



ORIGINAL ARTICLE

Identifying of effective factors on agricultural sustainability of growers maize in Doroud, Iran

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ABSTRACT

Food and fiber production is key to food security and food self-sufficiency and as such has a place on the national planning agenda. The aim of this research is to identify the individual, socio economic and technical factors of the maize 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 maize 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 cronbach Alfa of more than %81. Results show that the variables such as the education, average of land's size, lands under irrigated farming and income as well as the time they have been farming had shown to have %40 of the variables of agricultural sustainability in the area under study.

Keywords: Food security, Agricultural sustainability; Doroud; maize growers.

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INTRODUCTION

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, maize because of its strategic, the attention of governments, farmers and consumers to cultivating and producing this crop has an important and a 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.

Sustainability is a broad concept which means different thing to different people and it is somehow hard to measure [3]. The concept of sustainable development has its roots in the Brandt Report entitled "Our Common Future" with the underlying philosophy of supporting development without incurring a "Zero-sum" consequence. This clearly means that any food production or system development should meet the market requirements in the form of food and fiber production without ds incurring adverse environmental impacts. In other words, development is no way justifiable at the costs of resource depletion or resource degradation. Developmental trend could only be sustained on the conditions that the soil, water, air and other life-depending natural resources are jealously protected and preserved [4]. It is due to the importance attached to the concept that prompted the experts to view it as a way in which the society can organize its resources and the ways in which it is given priority in decision-making agenda [5].

One of the crucial aspects of sustainable development is sustainable agriculture. Basically, there is not a single definition for sustainable agriculture [6, 7- 8]. Because of the complexity argue that sustainable agriculture as a goal contains a great range of strategies [9]. Some experts regard sustainable agriculture on the basis of ecological perspective [10,11] 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 [12,13]. Thus the most important issue in agricultural

development is emphasis on sustainable agriculture. And agricultural sustainability depends on achieving a fundamental change in the overall agricultural structure, management and optimum utilization of resources, also organizing and conduction activities in rural areas. Because of the development and sustainability of agriculture, the village and rural development should take into consideration so it will be found true identity and real mean [14].

Thus, according to strategic role of maize in Iran, identifying these factors and determining how much they contribute to creating sustainability of maize 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 maize growers in the agriculture sustainable in rural regions of Doroud, Iran.

THE 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 maize 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, 250 family heads were selected randomly for the survey.

The Crunbakh 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 81% 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 maize 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 (table1) show that the average age of subjects is 44.79 years. The results also average of per capita respondent's agricultural land is 5.11 hectares and average of farming land for maize indicated 2.34 hectares. Table 1 shows other descriptive characteristics of the research.

Table 1: The findings of descriptive research

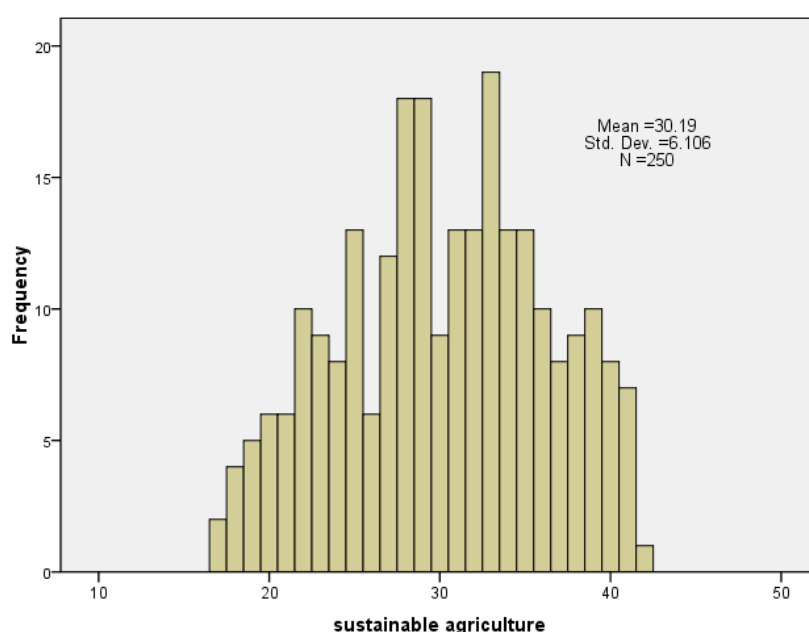
| Variables | <i>Mean</i> | <i>Std. Deviation</i> | <i>Minimum</i> | <i>Maximum</i> |
|---|-------------|-----------------------|----------------|----------------|
| Age(year) | 44.79 | 9.65 | 25 | 68 |
| Education(year) | 8.21 | 2.78 | 0 | 13 |
| Number of household | 5.32 | 1.49 | 2 | 11 |
| Agricultural history(year) | 29.47 | 10.14 | 2 | 40 |
| Distance to the nearest service center(Km) | 4.76 | 1.41 | 1 | 15 |
| Total amount of lands(hectare) | 5.11 | 1.90 | 1 | 14 |
| Lands under irrigated farming(hectare) | 4.16 | 1.13 | 0.5 | 10 |
| The level of cultivation of maize (hectare) | 2.34 | 1.27 | 0.5 | 10 |
| Income(10,000RIs) | 173.90 | 28.89 | 150 | 285 |
| Number of disposal lands(piece) | 2.34 | 0.82 | 1 | 11 |
| Average of land's size(hectare) | 2.17 | 1.13 | 0.5 | 7 |

The results (Table 2) also shows that the Use of animal manure to reinforced soil index with an average of 3.86 highest rank and no use of chemical pesticides index with an average of 1.91 have the lowest rank.

The findings of this research can be as a result that the highest and lowest ranking is for each maize grower respectively 50 and 10. The information related to this analysis is shown in Figure 1, which illuminates maize growers' agricultural sustainability in this study region.

Table 2: The Knowledge of maize growers about sustainable agriculture

| Index | Mean | Std. Deviation | Rank |
|---|------|----------------|------|
| Use of animal manure to reinforced soil | 3.86 | 1.23 | 1 |
| Use of fallow | 3.52 | 1.17 | 2 |
| Proper use of the recommended amount of fertilizers | 3.30 | 1.13 | 3 |
| Timing of planting & harvest for pest control | 3.19 | 1.22 | 4 |
| Using the combining methods | 3.11 | 1.16 | 5 |
| No use of chemical fertilizers | 2.93 | 1.21 | 6 |
| Better protection of water quality and quantity | 2.84 | 0.94 | 7 |
| Performance of crop rotation | 2.65 | 1.09 | 8 |
| No burning of straw left after harvest | 2.36 | 0.98 | 9 |
| No use of chemical pesticides | 1.91 | 1.14 | 10 |

**Fig1: Set Points of maize growers about sustainable agriculture**

The results of table (3) shows a meaningful correlation (99% confidence level) between maize growers' agricultural sustainability and education, Distance to the nearest service center, Lands under irrigated farming, income and Average of land's size, in addition, there is a meaningful and positive correlation between sustainability of agricultural system maize growers with Total amount of lands and The level of cultivation of maize (95% confidence level). Results further show close consistency with the results obtained in arid and semiarid regions of Iran ¹⁴ and similar regions in the world ¹³.

Table3: Analysis of correlation between agricultural sustainability with individual characteristics, social, economic and technical

| Variables | Correlation coefficient |
|---|-------------------------|
| Age | 0.059 |
| Education | 0.527** |
| Number of household | 0.035 |
| Agricultural history | -0.079 |
| Distance to the nearest service center | 0.161** |
| Total amount of lands | 0.143* |
| Lands under irrigated farming(hectare) | 0.332** |
| The level of cultivation of maize (hectare) | 0.137* |
| Income | 0.306** |
| Number of pieces | -0.097 |
| Average of land's size | 0.452** |

*P < 0.05

** P < 0.01

The results (Table 4) shows the effect of 40% variations of sustainability of agricultural for maize growers by 4 characteristics of education, average of land's size, lands under irrigated farming and income are explained that education with 28%, the highest share has in the explaining of maize growers' agricultural sustainability.

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

$$Y = 33.744 + 0.936 X_1 + 0.523 X_2 + 0.680 X_3 + 0.773 X_4$$

Symbols of variables in this equation are:

Y: maize growers' agricultural sustainability

X₁: Education

X₂: Average of land's size

X₃: Lands under irrigated farming

X₄: Income

Table4: Analysis of regression individual characteristics, social, economic and technical

| Dependent variable | Model | Independent variable | R | R ² | F | sig | B | Beta | t | sig |
|--|-------|--|-------|----------------|-------------|-------|--|----------------------------------|--|---|
| maize growers' agricultural sustainability | 1 | (Constant) Education | 0.527 | 0.278 | 103.10 2 | 0.000 | 45.492 1.332 | 0.527 | 56.476 10.154 | 0.000 0.000 |
| | 2 | (Constant) Education Average of land's size | 0.606 | 0.367 | 77.493 | 0.000 | 37.354 1.078 0.606 | 0.427 0.316 | 24.496 8.304 6.144 | 0.000 0.000 0.000 |
| | 3 | (Constant) Education Average of land's size Lands under irrigated farming | 0.619 | 0.383 | 54.933 | 0.000 | 35.925 1.007 0.547 0.729 | 0.398 0.285 0.133 | 22.331 7.658 5.454 2.565 | 0.000 0.000 0.000 0.011 |
| | 4 | (Constant) Education Average of land's size Lands under irrigated farming Income | 0.628 | 0.394 | 43.066 | 0.000 | 33.744 0.936 0.523 0.680 0.773 | 0.370 0.272 0.124 0.113 | 18.030 6.977 5.219 2.405 2.234 | 0.000 0.000 0.000 0.017 0.026 |

CONCLUSION

The results of this study show there is a significant relationship between sustainability of maize 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 maize growers' agricultural sustainability. In this regard, five indices of the ten indices have achieved above average scores.

In examining the relationship between maize growers' agricultural sustainability with variables such as education, Distance to the nearest service center, Lands under irrigated farming, income and Average of land's size in 99% confidence and with Total amount of lands and the level of cultivation of maize in 95% confidence was observed a meaningful and positive relationship. In other words, an increase of each these variables significantly will lead maize growers' agricultural sustainability.

Result obtained of stepwise multiple regression analysis method show the four factors of education, average of land's size, lands under irrigated farming and income are explained 40% of variable (maize growers' agricultural sustainability).

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