



Research Paper

## Investigating the Sustainability of Agricultural Indicators in the Rural Areas of Iran (the Case of the Town of Marivan)

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**ABSTRACT:-** This study, an applied study in nature and a descriptive analytical study in terms of objectives, attempted to investigate the agricultural indicators in the three economic, social and environmental dimensions. The population comprises all the farmers in the town of Marivan (N=5684), 190 of whom were selected as the sample using statistical procedures. The main research tool was a researcher-made questionnaire of which the validity and reliability were validated by expert judgment and pretest, respectively. The findings revealed that the conditions of agricultural sustainability in economic, social and environmental dimensions are 2.8, 2.6, and 2.7, respectively. The findings also demonstrated that the general condition of agricultural sustainability among the farmers of the town of Marivan with a mean of 2.7 is below the average level.

**Key terms:-** Agricultural Sustainability, Food Security, Rural Areas, Marivan.

### I. INTRODUCTION

Although the increase of crops has helped provide the needs of the increasing population, today, it has been found that the modern technologies which utilize first-hand resources excessively lead to substantial erosion and destruction (Khazayi, 1997). In addition, destruction and making forest lands and grasslands into farms, soil erosion and water pollution caused by excessive utilization of chemicals, and the increase of farming sewage have grown into a substantial and serious size (Along and Martin, 1995: 36). In spite of that, not only do the current agricultural systems in many third world countries emphasize excessive use of external resource, but the uses of these resources has even increased in the recent years (Sharifi et al, 2011: 144).

Although farming plays a significant role in economy, there are anxieties as to its efficiency in reducing poverty in rural areas establishing food security and sustainable income for farmers and other villagers. These worries are caused by the fact that the farming environment and rural areas have faced unprecedented environmental problems especially in the last two decades (Tatlidil, 2009). In Iran, like in other developing countries, agriculture is one of the most important sections of economy which includes a considerably high proportion of the production and employment (Ommani et al., 2009). Excessive use of pesticides and fertilizers in Iran has led to great damage to soil and water resources, decrease in yield strength, environmental pollution, damage to the nature's environmental cycle, and health problems for people and animals (Sharghi, et al., 2010). These factors raise the significance of issues pertaining to sustainable development in Iran especially in agriculture. Therefore, considering worries and the existing issues, the conditions to move toward sustainable farming must be provided. Various definitions have been offered for sustainable farming but the most common definition is that which includes all economic, social and ecological aspects. To put it otherwise, farming is sustainable when it is socially feasible and compatible, economically justifiable, politically suitable, environmentally compatible, and applicable from the point of view of management (Salmanzadeh, 1992: 31). Generally, there are three issues that are very important for sustainability of environment: first, sufficient income especially for low-income people; second, increase of accessibility of food and food consumption (by

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increasing production and improving marketing); and third, the protection and improvement of natural resources (Kouchaki et al. 2000: 28, Jamini et al., 448).

In Iran, there is scant information about the sustainability of agricultural systems. Although planning and various measures have been taken in the area of sustainability of farming, in order to establish a safer foundation for this issue, scientific assessment and analysis of sustainability of farming and utilization systems, and main aspects and factors related to sustainability, it is essential to describe the optimal conditions and choose the best possible way to move toward a more desirable state. In this regard, the Marivan town is one of the areas enjoying desirable climatic and geographical conditions and agriculture, as the people's main source of income and employment opportunities has provided appropriate conditions for the development of the villages. Considering the great potentials of the area's agriculture, lack of systematic and infrastructure studies has impeded the appropriate use of the area's farming potentials. Therefore, this study attempts to explain and measure agricultural sustainability in the Marivan town.

## II. MATERIALS AND METHODS

This study is an applied research adopting analytical-survey data analysis. The research tool used in the study is a questionnaire whose content validity was verified by using the views of experts of agricultural extension, irrigation and farming in the office of the agricultural Jihad of Marivan town and reached final confirmation after applying the necessary corrections. The statistical population comprises the heads of the families living in the Marivantown who were as many as 5684. In order to gain a primary estimation of the agricultural beneficiaries, identify the reasonable amount of the sample, and investigate the questionnaire's reliability, 30 questionnaires were distributed and filled out as a pretest in two villages of the investigated area which were not part of the statistical sample. Afterwards, the Cochran formula ( $z= 1.96$ ,  $p=.50$ ,  $q= .50$ ,  $d= .07$ ) was employed to identify the reasonable amount of the sample. Considering the size of the statistical population in the rural areas of the Marivantown, 190 family heads were selected as the sample for filling out the questionnaires.

After determining the sample, for data collection, by considering the rural districts of Marivantown (6 rural districts) as statistic strata, random sampling was employed. At last, in order to follow the rules and techniques and to measure reliability in preparing the questionnaire, the Cronbach Alpha was used in SPSS program which measured the questionnaire's reliability at 0.85. Afterwards, considering the share of each stratum and by the appropriate geographical distribution of the questionnaires in each rural district, the data were collected through the use of questionnaires.

## III. FINDING

Concerning the age status of the respondents, the results revealed that the mean of the subjects' age was 45.5 years and the level of education of most of them was below diploma. Besides, the results showed that the average area of the lands owned by the subjects was around 3.7 hectare and their monthly income was around 500,000 toman (roughly equivalent to 166 USD).

### Investigation of sustainability of agricultural indicators in economic dimension

The results obtained from investigation of the sustainability of the variables of the economic dimension of agriculture of the town of Marivan (table 1) demonstrate that the two indicators of accessibility to the diverse fertilizers and agricultural machinery with respective coefficients of variation of 0.254 and 0.273 are in a better condition in comparison to the other indicators of economic dimension. In addition, the results show that the two variables of investment in agriculture and accessibility to loans and bank funds with respective coefficients of variation of 0.496 and 0.457 are in a weaker condition in comparison to the other variables.

**Table1. Investigation of sustainability of variables of the economic dimension of agriculture**

indicator	item	mean	Standard deviation	Coefficient of variation
economic	Accessibility to all types of fertilizers	3.3	0.839	0.254
	Accessibility to agricultural machinery	3.2	0.876	0.273
	Accessibility to the market of agricultural products	2.7	1.17	0.433
	Accessibility to all warehouses, cold stores and store pits	2.8	1.09	0.389
	Investment in agricultural issues	2.5	1.24	0.496
	Accessibility to various seeds	3.2	.961	0.300
	Accessibility to loans and bank funds	2.6	1.19	0.457

### Investigation of sustainability of agricultural indicators in the social dimension

According to the results displayed in table 5, one can conclude that among the investigated variables in social dimension, variables of the rate of social participation in village activities and the rate of educational and extension class participation with the respective coefficients of variation of 0.294 and 0.331 are in a better condition in comparison to the other variables. Furthermore, the two variables of satisfaction of job future and the rate of use of communication channels with respective coefficients of variation of 0.491 and 0.547 are in the weakest condition of sustainability in comparison to other variables in the social dimension.

**Table 2. Investigation of sustainability of variables of the social dimension of agriculture**

indicator	item	mean	Standard deviation	Coefficient of variation
social	Satisfaction from farming career	2.6	1.21	0.465
	Sense of being non-deprived	2.5	1.19	0.476
	Sense of place attachment	2.8	0.956	0.341
	Amount of social participation in the village activities	3.1	0.913	0.294
	Satisfaction from job future	2.3	1.13	0.491
	Degree of willingness to insure lands	2.9	1.09	0.375
	Degree of satisfaction form authorities	2.7	1.12	0.414
	Degree of participation in training and extension classes	3.2	1.06	0.331
	Degree of use of communication channels	2.1	1.15	.547

**- Investigation of sustainability of agricultural indicators in the environmental dimension**

As illustrated by Table 3, among the variables of the environmental dimension, the two variables of the use of integrated pest management (with the coefficient of variation of 0.239) and use of agroforestry techniques (with the coefficient of variation of 0.360) are in a more acceptable condition in comparison to other variables. Moreover, the results show that the two variables of consumption of micronutrient fertilizers and refraining from the use of chemical pesticides with the respective coefficients of variation of 0.534 and 0.587 are in an inappropriate condition.

**Table 3. Investigation of sustainability of variables of the environmental dimension of agriculture**

indicator	item	mean	Standard deviation	Coefficient of variation
environmental	Use of the mixed method of livestock and plants	2.7	1.12	0.414
	Scheduling planning and harvesting in order to eliminate pests	2.8	1.17	0.417
	Amount of use of fallow land	2.5	1.27	0.508
	Plowing perpendicularly to the slope to avoid erosion in sloped farms	2.6	1.09	0.419
	Use of animal manure to reinforce soil	3.5	1.36	0.388
	Performing crop rotation	2.5	1.26	0.504
	Use of micronutrient fertilizers	2.3	1.23	0.534
	Use of integrated pest management	3.2	0.765	0.239
	Refraining from the use of chemical fertilizers	2.4	1.15	0.479
	Producing green fertilizer to reinforce and increase the fertility of land	2.6	1.31	0.503
	Refraining from the use of chemical toxins	2.3	1.33	0.578
	proper use of fertilizers in the exact recommended amount	2.2	1.17	0.531
	Better qualitative and quantitative protection of soil	2.1	0.897	0.427
	Use of agroforestry method	2.6	0.937	0.360
	Refraining from burning straw and the remaining stubble	2.4	1.05	0.437

### **Investigation of the sustainability of the three (economic, social and environmental) agricultural dimensions**

After investigating the variables of diverse dimensions of agricultural sustainability, the general condition of each of the three dimensions of agricultural sustainability as well as the condition of agricultural sustainability in the study area was investigated. The results show that among the three investigated dimensions of agricultural sustainability among the farmers of the town of Marivan, the environmental dimension with the coefficient of variation of 0.321 is in a better condition than other dimensions. Furthermore, the results show that agricultural sustainability among the farmers of the town of Marivan has not been sustainable in any of the three economic, social and environmental dimensions and is in an unsustainable condition with a general mean of 2.7.

**Table 4. Investigation of the condition of sustainability of farming among the farmers of the town of Marivan**

<b>coefficient</b>	<b>mean</b>	<b>Standard deviation</b>	<b>Coefficient of variation</b>
<b>economic</b>	2.8	0.986	0.352
<b>social</b>	2.6	1.09	0.419
<b>environmental</b>	2.7	0.869	0.321
<b>Total sustainability</b>	2.7	-	-

## **IV. RESULTS AND DISCUSSION**

Agriculture as the principle source of food security plays a crucial role in expanding societies. So, the investigation of diverse sustainability indicators in the agriculture sector is an important step to improve this sector. In general, with respect to the investigation of sustainability of the indicators of the agriculture sector in the town Marivan, the findings showed that the three main dimensions of agricultural sustainability (economic, social and environmental) are lower than the average level. In addition, the results obtained from investigation of the general condition of agricultural sustainability in the town of Marivan showed that the farmers of this town, concerning the investigated indicators, with a mean of 2.7, are enduring an unfavorable condition. Therefore, it is necessary to pay attention to each of the main dimensions of agricultural development and their sub-indicators among the farmers of the town of Marivan by holding educational and extension classes, offering banking facilities to the farmers, providing access to new agricultural machinery, proper marketing for agriculture productions, etc. That is because by invigorating the agriculture sector in this town one can expect the development of rural areas and the subsequent development of the region in the future.

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