

## Analysis of Factors Affecting the Reduction in Fertilizer Use to Achieve Sustainable Saffron Production (Case Study: Gonabad County)

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(Received: Sep. 24, 2018- Accepted: Mar. 9, 2019)

### ABSTRACT

The use of chemical inputs seriously threaten the sustainability of crop production due to the erosion and destruction of soil health, in such a way that it has been always put into question and concerns for it have been growing. The current study was conducted to investigate the factors influencing the application of chemical fertilizers in saffron farms in Gonabad County. To this end, the descriptive-correlation research method was used. The study statistical population consisted of all saffron farmers in Gonabad. Proportional random sampling procedure was used in which 105 saffron farmers were selected. The data collection tool was a questionnaire that its face validity was confirmed by the professors of agricultural economics. Also, the reliability of questions related to attitude towards sustainable agriculture was evaluated by conducting a pilot study in which the Cronbach's alpha was calculated as 0.698. Afterwards, a two-stage Heckman model was carried out to investigate factors affecting the use of chemical fertilizers. Based on the results, the coefficient of attitude towards sustainable agriculture in both stages was negative and significant, which represents that improvement of farmers' attitude effectively reduces the use of chemical fertilizers. While the coefficients of variables of farmers' income, age, education level, and agricultural insurance are positive and significant in both stages and increase the probability and amount of using fertilizers by farmers. Based on the findings, adopting appropriate strategies for familiarizing saffron farmers with sustainable agricultural practices, luding trust of reliable and experienced farmers to reduce the use of chemical fertilizers, and reforming the structure of agricultural insurance system plays a decisive role in improving the farmers' consumption pattern of chemical fertilizers.

**Keywords:** Saffron, Chemical Fertilizer, Sustainability, Attitude, Gonabad County

### Objectives

The advent of green revolution significantly improved the productivity of crops through invention of external inputs, specially, inorganic fertilizers. However, these fertilizers could largely cause environmental problems and has negative impacts on soil, land and water. Therefore, the use of chemical fertilizers have been always put into question and concerns for it have been growing. The current study was conducted to investigate factors influencing the application of chemical fertilizers in saffron farms in Gonabad county with an emphasis on the effect of farmers attitudes towards sustainable agriculture. Measuring farmers' attitudes or perceptions towards sustainable agricultural practices is the preliminary step in order to make the extension programs effective and successful. In the other words, even the best sustainable agricultural practices and promoting them may fail unless good information of farmers' attitudes is provided.

Production of saffron, the red gold, plays a fundamental role in creating job opportunities for rural communities and is the main source of income for almost all farmers of study region. Therefore,

the sustainability of saffron production must be taken into consideration by farmers and policymakers to sustain the livelihood of rural households.

### **Methodology**

To achieve the objectives of the study, the descriptive-correlation research method was used. The statistical population consisted of all saffron farmers in Gonabad. Proportional random sampling procedure was used in which 105 saffron farmers were selected. The data collection tool was a questionnaire.

In regard to the measurement of farmers attitudes, using previous studies and analysis of our field observations on the local farmers' practices, we draw and formulated 21 statements addressing (un)sustainable farming practices in different stages of Saffron growth. From the 21 statements, 13 items have a positive impact on the sustainable farming, and eight items with a negative impact. To quantify the farmer's attitudes towards sustainable farming practices, a five-point Likert scale containing response categorizes ranging from "strongly agree" with a score of five points to "strongly disagree" with a score of one point were developed. The respondents were asked to select the best option that describes their opinions with the respect to the associated question. Face validity of questionnaire was confirmed according to open ion of professors of agricultural economics. Also, the reliability of questions related to attitude towards sustainable agriculture was evaluated by conducting a pilot study in which the Cronbach's alpha was calculated as 0.698. Afterwards, a two-stage Heckman model was carried out to investigate factors affecting the use of chemical fertilizers.

### **Results and Discussion**

Using SHAZAM 10.1 software we estimated the two-stage Heckman model to investigate the effects of socio-economic factors on use of chemical fertilizers. Based on the results, the coefficient of attitude towards sustainable agriculture in both stages was negative and significant, which represents that the high degree of farmers' attitudes significantly decreases the intention of farmers to use chemical fertilizers, probably because some farmers think that use of fertilizers doesn't increase saffron yields and even some of them believe that it would decrease the yields. On the other hand, the coefficients of factors of farmers' income, age, education level, and agricultural insurance are positive and significant in both stages and increase the probability and amount of fertilizers use.

### **Conclusion**

Based on the findings, adopting appropriate strategies for familiarizing saffron farmers with sustainable agricultural practices, building trust of reliable and experienced farmers to reduce the use of chemical fertilizers, and reforming the structure of agricultural insurance system play a decisive role in improving the farmers' consumption pattern of chemical fertilizers.