



Factors Affecting the Formation of Change in Land Use in the Mazandaran Province: A Case Study of Tonekabon

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Introduction: Land use in the overall concept is said to be the type of using land in the current situation which contains all users in different sectors of agriculture, natural resources and the industry. Protecting land use is as follows: "Prevent the change of application of certain lands by their owners, if their change has negative natural, economic, political, cultural, or scientific effects". Change of application of land is certainly the most important factor that will affect the protection of natural ecosystems. Thus, it is imperative to consider the importance of land use change from the perspective of environmental, economic, social and finally, its important aspects such as food security and the lack of planning for its realization and the changes that occur in these sectors. Factors affecting the development of land use change should be considered to finally be able to apply appropriate policies and strategic principles to reduce its negative effects.

Materials and Methods: The study's data and information were obtained by simple random sampling and through interviews and 60 questionnaires that were completed by farmers and rice farmers of Tonekabon city that all or part of their land use had been changed and the data had been collected in 2012. For investigating the factors affecting agricultural land use changes, the Tobit model of Heckman's two-step was used. In this paper, the relationship between the factors that influence decision to change land use and actions to land use change were investigated. The variables including family size, literacy, experience, number of garden plots, citrus cultivation, kiwi cultivation, the price per square meter of garden land, the price per kilograms of horticultural crops (citrus), the price per kilograms of horticultural products (kiwi), number of pieces of agricultural land, cultivated level, the price per kilograms of crop, the price per square meter of agricultural land, satisfaction of supporting institutions and garden and agricultural insurance were used in this study.

Results and Discussion: The estimated Probit model's marginal effects showed that the variables of literacy, experience, citrus and kiwi cultivation, number of garden plots, the price per kilograms of horticultural products (kiwi), cultivated level, and the price per square meter of agricultural land have been positive signs that indicate a positive impact of these variables on the decision to change the use of land. The estimated linear regression model showed that the variables of number of garden plots, citrus cultivation, kiwi cultivation, the price per kilograms of horticultural crops (citrus), number of pieces of agricultural land, cultivated level and garden and agricultural insurance have been positive signs that indicate the positive impact of these variables on the action to change the use of land. Due to significant coefficients of the quantitative variables that influence the rate of change in land use, cultivation of citrus fruits is dedicated to most positive effects. As well, satisfaction of supporting institutions also has the most negative role as a dummy variable.

Conclusion: The issues of land use change, prevention of land destruction and preservation of land, are of the main challenges in recent years. In this paper, we investigated the factors affecting change in land use by using a survey of 60 farmers in Tonekabon and the two-step Tobit model (Heckman) in 2012. The result of the Probit model showed that literacy levels, experience, number of horticultural and pieces, area of citrus and kiwi, the price of horticultural products (kiwi), crop area and price of land had a positive effect and household size, price of horticultural land, price of horticultural products (citrus), number of agricultural land price, and average price of crop, the satisfaction level of support in situations, horticultural and agricultural insurance had negative effects on the decision of changing agricultural and to horticultural. Also, the results of the second stage Tobit regressi on model showed that the number of horticultural land price, area of kiwi and citrus, price of horticultural products (citrus), pieces of agricultural land and crop area, price of land and horticultural crop insurance had a positive effect on house hold size, literacy levels, experience, price of horticultural products (kiwi), and price of crops and satisfaction level of support institutions had a negative effect on the level of changing in land use. According to the findings, creation of expansion in surance for coverage of small farmers, preventing price volatility horticultural and agricultural products, paying attention to agricultural production as strategic products and supporting the operation of this sector in a package is suggested.

Keywords: Changing in Land Use, Heckman, Marginal Effect, Tobit Model

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Application of Multinomial Probit Model in Analyzing Factors Affecting the Occupation of Graduated Students from the University of Agricultural Applied-Science

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Introduction: Scientific and practical training with an emphasis on operation and application of what is taught and having an empirical approach to education is a more suitable approach for creating jobs. Preparation of educational needs of the agricultural sector by scientific and practical training and providing employment in agreement with education and skills is one of the most important programs in order to achieve the objectives of comprehensive development of the country. An imbalance seems to exist between the processes and materials in university courses and the skills and abilities needed by the labor market and this is the most important reason for the failure of the university graduates in finding employment. This study has been done for understanding the type of job of agricultural graduates of training center of Jihad-e-Keshavarzi in Mashhad and the factor affecting their employment.

Materials and Methods: This study is an applied research and the statistical population is 167 and includes all the students who had earned a Bachelor's degree who had come to receive their graduation certificates in 2011. The dependent variable is type of job which includes five categories of employment in the public sector related to education, employ men unrelated to the government, employment related to the private sector and the unemployed who were seeking work in the private sector. Independent variables include gender, quota in university admissions, the level of interest in the field of study, satisfaction with the discipline, evaluation and training of graduates of vocational skill sacquired in college graduates' assessment of the work culture in the society and evaluation of lack of capital as a factor preventing employment in the academic field. Information was collected through questionnaires and the multiple probit mode lwas used.

Results and discussion: The results of the survey show that jobs of graduates are divided in to four categories including: Related to the field of study and governmental job (21%), non-related to field of study and governmental job (25.5%), related to field of study and private job (25.7), non-related to field of study and private job (8.4%), and 41.5% of graduates were unemployed. 77% of the statistical population said that the cause of unemployment is lack of capital. The variables of professionalism and evaluation of work culture in the statistical population was intermediate. The model showed that gender, field of study choice based on the level of interest, satisfaction with the studies, and lack of capital as a barrier to employment, and evaluation of the educational and professional skills acquired during the studies have a significant impact on employment. The regression equation as a whole is significant. According to this, the likelihood of women working in government jobs and private and non-private was lower than that of men. With increasing interest in the field of study, he possibility of working in related and unrelated private jobs increased. By increasing the degree of satisfaction, the possibility of working in government jobs increased. The lack of funds for activities in the field of employment is one of the problems. Therefore, the more the lack of capital to start and continue is highlighted, the more the tendency of people to get employed in a public office and to avoid the possibility of setting up private businesses is. About the possibility of working in unrelated government jobs, none of the variables showed a significant relationship. And the possibility of working in private jobs, gender and level of interest in the choice of the field of study showed a significant relationship. Women are facing more difficulties than men in employment in the agricultural sector.

Conclusion: The risk of unemployment is higher among women graduates since the usual trend is to create better condition and motivations for male farmers who live in villages. Also they should be given them some low-interest loans using bank's financial resources until economic activity esare undertaken by them according to their knowledge. Moreover, the role of the motivations, creativity and innovation, creating value-added products, and the functional and operation altraining in higher education centers of agriculture must be emphasized. The lack of capitalasa major obstacle in this field must also beconsidered. Special attention should be to the educational and professional skills acquired in the school that could result in self-employed jobs in the

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private sector and even self-employed jobs in the agricultural sector. Activating skill development centers and entrepreneurship in the applied science learning centers must be aimed at providing a place of interaction and dialogue which can play a constructive role in the future employment of graduates, and the identification of talents too. Given that the majority of graduates have suggested that career guidance has not been provided for them, the role of such centers is also of high importance.

Keywords: Agricultural graduates, Job, Multinomial Probit model



An Investigation of Factors Affecting the Management of Risk for the Rice Cultivating Women in Sari Town with LISREL Application

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Introduction Agriculture relies on nature and farmers face environmental, social, financial and legal issues that makes farming to be consistently and strongly associated with risk. Agriculture can be considered to be the most risky economic venture. Ahmadi (1) listed several main sources of risk that farmers face. Economic risk includes price fluctuations for raw materials such as seed and fertilizer and for machinery at the pre-market delivery stage, difficulty obtaining bank credit and loans, price volatility for products in the post market delivery stage, inconsistent government policies for products and global fluctuations in the price of products. Social risk includes theft of crops, production and agricultural machinery and war. Nature-related risk includes natural disasters, climate change, agricultural pests and diseases. Market risk includes changes in the price of raw materials and products and increasing interest rates. Given that the range of agricultural activities having critical risk are diverse and the climate can vary widely, more sophisticated services are needed to meet the demands, cope with hazards and decrease risk. Understanding how women rice farmers deal with risk is essential for educators, and agriculture-related industries such as insurance, and policymakers. If the attitudes of these women towards risk are accurately recognized, risk management strategies, risk-related educational programs and risk strategies can be designed to meet their needs. The over all aim of this research is to investigate factors affecting risk management, and proposing and designing a model among rice cultivating women in Sari.

Materials and Methods: The population of the study comprised 1677 rice cultivating women in Sari of whom 248 were selected through stratified random sampling. A combination of quantitative, and descriptive-inferential statistics served as the methodology for the study and SPSS 16 and LISREL were applied for data analysis. To determine the validity of the questionnaire, copies were distributed to experts in the field and their comments were recorded and relevant corrections were made. Corrected content validity was determined by experts at the Agricultural Organization of Mazandaran province, then reliability of the questionnaire was assessed by random completion of 30 questionnaires by women rice farmers in Qaem Shahr by interview and survey. Cronbach's alpha and ordinal theta were 0.84 and 0.89, respectively. The questionnaire contained questions about age, work experience, area of owned land, extent of financial difficulty related to rice farming, and educational level of the women rice farmers. The questionnaire contained questions about risk management approaches (17 questions), sources of information for women rice farmers in Sari (12 questions) and sources for borrowing funds (7 questions). The Likert scale was: none (0), very low (1), low (2), moderate (3), high (4), and very high (5).

Results and Discussion: The average age range of women in the study was 46.68 years and their relative work experience was 26.17 years. The average financial difficulty for the women was high. The woman rice farmers were most likely to obtain loans from friends and neighbors and also to obtain financing from winning lottery. There was a significant positive relationship between information resources, borrowing resources, extent of financial difficulty, rice cultivation experience, and educational level with risk management methods. Tabatabaee *et al.* (30) stated that the extent of borrowing affected risk management. Tiraei (31) pointed to agricultural experience affecting risk management. Monfared (21), Torkamani and Ezatabadi (33) and Garavandi and Alibige (10) believe that the level of education affects risk management, which is consistent with the results of this study. Structural equation modeling showed that information sources influenced the use of risk management methods. Structural equation modeling showed that information sources had an effect on risk management rate which is consistent with the results of Tabatabaee *et al.* (30) and Steven *et al.* (29).

Conclusion: The results indicate that the average age of women was 46.68 years and their average work experience was 26.17 years, which represents a good work experience on paddy land. Women should be encouraged to pursue off-farm income sources and occupations as risk management methods. Collaborative rice farming and consulting agricultural experts are other forms of risk management. Recommended sources of information were the Internet, Jihad-e-Keshavarzi management and service center, participating in agricultural extension classes, educational publications and communicating with agricultural experts. Women farmers should

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be encouraged to increase their knowledge and awareness about the sources of risk and this can improve risk management. This should be regarded as a mission for agriculture extensions. Borrowing sources, the extent of farmer financial difficulties, work experience and educational level should be considered when risk management methods for women rice farmers are advocated.

Keywords: Risk management, Source of information, Rice cultivating women, Sari

Determination of Consumers' Preferences for Conventional, Healthy and Organic Cucumbers in Isfahan City Using Choice Experiment Method

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Introduction: Continuing growth in human population and consumption means that the global demand for food will increase for at least another 40 years and that the world needs 70-100% more food by 2050. Environmental issues such as climate change, depletion of natural resources and biodiversity loss increasingly threaten the welfare of human civilization. Confronting these threats requires, among other things, behavioral changes in citizens, governments and companies. Farmers and other producers are responding to consumer concerns about pesticides by creating new marketing opportunities for products grown with environmentally sound practices. Environmental economists are increasingly interested in better understanding of how people cognitively organize their beliefs and attitudes towards environmental change in order to identify key motives and barriers that stimulate or prevent action. The purpose of the present investigation is to evaluate the consumers' preferences and factors affecting their choice for conventional, healthy and organic cucumbers in Isfahan, Iran.

Materials and Methods: Data were collected on a sample of 230 consumers in 2013 by using the proportionate stratification sampling method through face-to-face interviews based on a comprehensive structured questionnaire. Before the survey, the reliability and validity of the questionnaire were initially evaluated in a pre-test study, respectively, by using Cronbach's alpha coefficient and Kaiser-Meyer-Olkin (KMO) criteria. Individual preferences were uncovered in choice experiment method (CEM) by a contingent ranking experiment. In a contingent ranking experiment, respondents are required to rank a set of alternative options, characterized by a number of attributes, which are offered at different levels across the options. Data were analyzed by multinomial logit models. The approach consists of modeling utility, that is to say the net benefit a consumer obtains from selecting a specific product in a choice situation. Determining and arranging selected sets based on a review of studies and theoretical basis design scenarios of the experiment method, includes environmental characteristics, taste, appearance, price, duration of storage, the disease and the long-term complications.

Results and Discussion: Most of the respondents were female, with average age of 41.6 years, academic education level (39.5%) and the average monthly income of 9,760 thousand Rials. The results show that 77.1%, 12.4% and 10.1% of consumers, respectively selected the healthy, organic and conventional crops as a first choice. Moreover, the consumer's awareness towards healthy food products is low. According to the logistic regression results, the most important factors affecting the consumers' healthier choices are income, consumer knowledge about the characteristics of healthy and organic crops, the level of consumer's attitudes toward the importance of environmental protection and human health and having an elderly or sick member in the household. On the other hand, healthy shopping concern, age, gender, employment status and education have no significant impact on the consumer's selection. In other words, the likelihood of choosing healthy and organic products is more in people who care about their health and nutritional status, as well as with more health consciousness, environmental concerns and knowledge regarding the risks of pesticides and characteristics of free of pesticide fruit and vegetables.

Conclusion: There is no difference between academic and non-academic respondent's preferences for healthy crops, because of no general academic courses on the importance of environmental protection, healthy shopping, production and consumption of healthy and organic products in Iran's educational system. Moreover, attitude and awareness play fundamental roles in consumers' preferences. Willingness to pay for healthy food products in women is observed to be more than men. This could be due to the fact that housewives have more leisure time than men to make themselves aware. Also in most families buying and cooking raw materials is one of women's responsibilities which enables them to be more cautious in selecting foods. Knowing the characteristics of healthy and organic crops is one of the most important factors in choosing and purchasing these products. Since the elderly and ill people need more feeding care and have less resistance to harmful additives and preservatives in food products, their families are more willing to buy free of chemicals fruits and vegetables.

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Promoting the consumers awareness toward the benefits of healthy products could change their attitude about the importance of maintaining health and subsequently improve public health and the environment. Furthermore, it is necessary to adopt the standards in the process of healthy crop production and to monitor and to strengthen the marketing system of healthy products such as guaranteeing labeling and appropriate packaging.

Keywords: Consumer preferences, Multinomial logit, Contingent ranking, Healthy and organic crops, Isfahan



Analyzing Agricultural Sustainability Indicators, Under Energy Subsidy Reduction Policy (Case Study of Qorveh Plain)

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Introduction: Generally, subsidies are the amounts of government payments in order to provide all society members with minimum well-being. In several countries such as Iran, the agriculture sector is supported by different methods to achieve goals such as increasing farmers' income, supporting domestic producers and eliminating dependence on imports, preserving employment and reducing poverty. A significant part of agriculture subsidies has been allocated to energy resources, chemical fertilizers, seeds, agriculture machines, vaccines, animal toxins, the interest on bank loans, insurance fees, certain airplane services, distributing young saplings, and government guaranteed purchase of products. However, examining the subsidies system in Iran reveals that most government payments are in the agriculture sector and more specifically on energy resources. Recently, the extra low cost of energy in the agriculture sector, which has had certain government supports, has resulted in low productivity and environmental damage, and has resulted in increased demand for agricultural products due to population growth, changes in life pattern, deviation in energy cost in agricultural sector, environment destruction and influences on sustainable agriculture indicators. Moreover, among different production units, agriculture has the closest relationship with the environment. This relationship is a mutual. On the one hand, erosion and destruction of the environment along with pollution growth and shortage of water resources negatively influences the production and efficiency of agricultural products, and on the other hand, agricultural pollutants and irregular use of chemical fertilizers in this sector impose indispensable damages to the environment. This study aims to apply a partial equilibrium model in order to examine direct and indirect effects of reduction of energy subsidies on economic and environmental indicators of agricultural sustainability in the Qorveh region, situated in the West of Iran.

Materials and Methods: The statistical sample of this research includes all irrigated land of Qorveh as the studied area. A partial equilibrium model has been applied by mathematic programming approach in order to analyze the economic and environmental effects of reduction of energy subsidies for the agriculture sector in the studied area. For this purpose, through a survey, questionnaires were used in order to identify production coefficients of agriculture products and farmers' behavior during 2012-2013. Then relevant equations were used in mathematical programming framework with the aim of maximizing gross margin of agriculture activities in planning horizon by using GAMS 22.9.

Results and Discussion: The results showed that by increasing energy price in policy scenarios of ES₁ to ES₇ the gross margin of agriculture activities decreases. Also, the results indicate that by implementation of scenarios SE₁ and SE₂, most economical and environmental indicators of agricultural sustainability will be improved and increasing energy prices as the mentioned policy scenarios has the most effect on GM_ELEC, GM_GAS, and NIT_H indicators and reduces them by 10.7%, 0.97% and 1.48%, respectively. In scenarios ES₃ to ES₅ with respect to scenarios ES₁ and ES₂, there is only 7% decrease in the NIT_H index. In scenario ES₆, which grows electricity cost by 2.25 times and diesel fuel cost by 1.98 times, GM_ELEC, and GM_WA have the maximum decrease, namely 12.66% and 14.47%, respectively and WA_H has reached 9010 which shows an increase of 6.47%. In scenario ES₇, with the exception of WA_H, GM_ELEC and GM_GAS other indicators decreased and this shows that the closer we keep to real energy prices, the more improvement we observe in the environmental indicators.

Conclusions: Consequently, results showed that the reduction of energy subsidies leads to reductions in economic indicators of the study area, as total gross margins. Also, the results showed that by increasing energy prices toward its real value, the consumption of energy will be reduced and environmental indicators including nitrate and potash fertilizers consumption per hectare of land will be improved.

Keywords: Agricultural Sustainability, Energy Subsidy, Mathematical Programming, Partial Equilibrium

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Studying the Efficiency of Industrial Dairy Farms of Saqqez and Divandarreh Cities: Using Super-Efficiency Approach

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Introduction: In the developed world, particularly in developing countries, livestock is the most important agricultural sub-sector. Livestock of primary and secondary industries has an especial place in the national economy because of their great value of products, creating job opportunities, providing health products for consumers, increasing export income of the economy through accessing global markets of livestock products and finally their undeniable role in acquiring food security. The demand for milk in Iran increased due to an increase in population and the amount of milk production was also increased. The great share of increased produced milk goes to the industrial dairy farms. One of the major methods to increase the amount of milk production continually is to make its production efficient and improve economic conditions. The current study attempts to determine the efficiency and ranking of industrial dairy farms in Saqqez and Divandarreh cities using super-efficiency model.

Materials and Methods: The statistical populations of the study are all active industrial dairy farms of Saqqez and Divandarreh cities which are about 19 farms. The required data for calculating the efficiency were gathered by surveying and completing questionnaires for the year 2013. In this study first, for each farm Data Envelopment Analysis (DEA) method and GAMS software package were used to estimate super efficiency. Super efficiency is a form of modified DEA model in which each farm can get an efficiency greater than one. Then in order to make sure about being unbiased the obtained super-efficiency scores, the modified model of Banker and Gifford, was re-estimated and the conventional efficiency scores of farms were compared by normalizing and removing some of the scores of outlier farm based on pre-selected screens. The model has suggested conditions for which some of the estimates for dairy farms might have been contaminated with error. As a result, it has been ranked as an efficient farm.

Results and Discussion: The statistical description of the farms studied showed that, the highest and lowest amount of produced milk from one dairy were in the range of 845 and 250 kg per month. The super efficiency estimation showed that the mean of farms' super efficiency based on the assumption of variable return to scale for input-oriented is 1.01. About 58 per cent of the studied dairy cattle farms were inefficient and the Super-efficiency of about 42 per cent of total farms got scores under the average. The amount of λ_i for all farms except for farms 3 and 5 has become 0. Furthermore, these two farms in primitive super efficiency model have become infeasible. Therefore, they have been considered as reference farms. The results of super-efficiency method and efficiency conventional DEA method were compared together and inefficient farms got the similar efficiency and super-efficiency scores, and efficient farms whose super-efficiency score had been equaled or more than 1, stand over frontier production function in the conventional model. To determine the sensitivity of results to removing the outliers, three different levels ($1 <$, $1.5 \leq$, $1 \leq$), were considered as base to identify outliers. Then, in the second stage the conventional BCC model was estimated for the remaining farms. The results obtained showed that, before (super efficiency) and after (conventional efficiency) removing outlier farms, the calculated efficiency mean for industrial dairy farm at $1 <$ and $1.5 \leq$ levels did not show a significant difference to each other due to a high correlation coefficient. The correlation coefficient was low only at $1 \leq$ which indicates outlier effects on efficiency scores. Also about 42 per cent of the farms have been identified at $1 \leq$ outlier and after removing these farms the mean of super-efficiency scores has become about 1.22 so, they have increased by 28 per cent with respect to the initial super-efficiency score. In this state, 6 farms have obtained super-efficiency scores more than the average.

Conclusion: The suggested model in this study which followed the Banker and Gifford super-efficiency method may help to find and remove those farms that have been contaminated with error and then earn more

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reasonable scores than the conventional DEA method. So, these farms in determining the level of milk production can project on to frontier production function and become efficient by decreasing using inputs. On the other hand, recognizing and removing outlier farms decreases or increases the amount of biased results and confidence coefficient of calculated super-efficiency scores, respectively. This result can give the right information to the managers who wish to follow the correct way of managing their farms.

Keywords: Data Envelopment Analysis, Dairy Farms, Outlier Farms, Saqqez and Divandarreh Cities, Super-Efficiency



Assessing the Vulnerability of Wheat Farmers to Drought in North of Fars Province

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Introduction: Iran is constantly exposed to natural disasters such as floods, earthquakes and drought. In the meantime, drought is the major natural disaster which leads to numerous losses in agriculture and water resources, and this phenomenon is slow and creeping. Available evidence suggests that drought management is based on crisis management. As the present management in our country is based on crisis management, and drought-prone areas in the country have become a society vulnerable to drought. So, the authorities require a new set of data for drought preparedness to deal with these challenges, in order to obtain the resources to be properly and effectively prioritized and reduce the effects of drought and its consequences. Undoubtedly, the starting point of vulnerability assessment and risk management is a prerequisite that has been sadly neglected in our country. In this context, the aim of this study is to determine the vulnerability of technical, economic and social vulnerability assessment determined before and after the drought and vulnerability patterns for wheat farmers in the North of Fars province.

Materials and Methods: The vulnerability of wheat farmers in the North of Fars province is determined using three methods. The first method measured ex ante vulnerability based on estimated income distributions, and the other identified ex post vulnerability according to farmers asset positions and drought coping strategy in the 1390 drought. The final section determined the patterns of vulnerability using cluster analysis and data mining. A sample of 203 farmers in three plains was selected for interview and collection of necessary farm level data for two years (1390 and 1391) was carried out. In this study, to assess the vulnerability of households in the North of Fars province against drought, the formula Me-bar and Valdez has been used. In North of Fars province, as many other fields, agriculture is the main source of income and income from agriculture is highly dependent on rainfall. The conditional mean and variance for each farmer household, were predicted using data on rainfall and farm household characteristics. In this study, to assess the vulnerability of wheat farmer households in the North of Fars province before the drought, the method used to estimate household income distribution is Kusunose.

Results and Discussion: Data for the wheat farmers in three fields Aspass, Namdan and Sedehwho constitute 86% of the Northern Province were collected through questionnaire and with a simple random multistage interview. Typically, ex ante vulnerability, using data on household consumption or expenditure data over time was measured. Household consumption or costs reflect the income stream and the family's coping capacity. It should be noted that the measurement of vulnerability to drought before (ex ante) is based on two assumptions of behavior and consumers' income. After the drought, vulnerability criteria (ex post), on the basis of income shocks caused by drought and household tools to tackle with the drought, were measured. The characteristics of households that are vulnerable according to the criteria based on the characteristics of vulnerable households are compared. Percent of irrigated lands are vulnerable households with vulnerable families, and it somehow reflects easier access to equipment and facilities are vulnerable households irrigation.

Conclusion: The results shows that if crops are the sole income source and have no consumption smoothing capability whatsoever, and consumption perfectly tracks income, over 32% of sampled farmers fall to the Southwest of the 60% vulnerability curve meaning that these farmers would fall under the poverty line ever 60% of the time. But only 10% of the sampled farmers would fall under poverty line over 60% of the time if we use the second income measure, the combined income from crops and off-farm sources. The results showed that factors such as unity of citizens and access to capital for agricultural inputs rank first and second in terms of vulnerability to drought. Also, by putting the dimensions of technical, economic and social vulnerability, this study extracted seven independent and distinct patterns of vulnerability. The comparison between the specifications of vulnerable and secure households during droughts shows policy for farmers who are vulnerable to drought before and after the drought, and policies to increase employment opportunities outside the farm. The findings of this study help policymakers shift from crisis management to risk management and design appropriate plans at sub-regional or farm level rather than national or regional levels.

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Keywords: Drought, Economical vulnerability, Social vulnerability, Technical vulnerability, Vulnerability patterns



Estimation of Customer Satisfaction Index of Food Markets, Case Study: Mashhad Municipality's Hypermarkets

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Introduction: In today's competitive environment delivering high quality service is the key for a sustainable competitive advantage. Customer satisfaction has a positive effect on an organization's profitability. Satisfied customers form the foundation of any successful business because customer satisfaction leads to repeated purchases, brand loyalty, and positive expression of satisfaction to other people about the business. Here, we introduce a new index for measuring customer satisfaction for hypermarkets in Iran. The new assumption of this research is that other factors affect customer satisfaction via image. They contribute in making image of hypermarket in customer mind and, through it, have most effect on customer satisfaction.

Materials and Methods: The current paper defines and estimates customer satisfaction index for Mashhad municipality hypermarkets. For this purpose, after definition of the model with structural equation modeling, it uses partial least square and generalized maximum entropy for estimating the defined model. After estimation, results of two manners will be compared with mean squared error for choosing the best way. The data used in this study are collected as a survey and are based on purposeful sampling method from 367 customers of 16 municipality hypermarkets available in Mashhad. Assumptions of this study are as follows:

Assumption 1: Increasing perceived quality of supplied products and services in a store will increase customer satisfaction.

Assumption 2: Increasing perceived value of services and supplied products in a store will increase customer satisfaction.

Assumption 3: Increasing a customer's perceived quality of supplied products in a store will increase his perceived value.

Assumption 4: Increasing a customer's perceived quality of services in a store will increase his perceived value.

Assumption 5: Positive perceived image of a store will increase customer satisfaction.

Assumption 6: Perceived quality of supplied products and services will have a positive effect on perceived image.

Assumption 7: Perceived value of supplied products and services will have a positive effect on perceived image.

Assumption 8: Increasing customer satisfaction will increase customer loyalty.

Assumption 9: Customer loyalty will lead to his praise, price insensitivity and complaint behavior.

Results and Discussion: Results of the study represents PLS as best manner and introduces perceived value and image as factors affecting customer satisfaction and praise as the result of customer loyalty and so suggests more surveillance on price level of these hypermarkets and creates a good atmosphere in them for improvement of these two indicators. All tests on PLS results indicate good and adaptable estimates. Average of composite reliability index is 0.85 and it is higher than 0.7 for all indices. So, the model has high reliability and all blocks are homogenous. The average of communality index is 0.58. It means that on the average 0.58 percent of manifested variables variability is explained by latent variables. With regard to the output of the model, the power of explanation is confirmed. In this model, the average of redundancy index is 0.2 and larger than 0.125, so it is an adaptable number. Also the GOF index is estimated to be 0.48 and implies on good estimating of the model. The square roots of the AVE values proved to be greater than the rest of the values for all the measured variables used in this study, confirming the existence of discriminant validity.

The CSI index was 3.77, which shows customers are relatively satisfied with services of these stores. Between all variables, score of loyalty was lower than others and shows that these stores must try harder for attaining customer loyalty.

Conclusion: In recent years, customer satisfaction index has been evaluated and measured in different countries across organizations, industries and national level, but in Iran this index is not studied enough. In this paper we devise a suitable model for measuring customer satisfaction index for hypermarkets in Iran. We consider new relationships between factors affecting satisfaction, as we assume that perceived quality and value

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have most of their effects on customer satisfaction via perceived image. We used PLS and ME Methods for estimating the model and our results confirmed our assumption. Also, the results of this study represent PLS as the best manner. Given the importance of customer satisfaction index, the model presented in this study can be used as a basic model adoptable by governmental and private institutions and organizations in this industry, especially municipality of Mashhad, after due research works.

Keywords: Customer satisfaction index, Generalized maximum entropy, Partial least square

Assessment of Farming Systems for Sustainability of Farming Activities in the Mazandaran Province

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Introduction: One of the fundamental issues in the agricultural sector in Iran is the absence of optimal water and soil resources utilization and lack of new agricultural science and technology adoption through major prevailing transformations in agricultural land exploitation system. The studies conducted in the history of agricultural development in Iran cast light on the fact that the farming system's role in the agricultural development in Iran is of great importance. And water and soil resources utilization has been one of the fundamental issues of agriculture which has enjoyed major consideration after the implementation of land restructuring. The agriculture farming systems are referred to as the focus of all activities related to sustainable agricultural development in Iran and it is believed that the shift and transition from traditional agriculture to modern and profitable agriculture through appropriate, improved and newly developed agricultural establishments are the major activities which can increase productivity and improve the overall performance of the agricultural sector and thus contribute to sustainable development more than any other factor. Hence, such significance will be more evident when the small and scattered farmlands in many cases have imposed some limitations in the application of agricultural techniques and machinery, equipping and developing the infrastructure and efficient use of resources with appropriate performance forcing agricultural policymakers to be always looking for ways to deal with it. Therefore, identifying the relative advantage of any farming system specified for each area and region in the country seems important. Accordingly, the Mazandaran province is regarded as one of the production hubs in producing crops such as rice, wheat and canola in the country playing a major role in supplying food. With a detailed analysis of research literature, the economic, ecological, social, technical and policy criteria were identified as sustainability criteria for agricultural activities in the province along with Cooperative, Commercial and Peasant alternatives as the dominant farming system in the present study. Consequently, the identification of the most suitable farming system for sustainable agricultural activities in the province serves as the main objective of this research.

Materials and Methods: The study adopted an applied survey approach to conduct the study in 2014 in Mazandaran. The statistical population comprised of all professionals and experts working in the field of sustainability aspects and farming systems with a deep understanding and sufficient information on the issue being selected through purposive and snowball sampling summing up to 15 subjects. A questionnaire was used to collect data. In order to determine the face and content validities, the professors' and specialists' comments were taken into account and to estimate the reliability, the inconsistency rate was used. To achieve the main objective, the analytic hierarchy process technique by considering 5 criteria and 33 sub-criteria on three farming types (cooperative, commercial and peasant) were used. The Expert Choice software 2000 was applied for data analysis. It should be noted that the analytic hierarchy process is a multi-criteria decision-making approach being based on paired comparison which enables managers and policymakers to review various scenarios. Likewise, it is sought to consider the experts' opinions from the most central units involved instead of focusing on the number of decision-makers.

Results and Discussion: Based on the results and considering criteria prioritization reveal the fact that the ecological, policy, social dimensions compared with the economic and technical criteria remain more imperative. Therefore, the ecological, political and social dimensions are the most important aspects of agricultural activities sustainability in the province. Hence, it can be concluded that in order to maintain the sustainability of agricultural activities, the emphasis should be placed on ecological issues which are at present a great challenge and crisis at the international level and social policy based on sustainable agriculture. The growing integration of land restructuring and biological and organic farming development in recent years advocates the importance of the ecological aspect. Similarly, considering the ecological, political, economic and technical criteria, the commercial and cooperative farming system ranked first and second, respectively. Nevertheless, consistent with social criterion, the cooperative and commercial farming system kept the first and second priorities.

Conclusion: Combining the relative weight of criteria and sub-criteria in agricultural activities sustainability

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and the farming system, the commercial farming system with good Inconsistency Ratio was the most desired and applicable farming system in sustainable agricultural activities and cooperative farming system with a diminutive difference ranked second. Based on the research findings, the most appropriate system was the commercial farming system and the cooperative farming system was second. However, since such model is not widely applied in the province at present, it is necessary that provincial and even national policymakers and practitioners consider the issue and the agricultural activities development and establishment mechanisms in terms of modern commercial and cooperative farming system be provided. As in most of these types of farming systems, the criteria identified in this research are substantially observed and their emphasis can serve as an effective step towards the development of sustainable agriculture.

Keywords: Analytical Hierarchy Process (AHP), Farming system, Sustainable agriculture



Investigating Food and Beverage Industry Market Structure and Market Power Based on Leo and Bresnahan's Approach

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Introduction: Food processing industries are one of the major industrial groups in developing countries which play an important role in the economic development of these countries. With the Developed and Developing Food Industry on the other hand, food security and providing food are very important in each country. In an overview, markets are divided into two groups: The first group is a market with perfect competition. And second group is markets with monopoly structure. One of the important features of markets that determine its type is the ability of the firms in the pricing and determining of the amount of production. If the firms do not have any effect on these two factors, the market has perfect competition. If the firms have the ability to influence price of productions, this market is non-competitive and a concept called market power emerges. In general, not only market power is the ability of firm in determination of price above the competitive situation, but also it does not let its share of sale to decrease. The existence of collusion in markets can make them distant from perfect competition and make them incomplete. In economics and particularly in industrial organization, market power is the ability of a firm to profitably raise the market price of a good or service over marginal cost. In perfect competitive markets, market participants have no market power. A firm with total market power can raise prices without losing any customers to competitors. Firms that have power to set price are referred to as "price makers" or "price setters", while those without it are sometimes called "price-takers". Significant market power occurs when prices exceed marginal cost and the long run average cost, so the firm makes economic profits. A firm with market power has the ability to individually affect either the total quantity or the prevailing price in the market. Price makers face a downward sloping demand curve, such that increases in price leads to a lower quantity of demand. The decrease in supply as a result of the exercise of market power creates an economic deadweight loss which is often viewed as socially undesirable. As a result, many countries have anti-trust or other legislation to limit the ability of firms to create market power. Such legislation often regulates mergers and sometimes introduces a judicial power to compel divestiture. A firm usually has market power by virtue of controlling a large portion of the market. In extreme cases—monopoly and monopsony—the firm controls the entire market. However, market size alone is not the only indicator of market power. Highly concentrated markets may be contestable if there are no barriers to entry or exit, limiting the incumbent firm's ability to raise its price above competitive levels. Market power gives firms the ability to engage in unilateral anti-competitive behavior.[1] Some of the behaviors that firms with market power are accused of engaging in include predatory pricing, product tying, and creation of overcapacity or other barriers to entry. If no individual participant in the market has significant market power, then anti-competitive behavior can take place only through collusion, or the exercise of a group of participants' collective market power. The Lerner index and Herfindahl index may be used to measure market power. Examination of market power of different industries provides possibility that policymakers design and deliver model for processing food and beverage producers to guide them to the product that has the most social benefits.

Materials and Methods: The main purpose of this study is to assess and identify market structure and market power and estimate coefficient of collusion in the food and beverage industry. Estimates of market power in the food and beverage industry in Iran are few when compared with similar studies overseas. For local studies we can cite papers such as Alijani&Sabuhi (4), Sheikh zeinodin&Bakhshude (3), Safdarhoseini et al. (2), Mazhari&Yazdani. Yet, foreign studies conducted in this area are varied in different sectors. For example, the studies Angelini&cetorell (15) and Rezitis (24) in the banking system can be mentioned. Of the other foreign studies Leo (21), Bresnahan (12), Abayasiri (8), Boyle & Hall (14), Saitone& et al. (25), Koontz (20), Duravall (17), Steen (29), Salhofer and et al. (28), Allender (10), Siton and et al. (25), Rigoberto et al (22), Lopez & et al. (22), Oustapassidis et al. (23) can be cited. The model in this paper to estimate market power used for the food and beverage industries has been developed by Bresnahan& Leo. In this model, by considering demand and supply market power can be investigated. In the next step, marginal cost (cost function is Translog cost) and marginal revenue will be obtained. In the final step, by estimating the final equation market power can be

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calculated. The type of industrial classification used in this study is the International Standard Industrial Classification (ISIC). This kind of classification is widely used for empirical studies because of lack of industrial data on the basis of other classifications. We use firm level data aggregated to the 4-digit ISIC code of industries. The purpose of this study is to estimate the market structure and market power of the food and drink industry in Iran. For estimating market power, conjectural variation is used.

Results and Discussion: In oligopoly theory, conjectural variation is the belief that one firm has about the way its competitors may react if it varies its output or price. The firm forms a conjecture about the variation in the other firm's output that will accompany any change in its own output. For example, in the classic Cournot model of oligopoly, it is assumed that each firm treats the output of the other firms as given when it chooses its output. This is sometimes called the "Nash conjecture" as it underlies the standard Nash equilibrium concept. However, alternative assumptions can be made. Suppose you have two firms producing the same good, so that the industry price is determined by the combined output of the two firms (think of the water duopoly in Cournot's original 1838 account). Now suppose that each firm has what is called the "Bertrand Conjecture" of -1 . This means that if firm A increases its output, it conjectures that firm B will reduce its output to exactly offset firm A's increase, so that the total output and hence price remain unchanged. With the Bertrand Conjecture, the firms act as if they believe that the market price is unaffected by their own output, because each firm believes that the other firm will adjust its output so that total output will be constant. At the other extreme is the Joint-Profit maximizing conjecture of $+1$. In this case each firm believes that the other firm will imitate exactly any change it makes in output, which leads (with constant marginal cost) to the firms behaving like a single monopoly supplier. The results show that it is significant uncompetitive pattern for 18 of the 19 industries. Existence of oligopoly industry for 12 shows the non-competitiveness of this industry. The flour and cereals production industry has 2.24 degrees of collusion and the tea industry has 2.14 degrees of collusion. Degree of conjectural variation is between 0.43 and 2.24. These numbers are related to carbonated soft drinks industry and production of flour and cereals.

Conclusion: This paper discusses the Market Structure and the Degree of Market Power and Collusion Index of Food and Beverage industry on the basis of Modern Industrial Organization (NEIO) with Bresnahan- Leo (1982) Approach. For this Purpose, data of ISIC Four- Digit Code is used to investigate the 19 industries for the years 2005-2011. The result shows that competitive conditions for 18 Industries are significant. The degree of Market Power is between 0.43 and 2.24.12. The industry has Oligopolistic Market and Production of Oil and Fat Industry has a Monopoly Market close to perfect. Conjectural Variation for the Industry of Flour and Tea is very high, with 2.42 and 2.14, respectively. Except malt and alcohol-free beer industry, uncompetitive model is significant for other industries. In summary, industries with a high degree of collusion will include: processing and preserving of fruit, sugar production, bakery, livestock slaughtering and poultry. Industries with a low degree of collusion will include: production of animal and vegetable oils and fats, tea making, producing Malt and alcohol free beer. Industries that follow Cournot Model will include tea making. Industries with coefficient of collusion between 2 and 5 will include: processing and preserving of fish, dairy products, animal feed production and the production of sugar, bakery, bread, pastries, biscuits and soft drinks. Industries with a competitive model will include date palm sorting.

Keywords: Conjectural elasticity, Industry, Market power, Oligopoly