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Investigation of the Potential Market and Estimation of WTP for Insurance of Pistachio Tree Trunk (Case Study Rafsanjan-Iran)

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Abstract

Capacity of garden productions in Iran is such that is accounted as a country that produces thirteen garden products in the world but despite excellent condition in Iran for producing garden products, natural disasters damage production of fruits in the country therefore farmers incur a loss. Pistachio tree has been in danger of destruction and dryness. Thus, in order to reduce loss incurred on trees, it is necessary to insure the tree. This study is aimed to investigate factors affecting willingness towards insurance of pistachio tree and to estimate willingness to pay premium for pistachio tree in Rafsanjan located in Kerman province. For this purpose, methods of contingent valuation and double bounded dichotomous have been used. Research data were obtained by field method and interview with 184 pistachio gardeners in 2012. Results suggest that willingness to pay premium of pistachio tree in central part, Anar and Kashkuieh has been estimated by 1953, 3255.8 and 1183.3 IRR per tree respectively. Considering results and high risk destruction of pistachio trees, it is suggested that premium of pistachio tree is offered to reduce risk and loss of pistachio gardeners. In order to determine premium in Rafsanjan, WTP calculated in this study can be used.

Keywords:
Pistachio tree, Contingent valuation, WTP, Logit model, Rafsanjan

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INTRODUCTION

As one of poles in production of garden products, Iran has a special potential. Capacity and climatic varieties have provided production and development of numerous garden products. According current statistics, Iran has been ranked among first to seventh countries in the world for producing 14 garden products. 17% of agricultural lands are planted for gardens. 17.5% of total agricultural production, 13% of employment and 80% of total agricultural experts are allocated to garden subsector (Agricultural Ministry 2009). Pistachio production in Iran and Rafsanjan is famous throughout the world. Rafsanjan with planting area of 110000 hectares is the main center of pistachio production in the world, Iran and Kerman province such that contribution of this city to fertile planting area for this product has been 34 and 60% in the world and Iran respectively (Mirzaee and Heidari 2007). In recent years, production of pistachio is prone to various risks due to production, weather, technological and market uncertainties in Rafsanjan county. Also the pistachio trees face always with risk of drying and ruin. Among economical activities, agricultural activity faces the highest risk. Agricultural production is different from other commercial and productive activities. the most important difference is that this sector relies in the nature highly and faces a wide range of natural events and dangers such as flood, hail, cooling and warming, pests and plant diseases that changes activity in this sector into a high risk one (Anderson 2003). All these risks affect the income stability and welfare of their gardeners' households. Risk management plays a really important role in the development of agriculture. Considering risky condition and uncertainty, one of the ways to cope with this phenomenon in agricultural productions is insurance of agricultural products (Kiani Rad 2004). Public support to agricultural insurance is necessary for its development especially in the incipient stage which can encourage farmers to take an active role in risk management and participate in insurance systems. Insurance of agricultural products is a strategy for participation in risk taking so that by cooperation with producers in risky condition, losses incurred on producers will be prevented (Nelson and Loehman 1987). Unfortunately, tree trunk insurance has not been performed in Iran and also, no serious researches have been done yet. Pistachio tree is one of those that have always been in danger. Much money has been spent for years to have a fruitful tree. If this tree is destroyed by natural disasters after paying money for years, loss will be incurred on farmers. In addition to direct costs, opportunity cost and time consumed for this tree make the damage double. Assuring fruitful tree and other productive factors is accounted as one of goals of fourth economical development program (Baniasadi 2011). Therefore, high risk condition in the country, legal obligation and in order to invest on producing garden products, it seems necessary to design a wide insurance system for fruit trees in the country. Codification of such pattern for fruit trees of the country due to new subject of tree trunk insurance needs to many studies in order that this new service will start and implement in the country as a scientific base. The purpose of the study is investigation of potential market and effective factors on willingness to adoption of gardeners for the new insurance. Then, the willingness to pay of gardeners for tree insurance (including; determining price and premium) will be estimated. Establishing a price for a product is not always as straightforward as finding the intersection point of the supply and demand curves as taught in Microeconomics. One may run into particular difficulties when attempting to price a product which is a public or non-market good. Numerous methods have attempted to solve this problem e.g. hedonic pricing, cost-benefit analysis, travel cost and cost-effectiveness to name a few (Asfaw and von Braun 2005). Much of the current WTP literature uses CVM method which elicits directly what individuals would be willing to pay for a particular product or good (Wright *et al.*, 2009). In topic of tree insurance (destruction of tree trunk), Willingness to pay, analysis of the potential market for new insurance and effective factors on Willingness to adoption of this insurance, there is not any research background. In this paper, the CVM method is used to study the demand for new tree trunk insurance in Rafsanjan county of Iran.

Ahsan *et al*. (1989) found that record of con-

frontation with the danger is as one of the significant factors on adoption of the agricultural insurance. He believed that insurance of agricultural products is one of the main ways to reduce the fluctuation of profit and income changes. Shaik and Atwood (2003) examined effective factors on demand of insurance for cotton products by using Logit model and the results showed that producers of more efficiency and bigger farm have more willingness to insure their products. Ogursov and Marcel (2006) analyzed explanatory factors of buying insurance in Indian dairy section. The results showed that there is a direct relationship among number of cows, level of income, and extent of the farm with buying the insurance. Wang (2010) analyzes characteristics of farmer behavior in agricultural insurance and the factors affecting their behavior. He with using Von. Norman-Morgenstern Utility Model to analyze the risk preferences of individual farmer. The research result is that under the present stage, agricultural insurance behavior is influenced by many factors. In the voluntary insurance and nor a certain amount of subsidy, the vast majority of farmers would not choose insurance and the demand of agricultural insurance can only be regarded as a potential demand rather than effective demand.

Moreover, there are many studies about scrutiny of potential market and estimation of willingness to pay for species of insurances. For example in circle of health insurance, Wright *et al.*, (2009) analyze the willingness to pay for health insurance and hence the potential market for new low-cost health insurance product in Namibia, using the double bounded contingent valuation (DBCV) method. The findings of this study show that 87 percent of the uninsured respondents are willing to join the proposed health insurance scheme and on average are willing to insure 3.2 individuals (around 90 percent of the average family size). On average respondents are willing to pay NAD 48 per capita per month and respondents in the poorest income quintile are willing to pay up to 11.4 percent of their income. However, there is no study about insurance market and the willingness to pay for fruit tree trunk insurance. But, in other countries some studies have been done in this subject, that majority of studies are around agricultural insurances (except insurance of fruit tree). For example Fengli Xiu *et al.* (2012) analyze farmers' willingness to pay (WTP) for cow insurance and factors influencing farmers' participation in and WTP. The results of this study show that the current premium is in the range that famers can accept. The acceptance of premium and farmers' knowledge of allowance significantly influenced both of their participation and WTP.

Considering newness of tree insurance, formulating such model for trees requires numerous researches in order that this new initiative is performed on a scientific basis. In first step to perform tree insurance design, this study is aimed to investigate factors affecting willingness of farmers for accepting this new insurance. Since most of farmers resist against new ideas, in first step, factors affecting acceptance of tree insurance should be studied. Then willingness of farmers to pay for tree insurance is estimated. Information required for this research has been obtained by questionnaire in 2010-2011 in a field method from pistachio gardeners of Rafsanjan.

MATERIALS AND METHODS

Due to lack of time series data to measure risk of trees destruction' in order to determine a rate for insurance premium in Iran, one of the best methods for determine temporary of insurance premium is estimation of willingness to pay of gardeners for pistachio trees insurance. Estimating willingness to pay for insurance is a kind of economic valuation. Contingent valuation method (CVM) is one of the typical non-market valuation methods (Turner *et al.*, 2001; Batmane *et al.*, 2003). Because insurance of tree trunk is not supply and there is not any market for this insurance in Iran, contingent valuation method is used to determine the value of this kind of insurance. Value of goods or service (WTP) is gained in CVM by choice technique, which is the main factor in contingent valuation method (Mitchell and Carson 1989). In this study, double bounded dichotomous choice (DBDC) method was used. This method used for the first time by Hanemann *et al.* (1991). Double bounded method is used when data are normal. Double bounded dichotomous is statistically more efficient than single bounded technique (Hanemann *et al.*, 1991). To determine number of necessary sample from society studied in

CVM, researcher must determine of the society which is influenced by existence or non- existence new good or service (such as; the insurance of pistachio tree as a service that has not been supplied). After choice of society (that are pistachio gardeners of Rafsanjan county), number of sample is determined. In CV method, first some questionnaire is completed as a pre-test and then sample volume is calculated by using the coefficient of variation of WTP in following equation (Mitchell and Carson 1989):

$$n = \left[\frac{t \times \hat{V}}{d}\right]^2 \quad (1)$$

Where, n is the sample volume, t is t-student statistic (that in level of 5% is approximately equal to 1.96), $\hat{V}$ is the coefficient of variation of WTP, d is the error percentage of the difference between WTP calculated and real WTP. Acceptable amount of d is 0.3-0.5 in contingent valuation studies (Mitchell and Carson 1989). Then, with using equation (2) the number of samples based-on percent of under-sown level of each tree in every district of the county is determined:

$$n_1 = n\frac{h}{H} \quad (2)$$

Where, n_1 is the number of necessary sample in 1st district, h is the amount of under-sown pistachio level in 1st district, and H is the whole level of under-sown pistachio in Rafsanjan county. In double-bounded choice method, it is assumed that gardener bear utility functions. Each gardener is ready to pay some amount of his agricultural income to tree trunk insurance titled as proposed amount (B) and this usage from new insurance causes utility to be created for him. The amount of created utility due to the usage of tree trunk insurance is more than the case in which he doesn't use insurance and relation (3) shows it (Amirnejhad *et al*., 2006; Judge *et al*., 1998; Pattanayak and Evan Mercer 1998):

$$U(1, Y- B;S)+\varepsilon_1 \geq U(0, Y; S)+ \varepsilon_0 \quad (3)$$

Where U is indirect utility function, Y is individual's income; S is a vector of other eco-social factors of individuals. and ε_1 and ε_0 are random variables with average 0 that have been distributed randomly independent of each other. Created difference in utility (ΔU) due to the effect of using tree trunk insurance is calculated from relation (4) (Amirnejhad *et al*., 2006):

$$\Delta U = U(1, Y- B;S) - U(0,Y;S)+(\varepsilon_1-\varepsilon_0) \quad (4)$$

Double-bounded questionnaire structure in studying the WTP of individuals has a dependent variable with dual selection. Hence, logit model for studying the effect of different descriptive variables on the amount of WTP of gardener was used to determine the premium. According to the logit model, probability of acceptance of the proposed amount by individual is expressed as relation (5) (Amirnejhad *et al*., 2006; Hanemann *et al*., 1991; Bishop and Heberlein, 1979):

$$P_i = F_\eta(\Delta U) = \frac{1}{1+\exp(-(\Delta U)} = \frac{1}{1+\exp(-(\alpha+\beta B+\theta S))} \quad (5)$$

Where F_η (ΔU) is accumulative distribution function with a standard logistic difference and in this paper it includes some eco-social variables. β and θ are coefficients that can be estimated and it is expected that $\beta \leq 0$ and $\theta > 0$. In order to calculate WTP a method known as truncated mean WTP is used, because this method protects the stability and compatibility of limitations with theory, statistical effectiveness and aggregation. The expected amount of WTP in this method is calculated from relation 6 by numerical integration within the range of 0 to maximum bid (B) (Amirnejhad *et al*., 2006; Batmane *et al*., 1995):

$$E(WTP) = \int_0^{B_{max}} F_\eta(\Delta U)dB = \int_0^{B_{max}} \left[\frac{1}{1+\exp(-(A+\beta B))}\right]dB \quad (6)$$

Where B is bid amount variable and A is calculated from relation (7):

$$A=\alpha+\Sigma_i\beta_i M_i=\alpha+\beta_a M_a+ \beta_{dL} M_{dL}+ \beta_{dI} M_{dI}+ \beta_y M_y + \beta_{nt} M_{nt}+\beta_{ce} M_{ce}+\beta_{ei} M_{ei}+\beta_{t1} M_{t1} \quad (7)$$

Where α is intercept of model and β_a, β_{dL}, β_{dI}, β_y, β_{nt}, β_{ce}, β_{ei}, β_{t1} are age of gardener, dummy variable of literacy, dummy variable of agricultural income, yield of pistachio, number of pistachio tree, dummy variable of crop insurance contract extension, qualitative variable of new insurance effect on damage reduction (Likert scale) and number of destroyed trees in the previous year, respectively and also M_a, M_{dL}, M_{dI}, M_y, M_{nt}, M_{ce},

M_{ei}, M_{tl} are their averages, respectively. Logit model could be estimated in linear or logarithmic form. The interpretation of two parameter is important in logit model results include elasticity and marginal effect. The elasticity of k explanatory variable (X_k) is as relation (8) (Hayati *et al*., 2011; Kavoosi Kalashami *et al*., 2012):

$$E = \frac{\partial(B'X_k)}{\partial X_k} \cdot \frac{X_k}{B'X_k} = \frac{e^{B'X_k}}{(1+e^{B'X_k})^2} B_K \frac{X_k}{B'X_k} \quad (8)$$

Elasticity of an explanatory variable explained the percentage change in the probability of bid acceptance for tree trunk insurance by individual when X_k amount changed by one percentage. Also, the marginal effect showed the percentage change in the probability of bid acceptance for green chicken buying by individual when Xk amount changed by one unit. The marginal effect of k explanatory variable (X_k) is as relation (9) (Kavoosi Kalashami *et al*., 2012):

$$ME = \frac{\partial P_i}{\partial X_k} = \frac{\exp(B'X)}{(1+\exp(B'X))^2} .B_k \quad (9)$$

In above relation, the extent of change in the probability of bid acceptance depends on the initial probability and initial value of independent variables and their coefficients.

RESULTS AND DISCUSSION

Collecting data and researches process was done in Rafsanjan county where includes Central district and suburbs, Anar, Nogh and Koshkoo'iyeh. Before the completing of questionnaire, with regard to the study that for the first time in Iran has been performed; CVM questionnaire is provided by analyzing conditions of each area, other questionnaires related to the insurance and CVM, and also corresponding with experts and professors. First, 29 questionnaires is accomplished as a pre-test to determine all of the questionnaires required in Rafsanjan county. In this pre-test, the necessary samples of Rafsanjan County are determined 170 individuals and then 184 questionnaires are accomplished.

Table 1 shows some of the statistics about the variables of age, level of education, agricultural income, under-sown level, yield and number of pistachio trees of the under-question individuals.

To Investigation of willingness to pay for pistachio tree insurance, first we should see whether there is any destruction risk of pistachio tree and if so, whether there is any willingness to adoption for insurance of this risk or not. Table 2, showed some reports from responses of questions related to the subject.

As can be seen in table 2, destruction risk of pis-

Table 1: Statistical characteristics (economic- social) of quantitative variable.

Variables	Average	Min	Max	Standard deviation	Coefficient of variation
Age (year)	50.4	24	80	13.1	0.26
Level of education (Years of education)	7.9	0	18	5.8	0.73
Agricultural income (10 million rials)	23.7	0.6	300	37.9	1.61
under-sown level (hectare)	4.8	0.12	70	7.4	1.55
Yield (tone per hectare)	1.3	0.06	3	0.7	0.56
Number of pistachio tree in 2010	4361	100	60000	8429.2	1.93

Source: research findings

Table 2: Willingness to adoption of pistachio tree insurance

Question	Whether have been destroyed your trees because of existing risks?		Whether you desire to insure your trees? (willingness to insurance)	
Answer	Yes	No	Yes	No
Frequency	172	12	132	52
Percentage	93.5	6.5	71.7	28.3

Source: research findings

tachio tree is reported in a high level of the sample as 93.5% of gardeners were faced with destruction risk of their trees. Therefore, it is expected that gardeners will accept the new kind of insurance. In according to table 3, among 184 gardeners asked in this sample, 132 of them (approximately 72%) have willingness to insure their trees and demand this new kind of insurance.

The main question of questionnaire is the WTP amount of gardeners to insure pistachio tree that is suggested which close-ended and double bounded dichotomous choice method. The first bid is based-on mean of maximum WTP of gardeners with regard to the pre-test (Batemen *et al.,* 1995). Generally in pretest, median of willingness to pay is considered as the first bid amount. If the first bid amount is accepted, double of first bid amount is considered as the second bid. If the first bid is not accepted, the second bid amount will be half of the first bid amount (Batemen *et al.*, 1995). Table 3, showed bid amount and adoption or not adoption of gardeners for bid amount.

According to table 3, from 184 gardeners asked to interview, 67 of them (approximately 36.4%) accepted the first suggestion and 117 of them (approximately 63.6%) did not accept it. As generally, at least one of the 3 suggestions is accepted by 118 of owners of pistachio gardens (approximately 64.1%) and none of the suggestions is not accepted by 66 of owners of pistachio gardeners (approximately 35.9%).

Table 4 reports results of the model. According to the results of estimated model, variables

Table 3: The results of accepting of bid amounts by gardeners

Bid amounts (Rials)	Acceptatio		Not acceptation		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
2000	67	36.4	117	63.6	184	100
1000	51	43.6	66	56.4	117	100
4000	28	41.8	39	58.2	67	100

Source: research findings

Table 4: Effective factors on probability of adoption of pistachio tree trunk insurance

Variable	Logit model			
	Coefficient	t-student statistic	Elasticity at mean	Marginal effect
Intercept	-1.95*	-2.38	-	-
Age	-0.016***	-1.60	-0.51	-0.004
DVL	0.68**	1.97	0.33	0.11
Agri-income	0.73*	2.47	0.18	0.16
Yield (tone per hectare)	0.44*	2.24	0.36	0.10
NPT	-0.00006*	-2.33	-0.17	-0.00001
DVCICE	0.93*	3.63	0.22	0.21
QVIEODR (Likert scale)	0.52*	4.31	0.95	0.12
Number of destroyed tree in 2010	0.00003	0.009	0.0004	0.000009
Bid amount (10 Rials)	-0.004*	-2.97	-0.46	-0.0008
Anar district	0.20	0.52	0.02	0.04
Koshkoo'iyeh district	0.53****	1.53	0.06	0.11
Nogh district	-0.80*	-2.18	-0.08	-0.13
Percentage of right predictions			70	
Likelihood ratio statistic			60.15	
P-value of Likelihood ratio			0.01	

Source: research findings. *** P < 0.01, ** P < 0.05 , * P < 0.10

Table 5: The results of estimation of expected WTP

District	A	WTP for per tree (Rials)
Central section and Anar	0.42	2573
Koshkoo'iyeh	0.95	3548
Nogh	-0.37	1454

Source: research findings

of age in level of 10% and number of pistachio trees in level of 1% with a negative sign are significant. Also, dummy variable of literacy, dummy variable of agricultural income, yield of pistachio, number of pistachio trees, dummy variable of period extension of crop insurance contract and qualitative variable of new insurance effect on damage reduction with positive sign and orderly in level of 10, 1, 5, 5, 1 and 1 percentage are significant. Therefore, analyzing effects of change related to every descriptive variable on probability percentage of acceptable bid amount is done.

The percentage of correct prediction of model is 70%. Therefore, considered model is reliable for analysis of the next results. The amount of expected WTP is obtained from relation below:

$$WTP_R = \int_0^{50000}\left[\frac{1}{1+\exp(-(0.42+0.004B))}\right]dB = 2573.1$$

According to relation above, the amount of expected WTP of gardeners for pistachio trees insurance is calculated 2573 IRR for central district and its suburbs and Anar section. In regarding to sample studied, average of number of the pistachio trees for per hectare is 866 trees that with multiply this number at expected WTP of a tree, the premium for per hectare are achieved. Calculated insurance premium for per hectare of pistachio garden is 2228212 IRR in Central section and Anar.

To estimate WTP of gardeners in districts of Nogh and Koshkoo'iyeh, only coefficients of two these districts should have to put into an equation differently. Then, WTP is estimated. With regard to relation below, the amount of A is 0.95 and -0.37 for Koshkoo'iyeh and Nogh, respectively.

$A_{Kosh}=A+\beta_{Kosh}=0.95$

$A_{Nogh}=A+\beta_{Nogh}=-0.37$

Where, β_{Kosh} and β_{Nogh} are dummy variables coefficients of Koshkoo'iyeh and Nogh in model. According to relation below, WTP for pistachio tree insurance are calculated 3547.6 and 1453.9 rials in Koshkoo'iyeh and Nogh restrict, respectively.

$$WTP_{Kosh} = \int_0^{50000}\left[\frac{1}{1+\exp(-(0.95+0.004B))}\right]dB = 3547.6$$

$$WTP_{Nogh} = \int_0^{50000}\left[\frac{1}{1+\exp(-(-0.37+0.004B))}\right]dB = 1453.9$$

According to average of number of pistachio trees for per hectare, expected insurance premium for per hectare of pistachio garden are calculated 3072568 and 1259164 IRR in Koshkoo'iyeh and Nogh, respectively. The results of WTP estimated are shown in table 5.

CONCLUSION

Purpose of the study is examine potential market of insurance of pistachio tree trunk, estimate the maximum willingness to pay of gardeners for the insurance, also analyzing the effective factors on adoption of pistachio tree insurance in Rafsanjan county of Iran. Selecting pistachio tree is done in regard to high risk of destruction of this tree, under-sown level and the importance of pistachio product in economy of Rafsanjan county and Iran. The results show that pistachio tree encounter with high risk of tree destruction. To estimating of WTP, 4 district of central and its suburbs, Anar, Nogh, and Koshkoo'iyeh have been studied. According to surveys, Nogh and Koshkoo'iyeh have significant differences in WTP for the insurance rather than central section, whereas Anar has no significant difference. The expected WTP of gardeners is 2573 IRR in central district and its suburbs and Anar district, but it is 3547.6 and 1453.9 IRR in Koshkoo'iyeh and Nogh, respectively. Also, with regard to the average of number of pistachio trees per hectare (866 trees), the

average of willingness to pay for insurance in three district of central section, Koshkoo'iyeh, and Nogh are estimated 2228218, 3072568, and 1259164, respectively. Therefore, there is a potential market to demand of pistachio tree trunk insurance in the county and agricultural insurance fund can use this potential and supply this new insurance. As above is said, it is concluded that the destruction risk of pistachio tree is high and every year gardener encounter with withering of number of pistachio tree that should cut their trees. The problem was severe for low-income gardeners (yeoman farmer) that own few pistachio trees and it is the only income source for them, as a result, it is required a supporting system, such as tree trunk insurance and this insurance is necessary. According to the results, due to inadequate information to measure risk and to determine of insurance premium by common methods, it is suggested to consider WTP of gardeners to insure their pistachio trees trunks as a temporary insurance premium until determining the fair insurance premium. To do experimental test of pistachio tree insurance and detection its problems, degree of efficacy and willingness of gardeners will be determined. According to considered elasticities, income of gardeners has significant effect on accepting the bid price to use new service for pestachio trees. Therefore, a policy advice to supply more efficiency of tree insurance is reinforcing the income levels by supporting production especially for low-income gardeners. To performing experimental of the tree insurance's project, it is begun from wealthy gardeners (great owners or esquire) because they have more income, so they will accept the insurance with higher probability. Positive attitude to new service of tree insurance influences on accepting of tree insurance and its bid prices. Therefore, before supplying this kind of insurance, with sending experts and promoter of the insurance in each area and introducing and making known this service and its requirements, agricultural insurance fund should make positive attitude towards tree insurance. Variable coefficient of crop insurance contract extension has significant and positive influence on accepting pistachio tree insurance. Extension of the period of of crop insurance contract considerably depends on economic logic, so client benefits from the contract and satisfies it. Therefore, it shows indirectly the influence of satisfied client from the general performance of insurance fund to attract gardeners' attention. The results of this study are usable for pistachio tree in Rafsanjan county, so it cannot be used for other trees and areas unless in areas which overlap the same characteristics. According to the characteristics of geographical, agricultural, and natural hazards each area, gardeners encounter with various destruction risks for fruit trees. So, it is suggested that the whole country will be categorized and estimated willingness to pay for every tree based on areas' features.

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REFERENCES

1- Agricultural ministry. (2009). Results of the sample program of garden products. Tehran: Office of statistical and information technology.

2- Ahsan, S.A., Ali A.G., & Kurian, N.G. (1987). Toward a theory of agricultural insurance. American Journal of Agricultural Economics, 69(3), 520-529.

3- Amirnejad, H., Khalilian, S., Assareh, M.H., & Ahmadian, M. (2006). Estimating the existence value of north forests of Iran by using a contingent valuation method. Ecological Economics, 58(4), 665-675.

4- Anderson, J.R. (1979). Impacts of climate variability in Australian agriculture. Review of Marketing and Agricultural Economics, 49(31), 147-177.

5- Asfaw, A., & von Braun, J. (2005). Innovations in health care financing: new evidence on the prospect of community health insurance schemes in the rural areas of Ethiopia. International journal of health care finance and economics, 5(3), 241-253.

6- Baniasadi, M. (2012). Effective factors on willingness to adoption for insurance of selected fruit trees in Kerman province. MSc thesis, University College of Agriculture and Natural Resources, Department of Agricultural Economics, University of Tehran.

7- Batmane, I.J., Lovett, A., & Brainard, J.S. (2003). Applied environmental economics, a GIS approach to cost-benefit analysis. Cambridge: Cambridge University press.

8- Batmane, I.J., Langford, I.H., Tuner, R.K., Willis, K.G., & Garrod, G.D. (1995). Elicitation and Truncation affects in contingent valuation studies. Ecological Economics, 12, 161-179.
9- Bishop, R., & Heberlein, T.A. (1979). Measuring values of extra-market goods: Are indirect measures baised?. American Journal of Agricultural Economics, 6, 926-930.
10- Fengli, X., Fengguang, X., & Siegfried, B. (2012). Farmers' willingness to pay for cow insurance in Shaanxi province, China. Procedia Economics and Finance, 1, 431-440.
11- Hanemann, M., Loomis, J., & Knninen, B. (1991). Statistical efficiency of double-bounded dichotomous choice contingent valuation. American Journal of Agricultural Economics, 73(4), 1255-1263.
12- Hanemann, W.M. (1992). Pricing in European environment. Oslo: Scandinavian University press.
13- Hanemann, W.M. (1984). Welfare evaluation in contingent valuation experiments with discrete responses. American Journal of Agricultural Economics, 66, 332-341.
14 Hayati, B.A., Ehsani, M., Ghahremanzadeh, M., Raheli, H., & Taghizadeh, M. (2010). Factors affecting the willingness to pay for Elgoli Tabriz park visitors. Iranian Journal of Economics and Agricultural Development (Agricultural Science and Technology), 24(1), 91-98.
15 Judge, G., Hill, R. C., Grifith, W. E., Lutkepphi, H., & Lee, T. C. (1988). Introduction to the theory and practice of Econometrics. 2nd Edition, New York: Wiley.
16 Kanninen, B.J. (1993). Design of sequential experiments for contingent valuation studies. Journal of Environmental Economics and Management, 25, 1-11.
17- Kavoosi Kalashami, M., Heydari, M., & Kazerani, H. (2012). Investigating consumers' willingness to pay for organic green ghicken in Iran (case study: Rasht city). International Journal of Agricultural Management and Development, 2(4), 235-241.
18- Kianirad, A. (2004). Determination of income insurance Pattern of selected agricultural products with emphasis on price risk importance. Ph.D thesis, University College of Agriculture and Natural Resources, Department of Agricultural Economics, University of Tehran.
19- Mirza'ee, H.R., & Chizari, A.H. (2008). Inputs management in pistachio production (case study Rafsanjan County). 6th Iranian conference of Agricultural Economics, Mashhad, Iran.
20- Mitchell, R.C., & Carson, R.T. (1989). Using surveys to value public goods: The contingent valuation method. Washington, D.C: Resources for the Futher.
21- Nelson, C.H., & Loehman, E.T. (1987). Further toward a theory of agricultural insurance. American Journal of Agricultural Economics, 69, 523-531.
22- Ogursov, A., & Marcel, V. (2006). Factors explaining farmer's insurance purchase in the Dutch dairy sector. 99th EAAE seminar.
23- Pattanayak, S., & Evan Mercer, D. (1998). Valuing soil conservation benefits of agroforestry: Contour hedgerows in the eastern Visayas Philippines. Agricultural Economics, 18, 31-46.
24- Shaik, S., & Atwood, J. (2003). Demand for optional units in crop insurance. American Agricultural Association Annual Meeting. Montreal, Canada, July 27-30.
25- Turner, R.K., Pearce, D., & Batmane, I.J. (2001). Environmental economics: An elementary introduction. New York: Harvester Wheatsheaf.
26- Wang, Q.S. (2010). The farmers behavior in agricultural insurance under the VonNeuman-Morgenstern utility model. International conference on agricultural risk and food security, 2010. Agriculture and Agricultural Science Procedia, 1, 226–229.
27- Wright, E.G., Asfaw, A., & Van der Gaag, J. (2009). Willingness to pay for health insurance: An analysis of the potential market for new low-cost health insurance products in Namibia. Social Science and Medicine, 69, 1351–1359.