



Influencing factors on attitude toward hydroponics cultivation viewpoint of experts

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Abstract

The purpose of this study was to determine effect of factors on attitude toward hydroponics cultivation. The research population consisted of 176 experts in Agricultural Ministry, which were selected using census method. The methodological approach of this study was descriptive-correlative. Validity of the instrument was established by a panel of experts consisting of senior faculty members and research committee advisors. Reliability analysis was conducted by using Cronbach alpha formula and result was 0.83. The results showed that 7.1, 13.5 and 79.4 percent of experts expressed that their attitude toward hydroponics cultivation were weak, moderate and good respectively. Also the results of the multiple regression analysis (stepwise method) revealed that Policy making factors and economical factors explained a variation of 36.6 percent of attitude toward hydroponics cultivation.

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Introduction

Supplying food stuffs for growing population of the country and the need for achieving self-sufficiency in agriculture products and food protection demands the increase of agriculture products in the country as much as possible (Khoshgoftar *et al*, 2008). In this respect, quantitative and qualitative restraint of soil and meter resources are considered as the original groundwork of agriculture products. An excessive percent of formable lands in Iran are encountered with problems of sodium, saltiness and bilge of soil. Considering these requirements, it is crucial to take new principles and provide more suitable situation in order to obtain nutritive needs for plants. During the past years, there have been special attentions paid to the production of agriculture products. In controlled environment (green house), especially soil-less plantation systems or hydroponics of all kinds of ornamental flowers, vegetables, fruits and medical plants. (Khoshgoftar *et al*, 2008) Hydroponics plantation is an advanced form of agriculture which enables the option of exclusive supervision over the distribution and delivery of nutrition among the plants (Calpas, 2001). Based on most of researchers views, the hydroponics groundwork should be easily drained, it must have suitable ventilation power and good ability and capacity to preserve water, and must be free of harmful elements and weeds and also can be provide-able in cheap prices (Cantliffe *et al*, 2007) Additionally, it is recommended to use groundwork with organic source instead of synthetic ones (Allaire *et al*, 2004).

Hydroponics, in spite of need for adequate expertise and relatively high investment, in comparison with soil-based plantation has a lot of advantages such as high performance, the need for low labor force, simplicity of works, free of need for following the plantation cycle, weed control, evenness of plants growth, minimal water dissipation, nonexistence of competition for reaching water and nutrition elements between the plants, the ability to supply nutrition elements relating to the needs of plants and lower exploitation of chemical materials, and finally

the more healthier agriculture products (Jaenalsorn & Ikeda, 2004); (Miceli *et al*, 2003); (Takeda, 2000).

Paraskevopoulou & Grafiadellis in 1995 compared the soil-based plantation with soil-less plantation. In result, the performance of every plant in the soil-based mode was higher than soil-less modes, but because of high density in soil-less mode, the performance is higher in soil-less mode, per square meter.

Sanchea *et al* (2002) in the study of feasibility of hydroponics in Ecuador concluded that simple hydroponics plantation can be an effective method for the production of constantly high-quality fruits and vegetables, through the germination and growth into nutritious water. This method is employed to reach higher qualities in fruits and vegetables, improvement of nourishment, food security in rural and suburb regions, and also the better social welfare conditions.

Verdonck & Demeyer (2004) concluded that the ability to produce production without using pesticides is one of the advantages of hydroponics systems. These crops are free of toxin reminders and possess higher levels of health and quality.

Cantliffe *et al* (2007) demonstrated that in hydroponics system it is possible to check and control pests and diseases precisely and consequently the terrigenous diseases will be decreased to the lowest level. Therefore, we can avoid high amounts of time and expenses in germiciding the soil and providing suitable conditions for the growth of plants.

Papadopoulos *et al* (2007) evaluated the investment in hydroponics systems of summer crops and green house of vegetables and also ornamental plants in the west of Macedonia. Results showed that, with regard to early investment, this investment could be economical only with receiving subvention. Based on the result, the total net expenditures for early investment and annually variable investments for soil-based plantation system and hydroponics system

during the programming horizon were 40100 and 133800 Rials per square meter, respectively. It is 3.33 times costlier than soil-based method. Considering the costly investment in hydroponics system, the soil-based plantation is economically justified. We should notice that agriculture land of this province are relatively appropriate and are free of salt or any other problems. In situations which the green house land is free of soil or poor, and also when the regions are very salty or polluted, we should manage to supply soil and prepare it based on the soil-based method. In this manner, the results of this study are not recommended for such conditions. Furthermore, because some of the expenditures in hydroponics system could be prorated into broader areas, the expenditures could possibly reduce per a square meter.

Porterfield & Banks (2009) declared that one of the advantages of hydroponics system is the ability to gain economical performances in the land with no potency of plantation or in conditions which are not suitable for growth of some plants. Some of the advantages of soil-less systems are plantation beyond the farming season, optimal utilization of water and fertilizers and also maximal exploitation of the land.

Franklin *et al* (2010) in their research over the possibility of farming the plants based on the hydroponics method stated that nearly 96 percent of fresh crops in Canada are imported. Turekto alone purchases more than 150 million tone lettuce every year, which 90 percent of them are imported, it is not economical at all. At these days, they generated advanced technologies of commercial hydroponics green houses and are able to challenge the imports and also reduce the high prices.

Janatan (2010) from research form of Lincoln University in his study about the supervision of environment through hydroponics system demonstrated that it will be easier and reachable to develop and grow the market and products through hydroponics system. The aim of this research project

is the development of constant scientific and economical techniques for hydroponics producing of fruits, plants, vegetables and seasoning. Simple and optimal hydroponic methods are used in order to reduce the production expenditures, increasing the product performance, and more quality and advantage of products.

Khoshgoftar *et al* (2008) concluded the traditional systems of farming production in farm have some problems like high consumption of essentials (like fertilizers and reparatory materials) and high level of consumed mater. In some regions like urban lands, suitable soil is not available for farming. Another serious problem is high cost for employing the manpower in farm and garden. So, hydroponics system enables optimal condition for plant growth, in order to acquire a production better than pen plantation in farm or garden.

The study of views of gardening expertise about the soil-less farming in Varamin Township determined that hydroponics plantation is a very good substitute for higher production if the condition is controlled. Furthermore, we should keep in mind that this method is very suitable because of pollution, the shortage of soil and other harmful factors in farming, provided that we should use chemical fertilizers in admissible rates. (Shariatmadar, 2012) The main objective of this research is to study the afflictions factors in attitude of experts toward hydroponics cultivation, and exclusive objectives include: condition of attitude toward hydroponics plantation regard, reviewing the relation and role of social, economical, educational and political factor with attitude toward hydroponics cultivation.

Hydroponics is as easy to use outdoors under the sun as it is indoors. One advantage to gardening indoors under grow lights is that you, not Mother Nature, control the seasons, making the growing season twelve months long. However, that is still true whether you grow in soil or hydroponically. Soil gardening can be done indoors and hydro can be done

outdoors. This myth has some foundation in truth but there is an important aspect to consider. Every seed, like all living things, already has a genetic code that will determine its general size, yield potential and flavor. Hydroponics can't turn a cherry tomato into a beefsteak tomato but it can turn it into the best cherry tomato it can be. Therefore, start with the best genetics possible.

The purpose of this study was to determine effect of factors on attitude toward hydroponics cultivation. In order to achieve this objective, specific objectives are presented as below:

- Study of Attitude toward hydroponics cultivation
- Relation of social, economical, educational and policy making factors with attitude toward hydroponics cultivation
- The role of social, educational, economical and policy making factors on attitude toward hydroponics cultivation

Materials and methods

Research Method

In relation to objective, this research is functional, since the results can be employed by programmer and policy makers. In order to reach precise and reliable data we used quantitative method. Because this research simply investigates existed conditions and defines them and there is no possibility to control or manipulate the variables, it is descriptive. Because the gathering of information about the views, beliefs, thoughts and behaviors or group characteristics of a society is statistical and also it is under recognition, so it is measuring. Furthermore, because it investigates and analyzes the relations between independent and dependent variables, it is correctional.

Statistical population

Statistical society of this research involve all the gathering experts of minister of rural construction organization (N=176).

Validity and Reliability

Content and face validity were established by a panel of experts consisting of faculty members and some specialists. Minor wording and structuring of the instrument were made based on the recommendation of the panel of experts. We gave the questionnaire to 25 experts which were similar to statistical society in regional, economical, cultural and social conditions. After gaining the data concluded the Cronbach alpha coefficient for all the variables with degree scale of 83% the independent variables were: social, economical, educational and policy making factors.

Table 1. Validity of research variables.

Variables	Cronbach alpha
Social factors	0.83
Economical factors	0.88
Educational factors	0.87
Policy making factors	0.86
Attitude toward hydroponics cultivation	0.83

Variables

Dependent variable was attitude toward the hydroponics plantation. In order to determine the social factor we measured 6 questions, 8 questions for economical factors, 9 questions for educational, 8 questions for policy making and 7 questions for attitudes toward hydroponics cultivation(none=0, very low=1, low=2, average=3, high=4, very high=5) . Consequently, the minimal score for social, economical, educational, policy making and attitude was zero and the maximal was 30, 40, 45, 40 and 35, respectively.

Results

Attitude toward hydroponics cultivation

The attitude toward hydroponics cultivation was measured by 7 questions including: 6 pieces spectrum of likret. Score giving to the mentioned spectrum was as follows: none=0, very low=1, low=2, average=3, high=4, very high=5. Then, the maximum score was 35, and the minimal was zero. Table 2 illustrates the mean, coefficient of variance (C.V) and the rank of each question related to hydroponics cultivation, from the viewpoint of experts. According to the table,

beneficial in activities, environment protection and decreasing pollution and employment in agriculture sector had been important related to hydroponics cultivation. Table 3 shows the attitude toward hydroponics cultivation. According to results, 7.1 percent of experts that attitude toward hydroponics

cultivation was inappropriate, 13.5 answered that it was moderate and the last 79.4 percent answer was appropriate. The mean of attitude toward hydroponics cultivation was 25.5 and its measure standard deviation (SD) was 5.3.

Table 2. Priority of related questions with attitude toward hydroponics cultivation.

Items	M	SD	C.V	Rank
hydroponics cultivation causes beneficial in activities	3.77	1.02	0.271	1
hydroponics cultivation causes environment protection and decreasing pollution	3.79	1.03	0.272	2
hydroponics cultivation causes employment in agriculture sector	3.62	1.00	0.276	3
hydroponics cultivation causes increasing yield	3.61	1.01	0.280	4
hydroponics cultivation causes control in used of inputs	3.46	0.98	0.283	5
hydroponics cultivation causes save of water and decreasing usage of water	3.70	1.09	0.295	6
hydroponics cultivation causes decreasing wastes	3.47	1.03	0.297	7

None=0, very low=1, low=2, average=3, high=4, very high=5

Table 3. Attitude toward hydroponics cultivation from the viewpoints of participants.

Situation	Frequ-ency	Percen-tage	Cumulative percentage
Very bad(0-7)	4	2.6	2.6
Bad(8-14)	7	4.5	7.1
Moderate(15-21)	21	13.5	20.6
Good(22-28)	83	53.6	74.2
Very good(29-35)	40	25.8	100
Total	155	100	-

M = 25.5 SD = 5.3

Relation of social, economical, educational and policy making factors with attitude toward hydroponics cultivation

Fourth table showed intensity, relation orientation and a meaningful level of social, economical, educational and policy making with attitude toward hydroponics cultivation. As the table shows the above mentioned factors have 99 percent of meaningful and positive relation with attitude toward hydroponics cultivation.

Table 4. The relation of social, economical, educational and policy making with attitude toward hydroponics cultivation.

Variables	Pearson correlation coefficient	Significant level
Social factors	0.325**	0.000
Economical factors	0.468**	0.000
Educational factors	0.484**	0.000
policy making factors	0.515**	0.000

*p<0.05 **p< 0.01

The role of social, educational, economical and policy making factors on attitude toward hydroponics cultivation

In order to predict the role of research variables on attitude toward hydroponics cultivation, we used step by step regression. Analyzing the regression enables the researcher to predict the variance of dependent variable through independent variables and determine the role of every independent variable in explanation of dependent variable. In step by step method, the strongest variables enter the equation one after another. This process goes on until the errors of meaning exam reaches to 0.05 errors. Results showed policy making and economical factors enter the equation in steps one and two, respectively. This means that policy making factors have the highest influence on attitude toward hydroponics

cultivation. This factor alone explained 32.6 percent of variance in dependent variable. Policy making and economical factors communally explained 36.6 percent of variance in dependent variables, in step two.

Table 5. Analyzing the regression of attitude toward hydroponics cultivation.

Steps	R	R Square	Adjusted R Square	F	sig
1	0.571	0.326 ^a	0.321	65.3	0.000
2	0.605	0.366 ^b	0.356	38.7	0.000

a: policy making factors

b: policy making and economical factors

Table 6. The standardized and non- standardized coefficients of attitude toward hydroponics cultivation.

Variables	B	Beta	t	Sig
policy making factors	0.43	0.45	5.46	0.000
Economical factors	0.24	0.24	2.90	0.004
Constant	7.25	-	3.36	0.001

According to the amount of beta in table 6, we can write the regression equation as follows:

$$Y = 0.45X_1 + 0.24X_2$$

X₁ = policy making factors

X₂ = Social factors

Conclusions and suggestions

This study aimed at studying the attitude of experts toward hydroponics cultivation, indicated that most of the respondents (79.4 percent) believed that attitude of experts toward hydroponics cultivation was good. According of results establish Information and declaration about hydroponics cultivation and performing experimental studies to show the benefits of hydroponics cultivation technology. Results from analyzing the Pearson correlation showed that social, educational, economical and policy making factors have 99 percent of positive and meaningful relation with attitude toward hydroponics cultivation. Results show that the correlation level of social, economical, educational and policy making factors with and hydroponics was equal to 0.33, 0.47, 0.48 and 0.52,

respectively. According to Davis table these correlations were in average level. Furthermore, the results of step- by- step regression illustrated that policy making and economical factors explained 36.6 percent of variance of attitude toward hydroponics cultivation, through two steps. Results of the researches performed by Latimer *et al.* (2002) and Matson (2008) showed the policy making factors are influential in the development of hydroponics cultivation. It is proved in our research. The researches and evaluations of Cantliffe *et al* (2007), Papadopoulos *et al* (2008), Porterfield & Banks (2009) indicates that economical factors are effective in the development of hydroponics cultivation. This is proved in our research, too. According to results of correlation analysis we suggest the propagation of achievements and advantages of hydroponics cultivation in environment control, reducing the earth pollution and controlling the level of stock consumption (seed, fertilizer, pesticide), in order to generate positive attitude among the authorities, programmers, experts and green house holders. According to results of regression we suggest to create suitable job opportunities with extensive acceptance of hydroponics cultivation and coordination of experts in all phases of production, evaluation and propagation of results gained from researches and evaluations about hydroponics cultivation.

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