

Research Paper

Analysis of Barriers to the Development of Renewable Energy Technologies at the Farm Level: A Farmer's Perspectiv

Mahnaz Ghorbannezhad¹, *Shahla Choobchian², Homayon Farhadian³

1. Ms. C. Student in Agricultural Extension and Education, Department of Extension and Education, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.
 2. Assistant Professor, Department of Extension and Education, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.
 3. Ph.D, Department of Extension and Education, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.



Citation: Ghorbannezhad, M., Choobchian, Sh., & Farhadian, H. (2018). [Analysis of Barriers to the Development of Renewable Energy Technologies at the Farm Level: A Farmer's Perspectiv (Persian)]. Journal of Rural Research, 9(2), 308-323, <http://dx.doi.org/10.22059/jrur.2018.247759.1194>

doi: <http://dx.doi.org/10.22059/jrur.2018.247759.1194>

Received: 11 Dec. 2017
 Accepted: 07 April 2018

ABSTRACT

Considering the importance of renewable energy technologies in reducing global climate changes and carbon dioxide emissions in agriculture, the present study seeks to analyze the barriers to the development of renewable energy technologies at a farm level from the perspective of farmers. The research was done using the confirmatory factor analysis method. The statistical population of the study consisted of 2501 farmers in Larestan county, Fars province, Iran. The individuals were selected by the stratified random sampling method, and the sample size was estimated to be 331 according to Morgan and Kerjesian tables. According to the findings, the farmers believed that the main obstacles to the development of renewable energy technologies in the economic sector were high initial investment costs, lack of financial resources or loans, and inadequate farmers' capital for projects. Next to this economic dimension, there were institutional, legal, social awareness, technological and infrastructural barriers, all of which were confirmed in a confirmatory model using the LISREL software (LISREL8 / 72). Considering that, in our agricultural sector, there is an increase in energy demands and environmental pollution control is one of the important issues nowadays, a number of planned measures are necessary to eliminate the barriers to the development of renewable energy technologies at the farm level.

Key words:

Sustainable energy, Barriers, Renewable energy, Energy technology

Extended Abstract**1. Introduction**

Nowadays, global energy systems are heavily dependent on fossil fuels. One of the key pillars for achieving economic growth and prosperity is to provide clean and sustainable energy. Most rural societies experience limited access to modern energy services

due to problems of availability and/or affordability. Rural people mostly depend on traditional fuels (mainly animal manure, crop residues and gardens) and fossil fuels (oil, gas, etc.) to meet most of their energy needs. This kind of energy obtained from traditional and fossil fuels has serious impacts on living standards and productivity. Also, when they are burned, they produce hazardous chemicals, such as Co₂. They have negative effects on human health especially when used indoors. The study area in this research is Larestan county, Fars province. The city of Lar-

*** Corresponding Author:**

Shahla Choobchian, Ph.D.

Address: Department of Extension and Education, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.

Tel: +98 (916) 2791416

E-mail: shchoobchian@modares.ac.ir

estan has over 285 days of sunshine per year (averagely 9.5 sunny hours per day) and production of crops with a land area of 61000 hectares. Moreover, cultivation of 5000 hectares for horticultural products has a high potential for the use of renewable energy. According to the statistics of the national oil distribution company of the country, the consumption of gas oil in the agricultural sector of Larestan county during the year 2015 grew by 30%. So, considering the potentials of Fars province in general and Larestan county in specific in the field of renewable energy use, the promotion and development of the corresponding technologies is essential. In this regard, identification of the barriers to the development of renewable energy technologies at the farm level is undertaken in the current research.

2. Methodology

The stratified random sampling method was conducted, and the sample size was estimated to be 331 people according to Krejcie and Morgan table. In the present study, several factors were used to measure each dimension, and each item was measured with a 5-point Likert spectrum (1 = very low importance, 2 = low importance, 3 = average, 4 = important and 5 = very important). After data collection, the SPSS22 software was used to analyze the data. Then, to validate the model, the LISREL software (version 8.72) was used.

3. Results

The results indicated that the high cost of investing in renewable energy technologies at the farm level with an average of 3.93 is the main problem for farmers. Next to this problem, the lack of financial resources (loans, etc.) for the development of renewable energies with an average of 3.86, insufficient funds for farmers to implement projects with an average of 3.86, and lack of financial mechanisms to encourage and support the development of renewable energy technologies with an average of 3.84 are the most important, ranking second, third and fourth respectively. After the results were obtained from the descriptive statistics about the main variables of the research, in order to validate the research model, the data were analyzed using the LISREL software version 8.72. As it was observed, in the final model confirmed, the studied components of the research were in the form of a conceptual model and were shown alongside their markers. According to the proposed model, the selected markers in the components of the barriers to the development of renewable energy technologies can correctly validate their components.

4. Discussion

As the first part of the findings, in the economic-market dimension, high costs of investing in renewable energy technologies at the farm level has the highest average. This can negatively affect the competitiveness and efficiency of the technology. This finding is consistent with the research by Stigka et al. (2014). In the second important institutional-legal dimension, inadequate legal protection and inappropriate management have a higher average and higher importance. Inadequate legal protection and inappropriate management cause lots of problems. This finding is consistent with the research by Rezaei et al. (2013). In the social-awareness dimension, low knowledge of farmers in terms of the benefits of renewable energy technologies has a higher average and higher importance. This is because our farmers still do not have enough knowledge in this field and do not know the benefits of using renewable energy technologies. There is not enough advertisement on the use of renewable energy in agriculture. So, this makes it difficult to accept the technology. The finding is consistent with the research by Stigka et al. (2014). Another important dimension is the infrastructure-technology. In this dimension, the lack of standardized renewable energy technologies to use at the farm level has the highest average and rank. The majority of farmers agreed on the importance of standard renewable energy technologies to use at the farm level. This finding is consistent with the research by Chauhan and Saini (2015). The second part of the findings is related to the model verification. The whole measurement model was fitted with fitness indices; the approximation error with the value of 0.075 (less than 0.08) indicates a good fit of the model.

5. Conclusion

A confirmatory factor analysis was conducted in this study to examine some variables all of which were confirmed in the form of a model. It was found that, in our agricultural sector, there is an increase in the demand for energy and electricity, and environmental pollution control is one of the key issues nowadays. Therefore, comprehensive planning is essential to identify and eliminate the barriers to the development of renewable energy technologies at the farm level.

Acknowledgment

This article is based on an MA thesis by Ms. Mahnaz Ghorbannezhad entitled "Analysis of barriers to the development of renewable energy technologies at the farm level from the perspective of farmers". The research was

funded by the Research Deputy of the Faculty of Agriculture, Tarbiat Modares University. Our gratitude is forwarded to all who supported us.

Conflict of Interest

The authors declared no conflicts of interest

Archive of SID