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Estimated value of forest conservation in Iran: A case study of Fars Province

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The aim of this study is to estimate the value of forest conservation through Fars rate and review conditional factors. For this purpose, the required information and data were collected from the citizens and visitors of Fars province's forests through a questionnaire. The information in the questionnaire includes personal information in four areas and social status like economic subjects, attitude or caprice questions, and the amount of their information about forests. Factors used to estimate the willingness to pay function include gender, education, marital status and age response of providers, income, family size, orientation to environmental biology, and distance to forest or park.

Key words: Willingness to pay, contingent valuation method, forest, Fars province.

INTRODUCTION

The total forest area of Iran is 12.4 million ha, and is among the 56 countries that have the largest forest area worldwide. It is equal to 0.2 ha per person, while the global amount is equal to 80 / ha. This shows poverty and a severe shortage in Iran in this field, but also with low annual per capita. Unfortunately, about 200,000 ha of forests are destroyed (Iran Statistic, 2007).

The forest area of Fars province is 1250000 ha, which is inappropriate because of the extent and distribution of existing forests relative to the lack of green spaces in the province. This is quite evident in terms of public recreational needs in many areas of the province's population and it causes fatigue with air pollution in an environment. As a result, non-urban green spaces such as parks and forests can partially solve the problems caused by this phenomenon for the health situation of the community. This can help in the beautification of the environment since the proper use of natural resources was provided by a regional mall, which also provided facilities that were suitable for recreational needs in the present and future users. As such, uniformity is seen in the urban life of individuals. In addition, reducing crime in social and economic research can be justified (Organization of forests, 2003). Environmental projects,

development of green space, creation of external recreational centers and leisure time for citizens in urban and industrial areas is important. Projects that create mental freshness effect for welfare needs of the urban population and urban people should be mentioned (Kashmir, 2009).

External services were used to estimate monetary value in the management of natural systems, and it was observed that human integration was effective. The retrieved level of valuation studies led to realization of data and ecosystem structure, and the function of the diverse and complex role in the protection of human welfare and development was sustainable. Economic valuation can be almost positive to make better environmental policies to intervene. Today, the need for understanding and entering values in environmental investments, development projects, industrial and related decisions is quite sensible (Organization of forests, 2003).

The effort required for estimating the monetary value of ecosystem services plays the role of double fusion in the management of human and natural systems. Lack of studies caused "Rate Access" to the information related to the structure and function of ecosystems and their complex and diverse role in supporting human welfare in the macro ecosystems. Rate ecosystem can create and improve human welfare and development indicators if participation is stable. Also, it can create and improve

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human welfare indicators and contribute to sustainable development. Economic rate can be constructed in a positive way to make better environmental policies. Thus, a small understanding of this is very important (Amirnejad, 2006).

From the perspective of economists and ecologists, forest resources were used to identify and understand the benefits and services of forest ecosystems by humans; although providing environmental issues for Mnhyty forest country by decision makers and planners, providing a link between economic policies and natural income, measuring the role and importance of forest ecosystems, adjustment and reformation of national collections, such as the calculation of gross domestic product (GDP), and the prevention of the destruction and exploitation of forests were irregular.

Rate functions and non-market environmental services were measured for many reasons, including: recognition and understanding of environmental and ecological interests by humans, providing environmental issues to decision makers and country planners, and providing the link between economic policies and natural income. The role and importance of environmental resources in support of Mnhyty human welfare and sustainable Tvsggh, adjustment and reform of national collections, such as GDP calculation, and prevention of the destruction and indiscriminate exploitation of natural resources is important (Guo et al., 2001; Ashim, 2003; Vaze, 1998).

The value of studios leisure park in Tehran, by using valuation estimate, has been provided. The results of the research have shown that 60% of the people that currently pay for recreational use of the park are diligent. However, the monthly recreational value of the Park which is more than 220 million Rials and the annual total value which is more than 2.7 billion Rials have been estimated (Emami and Judge, 2008). The value of the village tourist promenade in East Azerbaijan Kandovan using rate conditions has been estimated. The results showed that 83% of the visitors now pay to use the mentioned village. Average willingness to pay and the value of Rls 3,905 people that walk around the Kandovan village each year has been estimated as 1,171,500,000 Rials (Khodavardizadeh et al., 2008).

In this research, willingness to pay was used to estimate the conservation values of promenade Forest Park Si Sangan Noshahr. The results showed that 81.7% of the people were willing to pay money to protect the park and recreational use of it. The protective value and an annual outing to the park were estimated at 5.8 and 2.5 million ha of Rls respectively (Amirnejad, 2004). Although conditional evaluation was used to calculate the value of forests in northern Iran, the results of this study show that the value of forests in northern Iran for each family is 51/2 dollars monthly, and its annual value is about 13/30 dollars per family (Amirnejad et al., 2006).

The value obtained for the forests of Mantanay, America is based on the method of conditional Rate (CV),

in which 108 dollars was obtained for each trip, while the value of forest recreation, East America was examined using the CV method, and is estimated as 10.43 Dlarbray per family every year (Krygr, 2001). The total value of ecological services and the 17 environmental different ecosystems around the world have been studied, and the value of tropical and temperate forest recreation have been reported as 112 and 36 dollars per hectare respectively (Kastanza, 1997). Drbrsry recreational value of the five national parks in South Korea was obtained using CV, and the average amount obtained was 54/10 dollars per family every year (Lee and Han, 2002).

CASES METHODS

Model questionnaire for assessing and determining willingness to pay

The information gathered from the study of statistics required for completing the questionnaire designed for the visitors (89 to 1388) of the Forest Park were collected in the Gulf. The questionnaire for measuring the willingness to pay by visitors was selected by a two-dimensional dual method proposed by Hanman and Carson (1985) with a modifiable dichotomous choice questionnaire presented with it as well. With this method, the respondents tend to answer "yes" more than to answer "no". These questionnaires were designed in two parts: the first section features information related to personal, social, economic and individual accountability, and the second part features information related to people willing to pay. Intelligence organizations, as well as natural resources, and environment and sites of Fars province related to collection of data were valid in this context.

The study population was selected from Fars province based on possessing characteristics of forest parks and demographic indicators. One of the country's provinces that have the largest forest resources and forest parks was used as the study population (Statistical Yearbook, 2007). The study estimated the value of the forest conservation parks by Iran Rate conditional method. This method tries to determine the individuals' willingness to pay (WTP) under certain hypothetical market scenarios. However, the Dichotomous choice method was assumed for people under Daraytab desirability (Amirnejad et al., 2006):

$$p_i = f_{\eta}(\Delta U) = \frac{1}{1 + \exp(-\Delta U)} = \frac{1}{1 + \exp\{-(\alpha - \beta A + \gamma Y + \theta S)\}}$$

$$U = U(Y, S)$$

where U is the desirability to function indirectly, and Y, S represent income individuals. Taking other economic factors into consideration, the individual is social. However, the amount of earnings each visitor uses as a source of environmental fee proposal (A) is creates desirability for him. The following equation shows utility rate caused by the use of environmental resources (Haneman, 1984):

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

Where random , , variables with mean zero are randomly distributed and are independent of each other. To distinguish the difference in desirability (UΔ) from the use of environmental resource, the following equation was used:

Table 1. Statistics of important variables.

Variables	Protection value			
	Max	Mean	Standard deviation	Min
Age (year)	62	35/4	14/12	18
Education	24	13/76	6/04	0
Household size	11	4/32	1/62	1
Income single (RIAL)	11000000	1726600	1576500	0
Household Income (RIAL)	15500000	2855600	2496500	340000

Source: Research finding.

$$\Delta U = U(1, Y - A; S) - U(0, Y; S) + (\epsilon_1 - \epsilon_0)$$

Dual structure of the questionnaire in assessment of individuals willing to pay requires a dependent variable with a dichotomous choice as a qualitative choice model. Usually, Logit and Probit models for qualitative selection methods are used. Lojit pattern, due to its common and frequent usage, was used to assess the effect of different explanatory variables and to determine the amount of visitors' WTP value of promenade. Based on Lojit probability (Pi) that a person offers to accept, the following equation can be expressed (Haneman, 1984):

In this research, cumulative η u (F Δ That) distribution function with a difference is the standard logistic for some social variables, such as economic income, including the amount proposed, age, gender, household size and education. Estimable coefficients θ , $\gamma\beta$, are expected to be $0 \geq \beta$, $0 <$ and $0\gamma < be.\theta$. Three methods were used for calculating the amount of WTP here. The first approach called the average WTP was used to calculate the expectation value of WTP by numerical integration in the range of zero to infinity. The second method, called total average WTP, was used to calculate the expected value of WTP by numerical integration in the range of $\infty - \infty +$. The third method, called the middle part of WTP, was used to calculate the expected value by the integral numerical measures proposed in the range from zero to maximum (A). Among these methods, the third method was better, because it limited the stability and consistency of the theory; nonetheless, the ability to gather performance statistics and maintain the following equation was calculated (Khodavardizadeh, 2008):

$$E(WTP) = \int_0^{MaxA} F_{\eta}(\Delta U) dA = \int_0^{MaxA} \left(\frac{1}{1 + \exp[-(\alpha^* + \beta A)]} \right) dA$$

$$\alpha^{\circ} = (\alpha + \gamma\theta + \theta s)$$

where E (WTP) represents the willingness to use the latitude of origin which can be adjusted, α° represents pay the amount expected, and α represents the social-economic variable, including the width of the original source. Lojit patterns may form linear or logarithmic functions used to estimate the linear functional form of the average WTP. However, it has been used in most studies because it is easier. Lojit model parameters were estimated using maximum Rastnmayy Microfit software and Maple mathematical computation software. Tensile explanatory variables have k (Xk) pattern, while Lojit pattern can be obtained from the following equation (Judge et al., 1982):

$$E = \frac{\partial(B'x_k)}{\partial x_k} \cdot \frac{x_k}{(B'X_k)} = \frac{e^{BX}}{(1+e^{BX})^2} \cdot B_k \cdot \frac{X_k}{(B'X_k)}$$

Elasticity of each explanatory variable is expressed as a percentage change (Xk) that led to a percentage change in the probability of the success dependent variable (1 = Yi). Considering the type of explanatory variable, two separate methods were used to calculate the effect of the final Lojit pattern.

If Xk is a variable, less change is observed in the probability of obtaining the dependent variable (1 = Yi) of the final form. As such, the following equation can be used to calculate it (Judge et al., 1982):

$$ME = \frac{\partial P_i}{\partial x_k} = \frac{\exp(BX)}{(1 + \exp(BX))^2} \cdot B_k$$

As it is noted in this model, changes in the probability value depend on the initial probability, and thus on the initial value of all independent variables and their coefficients.

If Xk is a virtual variable, the ultimate effect of this variable in the probability of obtaining the dependent variable (1 = Yi) from Xk result from zero to one, while other variables with a value of (X*) are kept constant. However, the explanatory variable of the final virtual value (MED) can be calculated through the following equation:

$$P(Y = 1 / X_k = 1, X^*) - P(Y = 1 / X_k = 0, X^*) = ME_D$$

Fixed values of other variables (X*), entitled "Sample mode", are recognized, and the amount of sample for their fashion value was determined. However, the virtual variables which were considered for other variables justified the mean value.

RESULTS AND DISCUSSION

The statistical population of this study comprised citizens and visitors of Fars province. The statistical results from 180 review questionnaires are shown in Table 1. The mean age of 35 years was obtained for the visitors' populations. Considering the population number, 53% were men and 47% were women. More than half of the population had associate degree or bachelor degree. 11% of them were graduates or were having a higher degree. Also, 18% of them had a high school diploma; although the average family size among the visitors was

Table 2. Many respondents' job for the conservation value of forests in Fars Province.

Value	Other	Workman	Homemaker	Jobholder	Free	Specialist	Job	Total
Protection value	3	31	9	52	64	21	Deal	180
	1/66	17/22	5	28/88	35/55	11/66	Cent	100

Source: Research finding.

Table 3. Description abundance level of training and study respondents for conservative values.

Value	Illiterate	Less than diploma	Diploma	Associate degree	License	Graduate and above	Transcript	Total
Protection value	6	11	28	43	76	16	deal	180
	3/33	6/11	15/55	23/88	42/22	8/88	cent	100

Source: Research finding.

Table 4. Results of logistic regression model to estimate the value of protection for Lojit Golestan National Park.

Variable	Statistically significant	Value Pearson	Coefficient
Coefficient	0/0264	-2/38	-2/453
Offer	0/000	-5/46	-0/0112
Income	0/0014	3/9	0/876
Age	0/0312	-2/23	-0/365
Log likelihood=-458		Percent of right prediction=71%	
			R ² =0/42

4.32 persons. Employment and educational status of the forest visitors of Fars have been shown in Tables 2 and 3 respectively. Coefficients of the explanatory variables' results by Logit model, statistically significant levels of these variables and their influence on the dependent variable method for determining the maximum Rastm may currency Sat protective forests in Fars Province are shown in Table 4. According to estimation results, variable rate and offer significant income on a percentage of willingness to pay for the conservation value of forests are influential in Fars Province. Education levels also vary significantly and they had impact on the age range of 5 to 10% significant level of willingness to pay for the amount of protection.

In this study, a negative coefficient estimated variable was obtained. This shows that if the amount proposed for the forests' conservation value of Fars Province increases the probability of answering yes, then the willingness to pay decreases. Conversely, the differential positive sign indicates that the willingness to pay for the level of higher education increases. However, considering people in education, it was observed that young people have the probability of accepting money and are more willing to pay for education than the elderly ones.

FINDINGS AND RECOMMENDATIONS

This study presents an important step to protect the natural resources of the national parks, and move towards sustainable development. Planners and decision makers in their decisions for the economic, political and social sectors should always consider the cost analysis and benefits, and must rely on this analysis based on quantitative and monetary units. Therefore, economic valuation of important national parks is based on monetary units.

Unfortunately, important services and resources of the national forest that are largely outside the market system are neglected, and it is observed that the destruction of these resources is increasing. In terms of management, the study results are promising. First, it shows that the population is aware of the importance of forest resources and the national parks. Secondly, it shows a substantial willingness to pay to protect and improve the tolerance of these resources. The justification to prevent the policy makers and authorities to provide quality environment and natural resources, and the protection of the low and inconsequential effect of the natural resources are not supported by the government.

Suggestions for policy making

1. It is clear that the populations of the national parks are an important part of the natural endowments of these parks; as such, it is significant to protect them. Therefore, the government should consider this as a public domain resource that is in possession of more price data and as necessary measures for protection, improvement and development.
2. One of the most important factors affecting the willingness to pay by subjects in this study in order to protect the Golestan National Park is operating income; so people who have lower income levels are reluctant to specifically protect the national parks and natural resources. Generally, it is recommended to prevent the destruction of much of these resources, and as a consequence, policies that reduce income poverty to the society should be taken.
3. Educating and training subjects in this study are influential factors for the protection of Golestan National Park. Therefore, emphasis is on increased public education and student population. Diplomat Shay M. opined that this could be optimized to protect the natural resources of the national parks.
4. Younger people are more willing to shield the Golestan National Park. As such, it is proposed that government should make policies to protect the natural resources of the national parks, and that the younger generation should pay more attention to the community.
5. Population pressure and lack of industrial sources may lead to the reduction of natural resources, crops' growth, construction of residential and industrial cities in Khan and loss of natural landscapes. Population planning policies should be made to reduce population pressures, and the adoption of standards used in the field of industrial sources is suggested.
6. Justify the conservation costs of the natural resources in the country and calculate the value of these resources. However, emphasis should be made on Hay Construction Projects to further protect these resources and prevent the destruction of their suggestions.
7. A system of economic accounting and valuation assessment of the functions of the League attempts, in general, to create economic and policy analysis, and appropriate development of such military recommendation.

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