

Investigating the economic behavior of wheat farmers in Kermanshah to reduce the negative environmental impacts of chemical fertilizers (Application of Contingent Valuation Method)

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ABSTRACT

Agriculture as one of the main basis of realizing food security is one of the most important economic sectors of societies. Nowadays, rapid population growth and rising demand for food in the world have increased the pressure on natural resources and dependence on the consumption of chemical inputs in agricultural activities. Conventional agriculture, in which production focus is based on increasing the use of chemical inputs, such as various fertilizers, not only reduces the quality of water, soil and quality of the products produced, but also jeopardizes the health of consumers of agricultural products. The aim of this study was to investigate the economic behavior of wheat farmers in Kermanshah city regarding environmental control programs for chemical fertilizers using Contingent Valuation Method and in the form of willingness to pay farmers. For this purpose, 245 wheat farmers in this city were selected by simple random sampling method and required data were collected through a questionnaire. The content validity of the questionnaire was verified by 20 faculty members and experts and the Cronbach's alpha coefficient for the reliability of the questionnaire was calculated as 0.838. According to the results of the research, the average willingness to pay farmers to reduce the negative environmental impacts of chemical fertilizers is estimated at 1585 Rials. To investigate the factors affecting the willingness to pay of farmers, the logit model was used and the results showed that explanatory variables of education and general attitude of farmers about the risks of using chemical fertilizer at the level of 5% had a significant positive effect on the tendency to payments, and age and land ownership did not statistically affect farmers' willingness to pay.

Keywords: Contingent Valuation, Willingness to Pay, Logit Model, Chemical Fertilizers, Agriculture.

Objectives

The agricultural sector is one of the most important economic sectors of the societies as the main infrastructure for achieving food security. Nowadays, rapid population growth and increasing demand for nutrients in the world have led to increased pressure on natural resources and a strong dependence on the use of chemical inputs in agricultural activities. On the other hand, the need to increase agricultural production as population growth, as well as the country's development programs in recent years, has led to greater consumption of chemical fertilizers, especially nitrogen. Due to chemical fertilizer's detrimental effects on the environmental components, efforts to reduce the use of these chemical inputs to control and reduce the harmful environmental impacts in Kermanshah are very necessary. Various programs and plans are being implemented to control and mitigate the negative impacts of agricultural activities around the world, with farmers often playing a central role. Therefore, awareness of the behavior and preferences of farmers to participate in bio-agricultural projects is very important. This study also seeks to investigate the economic behavior of wheat farmers in Kermanshah with regard to their willingness to pay for mitigating the negative environmental effects of chemical fertilizers through various programs such as replacing organic fertilizers in Kermanshah. The valuation method is conditional and in the form of willingness to pay.

Methodology

In this study, contingent valuation method was used to estimate farmers' willingness to pay, which is one of the important and widely used methods in measuring willingness to pay. This method requires not only economic theories but also several other systems and rules in the field of sociology, psychology, statistics, and surveys. In this study, to collect data from a questionnaire with three parts including 7 items about the

personal and professional characteristics of the respondents, 14 items to assess the level of knowledge and information of farmers about the dangers of chemical fertilizers and 20 items related to tendency. Farmers were used to pay for reducing the risks of fertilizers.

Results and Discussion

A survey of farmers' shows on the effects of fertilizer use on agricultural activities showed that they have different views. For 89 percent of these farmers, the use of fertilizers has a huge and very negative impact on soil resources. Statistics show that farmers are aware of the negative impact of increasing fertilizer use on the environment and human health, and 80.8% and 80.4% of the sample studied, respectively, had a high and very high use of fertilizers. The fertilizer was approved. Most of the farmers were unaware of the environmental impact of chemical fertilizers with 31.8% and 21.6%, respectively, on the impact of fertilizers on human carcinogenicity and beneficial insect life. According to the results of the research, the average willingness to pay farmers to reduce the negative environmental impacts of chemical fertilizers is estimated at 1585 Rials. To investigate the factors affecting the willingness to pay of farmers, the logit model was used and the results showed that explanatory variables of education and general attitude of farmers about the risks of using chemical fertilizer at the level of 5% had a significant positive effect on the tendency to payments, and age and land ownership did not statistically affect farmers' willingness to pay.

Conclusion

Given the willingness to pay farmers to replace organic fertilizers with fertilizers, fertilizer-producing units can use them in planning organic fertilizers. According to the results of the study, the highest awareness of farmers about the negative effects of chemical fertilizers on human health and soil resources was reported and the least awareness about the effects of chemical fertilizers on useful insects, groundwater and carcinogenic residues in crops, and this is one of the reasons why farmers are not sufficiently aware of these harmful effects that can have irreparable consequences. Therefore, it is recommended to hold various courses on these harmful effects.