The Estimation of Input-Oriented Environmental Efficiency of Agricultural Products (Case Study: Environmental Efficiency of Rice Production)

Morteza Molaei , Nima Hesari, Ozra Javanbakht [1]

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Abstract

However, the use of chemical fertilizers and pesticides in the production of agricultural products increase crop yield; but cause huge damages to natural resources and the environment. In this study, the chemical fertilizer and pesticide inputs is considered as desirable inputs in the production process that help to increase crop yield. Then, those inputs is assumed harmful (undesirable) inputs that damage the environment. Required data collected using questionnaires from 140 paddy farmers in Babolsar city. Stochastic frontier production function method was used to estimate technical and efficiencies. Results showed that the average technical and environmental efficiency are 87 and 77 percent, respectively. It is observed that environmental efficiency is far less than the technical efficiency. In other words, in order to estimate close to reality production efficiency, harmful (undesirable) chemical inputs must be considered in the production process. Factors affecting technical and environmental efficiency shows that higher education, participation in extension courses and land defragmentation increase the technical and environmental efficiencies significantly. It is recommended to rise farmer's awareness through their participation in extension courses, as well as land defragmentation to increase efficiency in the region. Also, it is suggested that external effects of production enters in the estimation of production efficiency.

JEL Classification: Q01, Q50, D61

Keywords: Chemical Fertilizer and Pesticides, Technical Efficiency, Environmental Efficiency, Stochastic Frontier Production Function, Babolsar

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Estimating the Protection Values of Ardebil's Shorabil Lake using Contingent Valuation Method (CVM)

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Abstract

Wetland is a main natural ecosystem that has been exposed to a high amount of destruction over time. One of the reasons for the destruction of these resources is inefficient economic systems for proper valuation that has resulted in reinforcing the idea that these services are free of charge and also indiscriminate use of these resources and lead to irreparable damages. Accordingly, probably the first step in protection of these resources is offering reliable estimates of their real value to improve beneficiaries' and stakeholders' knowledge. This study attempted to determine willingness to pay of citizens in Ardebil province to protect the Shorabil lake using contingent valuation method (CVM) based on designing and filling the required questionnaires. In this regard, 218 questionnaires were filled in the summer of 2016 in Ardabil province and then were analyzed. The results showed that 53.21% of the respondents would pay an average 32,135 IRR per family member per year to protect the Shorabil lake. According to the results, the total protection value of Ardebil's Shorabil Lake was estimated as 21.398 milliard IRR per year and its protection value per hectare was estimated as 125.872 million IRR per year. To achieve integrated view of the effective management for authorities, it is recommended that other aspects of Shorabil lake values including recreational, cultural etc. would be considered in similar research.

JEL Classification: Q51 ،Q57

***Keywords*:** Shorabil Lake, Contingent Valuation, Logit Model, Willingness to Pay, Selection value.

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Investigating Bullwhip Effect in Multi-stage Milk and its Products supply chain

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Abstract

Milk and its Products Supply chain is one of the most important chains of agricultural products. One of the most important phenomena at the supply chains is Bullwhip effect. In this study, it has been tried to analyze Bullwhip effect using time series data for the years 1995- 2015, Almost Ideal Demand System and moving average method. One of the main reasons of this effect, is the lack of accurate and in-time information of the demand in different levels of the supply chain as well as long lead times. The results show the existence of Bullwhip effect at the supply chain of Pegah products in Kerman city. Bullwhip effect of milk, yoghurt, cheese, cream and dough is 2.50, 2.51, 2.52, 2.79 and 2.51, respectively. Accordingly, if information of actors of the supply Chain of products demand, be careful, this will lead to more targeted programs and the efficiency of the supply chain as well.

JEL Classification**:** C3, C32, C5, C53.

Keywords**:** Supply Chain, Bullwhip Effect, Dairy Products, Almost Ideal Demand System, Moving Average Method.

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Application of Game Theories to Assessing the Sustainability of Crop Patterns in Bavanat Fars Province Regarding to Economic, Social and Environmental Goals

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Abstract

Although agriculture activities have important role in gross domestic product of countries but they have externalities environment. In recent years the use of excessive and unreasonable chemicals in agriculture has led to soil and water pollution and also cause to human disease. Also Irregular usage of water and using inappropriate methods of irrigation has caused many environmental and economic problems.In this study, a mathematical planning model representing economic behavior of farmers is combined with game theory for achieving real vision of crop pattern with regarding agricultural, environmental and economic aspects. This research gives optimum solution for conflicting goals of farmers and environmental organizations as two main actors. Required data were collected from farmers in Bavanat region and jihad of agriculture organization in 2014-2015. Application of four methods for resolving challenge showed that both actors have ability to achieve balance between conflicting goals. Also, results showed that in the condition of equal weight to economic and environmental goals, nitrate fertilizer use decrease by 4% and gross margin decreases by 11 percent comparing to condition of regarding only economic goal. Again address to result and place of environmental issues it may recommend asking policy makers to apply and extent the appropriate methods of farming.

JEL Classification: C53, Q15, Q01, C61

Keywords: Crop Pattern, Sustainability indices, Game Theory, Bavanat region

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Investigating the effect of crop price fluctuations on the optimal cropping pattern in Sari

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Abstract

Farmers have always faced many risks such as price fluctuations in agricultural productions. Therefore, it seems important to identify the farmers risk aversion about price changes and consideration of it in the possible effects of price fluctuations on optimal cropping pattern. In this regard, this study examined the effects of crop price fluctuations on the reaction of sari farmers to the selection of suitable cropping pattern in 2012-2013 crop year using positive mathematical programming model. Data used including crops production costs in 2012-2013 crop year and crops price in 2002-2013 years were collected from Mazandaran Agriculture Organization. GAMS software has been used to analysis data. Results of decreasing 50% to increasing 50% in price fluctuations suggests that land use for riskier crops such as irrigated onions, dryland canola and irrigated potatoes reduce respectively about 17%, 4% and 2% in term of increasing 50% in price fluctuations, while cultivation of low-risk crops such as dryland soybean, dryland wheat and irrigated barley increase about 4%, 0.9% and 0.3%, respectively. According to study results, among the desired crops, cultivation of irrigated wheat has reduced in both increasing and decreasing prices fluctuation. On the other hand, reducing price fluctuations has no effect on rice and barley, while for other crops has observed adverse results to increasing price fluctuations. Such results can depend on the degree of risk aversion, the nature of the data and the ratio of risk to return. So, to deal the bad effects of price fluctuations should choose crops that have been minimal changes.

JEL Classification: C61, Q19.

Keywords: Positive mathematical programming, Risk, Risk aversion coefficient, Reaction of farmers.

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Determining the Premium Rates of Area Yield Crop Insurance Using Non-parametric Method: the Case Study of Wheat and Barley in East Azerbaijan Province

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Received: 1 April.2016 **Accepted:16 Aug .2016**

Abstract

The Producers in the agricultural sector have been faced with changes in income and are forced to employ suitable management methods to deal with risk and uncertainty conditions. This paper reviews the status of agricultural insurance for the two strategic wheat and barley crops in East Azerbaijan province, and also consider the area yeild crop insurance, as an appropriate alternative solution and determine its premium rate by a nonparametric approach.. For this purpose, the conventional two-step approach for yields risk modeling of wheat and barley were used. In the first stage the data will be detrended, while the second stage uses the detrended data to model the distribution by using a nonparametric approach. Finally, the probability of loss, fair and real premium rates and premium were calculated. The results showed that in the coverage level of 65% which is offered for traditional insurance, the actual premium rates are variable for wheat in different areas from 1.6% in Ahar county to 3.1% in Hashtrood, for dry wheat from 3.9% in Ahar to 9.3% in Myaneh, for water barley from 1.3% in Ahar to 4.9% in Maragheh and for dry barley from 2.7% in Maragheh to 6.9% in Sarab which considering to current premium rates, the results indicating the economic premium rates due to the current premium rates which will have benefits for farmers and insurers.

***JEL Classification**:* Q18,C14

***Key words**:* Area yield crop insurance, barley, kernel distribution function, premium, wheat

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Comparing Different kind of Vine Copulas Functions to Compute Weather-Based Crop Insurance Premium and Determine Step Function Indemnity for Rainfed Barley in Ahar County

Esmaeil Pishbahar, Sahar Abedi [1]

Received: 29 June.2016 Accepted:18 Dec .2016

Abstract

Traditional agriculture insurance suffers an asymmetric information challenges that lead to enormous costs. In addition, since agricultural sector, particularly rainfed production, is more dependent on natural factors and is more impressible of weather situation, politicians must adopt new risk management methods. Weather-based crop insurance schemes are one of these methods that were applied by developing countries and had satisfactory results. In this study, it was attemped to design weather-based crop insurance for Ahar rainfed barley with utilization of the newest approach in computing of dependency structure, i.e., vine copulas functions. The information of yield and weather variables was collected between 1995-2014 from Iranian Agricultural Organization and Metrological Organization, respectively. According to Vuong and Clarke tests, R-vine model was selected to explain joint distribution function of yield and weather variables, then expected loss, premium and step function indemnity were calculated. The calculated premium amount in 80 percent coverage level was 270348 Rials that is less and more reasonable than traditional project premium. The indemnity designing results showed for each certain unit reduction in cumulative rainfall, yield reduction is not linear and constant; hence, the utilization of step function in indemnity paying can provide reliable results.

JEL classification: G22, J65, N55, O13, Q10

Keywords: Weather-Based Crop Insurance, Vine Copula, Step function indemnity, Barley, Ahar.

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Factors Affecting the Adoption of Agricultural Insurance and Providing the Sustainable and Unsustainable Insurance Model

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Abstract

Food Provision is one of the main concerns of mankind. To achieve food security, governments design policies to increase the production capacity and reduce risks in agriculture. Agricultural insurance is a suitable mechanism to reduce economic risk and promote national food security. This research has been conducted to investigate and analyze the effective factors on purchasing the soybean insurance with the purpose of sustainable development in agricultural production in Gorgan district. The survey data was collected by designing and completing questionnaires from a sample of 183 soybean farmers in five rural districts that were selected via classified random sampling. Also, some data was gathered from documentary information of Agricultural Insurance Fund and Oil-bean committee. The econometric Logit model was used to determine the effective factors and their effectiveness on purchasing soybean Insurance by farmers. The results of Logit model estimation revealed that the educational level, getting loan, cultivation precedence, experience, age and risk experience of farmers had positive effects on insurance adoption, but revenue, revenue diversity and having agricultural production as the main job, land ownership for soybean farmers and production diversity had negative effects on insurance adoption. Amounts of marginal effects of variables showed that the insurance adoption probability will increase %0.071 by a %1 decrease in soybean acreage, meaning that smallholders have more tendency to insure their products. This is in accordance with the approach of Agricultural Insurance Fund in smallholders. Finally, the following are recommended to policymakers and planners to improve the efficiency of Agricultural Insurance Fund and insurance adoption rate in order to improve input usage and get closer to production development path: establishment of farmers and experts information bank in insurance fund, changing insurance encouraging policies such as supplying the subsidized detrimental inputs, and establishing an independent extension system in insurance fund.

JEL Classification: G22, C01, D03, N5

Keywords: Insurance, Adoption, Logit, Soybean, Sustainable Model

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