Comparison of Deterministic, Fuzzy and Possiblistic Multi Objective Programming Approaches: Case of Kohgilooye and Boyerahmad Province Farmers

M. Bagheri [1] - Z. Farajzadeh [2*]

Abstract

Regarding the imprecise or fuzzy data on the agriculture activities, applying models based on fuzzy data may be useful. In line with this condition this study tries to compare the ability of possiblistic programming approach in developing optimal solution with fuzzy and deterministic programming. To get this objective a data set obtained from 90 farmers of Kohgilooye region, gathered in 1387(2008), was applied. Goals regarded in the models are mainly to increase gross margin (GM), decrease risk and to decrease water consumption. In framework of possiblistic programming approach these goals are maximizing average GM, minimizing difference between average and minimum GM, maximizing difference between average and maximum GM. The goal of reducing water consumption also contains minimizing average water consumption, maximizing difference between average and minimum water consumption and minimizing difference between average and maximum water consumption. Different optimal solutions was developed using the above models and then some of them were chosen based on the goals. Findings showed that possiblistic programming has preference over the two other models in that is able to get the various and conflict goals and its superiority to other models is more noticeable as the number of goals increases. High ability in developing desired solution in bad condition is another superiority of possiblistic programming. It was also found that watermelon, rice and melon are more appropriate to get the goals. The results suggeat that in order to lessen the pressure on water resources, some efforts is needed to decrease the price and revenue fluctuations.

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Selection the Suitable Model for Forecasting land, Production and Price of Sugar Beet in Iran

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Abstract

The aim of this study was to selecting the suitable model for forecast land, production and Price of sugar beet in Iran. For this purpose, Models applied to forecast are ARIMA, Single and Double Exponential Smoothing, Harmonic, Artificial Neural Network and ARCH for period 1993-2008. Results of Durbin-Watson tests, land, production and price of sugar beet series were found non stochastic and predictable. Based on the lowest forecasting error criterion, ARIMA is the best model for forecast production and price of sugar beet series. But in orther to forecast land of sugar beet, Neural Network model is the best. Hence, using the forecast method can affect on different policy about production via forecasting the fluctuation variables.

Jel Classification: Q11 – D12 – C32 – C22

Keywords: ARCH, ARIMA, Artificial Neural Network, Exponential Smoothing, Forecasting, Harmonic, Iran, Land, Production, Price, Sugar beet

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Incorporate Externalities of Water Extraction from Agricultural Wells Around Parishan Lake, Case Study: Wheat Product

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Abstract

Irregular extraction from agricultural wells around Parishan Lake, moreover fall of groundwater surface and water salty, would affect the level of Lake water and move Lake water into wells. In this study we have evaluated the externalities of extraction from agricultural wells around the Lake. Therefore feedback effect is considered between agricultural activity around the Lake and level of Lake water by Auto_ regressive Distributed Lag Model. The results use in the ecological_ economic model. The results show that increase of water extraction from agricultural wells for wheat irrigation would affect the wheat yield and therefore increase farmers income. But on the other hand increase of extraction from wells, would affect the groundwater surface and increase pumping cost. By attention to effects of groundwater extraction on pumping cost are more than these effects on farmers income, so excess extraction has negative profit (loss) for farmers. In addition decreasing of the Lake water duo to excess extraction from groundwater, would affect the wheat yield and decrease farmers income and would affect the groundwater surface in wells around the Lake and increase pumping cost, so it decreases farmers profit. So we have offered to control of irregular extraction from groundwater for protection of Lake ecosystem and groundwater surface.

Keywords: Externalities, Irregular Extraction from Groundwater, Auto_ regressive Distributed Lag Model, Parishan Lake

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The Impact of Research and Development on Growth and Productivity in Agricultural Sector of Iran

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Abstract

Research and Development (R&D) spending plays a major role in innovation, raising productivity and increasing economic growth. The purpose of this paper is to investigate the impact of R&D spending on growth and total factor productivity (TFP) in Iran's agricultural sector. We estimate growth and productivity models using Auto-Regressive Distributed Lag (ARDL) approach and data over 1974 to 2007. Our results indicate that research and development spending has positive and significant effects on growth and total factor productivity in Iran's agricultural sector in short and long term. Therefore research and development can be used a main source of further growth of agricultural sector.

Keywords: Agricultural Sector, Total Factor Productivity, Research and Development, Growth, Iran

JEL Classification: O4, D24, Q16

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نشریه اقتصاد و توسعه کشاورزی (علوم و صنایع کشاورزی)

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Estimain How The impact of Monetary Shocks on The Growth of Agricultural Sector in Iran

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Abstract

In present paper has tried to examine and investigate quality of effectiveness of monetary Shocks on the growth of agricultural Sector by using Time series dataes of Iran Economy during 1960-2006 , filter Hodric-Prescott method and liner Regressive models. The resultes Show that qualily of effectiveness monetary shocks on growth of Agricultural Sector is Asymmetric and length of effectiveness Monetary Shocks is symmetric . in other words negetive monetary shocks affect growth of agricultural Sector more than positive monetary shocks on the and reflection of value added of agricultural to positive monetary shocks is small than negetive monetary shochs.however, monetary policies aren,t suitable for influence on production of agricultural sector. However, it is Necessery policemakes use suitable policies for influence production of sector agricultural.

Keywords: Agricultural sector, Hodric- Prescott

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Trade Evaluation of Iranian Agricultural Sector, Using Gravity Model and Panel Data

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Abstract

This study uses gravity model to examine the most important determinants of was agricultural trade. To This aim, import and export statistics of Iran agricultural products for the period 1380 to 1387 was provided from Iran customs organization and other information was obtained from different internet bases. Random effects estimating and Hausman test ratio result in fixed effects model, which determined the effects of dependent variables over independent ones. First, the effect of independent variables such as GDP, per capita income, Linder effect, geographic distance, exchange rates, exchange rate uncertainty and dummy variable of border was determined on on each import and export of agricultural sector. Then dummy variables related to the regional integrations of Organization of Islamic Conference and the ECO were also applied in model. The results showed that the GDP of commercial Partner has positive effect on export and import of agricultural trade but it is smaller for OIC members. Linder effect, geographical distance and exchange rate uncertainty have negative effects on both export and import of Iran agricultural products. Per capita income had a negative effect on export, while it had a huge positive effect on import. real exchange rate had positive but very small effect on import and negative effect on export of Iran agricultural sector. The results showed that cooperating with the OIC members lead to an increase in import and export of Iran agricultural products and it would reduce negative effects of exchange rate uncertainty. Because of the opposite relation between geographical distance and export or import is suggested reinforcement of international transporting infrastructures. In addition Islamic countries Which have shorter geographical distance from Iran have high commercial potential and the necessity for concluding local contracts with them is clearly understood.

Keywords: Trade, Agricultural sector, Exchange rate uncertainty, Gravity model

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Effect of Protective Policies on Comparative Advantage of the Most Important Vegetables in Jiroft Area

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Abstract

Comparative advantage is one of the important economic criterions in production, import and export programming. In this survey, existence and nonexistence of the most important vegetables(potato, cucumber and tomato) comparative advantage in Jiroft aria in the year 1385-86 by use of two comparative advantage recognition indexes was determined. The first indexes were Social Cost Benefit, Domestic Resource Cost and Net Social Profit and the second were Efficiency Advantage Index, Scale Advantage Index and Aggregative Advantage Index. By use of first indices, in the existent condition, cucumber and tomato had the comparative advantage. On the base of second indices, respectively, the yield mean of cucumber and tomato and concentration degree of cucumber, tomato and potato in relation to other crops in the region, was more than country average and indicated the preference of farmers to these crops cultivation. Calculation of protective coefficients and the Policy Analysis Matrix results showed that indirect subsidy was paid in potato production and in government intervention condition, market profit has been for potato and cucumber producers, more ever, productive system of cucumber and tomato had efficiency and cucumber and tomato producers in government intervention condition in compare to free trade had taken less profit.

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Aplication of Optimal Control Model in Grandwater Extraction
(Case Study: Ajabshir Plain)

J. Hosseinzad[1]* - A. Javadi [2]- B. Hayati [3]- E. Pishbahar [4]- Gh. Dashti [5]

Abstract

The use of water sources has increased due to extend of agricultural activity for answering food needs of increasing population. While because of exploitation and consumption of water, the use of this restricted resource is not appropriate. Consequently in many districts of country the head level of ground water aquifers have been fallen and water level is negative. So, application of a proper management program in optimal use of these resources seems to be necessary. With respect to the effects of depletion of ground water store through the time, the time is an important variable in solving of optimization problems for these resources. Thus, the application of dynamic models such as optimal control for these cases because of focusing on time is essential. Models are solved in order to maximize the social net benefit subject to stability of aquifer. In this study, optimal control model is applied for Ajabshir plain where is an important agricultural area in Azarbayjan-e- Sharghi. This plain has been faced with limitation and shortage of water supplies and negative water level in aquifer. The optimal extraction path was determined by execution of the optimal control model in this ground water aquifer. The results show that ground water aquifer built- up and reach the optimal steady state in 36 years. Thus ground water extraction would decrease besides another resource (backstop) would be applied to secure demand of farmers during this period of. Subsequently, regard of determined extraction would result in stability of ground water aquifer and on the other hand, it would cause the stability of agricultural activities as well as increase of farmer's revenue.

Keywords: Ajabshir Plain, Optimal Control Model, Optimal Economic Extraction, Groundwater Extraction

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The Effects of Optimum Cropping Pattern Water Consumption, Income and Rural Poverty: A Case Study of Kazeroon Region

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Abstract

In present study, it has been studied to oprimize culture pattern in water consumption reduction and increase in income by use of collected data from KAZEROON agriculture organization and forign commercial statistical annals and use of linear planning model due to simplicity and lts application, and to apply in water resources management. The purpose of this study had been to edit one planning model about water resources in order to determine suitable culture pattern, to optimum utilize superficial and underground water resources, and how to devote water between cultivar plants, so that it is minimized the bad effects of drought. It was used this model to determine optimum culture combination- the most suitable utilization pattern from existing resources- and to optimume devot it between various plants and at tast the benefit resulting from cultivation by using linear planning model and by choosing target function and existing constraints introduction. This model was performed for five five-years periods regarding gradual changes. Generally, the obtained results showed that changes in culture pattern with respect to reduce harvest from under-ground water resources have increasingly trend about resulting net incomes. So that, it has reached from $ 405 billion in 2011 to $ 453 billon in2031 . the use of culture optimum pattern had been effective, so that 17.5 percent of rural people locate above pouerty line using culture optimum pattern. These could be suitable strategies to increase in function and decrease in production expenses for culture efficacity in kazeroon region.

Keywords: Culture pattern, Optimization, Water resources, Water tension, Under-ground water- poverty indices, Mathematical planning

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Comparative Advantage of Export for Major Horticultural Crops in Iran and Forecast it

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Abstract

Iran is among the country that despite the possession of valuable natural resources does not placed in developed countries. Expansion of agricultural exports through the development of rural areas, reducing poverty and exclusion zones, In the process of economic development plays a key role. The export of horticultural products can have a positive impact on agricultural development. In this study we estimated comparative advantage of export for thirteen horticultural crops (Pistachios, grapes, dates, apples, almonds, walnuts, orange, peach, apricot, cherry, tangerine, kiwi and lemon) in the period from 1340-86 with Using information contained in the Food and Agriculture Organization and applying index of RCA, RSCA and X2 . After that the index changes are forecasted for the fourth time. The result show that we have Comparative advantage of export for Pistachios and dates while Grapes, oranges, peaches and apricots have no comparative advantage for export. Also the result of forecast of this indexes in period of 1387-90 show that despite continuing of Comparative advantage for Pistachios and Dates and Lack of comparative advantage for Grapes, oranges, peaches and apricots.

Keywords: Comparative advantage of export, Superiority, Forecasts, Iran, Major horticultural crops

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Water Economics Value Estimation in Wheat Product in Qazvin Plain Irrigation Network: A Dual Approach

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Abstract

Some issues such as dehydration, local and chronological disproportion of rainfall, low productivity of water in agricultural sector, increasing demand for agricultural products due to increase in population participate with doughtiness are the most challenges of agricultural water. These factors caused water to be as one of the important and scarce inputs is agricultural products. Therefore, proper management of water demand and any attempt to saving water consumption, lead to develop of irrigated cultivation and to decrease of environmental consequences due to it's over consumption. On of the methods in water resource's management is determination of economic value of agricultural water from consumer's point view. The main propose of this study is to determine the economic value of agricultural water in wheat production by using both production and dual cost functions in Qazvin plain's irrigation network in 2007-8 crop year. Results revealed that the economical value of water is 609 and 586 Rials for cubic meter based on the estimated production and cost functions, respectively.

Keywords: Economic value, Cost function, Production function, Qazvin plain, Water, Wheat

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The Investigation of Relationship between Exchange Rate and Date Export

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Abstract

According to the importance of date export in Iran, this study investigates short run and long run relationship between date export and important economical variable, specifically exchange rate. For this purpose, an autoregressive distributed lag approach (ARDL) to cointegration is applied to annually time-series data from 1981 to 2007. Results showed that the exchange rate, export price of date and agricultural value added have positive and statistically significant impacts on export value of date in both long and short-run. According to the results, it's recommended to apply appropriate policy about exchange rate. Finally, according to estimated coefficient of the Error Correction Model (ECM), in each period 66 percent of short run imbalance toward the long-run equilibrium is adjusted.

Keywords: Exchange rate, Export, Date, ARDL

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Optimal Sustainable Use of groundwater in Agricultural sector: Case Study Subsector in Qazvin Basin

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Abstract

Surface water restriction and supply variation of these resources causes of over extraction of groundwater and unbalance between feed and extraction of groundwater in Iran. Agricultural sector as the biggest consumer of water resources has the most share of this unsustainability. This paper studies the conjunctive use of surface and groundwater in agronomy production in Qazvin basin, one of the most important areas of water crisis in Iran. For this, we used an intertemporal mathematical programming model to determine optimal cropping patterns of the crops for ten years period in Qazvin. For constructing the model, the duration of growth, water requirement of the crops, accessible surface water and exhaustible groundwater in Qazvin has been considered, and finally the cropping patterns was recommended. According to groundwater resources restrictions, it is suggested that cucumber and sugarcane is excluded, and cultivated area of maize and barley is increased in cropping pattern.

Keywords: Conjunctive use, Groundwater, Intertemporal programming, Cropping patterns, Agronomy crops

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Evaluation of Economic Benefits from Research and Extension of Almond Late Flowering Cultivars in Iran

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Abstract

The purpose of this study is to examine the economic impacts of developing and introducing almond late flowering cultivars during 1968 to 2019 years in Iran, which developed in Sahand horticultural research station using the economic surplus model and field and time series data. The estimation of shift parameter identifies that almond late flowering cultivars make almond supply curve move less to the left in the chilling case. Moreover, it lead to changes in the economic surplus of both producers and consumers. Results show that the almond late flowering cultivars caused to economic surplus of producers and consumers increase around 8.09 and 11.27 billion Rials, respectively. In this context, the share of consumers from benefits was 58 percent. Regarding to the cost of research and extension, the social net present value of investment in developing and introducing of almond late flowering cultivars was about 10.7 billion Rials. It was also idicated that the internal rate of return of this investment had been about 15 percent.

Keywords: Economic surplus model, Internal rate of return, Sahand horticultural research station, Chilling

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