Assessing Factors Affecting on Sustainability of Agriculture A Case of Dezful County, Southwest Iran

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Abstract: Sustainability is not a new concept but rather a prominent concept at the present time. Sustainability of agriculture in the context of development efforts has to meet production efficiency, resilience of ecosystems, appropriate technology, and maintenance of the environment, cultural diversity, and satisfaction of the basic needs. The research objective of this study is to determine factor affecting on the sustainability of agriculture in Dezful County, southwest Iran. Statistical population of the research was 12000 persons of wheat-farmers of mentioned area. The tool of the research was questionnaire. Data were analyzed with "SPSS" & "Excel" software. The results of descriptive research showed that, most of the farmers are old and they do not have well enough literacy but wheat cultivation system is almost in the sustainable situation. The result of analytical research showed that among the age, cultivation background, wheat cultivation background, being member in cooperatives, kind of cultivation, the size of land, the size of land under wheat cultivation, ecological characteristics, social prestige, the knowledge of sustainable agriculture and attitude, have the significant and positive relations. According to regression analysis, the predictor variables of sustainability allocated six steps, the total production rate, the attitude about sustainable agriculture, social participation and the relative characteristics determined about 81 percentage regarding dependent variable of cultivations sustainability.

Key words: Agricultural sustainability, wheat cultivators, sustainable development, Iran.

INTRODUCTION

Although during past thirty years, increasing agricultural production have been a reality, could cure a part of boosting needs of increasing population; but; it has been cleared nowadays that modern technologies due to over using of resources has been resulted in natural resources degradation (Khazaiee, A. 1997). In this case, there is a question, whether natural resources and agricultural development (NRAD) will remains in sustainable manner?

Sustainable development is an internal part of development debates and mean time; it is a pre-condition and necessary need for country's economic development. While these barriers exist, none of other economic section, including industry section; could not developed and promote (Kuchaki, A. 1998). Therefore, planning for achieving to the increasing of agricultural production should follow other parallel goals in this section like, natural resource protection, sustainable development and food security (Senanayak, R. 1991). The main goals in sustainable agriculture are natural resources protection and improvement, environmental protection, profit increasing, energy saving, fertility increasing, improving of food quality and empowering of socioeconomic structure of rural communities (Shepherd, A. 1998). More common definition of sustainable agriculture is that contains economic, social and ecological aspect of that. In other words, when agriculture would be sustainable that is (Salmanzadeh, S. 1992).

1. Socially being possible and adaptable
2. Economically being justify
3. Politically being appropriate
4. Managerially being Enforceable
5. Environmentally being friendly

These days, agriculture section should face new challenges and answer new questions as well. How can grantee the nutritious needs of increasing population without natural resources degradations while the agricultural lands are reducing? (Kuchaki, A. 1997).

Dezful County in the north of Khuzestan province, south west of Iran. and is one of the suitable area for Wheat cultivation. Total of planted lands for wheat in country are 48,000 ha (est.) and Khuzestan is producing 12.04 % of total wheat production in all over the country. Dezful are the main areas for wheat cultivation in Khuzestan province by 75% of production. Wheat is one of the important foodstuffs, has a great role in food security and rural economy. It is crucial to concentrate on operation systems of lands and its sustainability in such away that could grantee farmer’s lives for a long time. Meantime, wheat is producing in these areas by
traditional technologies and judgment about whether these technologies economically, socially and ecologically
are sustainable is the main goal of this paper.

Since this case is very important for planning for this area, this paper is going to answer to the following
questions:
1. How much are the wheat farms are sustainable?
2. What are the relations among economic, social, individual, communications, attitudes and sustainable
agricultural and ecological knowledge (information) clarifications of wheat farmers and their own sustainability?
3. What are the main obstacles of reaching to the sustainability in the area?
4. What are the main factors of wheat sustainability cultivation?

In a research on measuring and sounding of sustainability of farming systems to reaching the best and optimum indicators, Factor analysis has been used. The results of that shown: successors production planting,
using of various crops, observance of preservation operations and following cultivation alternations for
preventing of futile grasses are the first ones; permanent land covering and toleration at fallow landing are the
second factors and using of chemical fertilizers and reduction using of herbal poisons are the third factors
(Salitiel, J., J.W. Bander and S. Palchovich, 1994). The indicators to measuring the cultivation sustainability are
included as:
- Nitrogen consumption, Deprecation killers consumption, Soil quality, Water quality, Water consumption,
Greenhouse gases, Wilde life, Agriculture perspective, Farm Management, Farm fiscal resources, Social and
cultural problems, Biodiversity (Japan's Agriculture Ministry). (Iravani, H. and A. Darban, 1995) in a research;-

"Measuring, analysis and explaining of sustainability of farm unites; Tehran case study" which has done for
wheat cultivators of Tehran state; have indicated that: 46.7 % of farmers have been in unsustainable group and
their production levels, productivity of all production factors and technical knowledge have been most affective
of sustainability on their farming systems. (Rousta, K. 1999) has been considered the corn farmers' farming
sustainability system and his results shown that, there have been direct, meaningful and positive relations
between farmer technical information and their production performance and also between the type of farming
system and degree of sustainability of their systems. (Amani, A. 1999) in a research;-

"Determining the social, economic and agronomic characteristics of wheat cultivators for LISA techniques acceptance" has been investigated different factors such as, age, number of family members, distance between farms and Agriculture
Service Center. and their relations with acceptance of LISA techniques.

By attention to above results, effective variables on wheat farming sustainability have been classified in
hereunder factors which is theoretical framework for this research as well (Fig. 1).

Personal Factors, Attitudes, Sustainable agriculture knowledge, Extension and education factors,
Communication factors, Social Factors, Economic Factors, Ecological Factors, Farming system characteristics,
Resources access obstacles.

Fig. 1: Factors affection on sustainability of wheat cultivation.
MATERIALS AND METHODS

The research objective of this study is to determine factor affecting on the sustainability of agriculture in Dezful County. This research was an explanatory-survey research which its data collection instruments have been questionnaires and interview. For questionnaire designing, firstly; according to the theoretical framework and literature review, as well as related available resources; which have been presented before; a pre-questionnaire has been prepared and after assurance about its validity and reliability; the final correction have been done on it. For determining the validity; a sample population of 30 individuals of local farmers of central section of Dezful County have been interviewed and according to results, Alpha (Cronbach) ratio obtained at 0.89 which was an appropriate validity ratio for this research. For data analysis, SPSS software, version 11.5 and Excel has been used. Statistical society included wheat farmers of Dezful County, were 12000 people. Sample volume by Kokran formula, has been determined on 280 people which for more accuracy increased up to 300 people. Sampling technique was multi stages sampling with appropriate connections. Prediction variables have been included:

Personal Factors, Attitudes, Sustainable agriculture knowledge, Extension and education factors, Communication factors, Social Factors, Economic Factors, Ecological Factors, Farming system Characteristics, Resources access obstacles. In this research multi dimensional and multi stages regression analysis for determine effective variables on cultivation sustainability of wheat have been used. By this technique which is one of the several multi variables analysis techniques; independent variable affects on dependent variables will be determined and most important ones would be recognized. Correlation techniques could not show the relations among variables and never could clear which factor affect on which ones. However, prediction factors chance from other factor (s) does not exist. This technique (multi stages regression), has a close relation with correlation ratio and usually at the same time are be using in the studies. Regression analysis will create this potential for the researcher to predict affect of independent variables and determine the share of each ones as well on the dependend variables. In this stage, stepwise approach was used.

RESULT AND DESICCATION

A. Personal and Professional Characteristics:

According to obtained results, from the total 300 people of wheat farmers which have been researched; age average was 46.57 years and around 53.8 % of them were illiterate. The average of agricultural proficiency (agricultural experience) was 29 years and in average, they have been cultivating wheat for 19 years. Thus; 71.9 % of them were member of wheat farmer's cooperatives. 83.1% of them had fallowing and alternatively cultivation systems. The average of land ownership were 9 ha and 46.3% of them had 1-5 ha which 45.6 % of them have been used less than 1 ha for wheat cultivation annually. According to this data; 36.3% of farmers had 1-5 ha and in average, each farmer had 11 different pieces of separated lands! The 50% of farmers have been using Leguminous as alternative cultivate. The 38% of them have been using pest killers at low level and 7.5% of farmers have been using chemical fertilizers at very low level, while 41.3% of them have been using of this type of fertilizers at medium level. Data gathered shows that; 44.4% of respondents have been believed that the production life time of their farms are going down and 35.6% of them held that; they are using their water resources more effectively right now. The 32.5% of them had 1000$ – 5000$ (Approx.) income annually, only from wheat.

B. Sustainable Agriculture knowledge:

To measure this case; Lykert specter by 25 different questions has been used. All questions have been about sustainable agriculture indicators and farmers were asked to present their information about sustainable agriculture. Finally, by summarizing the answers; their information about sustainable agriculture are classified to three levels of high, medium and low (Table. 1). As table shows, around 65% of researched individuals have had knowledge from medium to high level and have an optimum condition on this case and by designing and implementing appropriate education and extension programs.

<table>
<thead>
<tr>
<th>Level of knowledge</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>56</td>
<td>35</td>
</tr>
<tr>
<td>Medium</td>
<td>66</td>
<td>41.25</td>
</tr>
<tr>
<td>High</td>
<td>38</td>
<td>23.75</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100</td>
</tr>
</tbody>
</table>

C. Attitudes on Sustainable Agriculture:

To measure farmer's attitude on using sustainable agriculture techniques; Lykert specter by 16 different questions
has been used and farmers were asked to submit their "agreement" or "disagreement". By summarizing their answers; three different levels; high, medium and low aspects on this case have obtained which 40% of them had low attitudes on sustainable agriculture (Table 2).

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Numbers</th>
<th>Level of attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>64</td>
<td>40</td>
</tr>
<tr>
<td>Medium</td>
<td>68</td>
<td>42.50</td>
</tr>
<tr>
<td>High</td>
<td>28</td>
<td>17.50</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100</td>
</tr>
</tbody>
</table>

### D. Farming System’ S Sustainability:
Sustainable agriculture is a type of agriculture which is by more usefulness for human and more efficiency for resources will create environmentally balance. This type of agriculture should by promoting optimum resources management, satisfy humanities needs and at the same time, reserve natural resources, improve them and stop their destructions. By factor analysis technique, some records have been calculated for each of factors and by cluster analysis, people classified into three different groups. According to the gathered data (Table 3); level of sustain abilities classified into, (1) unsustainable, (2) semi-sustainable and (3) sustainable. Thus; 14.37% of farmers were at the unsustainable situation and most of them, 66.87 % people were ate the Semi - sustainable and only 18.76% had an appropriate situation.

<table>
<thead>
<tr>
<th>Level of sustainability</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsustainable</td>
<td>23</td>
<td>14.37</td>
</tr>
<tr>
<td>Semi - sustainable</td>
<td>107</td>
<td>66.87</td>
</tr>
<tr>
<td>Sustainable</td>
<td>30</td>
<td>17.18</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100</td>
</tr>
</tbody>
</table>

To consider the research relation, Pierson correlation, Spearman and Kramer Teta V. ratios have used. Research results show; age, agriculture experiment background, wheat cultivation background and cooperative membership from personal variables have a meaningful and positive relation with sustainability, but; using chemical fertilizers has non-meaningful and negative relation with this topic. To recognize the predictor variables of sustainability of cultivation; the step by step regression has been used. Table 4 and 5 show the results:

By these tables, linear equations from regression analysis will be:

### Table 4: Effective variables ration on potato sustainability cultivation.

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>Multi correlation ration</th>
<th>Appointed ratio (R $^2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Total Production</td>
<td>0.573</td>
<td>0.329</td>
</tr>
<tr>
<td>2</td>
<td>Sustainable Agricultural outlook</td>
<td>0.691</td>
<td>0.487</td>
</tr>
<tr>
<td>3</td>
<td>Amount of Loan</td>
<td>0.799</td>
<td>0.639</td>
</tr>
<tr>
<td>4</td>
<td>Sustainable agricultural information</td>
<td>0.835</td>
<td>0.697</td>
</tr>
<tr>
<td>5</td>
<td>Social Participation</td>
<td>0.865</td>
<td>0.750</td>
</tr>
<tr>
<td>6</td>
<td>Communication specialties</td>
<td>0.898</td>
<td>0.802</td>
</tr>
</tbody>
</table>

$Y = -62.866 + 0.21X_1 + 1.118X_2 + 1.742X_3 + 0.308X_4 + 0.205X_5 + 0.272X_6$

Which in this equation:
Y: Wheat cultivation sustainability
X1: Total production
X2: Sustainable Agricultural outlook
X3: Amount of loan
X4: Sustainable agriculture information
X5: Social participation
X6: Communication specialties

### Table 5: Amount of effective variables on potato sustainability cultivation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Non-standard ratio</th>
<th>Standard ratio (Beta)</th>
<th>t</th>
<th>Sig t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fix Ratio</td>
<td>-62.866</td>
<td>-</td>
<td>-5.658</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Production</td>
<td>0.21</td>
<td>0.810</td>
<td>18.659</td>
<td>0.00</td>
</tr>
<tr>
<td>Sustainable Agricultural outlook</td>
<td>1.118</td>
<td>0.470</td>
<td>11.798</td>
<td>0.00</td>
</tr>
<tr>
<td>Amount of Loan</td>
<td>1.742</td>
<td>0.475</td>
<td>11.566</td>
<td>0.00</td>
</tr>
<tr>
<td>Sustainable Agricultural Information</td>
<td>0.308</td>
<td>0.215</td>
<td>5.421</td>
<td>0.00</td>
</tr>
<tr>
<td>Social Participation</td>
<td>0.205</td>
<td>0.384</td>
<td>8.586</td>
<td>0.00</td>
</tr>
<tr>
<td>Communication Specialties</td>
<td>0.272</td>
<td>0.286</td>
<td>6.716</td>
<td>0.00</td>
</tr>
</tbody>
</table>
The results of multi regression analysis are as below:

- First Step:
  According to obtained model during research, at the first step, was shown that Total production variable added and multi correlation ration (R) was 0.573 and appointed ratio ($R^2$) was 0.329. It means around 32% of depended variable, cultivation sustainability has been explained by this factor.

- Seconds Step:
  At the second step, outlook variable added. This variable increased the multi correlation ratio (R) up to 0.691 and ($R^2$) to 0.487. In fact; multi correlation ratio for this variable in turn 0.118 and appointed ration was 0.158. So, 16% of depended variable, cultivation sustainability has been explained by this factor.

- Third Step:
  At the Third step, market accessibility added. This variable increased the multi correlation ratio (R) up to 0.799 and ($R^2$) to 0.639. In fact; multi correlation ratio for this variable in turn 0.108 and appointed ration was 0.152. So, 15% of depended variable, cultivation sustainability has been explained by this factor.

- fourth Step:
  At the fourth step, sustainable agriculture variable added. This variable increased the multi correlation ratio (R) up to 0.835 and ($R^2$) to 0.697. In fact; multi correlation ratio for this variable in turn 0.036 and appointed ration was 0.058. So, 6% of depended variable, cultivation sustainability has been explained by this factor.

- fifth Step:
  At the fifth step, outlook variable added. This variable increased the multi correlation ratio (R) up to 0.865 and ($R^2$) to 0.750. In fact; multi correlation ratio for this variable in turn 0.030 and appointed ration was 0.051. So, 5% of depended variable, cultivation sustainability has been explained by this factor.

- sixth Step:
  At the sixth step, communication specialties factor added. This variable increased the multi correlation ratio (R) up to 0.898 and ($R^2$) to 0.801. In fact; appointed ration was 0.050. So, 5% of depended variable, cultivation sustainability has been explained by this factor.

According to Beta ratios; total production has most effect on the cultivation sustainability variable, then; in turn, level of sustainable agriculture outlook, amount of loans, social participation and communication specialties had most effect on the cultivation sustainability. Fig. 2 shows these relations according to Beta ratio.

**Fig. 2:** Predictor factors of sustainability of wheat cultivation.

**Conclusion and Suggestions:**
By obtained from farmers, cultivation system are classified into three different class, unsustainable (14.37%), semi- sustainable (66.8%) and sustainable (18.76%) which show most of the local farmers are in medium level of sustainability. In this research, eight different personal, economic, social, ecological, communicative, educational – extensional, sustainable agriculture information (knowledge) and sustainable agriculture outlook (attitude) factors have considered. Relation between cultivation type and cultivation sustainability is direct and positive. It means farms with following and alternative systems in compare with those without had more sustainability. Economic dimension usually has a important role in explanation of phenomenon cases, therefore; in this research also; this effect seen and according to its results; income levels, total wheat production, amount of loans, appropriate prices of inputs have a direct and meaningful relations with cultivation sustainability; although; using of labor force has meaningful and negative relation.

Social respect has direct relation. Poor have less access to resources and have social respect as well. Since poverty is the main cause of non sustainability; we could get conclusion that the high respect people have high
level of income also. The levels of using of media and attending into the educational – extensional courses also have positive and meaningful direct relations. Those farmers which had more sustainable agriculture information have had more sustainable farms also, so; direct and positive relation between these two factors have approved. The farmers outlook and their commitment to the natural resources which should used in sustainable manner also; has a great role in sustainability, therefore approved direct and positive relation between these factors. According to regression analysis results; around 80.2 % of predictor variables of cultivation sustainability belong to the six factors; amount of loan, sustainable agriculture information, social participation and communication specialties which in turns are explained around, 32.9 %, 15.8 %, 15.2 %, 5.8 %, 5.3 % and 5.2% of total variance of all effective variables on sustainability. Only 19.8% of this variance is belongs to the other factors. Therefore, hereunder suggestions are presented according to the results:

1. Since the total production is one of the most effective factors which influence the economic conditions and the size of the farm, therefore we could get conclude that, farmers by more production will come to better sustainability. So, for more cultivation sustainability, it is better to support poor farmers and less land owners and try to direct investments through them to increase their productivity.
2. Loans and other agricultural services for production launched. Due to high importance for these services and effective roles on cultivation sustainability, establishing the agricultural service provider cooperation suggested.
3. By running educational – extensional courses and increasing the farmers' information on sustainable agriculture we can improve their attitudes on the sustainable techniques, their benefits and importance.
4. Try to increase the farmers' participation since by this factor and more attentions from them; using agricultural services will be more effective.

REFERENCES