World Journal of Environmental Biosciences

Available Online at: **www.environmentaljournals.org**

Volume 8, Issue 4: 58-63

ISSN 2277- 8047

Investigating the Effective Management Skills of Greenhouses in Producing Healthy Greenhouse Products in Alborz Province

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ABSTRACT

The main goal of this research was to investigate the effective management skills of greenhouses in producing healthy greenhouse products in Alborz Province. The research was applied and the statistical population of this study was a simple random sampling of 150 greenhouse producers of vegetable and strawberry products in Nazarabad, Hashtgerd and Chaharbagh regions of Alborz Province. The research instrument was a questionnaire, that its validity was confirmed by the Faculty of Water and Agricultural Management of Mohaghegh Ardebili University and University of Tehran. The reliability of the questionnaire was confirmed by Cronbach alpha 0.84. According to the research results, in the correlation test, all management skills of greenhouse owners, including communication skill, technical skill, planning skill, organization skill, performance skill, and control skill have a positive and significant relationship with producing healthy greenhouse products in Alborz Province. The results of the regression test showed that the communication skill with the coefficient (Beta) of 0.090 has a significantly positive effect on producing healthy greenhouse products in Alborz province. Technical skill, planning skill, and control skill with 99% confidence have a significantly positive effect on producing healthy greenhouse product with the coefficient (Beta) of 0.658, 0.125, and 0.262, respectively. According to diagnostic analysis, communication skills, technical skills, planning skills, implementation skills, and control skills with 99% confidence and organization skills with 95% confidence have a significant difference in different products in terms of health, and the technical skill variable with a coefficient of 0.917 predicts differentiation among different products in terms of health.

Keywords: *Healthy Products, Management skills, Greenhouse, Iran*

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Received: 22 July 2019
Accepted: 03 December 2019

1. INTRODUCTION

After the Green Revolution and the expansion of the idea of increasing yields per unit area by promoting the use of pesticides and chemical fertilizers in agriculture, many environmental and health problems have arisen worldwide. So one of the major challenges in the world is the issue of health and quality of agricultural food and products. Therefore, the production of healthy products, especially in the greenhouse, which is controlled by chemical inputs and specific cultivation methods and placed in the community food basket, is an important step in moving towards sustainable agriculture and the health community (Chakeri *et al.*, 2018; Naliukhin *et al.*, 2018; Hagab *et al.*, 2018). In the production of these products, usually alternative methods of control such as agronomic and biological control as well as the use of organic and environmentally friendly fertilizers such as vermicompost can guarantee environmental sustainability and is, in fact, an important step towards sustainable agriculture. However, lack of knowledge and awareness of the producer is a major limitation in the implementation of good agricultural practices (Banzon, 2013). The greenhouse managers in the role of the producer cannot engage in economic activities without acquaintance with new methods and having logical management (Haji Maleki *et al.*, 2011). Therefore, increasing the resource efficiency of this sector requires a constant increase in the level of knowledge and skills of the managers in the utilities and agricultural producers. The agricultural sector seems to be more inefficient due to inappropriate management, often as a result of the lack of managerial skills of greenhouse owners regarding the optimal use of agricultural inputs (Karari Ghrebaghg and Vitaly, 2013). So the consumption of chemicals in the agricultural sector has dramatically risen, which shows that in the past decade, the use of chemical fertilizers increased in Iran from 2,400,000 tons in 1999 to 3,300,000 tons in 2008 (Matesharzadeh, 2009; Rajabi *et al.*, 2011) and more than 27,000 tons of chemical pesticides are annually consumed in the agricultural sector. In this regard, in order to achieve a healthy diet and a dynamic life, it is necessary to pay special attention to the quality of products (Sayfkhani and Abaszadeh, 2008). Therefore, proper training of producers and consumers and awareness about the dangers of pesticides and fertilizers can help to reduce the use of chemicals in the production and consumption of healthy products. (Mahmoudi and Mahdavi Damghani, 2009). The Healthy Food Program was operational in 2001 (Bryme Nejad, 2014). The standard of a healthy product is a set of principles,

rules, standards, and technical regulations to minimize chemical, microbiological, and physical contamination in agricultural production (Ebrahimi, 2013). The four standards and management plans include Integrated Pest Management (IPM), Good Agricultural Practices (GAP), Critical Control Point Risk Analysis (HACCP), and Good Handling Practices (GHP). Researchers such as Shaw *et al.* (2015) provided training courses and workshops on GAP and found a positive role in changing the beliefs and knowledge of the Iowa state producers in the United States, which is the most effective way of promoting training for small-scale producers. Bakhtiari *et al.* (2017) concluded that the knowledge of experts about the sustainable agriculture is a one-dimensional concept based on the environment and its services with intergenerational equality rather than intragenerationonal equlity. This is most propbaby due to either misunderstanding of experts from the sustainable agriculture or its ine-dimensional definition by internal environmental institutions which may or maynot be dependent to the government. Alhariy *et al.* (2017) determined the factors affecting the acceptance of pest management for olive fruit fly in Roodbar, Iran for 171 olive producers using face-to-face interviews and completing the questionnaire. The results showed that annual variables of producers' annual income, the area under cultivation, agricultural experience, developmental activities, technical knowledge, and the average production of olive fruit are among the factors influencing the acceptance of integrated pest management operation for olive flies. Terano *et al.* (2015) in a study of factors influencing the willingness to accept sustainable operations among farmers in Malaysia's Cadai based on appropriate agricultural practices and integrated pest management showed that attitude; mental norms; perceived behavior control; individual characteristics like age, knowledge, and awareness are the most important factors influencing the willingness to use sustainable agriculture technologies. Soltani *et al.* (2014) in a study entitled "Farmers Obstacles to accept Organic Farming" concluded that Iranian farmers had a positive attitude towards organic products, certification, marketing, and access to reliable technical information challenges. Achieng (2014) in examining the effects and consequences of using the Global GAP on the relative poverty situation of petty landlords in central and eastern Kenya, the achievements and implications of using Global GAP include increasing income, food security, using natural and sustainable resources, and improving the health of expression and examined the role of individual factors, willingness to use, access to extension services, infrastructure services, garden position, market access, financial capital, natural capital, and physical capital in the relative poverty of gardener in a model. Eric *et al.* (2013) have reported to Oklahoma Greenhouse Producers Workshop to teach pest management principles to Oklahoma Greenhouse Producers that increasing IPM knowledge has shown a marked acceptance of IPM practices and a desire to adopt IPM. Hekmat (2012) explored farm management skills for graduates of higher education institutions working in the agricultural sector (Case study: Shooshtar and Shoaibiyah). The results of correlation test showed that between farm management skills of agricultural graduates and age variables, agricultural experience, participation in extension classes, use of communication channels, social participation, mechanization level and type of exploitation in the 95% and variables level Technical knowledge has a positive and significant relationship at 99% level. Allahiari *et al.* (2011) investigated the farm management skills of poultry producers in Iran. The results of the Friedman test showed that farmers have the most ability in technical skills. Also, the results of the research showed that by participating farmers in the promotion classes, farm management skills and marketing would increase. Carly *et al.* (2011) in the case study of Nepal tea fields showed that the probability of accepting organic farming among big and large farmers was more than that, and factor analysis showed that awareness of environmental effects, bright spotlight marketing, visible economic benefits, and awareness of the benefits of organic and organic products have been one of the factors influencing farmers' decision to accept this type of farming. Rahmani *et al.* (2012) in a study entitled "Investigating the role of individual and physical variables on the stability of seafront greenhouses of Khuzestan Province" showed that age, the field of study, and experience in the greenhouse can have a significant difference in the level make optimal management. Also, there was a statistically significant statistical relationship between the knowledge of greenhouse owners and their attitude towards sustainable agriculture with optimal management at 99% level. Etehadi *et al.* (2012) in assessing the participation rate of farmers in the farmer's farm management approach on pest management integrated technology (a case study of Sistan and Baluchestan Province) found that the extent of participation in farmer's school activities in the management of pest management and variables of agricultural activity history. There are positive and meaningful relationships between farm distance to service center, social characteristics, and attitudes of utilizations with 99% confidence. Moradi *et al.* (2011) identified six hidden factors in their research as barriers to the implementation of the Global Approach for Global Agriculture (Global Gap) in Iran's agricultural sector, which, given the nature of the constructive variables of each factor, has the structural-organizational barriers, attitudes and the lack of awareness of producers and consumers, research, economics, commerce, and marketing, and the barriers of the private sector and mass media, which explained 58.42% of the variance. Nadali and Ranjbar (2011) were identified lack of knowledge and skills necessary for farm management, lack of market sales, uncertainty about proper economic income, complexity of production process, need for more worker, pest and weed control, difficulty in certifying organic products, need for more investment and strict farm management conditions without the use of chemical fertilizers as problems for Iranian farmers in the production of organic products.

2. RESEARCH METHODOLOGY

The purpose of this research is descriptive research in the field of applied research, and its data are field and survey data collected in Alborz Province in 2016-2017. The statistical population of this study was a simple random sampling of 150 greenhouse cultivators of vegetables, and strawberries in three areas of Nazarabad, Chaharbagh, and Hashtgerd, which are the three main poles of production of greenhouse products in Alborz province. The main instrument of the dissertation was a researcher-made questionnaire. The content validity of the questionnaire was evaluated according to the opinion of the

faculty members of the Agricultural Management Department of Mohaghegh Ardabili University and University of Tehran. Its validity has been confirmed. The reliability of the questionnaire was confirmed by using Cronbach's alpha of 0.84. Data were analyzed by using SPSS software, correlation, multiple regression, and diagnostic analysis.

3. RESEARCH RESULTS

Table 1 shows that the highest average age of greenhouse owners in research areas belonging to the Chaharbagh region is 48 years and the lowest is Nazarabad region 42 years. This is despite the fact that the greenhouse of the Chaharbagh region has the most experience in the greenhouse compared to the two others, and the farmers of the Nazarabad region have less experience in greenhouse, as well as the duration of ownership of greenhouse in Chaharbagh region the highest rate is in Nazarabad region. The average greenhouse gas education in the Hashtgerd region has been higher than in the other two regions, and the average education over 15 years of age indicates that it has an academic education in greenhouses.

Table 1: Mean age and social variables of greenhouse in different research areas

Variable (year)	Hashtgerd region (66 people)	Charbagh region (30 people)	Nazarabad region (54 people)	Total (150 people)
Age	43	48.77	42.11	43.83
Experience in greenhouse	10.55	12.77	9.13	10.48
Period of ownership of the greenhouse	10.06	12.80	8.69	10.11
Education levels	15.97	14.10	15.13	15.29

The relationship between management variables on the production of healthy products in different areas of research using the correlation test in Table 2 shows that in the Nazarabad region, all managerial skills in the 99% level have a meaningful and positive relationship with the production of healthy greenhouse products. In the Chaharbagh area, technical skills, planning skills, control skills in the 99% level have a positive and significant relationship with the production of healthy products. Also, performance skills and communication skills at 95% level have a meaningful relationship with the production of healthy greenhouse products and the organization skill. There is no meaningful relationship between organization skills by producing healthy crops in this area. In the Hashtgerd area, greenhouse communication skills and organizational skills in the 95% level have a significant and positive relationship with the production of healthy products, and other management skills have a positive and significant relationship with 99% confidence. In general, all management skills have a positive and significant relationship with producing healthy product with confidence of 99%.

Table 2. Relationship of managerial skills with healthy greenhouse production in Alborz Province.

variable	Nazarabad		Charbagh		Hashtgerd		Total	
	correlation coefficient	sig	correlation coefficient	sig	correlation coefficient	sig	correlation coefficient	sig
Communication skills	0.482**	0.000	0.423*	0.020	0.249*	0.044	0.390**	0.000
Technical skills	0.841**	0.000	0.816**	0.000	0.781**	0.000	0.814**	0.000
Planning skills	0.511**	0.000	0.612**	0.000	0472**	0.000	0.497**	0.000
Organization skills	0.463**	0.000	0.701	0.712	0.252*	0.041	0.324**	0.000
Performance skills	0.648**	0.000	0.369*	0.045	0.343**	0.005	0.479**	0.000
Control skills	0.688**	0.000	0.744**	0.000	0.444**	0.000	0.606**	0.000

multiple regression was used to determine the effect of management variables on the production of healthy greenhouse products. The results of Table 3 show that 83.8% in the Nazarabad region, 87.6% in the Chaharbagh region, 71.5% in the Hashtgerd region, and in total, 78.4% of variations in the production of healthy products are exploited by using managerial skills.

Table 3. Multiple regression of management variables in research areas

region	R	R^2	F	Df	sig
Nazarabad	0.915	0.838	39.664	6	0.000
Charbagh	0.936	0.876	27.022	6	0.000
Hashtgerd	0.846	0.715	24.670	6	0.000
Total	0.885	0.784	85.922	6	0.000

Table 4 states that in the Nazarabad region, technical skills with a coefficient of (Beta) of 0.625 and performance skills with a coefficient (Beta) of 0.303 with a confidence of 99% have a positive and significant effect on the production of healthy greenhouse products. In this area, other management skills have no significant effect on the production of a healthy product. In Chaharbagh area, the communication skills with the coefficient (Beta) 0.273, technical skill with a coefficient of (Beta) of 0.349, and control skill with a coefficient (Beta) of 0.387 with 1% error probability had a positive and significant effect on the production of healthy greenhouses products. Performance skill with a coefficient (Beta) 0.025 with 95% confidence has a positive and significant effect on the production of healthy greenhouse products in this region. Planning skills and organizing skills have no significant effect on the production of healthy greenhouse products in this area.

In Hashtgerd area, two technical skills and performance skills have positive and significant effects on the production of healthy greenhouse products at 99% level, with a coefficient of (Beta) of 0.731 and 0.280, respectively. Other management skills in this area do not affect the production of healthy greenhouse products. In total, communication skills with the coefficient (Beta) of 0.90% have a positive and significant effect on the production of healthy greenhouse products with 95% confidence. Technical skill, planning skills, and performance skills with coefficient (Beta) of 0.658, 0.125, and 0.262, respectively, have significant and positive effects on the production of healthy greenhouse products in Alborz province with the possibility of 1% error and two skills of organizing and Control has no significant effect on the production of healthy greenhouse products.

Table 4. Impact of managerial skills on the production of healthy greenhouse products in Alborz province

variable	Nazarabad		Charbagh		Hashtgerd		Total	
	Standard coefficient (Beta)	sig	Standard coefficient (Beta)	sig	Standard coefficient (Beta)	sig	Standard coefficient (Beta)	sig
Communication skills	0.025	0.741	0.273	0.004	0.075	0.333	0.090	0.040
Technical skills	0.625	0.000	0.349	0.008	0.731	0.000	0.658	0.000
Planning skills	0.091	0.214	0.187	0.054	0.099	0.227	0.125	0.006
Organization skills	-0.092	0.229	-0.015	0.847	-0.073	0.384	-0.073	0.106
Performance skills	0.303	0.000	0.202	0.025	0.280	0.000	0.262	0.000
Control skills	0.123	0.170	0.387	0.003	0.003	0.975	0.090	0.081

In Table 5, in analyzing the diagnostic analysis test on the different products manufactured in health, we found that communication skills, technical skills, planning skills, performance skills, and control skills at 99% level and organizing skills at 95% level had a significant difference in the various products in the terms of health.

Table 5. Results of diagnostic analysis of management skills of research

variable	Wilks Lambda	F	Df_1	Df_2	sig
Communication skills	0.892	5.849	3	145	0.001
Technical skills	0.482	51.925	3	145	0.000
Planning skills	0.862	10.171	3	145	0.000
Organization skills	0.944	2.893	3	145	0.037
Performance skills	0.838	9.334	3	145	0.000
Control skills	0.778	13.826	3	145	0.000

According to Table 6, it is concluded that in the production products based on the health, three audit functions are extracted, the first function with a chi-square 153/401 and a degree of freedom of 18 at a 99% level, as shown in Table 7. It is suggested that the technical skill variable with a predictor of 0.917 is a distinction between different products in terms of health.

Table 6. Audit of management skills of research

functions	Wilks Lambda	Chi-square	Df	Sig
1	0.38	153.401	18	0.000
2	0.968	4.640	10	0.914
3	0.998	0.340	4	0.987

Table 7. Standardized Coefficients of Differentiating Functions of Research Manager Variables

variable	Function 1	Function 2	Function 3
Communication skills	0.166	0.384	-0.154
Technical skills	0.917	-0.097	-0.313
Planning skills	0.197	-0.440	0.754
Organization skills	-0.206	0.271	0.779
Performance skills	0.412	-0.443	-0.224
Control skills	-0.004	0.570	-0.093

4. CONCLUSION AND DISCUSSION

The producing of healthy greenhouse products has a positive and meaningful relationship with the managerial skills of greenhouse owners. So that the technical skill, planning skills, performance skills, and communication skills were effective in the production of greenhouse products by 65.8%, 12.8%, 26.2%, and 9%, respectively. The technical skill of greenhouses predicts the distinction between different productions of greenhouse in Alborz province. These results are consistent with the results of researchers such as Shaw *et al.* (2015), Hekmet (2012), Alhiyari *et al.* (2011), and Nadali and Ranjir (2011). According to the results, it can be stated that the technical skills of the greenhouse managers in the Alborz province increase, the production of healthy greenhouses increases, which can be increased by increasing the communication skills of greenhouse owners with the agricultural ministry and providing a booklet educational materials and educational materials in the province's agricultural by ministry increased the technical skills of greenhouse gardens. Considering the role of the virtual world in the lives of individuals, it is possible to increase the number of greenhouse managers in Alborz province by creating virtual channels in the Telegram app and information technology. Also, with the skill of planning and implementing, greenhouses can be formed by forming a school in the field of production of healthy greenhouse in the Hashtgerd area, as well as knowledge of how to cultivate and control the greenhouse pests of planning skills, improvement of greenhouse conditions by increasing the time of cultivation and control of diseases and increasing the skill of their implementation.

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