



ORIGINAL ARTICLE

Determining the characteristics of wheat growers in enhancing agricultural sustainability-A case study of the rural regions in Doroud, Iran

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ABSTRACT

The aim of this research is to identify the individual, socio economic and technical factors of the wheat growers in attaining agricultural sustainability. The methodology involved using descriptive analytical model of analyzing and interpreting the field data collected from a random sample of 250 wheat growers from Doroud. The survey questionnaire using the Cochran formula was applied. Test was also used to assess the reliability coefficient of the questionnaire with a chronbach Alfa of more than %75. Results show that the variables such as the total area under cultivation, average land acreage, number of croplands, their income and education as well as the time they have been farming had shown to have %48 of the variables of agricultural sustainability in the area under study.

Keywords: Agricultural sustainability, Doroud, factors, wheat growers.

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INTRODUCTION

The world's population growing is faster than ever. Since the increasing of population will have more acceleration in developing countries, therefore achieving to sustainable food security is more important in these countries. In Iran like other development countries, agriculture is one of the most important economic sectors which encompass high percentage of the production and employment [1]. In Iran, wheat because of its strategic, long- standing dependence of farmers to cultivating of wheat, habits and tastes and critical role of bread in the food basket, the attention of governments, farmers and consumers to cultivating and producing this crop has an important and an special place .The agricultural system in Iran like other systems has many factors to consider, the important of which are maximization of production aimed at food self-sufficiency that in turn generates environmental consequences such as soil salinity, soil alkalinity, spread of pests and diseases and hosts of other impact due to over-application of the agri-chemicals that in the long-term deem the farming system unsustainable [2]. These factors have been cause highlighting issues of sustainable development in Iran especially in recent years.

The concept of sustainable development can be considered in different ways in various contexts such as describing perspectives [3] exchanging values [4], providing moral development, providing social reorganization, changing toward a better future ,not endangering the quality of the environment[5,6],empowering people, producing new capacities ,respecting for native knowledge ,increasing knowledge [7] and having selection freedom of and equal access to opportunities [8,9],all of which somehow clarify the pivotal idea of sustainable development ,i.e. "meeting the requirements of the present generation according to the requirements of the future generation"[10]. The framework of this concept is based on "our common future" and "equality between generations "[11,12].Taylor believes that the concept of sustainable development is an important stage of environmental theory, because it proves how the society should organize itself [13]. One of the crucial aspects of sustainable development is sustainable agriculture. Basically, there is not a single definition for sustainable agriculture [14, 15, 16].Because of the complexity argue that sustainable agriculture as a goal, contains a great range of

strategies [17]. Some experts regard sustainable agriculture on the basis of ecological perspective [18,19] and some others see this concept beyond the guarantee of mere ecological aspects and consider it the container of moral aspects, sustainable growth, and rural communities and institutions' sustainability [20,21]. Significant researches have been done in the field of sustainable agriculture in the world that most aim of them finding points that led to sustainability or remove the suggestions that have been against of sustainability.

Taylor and et al pointed out that there were some kinds of the sustainability of one's activities. They focused on biophysical processes that supported sustainability and substituted intra field supplies for extra field inputs [22]. Uri believes that access to financial support and credit is very important for the sustainability of agricultural systems [23]. A study by Saifi and Drake showed that sustainable agronomical operations-orientation includes using advanced irrigation systems, using the technologies of integrated management of Pests combining administration, decreasing the consumption of chemical fertilizers and moving toward consuming organic fertilizers and supporting biologic variation, all of which are techniques that are essential for making agriculture sustainable [24]. In studying the sustainability of the ecology of cotton-wheat agricultural system in Khorasan province, Iran, Mahdavi Damghani et al reported that the most important factors determining sustainability in such agricultural system were the surface under cultivation, performance, management of plant residues, agricultural income and access to education and promotion [25]. Webster has also emphasized that the improvement of economic conditions of farmer is the most tangible and objective manifestation of advantage of any system which the farmer welcomes [26].

Karami believes that economic hardship of farmers caused that they don't considered environmental problems and it will be a challenge for achieving to aims of sustainable agriculture in Iran [27].

Bosshaq and et al through a study indicated that the education, the income from crop and total amount of land an important role in the sustainability of agricultural system of Ravansar, Iran [28]. D' Souza et al also indicated that the level of education played a crucial role in the sustainability of agricultural system in Virginia, USA [29]. Thus, according to strategic role of wheat in Iran, identifying these factors and determining how much they contribute to creating sustainability of wheat cultivating system can play a very important role in compiling the policies and approaches of sustainable agriculture. The present research was conducted with the aim of analyzing factors effective of wheat growers in the agriculture sustainable in rural regions of Doroud, Iran.

METHODOLOGY

The methods of this research have been descriptive and survey that data requirement for analysis the components are obtained by questionnaire. The calibration tests were performed by referring to some expertise of professors and experts for data validation. Then using statistical tests in SPSS program data were analyzed. Statistical population of this study constitutes the wheat growers of rural regions in Doroud (N = 8746 Individual). A trial test on 30 questionnaires was conducted in two rural units outside the geographical domain of the research area and outside the sample population in order to enhance the validity component of research. This was compounded by inclusion of the Cukran formulae. Hence, 200 family heads were selected randomly for the survey.

The Cronbach Alfa statistical technique was applied to verify the validity of the questionnaires and the results yielded by the methodology which showed a reliability coefficient of over 73% which suggests relatively sound results. This shows suitability tool of the research.

Two questions were asked in the questionnaire that first group was including individual, social, economic and technical questions while second group was used dependent variable (sustainability of wheat growers).

This range included (very low, low, somewhat, high and very high). So to review the cases in a range of "very low" to "very high" be scored from 0 to 5.

RESULTS AND DISCUSSION

The results of descriptive findings (table 1) show that the average age of subjects is 46/21 years. The results also average of per capita of respondent's agricultural land is 5.68 hectares and average of farming land for wheat indicated 4.11 hectares. Table 1 shows other descriptive characteristics of the research.

Table 1. The findings of descriptive research

Variables	<i>Mean</i>	<i>Std. Deviation</i>	<i>Minimum</i>	<i>Maximum</i>
Age(year)	46.21	9.14	23	66
Education(year)	7.40	2.23	0	13
Number of household	5.76	1.39	2	10
Agricultural history(year)	27.78	9.55	4	36
Amount of yield (Ton per hectare)	3.11	1.07	1	4
Distance to the nearest service center	4.88	1.32	1	13
Total amount of lands(hectare)	5.68	1.90	1	14
Lands under irrigated farming(hectare)	4.47	1.07	0.5	11
The level of cultivation of wheat(hectare)	4.11	1.11	1	11
Income(10,000Rs)	167.23	22.75	140	245
Number of disposal lands(piece)	2.44	0.96	1	12
Average of land's size(hectare)	2.13	1.05	0.5	8

The results (Table 2) also shows that the performance of crop rotation index with an average of 4.23 highest rank and no burning of straw left after harvest index with an average of 1.97 have the lowest rank..

The findings of this research can be as a result that the highest and lowest ranking is for each wheat grower respectively 60 and 12. Therefore, obtaining an average of 41 by wheat growers (It is more than average of 36) indicate sustainability of agricultural system in this lands. The information related to this analysis is shown in Figure 1, which illuminates wheat growers' agricultural sustainability in this study region.

Table 2. The Knowledge of wheat growers about sustainable agriculture

Index	<i>Mean</i>	<i>Std. Deviation</i>	<i>Rank</i>
Performance of crop rotation	4.23	0.93	1
Utilizing of combination of animal & plant	4.19	1.15	2
Use of fallow	4.03	1.06	3
Use of animal manure to reinforced soil	3.96	1.22	4
Timing of planting & harvest for pest control	3.77	1.18	5
Proper use of the recommended amount of fertilizers	3.34	1.03	6
Better protection of water quality and quantity	3.11	1.13	7
Using the combining methods	3.07	1.32	8
No use of chemical pesticides	2.95	1.17	9
Planting green manure to improve & increase lands fertility	2.82	1.25	10
No use of chemical fertilizers	2.76	0.97	11
No burning of straw left after harvest	1.97	1.21	12

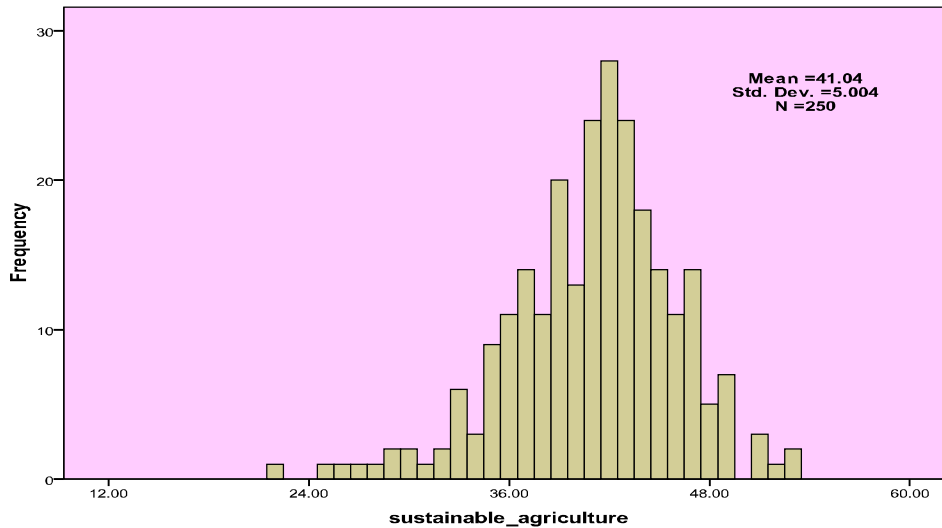


Fig1. Set Points of wheat growers about sustainable agriculture

The results of table (3) shows a meaningful correlation (99% confidence level) between wheat growers' agricultural sustainability and education , total amount of lands, income and average of land's size, in addition, there is a meaningful and positive correlation between sustainability of agricultural system wheat growers with irrigated farming (95% confidence level). Results further show close consistency with the results obtained in arid and semiarid regions of Iran [28] and similar regions in the world [21, 23, 29].

Results also showed a significant negative correlation between agricultural history of wheat growers and their number of pieces of lands in 99% confidence and between age of wheat growers and sustainability of agricultural in 95% confidence were observed.

Findings [30] also indicate that individual factors such as age, agricultural history have a negative correlation with sustainability of agricultural. In other words the groups of wheat growers don't interest to continue wheat cultivating and rural life because of more tendencies to non-agricultural jobs, such as working in mines, industries and urban services. The recent decades have created a profound influence on social structure and demographic of city and village in Iran. For example the migration of some villagers from Lorestan to Khuzestan province can explain this process .The findings [31] also show that dispersion of lands has a negative role in unsustainability of agricultural system.

Table4. Analysis of correlation between agricultural sustainability with individual characteristics, social, economic and technical

Variables	Correlation coefficient
Age	-0.128*
Education	0.403**
Number of household	0.064
Agricultural history	-0.257**
Amount of yield (Ton per hectare)	-0.019
Distance to the nearest service center	0.118
Total amount of lands	0.567**
Lands under irrigated farming(hectare)	0.136*
The level of cultivation of wheat (hectare)	0.083
Income	0.244**
Number of pieces	-0.331**
Average of land's size	0.213**

*P< 0/05

** P< 0/01

The results (Table 5) shows the effect of 48% variations of sustainability of agricultural for wheat growers by 6 characteristics of total amount of lands, number of pieces, income, education, average of land's size and agricultural history are explained that total amount of land farmers with 32%, the highest share has in the explaining of wheat growers' agricultural sustainability.

So, the equation of linear obtained analysis of regression is as follows:

$$Y = 25/201 + 0.234X_1 - 0.686 X_2 + 0/937 X_3 + 0/343 X_4 + 0.165 X_5 - 0.064 X_6$$

Symbols of variables in this equation are:

Wheat growers' agricultural sustainability : Y

X₁ : Total amount of lands

Number of pieces : X₂

X₃ : Income

X₄: Education

X₅: Average of land's size

X₆: Agricultural history

Dependent variable	Model	Independent variable	R	R ²	F	sig	B	Beta	t	sig
wheat growers' agricultural sustainability	1	(Constant) Total amount of lands	0.567	0.322	126.776	0.000	26.162 0.294	0.567	19.622 11.259	0.000 0.000
	2	(Constant) Total amount of lands Number of pieces	0.629	0.396	87.061	0.000	29.469 0.279 -0.971	0.538 -0.273	21.225 11.226 -5.695	0.000 0.000 0.000
	3	(Constant) Total amount of lands Number of pieces Income	0.661	0.437	68.616	0.000	26.408 0.274 -0.938 1.137	0.529 -0.264 0.204	17.484 11.395 -5.688 4.423	0.000 0.000 0.000 0.000
	4	(Constant) Total amount of lands Number of pieces Income Education	0.682	0.465	57.454	0.000	25.944 0.248 -0.833 0.969 0.349	0.480 -0.234 0.174 0.182	17.530 10.169 -5.092 3.800 3.732	0.000 0.000 0.000 0.000 0.000
	5	(Constant) Total amount of lands Number of pieces Income Education Average of land's size	0.690	0.476	47.843	0.000	23.516 0.243 -0.782 1.029 0.330 0.160	0.470 -0.220 0.185 0.171 0.107	13.089 10.001 -4.777 4.047 3.537 2.343	0.000 0.000 0.000 0.000 0.000 0.020
	6	(Constant) Total amount of lands Number of pieces Income Education Average of land's size Agricultural history	0.698	0.488	41.556	0.000	25.201 0.234 -0.686 0.973 0.343 0.165 -0.064	0.453 -0.193 0.175 0.178 0.111 -0.112	13.169 9.618 -4.108 3.844 3.704 2.450 -2.403	0.000 0.000 0.000 0.000 0.015 0.017

CONCLUSION

The results of this study show there is a significant relationship between sustainability of wheat growers system and collection of individual factors, social, economic and farming that it can have a great influence in macro planning.

This research has been to identify effective factors on wheat growers' agricultural sustainability. Results indicate that total average of sustainability of wheat growers system is more than average. In this regard, eight indices of the twelve indices have achieved above average scores. In examining the relationship between wheat growers' agricultural sustainability with variables such as education, total amount of lands, income, average of land's size in 99% confidence and with irrigated framing in 95% confidence was observed a meaningful and positive relationship. In other words, an increase of each these variables significantly will lead wheat growers' agricultural sustainability. Results further show that there is a

meaningful and negative correlation between agricultural history and number of lands (pieces) in 99% confidence and variable age in 95% confidence with wheat growers' agricultural sustainability. Result obtained of stepwise multiple regression analysis method show the six factors of total amount of lands, number of pieces, income, education, average of land's size and agricultural history are explained 48% of variable (wheat growers' agricultural sustainability).

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