Indian Journal of Fundamental and Applied Life Sciences ISSN: 2231– 6345 (Online)
An Open Access, Online International Journal Available at www.cibtech.org/sp.ed/jls/2014/03/jls.htm
2014 Vol. 4 (S3), pp. 1390-1400/Roosta et al.
Research Article

ANALYSIS OF STABILIZER STRUCTURES OF TOMATO FARMS IN FARS PROVINCE

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ABSTRACT
Today, addressing the issue of sustainability especially in agriculture has received more attention. Sustainability in the systems of tomato cultivation depends on many factors like ecological, social and economic dimensions and understanding these factors can result in formulation of policies and strategies for sustainable agricultural development. Therefore the overall objective of this research is to investigate the sustainability level of tomato cultivation from economic, social and ecological aspects. To accomplish this goal, by retrospective study and obtaining information from experts, criteria and measures of sustainability were compiled and weighted with regard to the three above mentioned aspects. 8961 tomato farmers of Fars Province composed the statistical society of this research out of which 322 persons were chosen as sample using Cochran formula and they have been studied using a stratified sampling technique. The research collection tool was a questionnaire validity of which was approved by professors and experts in rural development and reliability of which was approved by preliminary study and calculation of Cronbach's alpha. Total sustainability indicator was calculated according to the three separate dimensions after leveling the indicators scale with the method of dividing by the average through analysis of main factors. The findings suggest that in terms of sustainability of the whole system of tomato cultivation, 50.90 % of the farmers act in unstable and relatively unstable manner. From economic aspect, 44.10 % of the farmers act in unstable and relatively unstable manner. 25.8% of the farmers act in stable manner in terms of ecological aspect. Results of regression analysis showed that 32% of the changes in the ecological sustainability are explained by variables of technical knowledge, knowledge of sustainability, job satisfaction, benefit from promotional programs and mechanization.

Keywords: *Sustainability, System of Tomato Cultivation, Sustainable Agriculture, Fars Province*

INTRODUCTION
Benefiting from 1.38 million hectares of arable lands and 265 thousand farmers with more than seven million tons of different products, Fars Province is considered as one of agricultural poles of Iran (Anonymous, 2005). Tomato cultivation area in this province was over 20 thousand hectares during crop year of 2009-2010. Total amount of tomato production in the same crop year totaled 850 thousand tons which led to its first place in the country (Statistics of Agricultural Jihad, 2009). In recent years, tomato production increased in this province and therefore, farmers have been encouraged to use various technologies and chemical fertilizers and pesticides in the production of this crop. Studies conducted by researchers and organizations related to rural and agricultural development show that more emphasis on the use of technology in agricultural development has led to adverse and concerning consequences for environment and natural resources. In addition investigation shows that the past functions all of which have been based on technology promotion are not in harmony with current needs of human society. Soil erosion, destruction of forests and pastures, destruction of beneficial soil microorganisms, threat of aquatic life due to indiscriminate use of pesticides and chemical fertilizers are adverse and concerning effects of the approach of technology transfer. This concern has led to a new attitude titled " Unsustainable Exploitation of Natural Resources"; however it should not be forgotten that sustainability is not a new concept, but a concept that today has received more attention (Praneetvatakul *et al.*, 2001) and

due to its long-term and unique nature it requires attention to issues beyond the everyday problems and it is rapidly expanding (Lozano, 2008). In relation to interpretation of the concept of sustainable agriculture, there are different schools of thought all of which have a common vision: what exists today is not sustainable agriculture. Some researchers classified present schools of thought into three categories: economic, ecological and social categories (Karami, 1995); others believe that sustainable agriculture is a system widely focused on both environmental and social aspects (Lyson *et al.*, 1998). Others define sustainable agriculture with regard to economic dimension (Young and Burton, 1999); others consider sustainable agriculture as a system that is technically appropriate, economically viable and socially acceptable (Ogaji, 2005).

Thus, we can say that sustainable agriculture includes different aspects like economic profitability for farmers (Karami, 1995, Ingels *et al.*, 1997, Herzog and Gotsch, 1998, Lyson, 1998, Comer *et al.*, 1999, Pannell and Glenn, 2000, Andreoli and Tellarini, 2001, Koeijer *et al.*, 2002, Rasul and Thapa, 2003, Gafsi *et al.*, 2006; Passel *et al.*, 2006), maintenance of environmental quality and facilitation of local communities. Hence, despite public concern about sustainable agriculture, there are disputes among researchers and agricultural scientists in the field of sustainable agriculture. A group of researcher's emphasis on low use of external inputs as a key tool for agricultural sustainability (Saltiel *et al.*, 1994; Hayati, 1995; Rezaie, 1997; Ingels *et al.*, 1997; Norman *et al.*, 1998; Comer *et al.*, 1999; Boshard, 2000). Others heavily focus on increasing production and use of more external inputs in some cases – albeit taking soil quality and crop yield into account. However, concern of most researchers in ecological sustainability is maintaining the ecological health (Rasul and Thapa, 2003), diversity (Saltiel *et al.*, 1994; Ingels *et al.*, 1997; Pannell and Glenn, 2000; Gafsi *et al.*, 2006; Cawenbergh *et al.*, 2007) and maintaining the quality of resources (Sands and Podmore, 2000; Bosshard, 2000; Gafsi *et al.*, 2006) as necessary conditions for sustainable agriculture. However, understanding different approaches of sustainability enables us to evaluate potentials and related constraints.

Sustainable agriculture depends on different ecological, economic and social factors that recognizing these factors and their interactions can be of great importance to the issue of sustainability (Brower, 2004; Filho, 2004; Ikerd, 1990). Ecological dimension of sustainable agriculture is its most visible and important aspect. This dimension is based on conservation of natural resources and less emphasis on hazardous inputs and chemicals contaminating the environment. Climate change or new plant pests and diseases can have similar effects. Efficient use of water resources (Karami and Hayati, 1998), minimum tillage (Manyong and Degand, 1995), multi-cultivation (Kouchaki and Khiabani, 1994), crop management for sustainable soil fertility, crop rotation, use of crop residue, use of green and animal manures, use of compost, efficient use of fertilizers and chemical pesticides are variables that are considered in terms of ecology (Arnon, 1998; Nazemosadat *et al.*, 2006). Exclusive emphasis on ecological sustainability, regardless of its economic dimension, will not result to sustainable agricultural development because farmers usually make their decisions about the use or non-use of different methods in agriculture based on personal guarantee of profitability of these methods.

In assessment of the economic dimension of sustainable development we can mention several criteria and measures like productivity (in terms of yield or net income), stability of yield or net income, yield sustainability or net income and income distribution (Yousefi, 2005; Tisdell, 1992).

The social dimension may be reflected in the capacity of agricultural systems to adequately protect agricultural communities (Herzog and Gotsch, 1998). The welfare of family and farmer, job satisfaction, appropriate working conditions, health and nutrition, life and living standards of farmers, all affect production process and its continuation (Filho, 2004).

In general, there are problems in the way of analysis of sustainability that prevent a thorough assessment and providing a comprehensive model of sustainable agriculture. However, several studies have been done in assessment of the three dimensions of sustainability in agriculture. In a study, ecological sustainability was measured according to five indicators of land use pattern, cropping pattern, soil fertility management, pest and disease control management (Rasul and Thapa, 2003). Also intercropping, soil fertility, use of fertilizers and pesticides were discussed as measures in the ecological dimension (Ibid).

Whereas some researchers consider soil structure, food chain, residue management and crop diversification as indicators of ecological sustainability (Anderson, 2005).

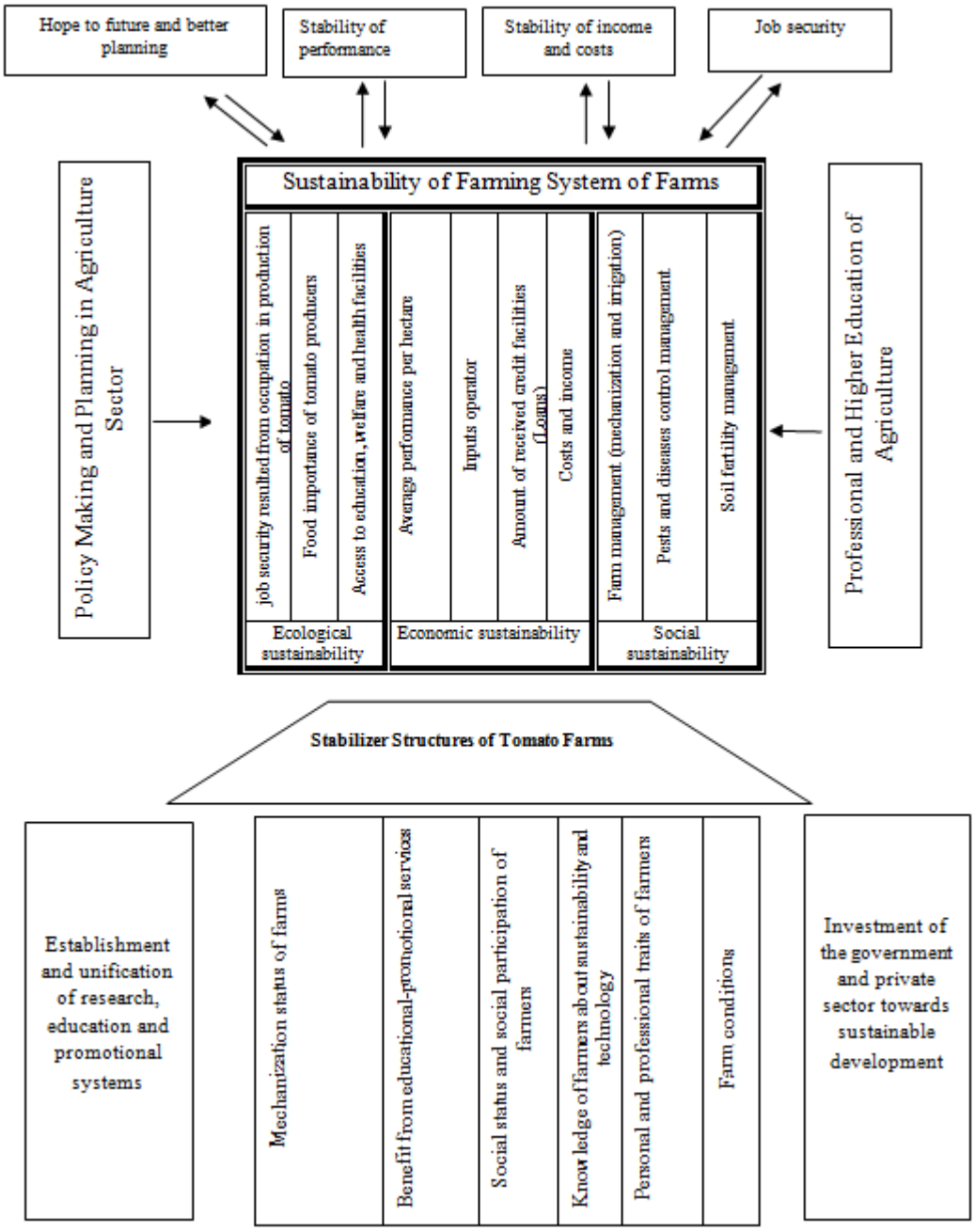

Figure 1: The Research Framework

In consideration of economic dimension, income is considered as one of the indicators. As well the economic sustainability has been measured by three indicators of land use efficiency or performance, stability of yield, and profitability (Rasul and Thapa, 2003). In assessment of social impacts, some people consider it as existence and operation of infrastructure, services (health, education and culture) and governmental rules for the public (Karami, 1993). From another perspective, social sustainability includes issues that affect people's quality of life (Guy and Rogers, 1999). Some of them have spoken about

combinational approaches for analysis of sustainability (Bebbington *et al.*, 2006; Dietz and Neumayer, 2006). However, as sustainability simultaneously emphasizes on economic, social and ecological dimensions, the process of evaluation of sustainability and analysis of related models makes we face this challenge that how we can create interaction between the different dimensions of sustainability (Munda, 2004). Several studies have been done by domestic and foreign researchers in the field of measurement of agriculture sustainability and its effective factors that some of the most important ones are mentioned.

In the study of Roosta (2000) analysis of sustainability of farming system of corn farmers is considered and the findings suggest that there is significant positive relationship between technical knowledge, performance of the product, the service provided by the Agricultural Service Centers and type of farming system and sustainability of farming systems of corn farmers. Iravani and Darban (2004) in a study entitled "Measurement, analysis and explaining sustainability of operation units of wheat farmers in Tehran" concluded that 46.70% of the operations were unstable and amount of yield and productivity of production factors and technical knowledge have had the greatest impact on sustainability. Findings of Omani and Chizari (2006) about analysis of sustainability of farming system of wheat farmers show that educational level, technology, knowledge of sustainable agriculture, the amount of land under cultivation, crop income, social status, and social norms, social participation and use of information channels have positive and significant correlation with the sustainability of farming systems. In the research of Maghsoudi *et al.,* (2007) sustainability of the farming system of potatoes was studied. The findings show that 66.78% of the cultivation systems are relatively stable. Also there is positive and significant correlation between sustainability of potato and variables like history of farming, history of potato cultivation, and membership in cooperative company, the area of land under potato cultivation and use of fallow. However consumption of fertilizer has a significant relationship with sustainability. Solomon *et al.,* (1997) examined the influence of family factors affecting the adoption of sustainable farming systems and concluded that the adoption of sustainable systems has a positive and significant relationship with ethnicity, and religious activities and cooperative promotional services. In the research of Stokle *et al.,* (1994) 9 major factors of profitability of farm, product quality, water quality, soil quality, air quality, energy efficiency, protection of the environment, and acceptance by the society were considered to assess the sustainability.

Overall in this study 38 indicators were used to measure sustainability in three social, economic and environmental dimensions and the effects of technology, mechanization status, benefit from support services, educational and promotional services, social participation and satisfaction with the job of farming on sustainability of tomato cultivation were studied.

MATERIALS AND METHODS

Methodology of Research

In terms of nature and quantity and considering the extensive range of research, survey techniques were used in the present study. This study is considered as applied research in terms of orientation and target. In terms of time as well, given that it was performed at a certain point of time, it is considered as a cross-sectional study. The population of this study consisted of 8961 tomato farmers who cultivated tomato in crop year 2009-2010 in Fars province. Sampling was based on a stratified multi-stage random sampling. For that purpose, with respect to the method of sampling, Scheffer *et al.*, Formula (1996) was used to more accurately estimate the number of samples and 245 persons were included in the study. In order to better generalize the results, according to the classes of the total population, 77 persons were added to the obtained ratios. Finally, the sample size was determined as n=322. Data collection was conducted using a questionnaire. First the validity of the questionnaire was approved by the relevant professors and experts and a pilot study was performed with 30 selected farmers outside the scope of the investigation, in order to check reliability of the measurement tool. The Alpha coefficients obtained for measures were between 0.75 and 0.88. Necessary adjustment was performed on variables that had a small amount of alpha and finally 322 questionnaires were completed.

In the present study, in order to assess the sustainability, basic variables of three ecological, economic and social dimensions were extracted and indicators of sustainability were developed based on them. Ecological dimension was composed of 19 indicators, economic dimension was composed of 12 indicators and social dimension was composed of 12 indicators (Table 1). Validity of the indicators was approved by consensus of the pundits. Then the desired indicators were leveled through the method of division by the mean (Karami and Rezaei, 1998). The scaled leveled indicators were multiplied by corresponding weight obtained by the method of principal components analysis. The combined indicator, according to the three dimensions, was obtained by the sum of all related indicators. Then total combined sustainability indicator was measured by the sum of combined indicators of the three dimensions. The equation of sustainability indicator of farming system of tomato is as follows:

$$CI = \sum_{i=1}^{n} \frac{xij}{X} * Wij$$

Where CI is combined indicator of sustainability, Xij is indicator I of tomato farmer j, X is the mean of Xi, wij is the weight of indicator I, which was obtained through principal components analysis.

Table 1: Indicators used in the Measurement of Sustainability in the Research

Measures of Ecological Sustainability	Measures of Economic Sustainability
Ratio of fallow lands to total cultivated lands	The average yield per hectare
Ratio of rotation lands to total land area	The average income of farmer per hectare
Ratio of continuously cultivated lands to total area (negative)	Ratio of debt to total farm income
Ratio of Leveled lands to total lands	Ratio of insured to total land area
Ratio of sloped lands to total land area (negative)	Proportion of the family workforce employed in agriculture
Ratio of composted lands to total land under cultivation	Expenditure per hectare (negative)
Ratio of Protective tillage to total land under cultivation	Seed productivity (total value of production to the costs of seeding)
Ratio of lands with modern irrigation systems to total land area	Fertilizer efficiency (total value of production to the costs of fertilizer)
Consumption of bred seeds per kilogram of consumed seed	Productivity of toxins (total value of production to the costs of toxins)
Consumption of sterilized seeds per kilogram of consumed seed	Water productivity (total value of production to the costs of water)
Removal of crop residue per hectare (negative)	Labor productivity (total value of production to the costs of labor)
The use of agricultural machinery (negative)	Machine productivity (total value of production to the costs of machinery)
Consumption of phosphate fertilizer per hectare (negative)	Measures of Social Sustainability
Consumption of potassium fertilizer per hectare (negative)	Satisfaction with the career future
Consumption of nitrogen fertilizer per hectare (negative)	Position and social status
Consumption of micronutrient fertilizer per hectare (negative)	Participation in promotional classes
Consumption of herbicide per hectare (negative)	Job security
Consumption of toxin per hectare (negative)	Food Security
Consumption of water per hectare (negative)	Access to training facilities
	Access to health and welfare

RESULTS AND DISCUSSION

Findings listed in Table 2 show individual and occupational characteristics of the responding farmers. The results indicate that average age of respondents is 46.09 years, and average household size is 6 persons.

Average agricultural work experience of the farmers is 18.33 years indicating the importance of agriculture in the study area. The research findings suggest that the area of personally-owned land is 2.91 hectares 2.39 hectares of which, whether personally or by rent, are devoted to the cultivation of tomato on average. The average number of plots, which is one of the basic measures of dispersion, is 3.5 plots and the average size of the plots is 2.47 hectares.
The findings suggest that average yield of tomato is 55.33 tones and average annual income of the farmers is 50 million Rials per year.

Table 2: Individual and occupational characteristics of the respondents

Variables	Mean	SD	Min.	Max.
Age (Year)	46/09	16/16	20	85
Household Size (person)	6	2/89	0	12
Agricultural work experience (year)	18/33	11/66	2	45
Area under cultivation of tomato (hectare)	2/39	1/13	0/5	6
Land area (hectare)	2/91	7/06	1	45
Number of plots (plot)	3/5	1/33	0	6
Average size of plots(hectare)	2/47	2/55	0/5	15
Average yield (tone)	55/33	17/45	20	92/5
Income (1000 Tomans[1])	5000	738/43	750	130000

The findings contained in Table 3 indicate that 9.31% of the farmers have low level of technical knowledge and 25.15 of the farmers are located on the upper level. In addition, 46.61% of the farmers had medium level of knowledge about sustainability. In terms of mechanization, 15.62% of them benefited from low level of mechanization and about 51% were at high levels. The results showed that 73.90% of the farmers benefited from low level of support services and only 3.41% of them enjoyed high level of support services. Information related to benefit from educational – promotional services also shows that 69.87% of the respondents enjoyed low level of benefit from these services. 31.36% of the tomato farmers had low participation in social activities of the village and 15.83% of them showed high level of participation in social activities of the village. In terms of satisfaction with the career, 49.06% of the farmers had low satisfaction with the job of farming and only 11.8% of them were satisfied with the career.

Table 3: Distribution of Respondents Regarding Some Selected Structures

Quantity	Low		Medium		High	
Structures	Frequency	%	Frequency	%	Frequency	%
Technical Knowledge	30	9.31	211	65.52	81	25.15
Knowledge of Sustainability	43	13.36	134	41.46	145	45.03
Status of Mechanization	50	15.62	107	33.23	165	51.24
Benefit from Support Services	238	73.9	73	22.67	11	3.41
Benefit from educational – promotional services	225	69.7	69	21.42	28	8.69
participation in social activities	101	31.36	170	52.79	51	15.83
satisfaction with agriculture	158	49.06	126	39.12	38	11.8

Sustainability of Tomato Farms
Table 4 shows frequency distribution of tomato farmers in terms of the three dimensions of sustainability of tomato farms.

[1] - 1$=3200tomans

In terms of ecological sustainability of tomato farming system, 15.2 percent of the farmers act in unstable manner, 33.2% of them act relatively unstable, 25.80% of them act relatively stable and 25.80% of them have stable action.
Findings in terms of social sustainability showed that 10.2% of the farmers act in unstable manner, 39.10% of them act relatively unstable, 36.10% of them act relatively stable and 14.60% of them have stable action.
The data indicate that in terms of economical dimension, 15.2 percent of the farms act in unstable manner, 28.90% of them act relatively unstable, 39.40% of them act relatively stable and 16.50% of them have stable action.
In terms of combined indicator of sustainability, 18.90% of the farmers act in unstable manner, 32% of them act relatively unstable, 32.60% of them act relatively stable and 16.50% of them have stable action.

Table 4: Distribution of tomato farmers' frequency in terms of sustainability of tomato cultivation in different dimensions

Status	Unstable		Relatively Unstable		Relatively Stable		Stable	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Ecological Sustainability	49	15.2	107	33.2	83	25.8	83	25.8
Social Sustainability	33	10.2	126	39.1	116	36.1	47	14.6
Economic Sustainability	49	15.2	93	28.9	127	39.4	53	16.5
Total Sustainability	61	18.9	103	32	105	32.6	53	16.5

According to the findings contained in Table 4 it can be seen that sustainability of tomato farm both in terms of total combined indicator and the three dimensions of sustainability has been in medium level. Based on total combined indicator, 18.9% of the farmers were in the group with unstable system and 16.5 percent of them were in a stable state.

Table 5: Correlation between the Dimensions of Sustainability and Selected Variables

Sustainability Dimensions	Ecological		Economic		Social	
Variable	r	p	r	p	r	p
Age	-0.685	0.001	0.251	0.001	-0.641	0.001
Agricultural work experience	-0.713	0.001	0.223	0.001	0.442	0.001
Tomato Cultivation Area	-0.222	0.001	-0.021	0.671	-0.271	0.001
Ownership	-0.123	0.020	0.071	0.191	-0.195	0.001
Satisfaction with Agriculture Career	0.160	0.000	0.321	0.000	0.434	0.001
Participation in social activities	0.483	0.001	0.302	0.001	0.243	0.001
Social Status	0.152	0.094	0.194	0.041	0.262	0.000
Technical Knowledge (Ordinary)	-0.171	0.030	0.632	0.000	0.145	0.040
Knowledge of sustainability	0.614	0.001	0.02	0.603	0.482	0.001
Mechanization	-0183	0.044	0.144	0.025	0.145	0.040
Benefit from Educational-Promotional Services	0.593	0.001	0.735	0.001	0.250	0.001

Factors Affecting the Sustainability of Tomato Farms

In examining the effects of individual, social and economic variables on anticipation of the sustainability of tomato Farms in three economic, social and ecological dimensions, as can be seen in Table 5, among

individual variables age has had a significant negative correlation with ecological sustainability in the confidence level of 0.01 (r=- 0.685, P=0.0001) and social sustainability (r=0.641, P=0.0001), but positive and significant relationship with the variable of economic sustainability (r = 0.251, P = 0.0001). Agricultural work experience has had significant negative correlation with ecological sustainability (r = -0.713, P = 0.0001) and a significant positive correlation with economic sustainability (r = 0.223, P = 0.0001) and social sustainability (r = 0.442, P = 0.0001). Also, according to the findings, there is a significant negative correlation between tomato cultivation area and the three levels of sustainability of tomato Farms in confidence level of 0.01 (Table 5). The variable of ownership has had a significant negative relationship with ecological sustainability (r = -0.123, P = 0.020) and social sustainability (r = -0.195, P = 0.0001) and it has had no statistically significant relationship with economic sustainability variable (r = 0.071, P = 0.191). According to the research findings, there is a significant positive correlation between job satisfaction and the three dimensions of sustainability of tomato Farms (Table 5). However among social characteristics, participation in social activities has a positive and significant relationship (confidence level of 0.01) with the three dimensions of sustainability of tomato Farms.

There was no statistically significant relationship between social status and ecological sustainability of tomato Farms (r = 0/152, P = 0/094). However there was positive and significant relationship between social status and economic sustainability (r = 0/041, P = 0/194) and social sustainability (r = 0/262, P = 0/000), respectively, in the confidence level of 0.05 and 0.01. Technical knowledge of the farmers has negative and significant relationship with ecological sustainability (r = 0 / -171, P = 0/030) of their farms and positive and significant correlation with economic sustainability (r = 0/632, P = 0/000) and social sustainability (r = 0/145, P = 0/040) of their farms (at confidence level of 0.01). This finding is consistent with the research of Roosta (2000).

Table 6: Multiple stage regression in order to predict the concurrent effects of independent variables on the sustainability prediction

Sustainability dimensions	Variable	b	B	t	p
	y-intercept	2.465	------	12.572	0.000
	Technical Knowledge	0.242	0.233	3.108	0.002
Economic	Knowledge of sustainability	0.435	0.451	6.467	0.000
	Benefit from promotional programs	0.239	0.281	3.322	0.002
	Job Satisfaction	0.178	0.125	1.99	0.049
	Participation in social activities	0.182	0.239	2.738-	0.007
	y-intercept	0.529	----	1.570	0.177
	Technical Knowledge	-0.222	-0.215	-4.244	0.000
Ecological	Knowledge of sustainable agriculture	0.345	0.330	6.451	0.000
	Job Satisfaction	0.338	0.291	6.103	0.000
	Benefit from promotional programs	0.328	0.282	5.77	0.001
	State of mechanization	-0.114	-0.152	-2.81	0.000
	y-intercept	2.465	-	12.572	0.060
	Benefit from promotional programs	0.239	0.281	3.232	0.002
Social Sustainability	Knowledge of sustainability	0.435	0.451	6.467	0.000
	Job Satisfaction	0.243	0.233	3.108	0.002
	Participation in social activities	0.184	0.239	2.738	0.007

Also knowledge of sustainable agriculture of the tomato farmers has had positive correlation with three dimensions of sustainability of their farms. This finding confirms results of Roosta (2000), Iravani and Darban (2004). Mechanization status variable has low negative correlation with ecological sustainability (r = -0 / 183, P = 0/044) of tomato Farms and significant positive correlation with economic sustainability

(r = 0/144, P = 0/025) and social sustainability (r = 0/145, P = 0/040) of tomato Farms. Finally, there is a significant positive relationship between benefit of educational-promotional services and the three dimensions of sustainability of tomatoes Farms in the confidence level of 0.01. These findings suggest that promotional trainings could lead people's knowledge towards sustainability that are consistent with the results of some studies on the social - economic dimensions (Saltiel *et al.*, 1994; Comer *et al.*, 1999; Sydorovyh and Woossink, 2008) and ecological (Hayati and Karami, 2000).

The ability of concurrent effect of the research variables on anticipation of sustainability dimensions:

As shown in Table 6, among independent variables, technical knowledge, knowledge of sustainability, benefit from the promotional programs, job satisfaction and participation in social activities have entered the equation. Given the value of R^2, these variables are totally can predict 22% of the variation in economic sustainability. Meanwhile, technical knowledge, knowledge of sustainability, job satisfaction, benefit from the promotional programs, and state of mechanization are totally able to predict 32% of the variation in ecological sustainability. However according to the research findings outlined in Table 6 in relation to the social sustainability, among the independent variables, four variables of benefit from educational-promotional services, knowledge of sustainability, job satisfaction and participation in social activities can totally predict 43% of the variation in social sustainability.

Conclusion

Our results indicate that total sustainability status and the three dimensions of sustainability of tomato Farms in the study area are in relatively good condition. Therefore, in order to improve the situation and prevent non-sustainability, officials and planners' attention to the priority of making policy and strategies in economic, ecological and social areas for sustainable agriculture can be beneficial.

The findings suggest that the level of farmers' knowledge of sustainability has had the greatest impact on the three dimensions of sustainability.

It is therefore recommended to improve knowledge of sustainability in the region through agricultural training strategies focused on sustainability. Workshops, educational promotional classes, methodological and consequential presentations, scientific excursions, mass media and press can be used in this regard in proportion to the farmers' capability.

According to the research, about 90% of the farmers have lower-middle to middle job satisfaction that needs more contemplation. So in this case by providing the necessary measures to improve attitudes towards agriculture (including financial incentives which are considered by most farmers) can improve their job satisfaction.

Also it is recommended that inviting farmers to various stages of planning, design, and implementation of different phases makes them more attracted to the participation. In the economic dimension, similarly by taking the necessary measures including timely provision of funds and facilities needed by farmers, their job security and systematization of insurance policies and the like their job satisfaction can be improved. Participation in social activities can be a good predictor for social sustainability. Hence, according to cases predicted in the area of farmers' participation, it is strictly recommended that conditions of farmers' presence are provided in the appropriate context.

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