



## FACTORS AFFECTING THE WILLINGNESS TO PAY OF GHOROUGH FOREST PARK VISITORS IN IRAN

Elham Kalbali<sup>1\*</sup>, Mahmoud Ahmadpour Borzajani<sup>2</sup>, Hadis Kavand<sup>3</sup>, Samira Soltani<sup>4</sup>, Ehsan Kalbali<sup>5</sup>

<sup>1</sup>MSc Student of Agricultural Economics, College of Agriculture, University of Zabol.

<sup>2</sup>Assistant Professor of Agricultural Economics Department, College of Agriculture, University of Zabol.

<sup>3</sup>PhD Student of Agricultural Economics, College of Agriculture, University of Zabol

<sup>4</sup>Graduates in Agricultural Economics, College of Agriculture, University of Marvdasht

<sup>5</sup>MSc Student of Watershed, College of Natural resources, University of Zabol

\*Corresponding author Address E-mail: elham\_kalbali@yahoo.com

**ABSTRACT:** Ghorogh forest park is located in Gorgan city, Golestan province, which is one of touristic areas due to the natural attractions. This study specified the factors affecting the willingness to pay of visitors and the amount they are willing to pay for forest park using contingent valuation and application of Tobit model and estimated the average willingness to pay of them for using the park. The required data were collected in spring 2013 through questionnaires filling and conducting interviews with 120 visitors of the park. Results showed that the number of household members and income were the variables influencing the willingness to pay. Average willingness to pay per visitor for each visit was estimated 2623 Rials and annual recreational value of Ghorogh forest park, assuming 1.5 million visitors, was around 4 billion Rials.

**Keywords:** Contingent Valuation, Willingness to Pay, Tobit, Ghorogh Forest Park, Iran

## INTRODUCTION

Despite the importance of the ecosystem on human life, its real value has not been defined. So that one of the main challenges governments are facing in the 21<sup>st</sup> century is environmental crises. Misunderstanding of the services provided by ecosystem is considered as a serious threat to the society. Therefore, adopting the correct ecosystem management procedures and direct or indirect operation of services and goods resulting from it is required.

Environmental services and applications often have a very high value but are rarely traded in markets. However, due to the lack of the possibility of accurate and quantitative analysis in macro-policy and decision making, they do not get enough attention. Quantifying these benefits in order to clarify the importance of these resources is impossible in practice, but nowadays some efforts are made worldwide to include the value of these resources in the national accounts by utilizing various economic theories. However, such efforts to achieve this goal can be very effective in maintaining and protecting these resources [16]. One of today's criteria which has been focused by the international community in order to achieve sustainable development includes improving the quality of ecosystem, controlling and monitoring the continuity and survival of the natural landscapes. However, in traditional accounting process and common accounting methods, items like social costs resulting from environmental contamination or depletion of natural resources are ignored due to not being in economic transactions. So, one of the most immediate issues that needs to be considered by policy makers with the aim of implementing environmental policies is to pay attention to the economic value of natural resources. Overall, the economic value of natural ecosystem is the monetary value of goods and services that an ecosystem can provide. Part of these goods and services is considered as market commodities due to being tradable in markets (such as forest wood); however, another group is known as nonmarket goods because of being non-tradable in the market and as though being valuable, due to inability to value them as monetary, they are often ignored in environmental decision-making [3]. Among this group, it is worth noting the satisfaction of visiting a natural ecosystem which is often known as a recreational value of an ecosystem.

In another categorization of the value of ecosystem goods and services, ensuring the satisfaction is in the category of consumable values of natural resources. Consumable values of natural resources play an important role in the creation of economic added value. In today's world, existence of recreational value of natural resources causes the formation of natural tourism industry which is an important source of income for some developing countries [22]. Due to the increasing demand for public resorts and leisure facilities, analysis of the factors influencing people's demands from economic and social standpoint can help the prediction of recreational and entertainment needs. Another factor is the value that people consider to visit the public resorts. Desirability created from these spaces is the direct interest of the resorts which includes using them for recreation, entertainment, hiking, mountain climbing, and aesthetic. This system provides the required mechanism to enhance human well-being; therefore, quantifying and understanding these benefits are highly important. In other words, the estimated monetary value of this kind of services plays double role in fusion management of human and natural systems. At the micro level, valuation studies lead access to information relating to ecosystem structure and function and their sophisticated and varied role in supporting human well-being and sustainable development. Economic valuation can be positively involved in better environmental policies. Today, the need for understanding and applying the ecological values in investments, development and industrial projects, and policies related to decision-making is clearly evident [9]. Several studies have examined the factors affecting the willingness to pay of visitors and the amount of benefits obtained from visited resorts using different methods of valuation [8].

In a study, using a two-stage Heckman method, it was concluded that variables of income, education, household size and gender affected the willingness to pay of visitors and variables of income, household size, education, age and visitors' satisfaction from the condition of amenities affected the willingness to pay of visitors visiting St. Stephanus Church [15]. Recreational value of Chahnime was estimated using the contingent valuation method. The average willingness to pay of visitors for this resort was estimated 3920 Rials per visit and its annual recreational value was estimated 1568 million Rials [12]. The value of Anzali recreation pond was estimated using the contingent valuation method. Researchers estimated the average willingness to pay of people for Anzali recreation pond about 14.9 thousand Rials and its annual recreational value was equal to 1490 million Rials [2]. Using the contingent valuation method, recreational value of Golestan National Park was estimated. The study estimated the average willingness to pay of visitors for recreational use of the park equal to 3520 Rials per visit and the annual tourist value of the park equal to 1.96 million Rials per hectare. Factors of income, offered price and education level affected the willingness to pay [7]. Using the contingent valuation and a two-stage Heckman procedure, it was concluded that income and household size of visitors affected the willingness to pay of visitors visiting Mohtasham Park in Rasht City [18]. Recreational value of cedar forests in Lebanon was calculated 42.43 dollars annually for each household [10]. Recreational value of five national parks in South Korea was obtained 11.94 dollars per family annually in average, using the contingent valuation method and factors of offered price, age, and education were reported to affect the their willingness to pay [17]. Using the contingent valuation, studies showed that the average willingness to pay of Skaftafell National Park and Gullfoss waterfall visitors were 508 and 333 million Kroner of Iceland, respectively. Their income, attitudes toward the environment, number of previous visits, accommodation, entrance payment history, age, and education were introduced as the factors affecting the willingness to pay [6]. A study estimated the value of ecosystem services in a region in Turkey equal to 67.44 dollars per household annually, using contingent valuation approach. Ghorogh Forest Park is located in 24 kilometers east of Gorgan, Mashhad route. The park has an area of 650 hectares and is located in the plain area. A wildlife park inside the park (an area to keep wild animals) is available. It also has some wooden shelters for visitors and other facilities for their accommodation. Currently, more than 30 deer are kept in the park. Ghorogh Forest Park is one of the major resorts of Gorgan which is exploited in vast area all year long. The current study aimed to identify factors affecting the willingness to pay of visitors and the amount they wish to pay for visiting Ghorogh Forest Park. Determining the value and importance of this park can be an incentive for people to protect it.

## **MATERIALS AND METHODS**

Contingent valuation method creates a hypothetical market for environmental goods and makes use of studying a questionnaire to elicit willingness to pay of individuals for changes in quality or services. Contingent valuation method can measure both value of use and value of non-use. Contingent valuation is the only method that can directly measure existential and expected values [4]. Contingent valuation technique is used to estimate the benefits of environmental goods, services and the like. The purpose of this method is to obtain a precise estimation of the benefits gained not from market but from changing production levels or prices of some public goods and services. Contingent valuation method was introduced for the first time in 1947 by Chris and Vantrap and was used for the first time in 1960 by Davis [14]. The method is conventionally useful and applicable for two major values of existential value and selection value [21]. Data collection is one of the basic issues in this method in which field study should be used mostly.

Questionnaire or interview can be used in the field study. However, in this method we are looking for estimating the value people grant to an environmental phenomenon. Here, people are questioned how much they are willing to pay for this environmental phenomenon. This issue has two aspects one which is that how much people are willing to pay to accept this benefit (benefits of an environmental phenomenon). In this case, the question is how much people are willing to pay for that ecological phenomenon. Obviously we consider the highest willingness to pay [19]. The most common approach to this method is that the maximum amounts of money that people are willing to pay for the use or protection of a good or service will be ask. This method requires application of stages which include: 1) raising interviewees' awareness about the issue under study, 2) creating a hypothetical market, 3) acquiring the offered price, 4) estimating the average willingness to pay, and, 5) investigating the factors influencing the willingness to pay according to the definition.

There are some functions and equations in econometrics where in the dependent variable is truncated at the top or bottom. In this case, the dependent variable is visible only if its value is higher or lower than a certain limit. Such variables are called censored variables in econometric terms. In such kind of variables, censoring threshold is as not wanting to do the activity despite having its condition. It should be noted that in the censored regression models, the independent variables for all samples are known but the data of the dependent variables can be observed only in a limited scope. The sample having such a feature is called censored sample [5]. Tobin (1958) introduced a model for regression of these variables. This model was developed by Goldberger and called Tobin Probit or Tobit model and was used in several cases [20]. The dependent variable in the Tobit model implies two groups or states in nature that usually take zero and non-zero values. Positive values indicate the occurrence and the level of desired activity and zero values imply its non-occurrence [13]. The estimated Tobit model for Ghorogh Forest Park visitors is as follows:

$$C_i^* = \beta'X_i + \varepsilon \quad (1)$$

$$C_i = C_i^* \text{ if } C_i^* > 0 \quad (2)$$

$$C_i = 0 \text{ if } C_i^* \leq 0 \quad (3)$$

where in  $\beta$  is the value vector,  $X_i$  is the vector of independent variables including socio-economic and environmental characteristics of the respondents, and  $\varepsilon_i^*$  is the disturbing part. For someone who is willing to pay,  $C_i^*$  is the actual level of willingness to pay and  $C_i^*$  for someone who is not willing to pay is zero [11]. It believes that observations above the censored threshold can be expressed as follows:

$$E(C_i) = E(C_i | C_i^* > 0) = \beta'X_i + E(\varepsilon_i | \varepsilon_i > -\beta'X_i) \quad (4)$$

$$E(C_i | C_i^* > 0) = \beta'X_i + \delta \frac{\phi(\beta'X_i/\delta)}{\varphi(\beta'X_i/\delta)} \quad (5)$$

so that  $\phi(\beta'X_i/\delta)$  and  $\varphi(\beta'X_i/\delta)$  are the standard normal density function and standard normal cumulative density function in  $(\beta'X_i/\delta)$  value, respectively. The left side of the equation 4 represents the expected value of  $C_i$  when  $-\beta'X_i > 0$ .  $E(\varepsilon_i | \varepsilon_i > -\beta'X_i)$  in the equation 4 is the expected error component when it is larger than  $-\beta'X_i$ . Clarification of Tobit provides the possibility to consider the decisions related to entrance WTP and conditional levels of willingness to pay for making decision for willingness to pay [13]. The relationship between total observations, average observations above the censored point of dependent variable and the probability of being above the censored point can be demonstrated as follows:

$$E(C_i) = \varphi(Z)E(C_i^*)E(C_i^*) \quad (6)$$

$$Z = \frac{\beta'X_i}{\delta} \quad (7)$$

Then, in order to assess the effect of the change in the variable of  $X_i$  on  $C_i$  (aggregate elasticity), the following equation was used:

$$\frac{\partial E(C_i)}{\partial X_i} = \phi(Z) \left[ \frac{\partial E(C_i^*)}{\partial X_i} \right] + E(C_i^*) \left[ \frac{\partial \phi(Z)}{\partial X_i} \right] \quad (8)$$

In other words, aggregate elasticity, the aggregate elasticity of the predicted probability level of willingness to pay (the first part of the right part of the equation) and the conditional expected value elasticity (the second part of the right part of the equation) [1].

The data required in this study was collected by interviewing Ghorogh Forest Park visitors and filling the questionnaires by them in spring 2013. For sampling with simple random sampling, 120 visitors were interviewed. SPSS 16 and shazam9 software were used for data analysis.

## RESULTS AND DISCUSSION

The data related to the filled questionnaire were extracted and analyzed statistically. The questionnaire covered the questions such as age, gender, education, number of household members, monthly income and the number of visits from the forest park. Table 1 presents the general data description of Ghorogh Forest Park visitors in spring 2013. According to this table, the averages related to family income, age, number of school year, number of household members, gender and willingness to pay were 979 thousand Tumans, approximately 35 years, 14 school years, 3.73 people, 0.5 gender, respectively and the average willingness to pay was 700 Tumans. Overall, mean age of the respondents was nearly 35 years and also they had a high income (average annual income was around 9800 thousand Rials). Based on a field data, the intercept of most visitors were several cities of Golestan province. Also, most visitors to the forest park had visited it for several times and approximately 80% of the respondents stated that they would still travel to the region and only 20 percent gave negative answer to the questions of their willingness to visit again.

**Table 1 – description of the general data of Ghorogh Forest Park visitors in 2013**

Variables	Max	Min	Variance	Standard Deviation	Mean
Offered Price	2000	0	2285570	478.09	700
Age ( years )	85	18	157.84	12.563	34.742
Gender	1*	0	0.24510	0.495	0.583
Household size (people)	9	1	2.4325	1.559	31733
Monthly income (Thousand Rials)	39000	4000	29860	5464	9790
Education (years)	24	1	39.594	6.2924	13.950

### Source: Results of the questionnaire

\* Gender variable considering its being qualitative includes female (0) and man (1).

Table 2 demonstrates the condition of answering to the proposed prices for amusement value of Ghorogh forest park in Golestan province in spring 2013. Based on this table, 111 people (92.5 %) out of 120 questionnaires showed willingness to pay for recreational use of the park (i.e. they answered yes to the question of willingness to pay) and 11 people (7.5 %) were not willing to pay for the use of the park. willingness to pay results in this table show that 53 people (44%) did not accept the first offer. In fact, they were not willing to pay 1000 Rials to visit Ghorogh forest park, while 67 people (56%) accepted it. When the lower price proposed, 74 people (61%) rejected the proposal. Those respondents who adopted the first proposal (10,000 Rials) were put in higher offer group (20,000 Rials) that 7 people (5%) accepted the third proposal and 60 people rejected it. According to the calculations, the average willingness to pay as the entrance fee for each tourist was obtained 7000 Rials.

**Table 2 – Status of answering to the 3 proposed prices to calculate amusement value of Ghorogh Forest Park in 2013.**

Condition of acceptance		First proposed price 10000 (Rials/ every visit)	Lower proposal 5000 (Rials/ every visit)	higher offer 20000 (Rials /every visit)
Acceptance of the offered price	Number	67	44	7
	Percent	56	37	5.8
Rejection of the offered price	Number	53	9	60
	Percent	44	7.5	50
Sum	Number	120	53	67
	Percent	100	44.5	55.8

In regression models with qualitative dependent variable, calculating the coefficient of determination ( $R^2$ ) is not possible and instead, Cox and Snell (1989) presented  $R^2$  based on the likelihood log that its maximum amount doesn't reach to one. Then, Nagelerke regulated  $R^2$  of Cox and Snell in 1991. New statistic of  $R^2$  can also take the value of one. Based on the results listed in Table 3, the aggregate elasticity for explanatory variable of family size was 0.5. Assuming the other factors constant and given its negative relationship, on average, a one percent increase in this variable decreases the probability of willingness to pay of visitors to 0.5%. The negative and significant relationship of family size suggests that by increasing the number of family members, willingness to pay reduces due to lower per capita income. Aggregate elasticity for explanatory variable of visitors' income shows that an increase of one percent of these variables, assuming the other factors constant, will have an increase of 0.04 in the probability of willingness to pay of visitors. Since the increase in per capita income will increase liquidity for everyday activities, increase in willingness to pay of visitors is natural. Moreover, the education variable indicates that a one unit increase in the average education, assuming the other factors constant, will lead to the reduction of 0.07 unit in the average willingness to pay of visitors.

The results of this study indicate that factors such as number of household members and income have a significant effect on the willingness to pay but only the economic factor of income is the most important one on the willingness to pay for environmental services. Based on the results obtained from linear regression model, the average willingness to pay of visitors for the use of Ghorogh Forest Park is calculated about 2623 Rials per visit from the following equation:

$$WTP = 846.58 + (0.00022295 \times 9790000) - (102.39 \times 3.733) + (0.097 \times 34.742) + (55.684 \times 0.583) - (4.2619 \times 13.95) = 2623.42$$

**Table 3 - Results of Tobit model estimation of the factors range affecting the willingness to pay of Ghorogh Forest Park visitors in 2013.**

Variables	estimated coefficients value	standard deviation of coefficients	t-statistics	elasticity
Intercept	846.58	0.489	3.352	
Age	0.097	0.00957	0.0195	0.0044
Gender	55.684	0.202	0.534	0.0427
Number of family members	-102.39	0.068	-2.902	-0.5025
Income	0.00022295	0.000000199	2.166	0.2868
Education	-4.2619	0.0182	-0.452	-0.0782

#### Source: Results of the investigation

According to these results, the majority of respondents were willing to pay a fee for Ghorogh recreational Forest Park facilities. Results from this study indicate that the majority of visitors were not satisfied with health condition and facilities of this forest park. The findings show that the higher the income the greater the likelihood of a positive response to the stated willingness to pay will be. Furthermore, the ones who had the experience of paying for a destination resort were more willing to pay for the use of recreational sites. Creating cultural environment and increasing the quality of the park structure such as creating an environment for studying and training classes could attract educated people to these places. In addition, improvement of health and welfare condition for people in these environments leads to the increase of willingness to pay in the Forest Park.

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