Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 35

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۳۵

The Effects of Wheat Guarantee Price on the Economic Value of Groundwater Resources; the Case Study of Orzoiye Region, Kerman

S.H. Mosavi[1*] and S.Shahabi[2]

Received: 29-04-2014
Accepted: 14-09-2015

Extended Abstract

Introduction: Agriculture as one of main axis of development in Iran is heavily depend on irrigation water. on the other hand, water resources have been under heavy pressure due to rising demand with different uses. Hence, water resources management and optimal water allocation have become increasingly important Undoubtedly, one of the most important tools for optimal allocation of water resources, is the economic valuation of the long-term development strategy of the country. However, the main question is whether the various agricultural policies of the government are to achieve self-sufficiency in the production decisions, in line with the management of water resources?

Materials and Methods: To develop an analytical context for responding to above question, in this study, the effect of guaranteed purchase policy of wheat as one of the most supporting government policies, on the economic value of water resources in Orzoiyeh plain of Kerman province was studied. In order to achieve our goals, a dynamic mathematical programming model was used.

A number of key questions are involved with the modeling of dynamic situations. Fundamentally, one must ask whether an explicit multiple time period representation is necessary. If so, a number of other questions are relevant. First, the length of the total time period and the starting date must be determined. Second, the length of the time intervals explicitly represented within the total time period must be determined. Third, initial and final inventory conditions must be specified. Fourth, one must decide on activity life, i.e., when a particular activity is begun and how long it lasts. Fifth, the rate of time preference must be determined, i.e., one needs the discount rate at which future returns are considered when compared with current returns. Sixth and finally, one must decide whether to include uncertainty. The sections below present discussion on each of these topics.

Dynamic situations may not require multi-period dynamic models. Some dynamic questions must be explicitly modeled, allowing the solution to change over time. On the other hand, other questions may be adequately depicted by a steady state equilibrium model. In an equilibrium model the same decision is assumed to be repeatedly made in all time periods and thus a "representative" single period representation is used. Choice between these two modeling alternatives depends on a number of considerations. First, one must ask whether modeling adaptation is important. This depends upon whether the modeled entity is likely to experience growth, development/exhaustion of its resource base, and/or dynamic changes in model parameters. Second, one must be interested in the time path of adjustment and must not be content to solve a model for an optimal final state with the adjustments required to attain that state determined exogenously. Simultaneously, one must ask whether the data are present in sufficient detail to support a dynamic model. Finally, the multi-period dynamic analysis must be affordable or practical given the model size and data required. Dynamic equilibrium models may be used when one is willing to assume: a) the resource, technology and price data are constant; and b) a long-run "steady state" solution is acceptable. Disequilibrium models are used when these assumptions do not hold. Often reliance on equilibrium models is stimulated by the absence of data on parameter values over time. The decision on whether or not to assume equilibrium needs to be addressed carefully. Two common errors occur in the context of dynamic models are unnecessarily entering explicit dynamics into a model and improperly omitting them. Naturally, the proper dynamic assumption depends upon the problem. Treating dynamics as an equilibrium does not imply ignoring dynamics, but rather assumes repetitive decision making with equal initial and final inventory, a zero growth rate and a constant resource base. Most models do not contain either an infinite time horizon or conditions where all dynamic enterprises stop at the end of the horizon. Consequently, terminal conditions are important. Terminal conditions reflect the value of in-process inventory beyond the final period explicitly modeled and should either value or require a minimum level of inventory. When used, terminal values should reflect the net present value of the future income stream earned by ending the time horizon with a unit of

1,2- Assistant professor and Graduated student of Agricultural Economics respectively, TarbitModares University
(*- Corresponding Author Email: shamosavi@modares.ac.ir)

the in-process inventory. Such conditions can insure that model activity will be reasonable up until the final year. The error created by ignoring terminal conditions can be illustrated through example.

Data required in the study for the crop year of 2011-2012, were collected by farmers in Orzoiyeh using questionnaires along with data of the Regional Water and Agriculture Organization of Kerman were collected.

Results and Discussion: results showed, that although the policy guaranteed purchase of wheat increased in agricultural gross profit ,it is not compatible with water resources management. Therefore, policymakers should enact policies to support the production, they considered the side effects on water resources in addition to encourage more production was also important to protect water resources. In order to reduce the exploitation of water resources, in line with the policy of supporting the production of water-price policies gradually, developing new technologies and water saving, promoting drought resistant varieties and the optimal irrigation strategies can be implemented.

Conclusion: Policy makers should enact policies that support the production, they considered the side effects on water resources in addition to encouraging more production was also important to protect water resources. In order to reduce the exploitation of water resources, in line with the policy of supporting the production of water-price policies gradually, developing new technologies and water saving, promotion drought resistant varieties and the optimal irrigation strategies can be implemented.

Keywords: Dynamic Mathematical Programming, Economic Value of Water, Guaranteed Price, Kerman, Wheat

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 37

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۳۷

Estimating the Economic Value of Greenhouse Gases Emissions of Oilseeds in Iran

M. Jamalipor[1], M.Ghorbani[2*], A.R. Koocheki[3]

Received: 03-02-2015
Accepted: 09-05-2015

Introduction: Human life on earth depends on temperature range control due to the effects of greenhouse gases. Earth atmosphere plays an important role to prevent the decrease of temperature. One of the principal factors of environmental pollution and the main source of earth climate and biodiversity changes is greenhouse gas emissions from various sources, particularly agricultural sector. Agriculture sector is a major source of greenhouse gas sequestration, including methane, nitrous oxide, carbon dioxide, ammonia, and nitric oxide. One of the most important sub-sector of agriculture that produce greenhouse gases is agronomy. Nitrous oxide is one of the most important greenhouse gas and agriculture is the largest source. About 70 percent of N_2O emitted into the atmosphere from soil, obtained from biomass. The total cultivation of oilseeds i.e. soybean, canola, corn for grain and other oilseeds, is equal to 534,132 hectares.

Materials and Methods: In this study to measure emissions of CO_2 and N_2O, Greenhouse Gas Emissions Model (GHGEM) was used. This model was employed to estimate greenhouse gas emissions from activities directly and indirectly related to agriculture production and the effects of mitigation measures to reduce greenhouse gas emissions. To estimate the total production of N_2O and CO_2 in the agricultural ecosystem, 2011-12 crop year data reported by the Ministry of Jihad Agriculture has been used. In addition, the provinces divided into different classes based on the scale of production and emissions and their condition through means comparison test was examined.

Results and Discussion: The total amount of N_2O and CO_2 emissions from cereal crops including soybean, canola, corn for grain and other oilseeds was estimated. Khuzestan and Zanjan provinces, with an annual production 341.49 and 0.004 ton of N_2O emission are the highest and lowest N_2O producers, respectively. In addition, the Golestan and Hormozgan provinces respectively, with an annual production 7841.47 and 0.24 ton of CO_2 have the highest and lowest annual production of CO_2 emissions. Based on the results, Khuzestan province has the largest share of emissions from oilseeds. In other words, this province has about 26 percent of N_2O and 24 percent of CO_2 emissions. Total of N_2O and CO_2 emissions from the Iran's oilseeds farms, was estimated equivalent 1330 and 32170 ton, respectively. However, Khuzestan with production equal 8183 tons of N_2O and CO_2 is the largest producers of greenhouse gas N_2O and CO_2 in Iran. Khuzestan province has the most environmental costs caused by N_2O and CO_2 emissions. The environmental cost of N_2O and CO_2 release in this province was estimated, approximately 16000 and 36290 US$ (or 0.552 and 1.252 billion rials), respectively. In other words, the Khuzestan province has the largest share of creation this pollution, with a share of about 25 percent of greenhouse gas emissions under review, caused by the production of such pollutants. Minimum environmental costs of N_2O and CO_2 emissions are to the Zanjan province. Total environmental costs of N_2O and CO_2 emissions was estimated about 211,333 US$ (7.291 billion rials).

Discussion: In this study, according to the agricultural activities diversity and greenhouse gas emission of these activities, it estimated the greenhouse gas emission CO_2 and N_2O from the oilseeds farms i.e. soybean, canola, corn for grain and other oilseeds, under the crop production. Results showed that the most important factor of N_2O and CO_2 emissions of the crops production activities is crops cultivation. However, due to the influence of variables such as the use of nitrogen fertilizers, crops residue remaining of products on the farms and annual fallow of N_2O and CO_2 emissions in production of oilseeds, using the modern farm management strategies, management and increase the efficiency of nitrogen fertilizers that use on the farms and development the emission reduction policies such as carbon sequestration was proposed to the decision makers. Cultivation of oilseeds is the main source of greenhouse gas of N_2O and CO_2 emissions, environment tax of greenhouse gas emission on level of production in compensation environmental costs due to the release of such pollutants can be useful.

Keywords: Carbon Dioxide, Greenhouse Gases, Nitrous Oxide, Oilseeds

1,2 - Msc Student and Professor., Agricultural Economics, College of Agriculture, Ferdowsi University of Mashhad
(*- Corresponding Author Email:ghorbani@um.ac.ir)
3 - Professor., Agronomy, College of Agriculture, Ferdowsi University of Mashhad

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 38

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۳۸

Survey Probability and Factors affecting Farmers Participation in Future and Option Markets Case Study: Cotton product in Gonbad kavos city

F.sakhi[1], h.mohammadi[2*], M. Sabuhi[3]

Received: 02-03-2015
Accepted: 18-10-2015

Abstract

Introduction: Farmers are facing with a variety of natural and unnatural risks in agricultural activities, and thus their income is unstable. A wide range of risks such as risks of production, price risk, financial and human risks, influence the income of agricultural products**.** One of the major risks that farmers faced is the risk of price volatility of agricultural products. Cotton is one of the agricultural products with high real price volatility. Numerous tools for marketing and risk management for agricultural products in the face of price risks are available. Futures and options contracts may be the most important available tools (to reduce price volatility) in agricultural products. The purpose of the current study was to look at the possibility of farmers participations in the future and option markets that presented as a means to reduce the cotton prices volatility. The dependent variable for this purpose had four categories and these included: participate in both the market, participation in the future market, participation in the option market and participation in both future and option markets**.**

Materials and Methods: data gathered with interview and completing 200 questionnaires of cotton growers using simple random sampling. Multinomial Logit Regression Model was used for data analysis.

Results and Discussion: To measure content validity of the preliminary study the validity of confirmatory factor analysis were used. For calculating reliability, the pre-test done with 30 questionnaires and reliability, coefficient Cronbach alpha was 0.79. The independence of dependent variables categories was confirmed by Hausman test results. The Likelihood ratio and Wald showed these categories are not combinable. Results indicated into period 2014 -2015 and the sample under study, 35% of cotton growers unwilling to participate in future and option markets. Farmers willingness to participate in future and option market was 19% and %21.5 respectively. Multinomial Logit model estimation results for the probability of participation in the future and option markets showed that variables of the level of education, farm ownership, cotton acreage, and non-farm income, work experience in agriculture, the index of willing to use new technologies, the index of risk perception cotton market and risk aversion index are statistically significant. The variables of farm ownership, non-farm income and work experience in agriculture, showed negative effects and the other variables showed positive effects on the probability of participation in these markets. The results are in line with previous studies.

Conclusion: The purpose of the current study was to look at the possibility of farmers participations in the future and option markets that presented as a means to reduce the cotton prices volatility. The dependent variable for this purpose, have four categories: participation in both market, and future market, participation in option market and participation in both future and option markets**.** Multinomial Legit Regression Model was used for data analysis. Results indicated that during the period of 2014 -2015 and the sample under study 35% of cotton growers unwilling to participate in the future and option markets. Farmers willingness to participate in the future and option market was 19% and %21.5, respectively. Multinomial Legit model estimation results for the probability of participation in the future and option markets showed that the variables of the level of education, farm ownership, cotton acreage, and non-farm income, work experience in agriculture, the index of willing to use new technologies, the index of risk perception cotton market and risk aversion index were statistically significant. The variables of farm ownership, non-farm income and work experience in agriculture, showed negative effects and the other variables positive effects on the probability of participation in these markets. The results are in line with previous studies. Given the positive relationship between level of education and

1 - A graduate student at the Department of Agriculture, University of Mashhad
2 - Assistant Professor, Colleg of Agriculture, Ferdowsi University of Mashhad
(*- Corresponding Author Email: hoseinmohammadi@um.ac.ir)
3 - Asociate Professor, College of Agriculture, Ferdowsi University of Mashhad

participation of farmers in the future and option markets can be suggested that the training seminars would be provided. The content of the seminars could be about how these markets as a means of reducing the risk of price and performance, and informing farmers of the role of research, education and extension services. Given the positive relationship between risk aversion and risk perceptions which tend to use the new technology on the market, cotton farmers are likely to participate in these markets. Therefore it is proposed to develop a more farmers markets.

Keywords: Cotton, Future market, Multinomial Logit, Option market, Participation

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 40

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۴۰

Appling Cross Efficiency Method to Determine the Score and Rank of Iranian Provinces in Onion Production

A. Shahnavazi[1]

Received: 16-03-2015
Accepted: 15-07-2015

Introduction: In agriculture sector, the yield indicator is usually used to compare production units with each other, which is called "partial productivity measure" in literature review. however as it is not consider other inputs, it is always urged by researchers. To produce some better criteria, Farrell (1957) proposed some ways to make a frontier by using the existing information, and then compare units with this frontier. The approach can consider two inputs and one output. His work in 1978 developed by Charnes, Cooper and Rhodes, using mathematical programming methods, which is now known CCR model. Sexton in 1986 introduced the cross efficiency method (CEM) to complete the ranking ability of the basic models. In this study CEM was used to rank Iranian 25 provinces in onion production and their results were compared with some other extended models like super efficiency model (SE) introduced by Andersen and Petersen (1993) and CCR with correlation coefficients model (CCRCOR) proposed by Mecit and Alp (2013).

Materials and methods: Data envelopment analysis (DEA) tries to identify the production frontier using mathematical programming approach. To get this target, all inputs that are needed to produce one unit of output, are calculated for every decision making units (DMUs). If there is no better performance, then that unit is on the frontier and gets the score of one, so the other units will be relatively inefficient and their inefficiency degree is determined by comparing them with the frontier. The basic model is introduced in equation 1:

$$\begin{aligned} &Max \quad \theta_k = \sum_{r=1}^{s} \upsilon_r y_{rk} , \\ &st. \qquad\qquad\qquad\qquad (j = 1,...,n) \\ &\sum_{i=1}^{m} \nu_i x_{ik} = 1, \qquad\qquad (r = 1,...,s) \\ &\qquad\qquad\qquad\qquad (i = 1,...,m) \\ &\sum_{r=1}^{s} \upsilon_r y_{rj} - \sum_{i=1}^{m} \nu_i x_{ij} \le 0, \\ &\upsilon_1, \upsilon_2, ..., \upsilon_s \ge 0, \\ &\nu_1, \nu_2, ..., \nu_3 \ge 0, \end{aligned} \qquad (1)$$

Where θ_k, υ and ν are the efficiency score for DMU_k, outputs and inputs weights, respectively. The above equation which is called input orientated CCR model can not rank all units, so Sexton introduced CEM and used other unit weights to estimate the efficiency scores. He used the equation 2, to get n efficiency score for every unit:

$$E_{kj} = \frac{\sum_{r=1}^{s} \upsilon_{rk} y_{rj}}{\sum_{i=1}^{m} \nu_{ik} x_{ij}} \qquad (k, j = 1,2,...,n) \qquad (2)$$

Finally by using the equation 3, the efficiency score for the unit was calculated:

$$\overline{E}_j = \frac{\sum_{k=1}^{n} E_{kj}}{n} \qquad (3)$$

1- Rural and Agricultural Economy Research Group, East Azarbaijan Agricultural and Natural Recourses Center, AREEO, Tabriz, Iran.
(Email: a.shahnavazi@areo.ir)

In above relation, $\overline{E}_j$ is the average efficiency for DMU_j.

Results and Discussion : The results showed that the basic Charnes, Cooper and Rhodes model (CCR) could only identify the efficiency score of seven provinces but the super efficiency (SE) method ranked all of the provinces except Kurdistan and Gilan. The findings illustrated that correlation coefficients in the basic model (CCRCOR) increased the discrimination power of model by reducing the number of unranked provinces from 18 to 12. It was showed that the cross efficiency method (CEM) produced the most complete ranking among others. According to this model, the provinces of Qom, Khorasan-e-Razavi and Hormozgan with 0.3141, 0.3225 and 0.3934 scores took the 25th, 24th and 23rd places and the provinces of Ilam, Sistan & Baluchestan and Hamedan with 0.9047, 0.9015 and 0.8564 scores took the first, second and third places, respectively. The correlation coefficients analysis showed that the ranking of CCRCOR model was more similar to CEM ranking model. If the results from efficiency ranking compared with those yield or production rankings, it could be observed that the provinces of Lorestan, Esfahan and Yazd with 74,722, 64,073 and 60,032 kg production per hectare had the highest yield in the country, but their efficiency ranks were 5, 7 and 8, respectively. In terms of total production, the provinces of East Azerbaijan, Hormozgan and Esfahan were ranked from first to third, but their efficiency ratings were 17, 23 and 7, respectively.

Conclusion: If results from efficiency ranking are compared with those yield or production rankings, it can be observed that the provinces of Lorestan, Esfahan and Yazd with 74,722, 64,073 and 60,032 kg per hectare had the highest yield in the country, but their efficiency ranks were 5, 7 and 8, respectively. In terms of total production, the provinces of East Azerbaijan, Hormozgan and Esfahan were ranked from first to third, but their efficiency ratings were 17, 23 and 7, respectively. So it is a necessity to produce and use other indexes like efficiency measures in comparing and monitoring the performance of different reigns for better evaluating and planning in Iranian agriculture sector.

Keywords: Correlation coefficients, Cross efficiency, Data envelopment analysis, Ranking, Super efficiency

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 42

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۴۲

Prioritization of Factors affecting the delay or inability to repay bank facilities to farmers

B. Maadanian[1], A. Dourandish[2*], M. Ghorbani[3], M. Kohansal[4]

Received: 16-03-2015
Accepted: 19-08-2015

Introduction: The role of credits in agricultural development is very important, especially after implementing land reform and converting subjects to a large class of small owners, the demand has been intensified. Seasonality of agricultural productions usually creates temporary vacuum among farmers payments and receipts, thus farmers need to save their previous incomes or seek financial help out of the sector in order to pay current expenses and investments in agriculture sector. Due to farmers low income, the saving possibility is low and therefore farmers are not in a situation that they can invest in agriculture sector from their savings or to purchase required inputs

Materials and Methods: The aim of this study was to prioritize the factors affecting the delay and lack in repaying loans, therefore at first it should identify the payment factors. This means that one should find what factors are affecting the lack or delay in repayment of loans granted to farmers. So the factors affecting the delay or failure to repay the loans were identified by using the Delphi method and then prioritizing the factors will be discussed with regard to experts perspectives by using the analytical network process model.

Analytical network process (ANP) is one of the most efficient techniques for decision making with multiple criteria that it was proposed by Thomas Almaty for the first time in 1982 and as the developed form of AHP method. In cases where lower levels affect the upper levels or elements in a same level are not independent of each other, AHP method cannot be used. ANP technique is a more general form of AHP, but it does not require the hierarchical structure and therefore it show more complex relationships between different levels of decision in network form and it considers the interactions and feedbacks between criteria and alternatives. In fact the main objective of this process is to determine the overall impact of all factors in the face together.

Results and discussion: In the study, factors affecting repayment were divided into the five categories, including farmers, the rules of bank loan payment, banking laws, the government and Jihad agricultural organization . In farmers sector, the farmers primary earned cash had weight of 0.3 out of 1 among five variables. The second stage is the farmers experience which has allocated the weight of 0.23 percent itself. Project failure is located in the third rank. The duration of project restoration and farmers activity volume has less weight than other variables. The results in section of rules of bank loan payment showed that lobbying in bank is in the first place with weight of 0.28. Insurance Fund was also one of the factors that its lack causes lack of immediate repayment of the loans. About bank laws, deep court sentences also were among the factors that its lacking may lead to delay or failure to repay loans. This variable with the weight of 0.2 is among variables affecting on the loan repayment. Long process of enforcements is a factor that in bank experts perspective, it has weight of 0.19 percent compared to other variables. Experts specialties has little weight compared to the other variables. Agriculture-related factors suggested that the accuracy and frequency of visits from project are the most important variables among agents. Preventing the failure of the project is among the factors that had allocated the weight of25% to it. The focus of special funds is among factors that have allocated the weight of 20% to itself that it be considered as an important factor. Jihad agricultural experts specialty and lobbying are the factors that are not of high importance and they are in grades 4 and 5. Agents related to government that effect the loan repayment according to the results also indicated that attention to relations in the macro-level and lobbying have high impacts on non-repayment of the granted facilities. In Agricultural Bank experts views, the repayment extending policy is among the factors that cause to non-repayment of the granted facilities. This variable has the weight of 25 percent among the other variables. Interest and inflation rates are the factors that have common weight in non-repayment of the granted facilities.

Conclusions: The results showed that in bank experts views, banking laws are the most important criterion that affects the absence or delay in repayment of installments. Experts believe that if the banking system strongly enters into financial markets, it will contribute to the development of national economy. Accordingly, it was

1- Post graduate of Agricultural Economics Department of International Campus of Ferdowsi University of Mashhad.
2,3,4- Assistant professor, Professor and Professor of Agricultural Economics Department of Ferdowsi University of Mashhad, Respectively.
(* - Corresponding Author Email: dourandish@um.ac.ir)

determined that lobbying in bank is the most important variable of banking laws subset, and it is the most effective factor on the lack and delay in repayment of loans. It means that if the banking legislations is performed correctly and enforced, then the payment of loans is timely and will ease the problems of lack of timely payment. On the other hand, according to bank experts, including measures that affects the delay and lack in timely payment. If the farmers have proper cash and sufficient experience in their own field, they can be successful in the timely payment.

Keywords: Agricultural Bank, Analytical Network Process, Delphi Method, Facilities

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 44

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۴۴

Estimation of Esfarayen Farmers Risk Aversion Coefficient and Its Influencing Factors (Nonparametric Approach)

Z. nematollahi[1*], S.-A. Hosseini-yekani[2], M. Hosseinzadeh[3]

Received: 06-07-2015
Accepted: 01-08-2015

Introduction: Due to existence of the risk and uncertainty in agriculture, risk management is crucial for management in agriculture. Therefore the present study was designed to determine the risk aversion coefficient for Esfarayens farmers.

Materials and Methods: The following approaches have been utilized to assess risk attitudes: (1) direct elicitation of utility functions, (2) experimental procedures in which individuals are presented with hypothetical questionnaires regarding risky alternatives with or without real payments and (3): Inference from observation of economic behavior. In this paper, we focused on approach (3): inference from observation of economic behavior, based on this assumption of existence of the relationship between the actual behavior of a decision maker and the behavior predicted from empirically specified models. A new non-parametric method and the QP method were used to calculate the coefficient of risk aversion. We maximized the decision maker expected utility with the E-V formulation (Freund, 1956). Ideally, in constructing a QP model, the variance-covariance matrix should be formed for each individual farmer. For this purpose, a sample of 100 farmers was selected using random sampling and their data about 14 products of years 2008- 2012 were assembled. The lowlands of Esfarayen were used since within this area, production possibilities are rather homogeneous.

Results and Discussion: The results of this study showed that there was low correlation between some of the activities, which implies opportunities for income stabilization through diversification. With respect to transitory income, Ra, vary from 0.000006 to 0.000361 and the absolute coefficient of risk aversion in our sample were 0.00005. The estimated Ra values vary considerably from farm to farm. The results showed that the estimated Ra for the subsample existing of 'non-wealthy' farmers was 0.00010. The subsample with farmers in the 'wealthy' group had an absolute risk aversion of 0.00003, which is lower than for the subsample existing of farmers in the 'non-wealthy' group. This assumption that the absolute risk aversion is a decreasing function of wealth is in accordance with Arrow (1970) expectation. The method used was to calculate the proportional risk premium (PRP) representing the proportion of the expected payoff of a risky prospect that the farmers would be willing to pay to trade away all the risk for a certain thing, proposed by Hardaker (2000). Our finding showed that the higher risk averse the farmer was, the higher will the PRP would be. Farmers risk premium was 303113 IRR. It should be mentioned that the 'non-wealthy' group had a larger PRP than the 'wealthy' group. Following Freund (1956), if the net revenue for each activity is normally distributed and assuming a negative exponential utility function, we can utilize the absolute risk aversion coefficient to obtain relative risk aversion coefficient (Rr). Based on this study, Rr vary from 0.31 to 8.49 and the relative coefficient of risk aversion in our sample was 4.79. Our results showed that the majority of farmers in the study area are highly risk averse (Anderson and Dillon, 1992). The relationships between the relative risk aversion coefficients of farmers and their socio-economic characteristics were also evaluated in this study. Results showed that the age had a positive impact, level of wealth and diversity had negative impacts on farmers' risk aversion coefficient.

Conclusion: Due to existence of the risk and uncertainty in agriculture, the present study was designed to determine the risk aversion coefficient for Esfarayen farmers. A new non-parametric method and the QP method were used to calculate the coefficient of risk aversion. The model used in this analysis found the optimal farm plan given a planning horizon of 1 year. Thus, the historical mean GM vector and variance-covariance matrix were assumed to represent farmers beliefs. Our results showed that the majority of farmers in the study area are highly risk averse. In addition the more risk averse the farmer was, the higher will the PRP would be. Farmers risk premium was 303113 IRR. Our finding showed that the age had a positive impact, level of wealth and diversity had negative impacts on farmers risk aversion coefficient. According to the results, insurance development and investment in agricultural commodities exchange was suggested to reduce the coefficient of risk aversion.

Keywords: Coefficient of risk aversion, Esfarayen, Non-parametric method, QRP method

1- Ph.D student of Agricultural Economics of Sari University of Agricultural Sciences & Natural Resources
(* - Corresponding Author Email: znematollahi2002@gmail.com)
2- Assistant Professor of Agricultural Economics of Sari University of Agricultural Sciences & Natural Resources
3- Ph.D Student of Agricultural Economics of University of Zabol

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 45

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۴۵

Determining the Appropriate Crop Rotation Plan in a Farm Scale Using Fuzzy Goal Programming Model

A. Alizadeh Zoeram[1], Z. Naji Azimi[2*]

Received: 07-06-2015
Accepted: 29-08-2015

Introduction One of the important subject in the field of agricultural programming is reaching to a pattern or appropriate crop rotation to plant. Existing constraints, including the amount of available resources, and different goals, makes the decision to optimize the use of resources and production factors a complicated task. Therefore, applying mathematical models can be a grate help in this field. The goal of this study is to determine the appropriate patterns of crop cultivation in a farm in the North Khorasan province.

Materials and Methods Implem enting fuzzy goal programming (FGP) model based on different scenarios was employed to achieve our goals. According to results ,represented process , constraints and problem goals, four plant patterns are offered based on eight proposed scenarios for crop products in this farm or this study. These proposed cultivation pattern can help to make better decision for determination the appropriate rotation of crops in different conditions and different goals by decision makers.

Results Discussion Finally, proposed cultivation patterns were prioritized according to maximum amount of reaching the desired level of total goals. Based on maximum level of reaching goals, different scenarios consisted of income, cost, production resources, income-cost, income-production resources, cost-production resources, income-cost-production resources with equal weights, and income-cost-production resources with different weights have been prioritized and four cropping pattern have been detected. In first pattern, three scenario consisted of scenario 1 (income), scenario 4 (income-cost) and scenario 5 (income-production resources) have combined. The second pattern have made scenario 2 (cost). In third pattern, scenario 3 (production resources), scenario 6 (cost-production resources) and scenario 7 (income-cost-production resources with equal weights) have combined. The scenario 8 (income-cost-production resources with different weights) have considered as fourth pattern, too. For each pattern, the level of reaching goals have been differentiated. In order to determine the appropriate pattern of cropping Euclidean distance have been used. The main difference between outputs of these patterns in pursuit of favorable culture could be due to labor, urea, and income, so the highest aspiration to achieve the desired level of labor have been to cultivation patterns 2 and 3. The desired level of urea fertilizer have been 3, and the highest aspirations and achieve the desired level of income of cropping pattern have been 1. Overall, the appropriate pattern of crop have selected based on the minimum Euclidean distance among of four patterns. In conclusion, Pattern 4 based on scenario 8 (income-cost-production resources with different weights) with minimum swing of desired level of goals have selected as appropriate pattern. Patterns 2, 3 and 1 situated in next priorities.

Conclusion In agriculture planning, sometimes, conflict between objectives occurs. Goal programming is a technique to achieve proper patterns in agricultural planning, by considering different objectives. Due to high uncertainty about the number of desired level of objectives, goal programming model results may be desirable to have or not to conform actual conditions. To resolve this problem, fuzzy goal programming can be utilized where in addition to consider the appropriate level of ideals, fluctuations can be defined for each of them. In this study, fuzzy goal programming models were applied. The proposed method of this study can help farmers to make decision to detect crop patterns. Therefore they can approach to the right decisions based on limited, available resources and importance of goals. Therefore, decision makers can select the appropriate pattern for cropping according to their priority for each goal.

Keywords: Agriculture Planning, Fuzzy Theory, Goal Programming, Plant Pattern.

1 - PhD Student in Management (Operations Research), Faculty of Economic and Administrative Sciences, Ferdowsi University of Mashhad
2- Assistant Professor, Faculty of Economic and Administrative Sciences, Ferdowsi University of Mashhad
(*- Corresponding Author Email:znajiazimi@um.ac.ir)

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 46

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۴۶

The effect of tariff reduction in agricultural sector on macroeconomic variables: using Global Trade Analysis Project (GTAP)

H. Heidari[1]*, N. Davoudi[2], M. Pasha Zanousi[3]

Received: 07-06-2015
Accepted: 11-10-2015

Introduction: Economic effects of membership in the WTO in recent years, has been one of the most important issues for Iranian economy. If Iran joins the WTO, in this process, tariff reduction in agricultural sector will be one of the policies which has to be employed. Therefore, investigating economic effects of tariff reduction or even its elimination in this sector will be necessary in running effective policies to minimize the probabilistic losses of accession. Tariffs on agricultural products in Iran are determined merely on the basis of annual country economy, and have no long term strategy. Government is just obliged to impose effective tariffs on agricultural products imports, in order to protect local productions. On the other hand, according to the census of population and housing, the share of agricultural sector in employment has reduced during the past decade. Moreover, Iran central bank information indicated the reduction in the share of agricultural sector in GDP for the past decade. Declining the share of agriculture in production and employment, considering the high number of university graduates in the field of agriculture along with rising unemployment rate of this group, motivated this study to investigate the effect of tariff reduction in this sector on macroeconomic variables.

Materials and Methods: This study analyzed the welfare effects of import tariffs reduction in agricultural sector from Iran most important commercial partners and vice versa, using the Global Trade Analysis Project (GTAP), based on computable general equilibrium (CGE) model. Moreover, the effects of tariffs reduction, is investigated on output, price level and transfer of production factors between different economic sectors. In order to simulate the above model, we used GTAP version 8 which covers 57 commodities and 113 regions with economic information of these regions. This model uses Social Accounting Matrix of countries as data information. Our model includes 3 regions: Iran, ECO and CIS countries as commercial partners of Iran, and the rest of the world, 5 production factors: land, skilled labor, unskilled labor, capital, and natural resources, and finally, 3 production sectors: agriculture, industry, and services. Two scenarios are simulated in this study: first, 50 percent imports value tariff reduction, and zero import tax target rate on intermediate goods for agriculture production in Iran is been considering. For the second scenario, we set a zero target rate for all cases mentioned above. It should be noted that according to Social Accounting Matrix gathered for Iran currently, the average tariff rate on imports of agricultural products from selected commercial partners is 27.67 percent and 7.82 percent from Iran to these countries.

Results and Discussion: Results showed that 50 percent reduction in tariffs, increases social welfare, while full elimination of agricultural tariffs leads to a loss in welfare. The welfare analysis illustrated that the efficiency of resource allocation in agriculture sector increased in the first scenario, while in the second scenario, the share of efficient allocation of resources in welfare was negative. Despite equal reduction in tariff rate on the value of imports from these countries to Iran and vice versa, trade balance of Iran has been worse, while it was beneficial for trade balance of her commercial partners. However, agricultural sector had positive share in trade balance of Iran, but the negative effect of industrial sector on trade balance, totally, reduced trade balance of Iran in large quantities. The first scenario increased agricultural production, but increased production was lower in the second scenario..However, the industrial sector production was slightly reduced. On the other hand, more production in agriculture lead more production factors demand, such as skilled and unskilled labors, and capital using in this sector. Moreover, price of production factors has been increased due to increasing demand for these factors.

Conclusion: According to our results, 50 percent tariff reduction on agricultural productions imports policy among Iran and her commercial partners will be beneficial for both sides in terms of welfare and agricultural production. However, with this information in hand, full elimination of these tariffs had no positive results. Therefore, policy makers, on the way to join WTO, should impose the policy of 50 percent reduction in tariffs in short time, subject to bilateral agreement. According to the prospect of the accession toward full elimination of

1- Associate professor of Economics, Department of Economics, Urmia University
(* - Corresponding Author Email: h.heidari@urmia.ac.ir)
2- Phd Student of Economics, Department of Economics, Urmia University
3- Phd Student of Economics, Department of Economics, Urmia University

agricultural tariffs, to minimize the welfare losses due to it, this is essential to apply other protective strategies such as subsidies and production facilities to intermediate goods producers for agricultural sector.

Keywords: Intersectoral transferring of production factors, Agricultural sector tariff, Reallocation of resources, GTAP, Welfare

Journal of Agricultural Economics and Development
Vol. 29, No. 3, Fall 2015, p. 48

نشریه اقتصاد و توسعه کشاورزی
جلد ۲۹، شماره ۳، پاییز ۱۳۹۴، ص. ۴۸

Assessment the Economic Damage of Inter-Basin Water Transfer on Cropping Pattern and Farmers' Income Situation in the Origin Basin (Case Study: Water Transfer of Alamoutrood to Qazvin Plain)

A. Parhizkari[1]*, H. Taghizade Ranjbari[2], M. Shokatfadaee[3], A. Mahmoodi[4]

Received: 13-08-2015
Accepted: 10-11-2015

Introduction: Sustainable management of water resources is one of the most important disturbances of current century and many scientists and investigators have already started to pay attention to it from last decade and early 21st century. Iran is in the semi-arid region and thus disproportionate distribution of water resources, so atmospheric precipitation and soil in the country, along with factors such as climate change, drought, environmental protection, ecological special situation, maintain the current pattern of population distribution provides various challenges. Industry and agriculture sectors create a regional balance tailored to the development needs on the one hand and focusing on distribution balanced and optimal management of water resources on the other hand. Transfer of water between river basins (watersheds, catchments), which is basically a hydrological category, different from the notion of transferring water over political boundaries, usually called transboundary water transfer. Interbasin water transfer usually implies large hydraulic engineering structures, conduits, canals, dams, pumping stations, and consequently shares the mistrust which meets large scale infrastructural solutions in water management, often criticized and opposed with the argument that one should first try to reduce water wastage, before embarking into costly investments. Inter-basin water transfer in fact is physical transfer of water from one basin to another basin. This transfer (Inter-basin water transfer) despite the elimination of shortcomings in the transmission destination areas, can the source of many changes in the cropping pattern, and farmers gross profit. Natural environment, migration, reduction of dependency to agriculture, small industries in the origin basins all requires assessments before the implementation of the water transfer projects. In Iran also water transfer from regions with high rainfall to arid regions has been performed by building the dam, canals, streams and aqueducts. Even today, many projects are implemented in Iran that water transfer project of Alamoutrood to Qazvin plain is one of the most important of these projects. According to reports of Regional Water Company of Qazvin province and the specifications of inter-basin water transfer project of Alamoutrood to Qazvin plain will be out from the farmers availability of Alamut region about 370 million cubic meters of irrigation water. This issue has the huge impacts on cropping pattern and farmers economic and livelihood condition in the origin basin (Alamout region). Therefore, in this study a hydrological-economic modeling system to analysis the effects of water transfer project of Alamoutrood to Qazvin plain on cropping pattern, farmers gross profit and economic value of irrigation water in the Alamut region (origin basin) was used.

Materials and Methods: Nowadays different methods to analysis of the issues related to the management of water resources and agriculture are used. One of the most important of these methods is mathematical programming that in recent years are in use to solve problems of water resource management sector and analysis of the agricultural policies. In this study a hydrological-economic modeling system consists of the Positive Mathematical Programming (PMP) and product function with Constant Elasticity of Substitution (CES) to analysis of the effects of inter-basin water transfer on land use, farmers income situation and economic value of irrigation water in the origin basin (Alamout region) was used. The first time PMP model developed by Howitt (1995) to calibrate agricultural supply models have been used to link biophysical and economic information in an integrated biophysical and economic modelling framework and to assess impacts of agricultural policies and scenarios. These models are also accepted for analysing the impact of water resources management policies and scenarios. PMP model used in this paper is a three-step procedure which in it a non-linear (Quadratic) cost function is calibrated to observed values of inputs applied in agricultural production. In the basic formulation,

1- PHD student of Agricultural Economics, University of PNU (Natural Resources Research Center of Qazvin province and the member of the National Foundation of Elites)
(*- Corresponding Author Email: Abozar.parhizkari@yahoo.com)
2- PHD student of Agricultural Economics, University of PNU
3- Faculty Member and Associate Professor Department of Agricultural Economics, University of PNU
4- Faculty Member and Assistant Professor Department of Agricultural Economics, University of PNU

the first step is a linear program providing marginal values that are used in the second step to estimate the parameters for a non-linear cost function and a production function. In the third step, the calibrated production and cost functions are used in a non-linear optimisation program. The solution to this non-linear program calibrates to observed values of production inputs and output. The required data in this study are related to the cropping year of 2013-2014 of Qazvin province.

Results and Discussion: The obtained results in this study showed that inter-basin water transfer of Alamoutrood to Qazvin plain resulted in using 10 to 40 percent the supply of irrigation water leads to reduction of cropping pattern from 1/71 to 5/52 percent in Eastern Alamut Rodbar and from 2/17 to 6/32 percent in Western Alamut Rodbar. The above restriction after inter-basin water transfer of Alamoutrood to Qazvin plain leads to reduction of farmers gross profit from 2/58 to 8/21 percent in Eastern Alamut Rodbar and from 3/18 to 9/82 percent in Western Alamut Rodbar. In addition, the results of this study showed that inter-basin water transfer of Alamoutrood to Qazvin plain affects the economic value of each cubic meter of irrigation water in the origin basin (Alamout region) and leads to increase it from 3/23 to 31/1 percent in Eastern Alamut Rodbar and from 4/09 to 14/0 percent in Western Alamut Rodbar. Moreover, the results of this study showed that farmers irrigation water demand function in Alamout region changes after inter-basin water transfer of Alamoutrood to Qazvin plain and farmers are compelled to buy every cubic meter of irrigation water at higher price compared to the current situation (before inter-basin transfer of water). Increasing of the rural people emigration, urbanization development, reducing tourism and disturbance in the ecosystem origin basin are the potential consequences of inter-basin water transfer of Alamoutrood to Qazvin plain.

Conclusion: Implementation of Inter-basin water transfer projects is responsive to resolve the water shortage problems in destination basins in short-time periods and the situation in the long time will be repeated as before. Therefore, it is recommended that instead of inter-basin water transfer project from Alamoutrood to Qazvin plain (despite the high cost for implementation of project and creating the detrimental problems in the origin basin) other appropriate methods in the field of water resources management (such as equipping of lands to modern irrigation systems, use of deficit irrigation techniques, modification of cropping pattern by products with low water requirement, increase the irrigation efficiency by repairing and equipping of water transfer channels) to solve the problem of water shortage in the destination basin (Qazvin plain) to be used. The results of this study showed that inter-basin water transfer of Alamoutrood to Qazvin plain leads to reduction of cropping pattern and farmers' gross profit. Therefore implementation of this project by considering of economic, social and environmental considerations in the origin basin (Alamout region) was recommended.

Keywords: Branches of Alamoutrood, Cropping pattern, Economic effects, Farmers' gross margin, Inter-basin water transfer