainable agriculture as a practice that meets current and long-term needs for food, fiber, and other related needs of society while maximizing net benefits through conservation of resources to maintain other ecosystem services, functions, and long-term human development (Rao & Rogers, 2006). Agricultural sustainability is not about technical fixes and expertise. It is development processes that need to integrate ecological and societal knowledge through changes in policy, institutions, and behavior (Saifi & Drake, 2008).

The concept of sustainable agriculture is strongly related to the multifunctional role, either explicitly or implicitly, recognized to the primary sector (Parra-Lopeza *et al*., 2008). This sustainability approach comprises a social, an environmental and to a lesser extent, an economic dimension. It takes into account the needs of rural communities and food safety for consumers as well as the impact of agricultural practices on local ecosystem services and the global environment (Aerni *et al*., 2009). Not only is strong multi functionality predicated on ensuring the protection of the environment, healthy farming and rural communities, but it can also be seen as the most 'moral' systemi (Wilson, 2009).

Despite the diversity in conceptualizing sustainable agriculture, there is an aspect commonly pointed out, which is its multiple-dimensional characteristic including economic, environmental and social aspects (Shaller, 1993; Conway, 1994; Rossing *et al*., 1997; Berentsen *et al*., 1998; Legg, 1999; Cobb *et al*., 1999; Pretty & Hine, 2001; Pacini *et al*.,

2004; Vandermeulen & Van Huylenbroeck, 2008; Sydorovych & Wossink, 2008; Peacock & Sherman, 2010).

Rasul and Thapa (2004) pointed out to 12 indicators to measure sustainable agriculture. Ecological sustainability was assessed based on five indicators: land-use pattern, cropping pattern, soil fertility management, pest and disease management, and soil fertility. Economic viability was assessed based on five indicators: Land productivity, yield stability and profitability from staple crops were considered the indicators of. Social acceptability was assessed based on fore indicators: input self-sufficiency, equity, food security, and the risks and uncertainties.

Although many indicators have been developed, they do not cover all aspects of sustainability. Moreover, due to variation in biophysical and socio-economic conditions, indicators used in one country are not necessarily applicable to other countries. The content of the indicators system is different from each other for different countries, regions, and development stages, and is of great subjectivity (Bellows, 1994).

In Iran, like the other developing countries, where the majority of farmers are smallholders and average land holding size is less than one hectare, farmers' immediate concern for agricultural development is how to increase crop yield, income, and food security and reduce the risk of crop failure (Brady, 1990; Pretty, 1995). The overwhelming majority of farmers lack the capital required for the purchase of inputs, but normally have an adequate labor force. Thus, in view of biophysical and socio-economic conditions in the study area, environmental, economical and social aspects of sustainable agriculture were selected in Iran. The research question for this study is: what are the perceptions of greenhouse owners about the environmental, economical and social aspects of sustainable agriculture?

MATHERIALS AND METHODS

The research in terms of nature is a kind of quantitative research and in terms of goal is applied research, in terms of controlling the variables is descriptive and correlation kind, which has been carried out in a survey way. The target population was 1787 greenhouse owners in the Province of Tehran. By multi-stage cluster sampling technique, 306 were selected. Data were collected through interview schedules.

A series of in-depth interviews were conducted with some senior experts in the Ministry of Agriculture to examine the validity of questionnaire. A questionnaire was developed based on these interviews and relevant literature. The questionnaire included both open-ended and fixed-choice questions. The open-ended questions were used to gather information not covered by the fixed-choice questions and to encourage participants to provide feedback.

Measuring greenhouses' attitudes towards the environmental, economical and social aspects of sustainable agriculture has been achieved largely though structured questionnaire surveys. The usual questionnaire approach to measure attitude is to include a range of semantic-differential (with good/bad options for example) and Likert items (ranging from 1 as strongly disagree to 5 as strongly agree) to operationalize the attitude construct.

The final questionnaire was divided into several section. The first section was designed to gather information about personal characteristics of respondents. The second section was designed to measure the attitudes of greenhouse owners about the environmental, economical and social aspects of sustainable agriculture. The respondents were asked to indicate their agreements with statements by marking their response on a five point Likert-type scale. The variables and their measurement scale are presented in Table 1.

Table 1: Variables and their measurement scale

Variables	Measurement Scale
Attitudes about Environmental Aspect	Five- point Likert
Attitudes about Economical Aspect	Five- point Likert
Attitudes about Social Aspect	Five- point Likert
Farming Factors	Five- point Likert
Economic Factors	Five- point Likert
Social Factors	Five- point Likert
Extension and Education Factors	Five- point Likert
Policy Making Factors	Five- point Likert

Content and face validity were established by a panel of experts consisting of faculty members at Science and Research Branch, Islamic Azad University, and some specialists in the Ministry of Agriculture. Minor wording and structuring of the instrument were made based on the recommendation of the panel of experts.

A pilot study was conducted with 30 greenhouse owners who had not been interviewed before the earlier exercise of determining the reliability of the questionnaire for the study. Computed Cronbach's Alpha score was 90 percent, which indicated that the questionnaire was highly reliable. Dependent variables in the study included environmental, economical and social aspects of sustainable agriculture which were measured by perception of respondents. The independent variables in this research study were the knowledge of respondents about farming, economical, social, policy making and extension and education factors.

For measurement of correlation between the independent variables and the dependent variable correlation coefficients have been utilized and include spearman test of independence.

RESULTS AND DISCUSSION

The results of descriptive statistics indicated that the respondents were all male, with average age of 43.8 years old and more than 46 percent had degree under diploma. More than 80 percent greenhouses were non hydroponic and the main production was vegetables. Majority of greenhouse owners had less than 5 years working experience. Also Majority of greenhouses area was less than 5000 m^2.

Table 2: Demographic profile of respondents

Demographic Variables	Number	Percentage, n =306	Cumulative Percentage
Age (years)			
20-30	35	11.4	11.4
31-40	84	27.5	92.5
41-50	93	30.4	65.0
51-60	71	23.2	34.6
Over 60	23	7.5	100.0
Education			
Under Diploma	142	46.4	46.4
Diploma	98	32.0	78.4
Associate Degree	28	9.2	87.6
Bachelor and above	38	12.4	100.0
Working Experience in Greenhouses (years)			
Less than 5	176	57.5	57.5
5-10	94	30.7	88.2
11-15	26	8.5	96.7
More than 15	10	3.3	100.0
Kind of Production			
Vegetables	290	94.8	94.8
Strawberry	12	3.9	98.7
Vegetable and Strawberry	4	1.3	100.0
Kind of Greenhouse			
Non Hydroponic	252	82.4	82.4
Hydroponic	54	17.6	100.0
Area of Greenhouses (1000 m^2)			
Less than 5	128	41.8	41.8
5-15	126	41.2	83.0
15-25	16	5.2	88.2
More than 25	36	11.8	100.0

In order to finding the perception of respondents about their attitudes about farming, economical, social, policy making and extension and education factors influencing the sustainable agriculture, they were asked to express their views. Table 3 displays the respondents' means about the five factors. As can be seen the highest mean number refers to the economical factor (mean = 4.21) and lowest mean number refers to social factor (mean = 3.83).

Table 3: Means of respondents' views about the factors influencing the sustainable agriculture.

Factors	Mean	SD
Farming	3.98	0.66
Economical	4.21	0.64
Social	3.83	0.87
Policy making	4.03	0.70
Extension and Education	3.97	0.71

The perception of respondents about environmental, Economical and Social aspects of sustainable agriculture was displayed in table 4. In related to the perception of respondents about environmental aspect of sustainable agriculture, the highest mean refers to maintain or improve health and quality of soil (mean = 4.16) and the lowest mean refers to maintain or improve health and quality of water (mean = 3.98).

Connected to the perception of respondents about economical aspect of sustainable agriculture, the highest mean refers to maintain or improve yield of agricultural production

(mean = 4.09) and the lowest mean refers to maintain or improve farmers' income (mean = 3.96).

In related to the perception of respondents about social aspect of sustainable agriculture, the highest mean refers to decrease risk and hazard of production (mean = 3.97) and the lowest mean refers to enhance equity between farmer, self-reliance and improve welfare and quality of living (mean = 3.92).

The perception of respondents about sustainable agriculture considering environmental, economical and social aspect of sustainable agriculture was displayed in table 5. The highest mean refers to environmental aspect (mean = 4.6) and the lowest mean refers to social (mean= 3.93).

Table 4: Means of respondents' views about the environmental, economical and social aspects of sustainable agriculture.

Environmental	**Mean**	**SD**
Maintain or improve health and quality of soil	4.16	0.81
Maintain or improve health and quality of production	4.12	0.83
Maintain or improve health of producer and consumer	4.00	0.88
Maintain or improve health and quality of water	3.98	0.91
Economical	Mean	SD
Maintain or improve production yield	4.09	0.80
Maintain or improve farm profitability	4.08	0.84
Maintain or improve farmers' income	3.96	0.86
Maintain or improve food security for producer and consumer	3.98	0.94
Social	Mean	SD
Enhance equity between farmer	3.92	0.96
Enhance self- reliance	3.92	0.94
Decrease risk and hazard of production	3.97	0.95
Improve welfare and quality life	3.92	0.92

Table 5: Means of respondents' views about the environmental, economical and social aspect of sustainable agriculture.

Aspects	**Mean**	**SD**
Environmental	4.06	0.70
Economical	4.03	0.69
Social	3.93	0.70

Spearman coefficient was employed for measurement of relationships between independent variables and dependent variable.

Table 6 displays the results which show that there were relationship between perception of respondents about environmental, economical and Social aspects of sustainable agriculture as dependent variable and the farming, economical, social, policy making and extension and education factors as independent variables.

Table 6: R correlation coefficient measures between independent variables and depended variable.

	Depended Variable		
Indipended Variable	Environmental	Economical	Social
Farming Factors	0.504**	0.362**	0.553**
Economical Factors	0.354**	0.400**	0.397**
Social Factors	0.324**	0.320**	0.351**
Policy Making Factors	0.414**	0.388**	0.398**
Extension & Education Factors	0.384**	0.371**	0.484**

**$p<0.01$

Table 7 shows the result for regression analysis by stepwise method. Independent variables that were significantly related to perception of respondents about environmental aspect of sustainable agriculture as dependent variable were entered. The result indicates that 26 percent of the variance in the perception of respondents about environmental aspect of sustainable agriculture could be explained by the farming and policy making factors.

Table 8 shows the result for regression analysis by stepwise method. Independent variables that were significantly related to perception of respondents about economical aspect of sustainable agriculture as dependent variable were entered. The result indicates that 19 percent of the variance in the perception of respondents about economical aspect of sustainable agriculture could be explained by the economical and policy making factors.

Table 9 shows the result for regression analysis by stepwise method. Independent variables that were significantly related to perception of respondents about social aspect of sustainable agriculture as dependent variable were entered. The result indicates that 33 percent of the variance in the perception of respondents about social aspect of sustainable agriculture could be explained by the farming and extension/education factors.

Table 7: Multivariate Regression Analysis
(environmental aspect of sustainable agriculture as dependent variable)

	B	Beta	T	Sig.
Constant	1.711	……	6.879	0.000
Farming Factors (x_1)	0.410	0.374	6.588	0.000
Policy making Factors (x_2)	0.215	0.207	3.654	0.000

R^2= 0.26

$$Y = 0/37\ x_1 + 0/20\ x_2$$

Table 8: Multivariate Regression Analysis
(economical aspect of sustainable agriculture as dependent variable)

	B	Beta	T	Sig.
Constant	1.773	……	6.301	0.000
Economical Factors (x_1)	0.318	0.276	4.737	0.000
Policy making Factors (x_2)	0.243	0.229	3.941	0.000

R^2=0.19

$$Y = 0/27\ x_1 + 0/22\ x_2$$

Table 9: Multivariate Regression Analysis
(social aspect of sustainable agriculture as dependent variable)

	B	Beta	T	Sig.
Constant	1.181	……	5.018	0.000
Farming Factors (x_1)	0.436	0.384	6.787	0.000
Extension and Education Factors (x_2)	0.278	0.265	4.695	0.000

R^2=0.33

$$Y = 0/38\ x_{1+}\ 0/26\ x_2$$

CONCLUSION

The regression analysis base on environmental, economical and social aspects of sustainable agriculture showed that the farming and policy making factors determined 26 percent of variance on the perception of respondents regarding the environmental aspect of sustainable agriculture. Also, 19 percent of the variance on perception of respondents about economical aspect of sustainable agriculture could be explained by economical and policy making factors. In addition, 33 percent of the variance on perception of respondents about

social aspect of sustainable agriculture could be explained by farming and extension/education factors.

Farming factors related to environmental sustainability (Cox *et al*., 1997; Kochaki *et al*., 1995; Mazaheri & Majnoon Hosseini, 2008) and it is consistent with results of this research. Farming factors was the most important factor in term of environmental aspect of sustainable agriculture. Economical factors also contribute to economical sustainability (Sedaghati, 1991) and it is consistent with the results of this study.

As well, farming and extension/education factors had affected the social sustainability (Karami, 1998; Hoseini & Shariati, 2003). The results of this research demonstrated that social sustainability will depend on farming and extension/education factors. Karami (1998) and Pereti (1995) reported that farming, economical, social, policy making and extension/education factors contribute in achieving sustainable agriculture.

The development of sustainable in greenhouse could be achieved over time. Therefore, certain factors should be identified and need to be carefully examined. Innovative strategies need to be developed that cater specifically in area of environmental, social and economical aspects of sustainable development

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