

# International Journal of Farming and Allied Sciences Available online at www.ijfas.com ©2013 IJFAS Journal-2013-2-23/1112-1117 ISSN 2322-4134 ©2013 IJFAS

# Estimating the recreational value of wilderness areas in the tourist season with contingent valuation method (Case Study: Sadiq Abad Desert)

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ABSTRACT: Desert can be an interesting place for tourists and it can make them familiar with different perspectives in beauty of nature and green landscape. From the perspective of European tourists, wilderness excursions have attractions and can be a significant source of revenue for the country, especially in the towns and villages in the desert. In classification of goods, deserts are in nonmarket goods categories and have accordingly no market price and there is no benchmark for comparison with other commodities. This study is to determine the recreational value of Sadig Abad Desert in the city of Bafg in Yazd and to measure willingness to pay for recreation in this area using contingent valuation and dimensional dichotomous choice questionnaire. To evaluate the effect of explanatory variables on the willingness of people to pay, a logarithmic logit model was used and parameters used in the model are estimated using maximum likelihood. Results have shown that 67.13 % of the subjects in this study were willing to pay the entrance fee. Average willingness to pay per person for recreational use of wilderness is obtained 38520 rials per month. In other words, each family is ready to pay 294,501,529 of annual income per household for a walk in the desert. The annual recreational value of wilderness Sadeqabad is estimated at 963,020,000. Accordingly, the results suggest an important role of deserts in society leisure and city managers are obliged to respect the opinions of visitors to wilderness areas, moreover these deserts can be very economical for the revenue plan.

*Keywords:* Sadeqabad wilderness, recreational value, contingent valuation, willingness to pay, the logit model

### INTRODUCTION

Iran is a country with over 1648195 square kilometers, one of the largest countries in Southwest Asia. Almost two-thirds the length of its borders is 7744 km land border and the remaining border is water. The vastness of Iran surrounded with mountains and the average elevation is over 1,000 meters above sea level. Iran sits on the world's arid and semi-arid belt (Mirjalili, 2005). Two-thirds of the area is arid and semi-arid climate in our country, Iran, and

about 40-45 million acres are deserts, (Ahmadi, 2008). The causes of valuation of Natural Resources and Environmental Systems for economists and ecologists are determining environmental and ecological benefits by human, providing environmental issues to decision-makers and planners, providing a natural link between economic policies and outcomes, assessing the role of natural resources, mitigating and reforming national measures such as GDP and preventing excessive degradation and exploitation of Natural Resources (Vaz, 1998; Ashym, 2000, Gao et al., 2001).

Several studies have been conducted in the field of Natural Resources Valuation and other wilderness areas that can include: (Lynhvp and Macmillan , 2007) , in a study titled Valuation of wilderness areas in Iceland , they used pricing method to estimate the costs and development revenue of water in the desert areas of Iceland . Average willingness to accept 780/170 and the average willingness to pay SEK 21/326 SEK (Icelandic currency) = 0.31 dollars was obtained. (Amigus et al., 2002) obtained the French Garvn River habitat conservation value with linear models , Tobit , Heckman two-stage semi-log respectively as 66 , 67 , 13 and 133 francs . (Zahra Abedi et al., 2011) in a study of a complex economic valuation for tourist attractions \_ Namak Abrood showed that 64.29 % of the visitors are willing to pay for these complexes .

Sadeqabad Desert is located in Yazd province. This sedulous is in salt desert south or Bafq desert and in north of the village Sadeqabad located in 15 kilometers north of the city. Sedulous is a north-south range shaped like a diamond. Its large diameter and small diameter are about 5 km and 4 km. This sedulous reaches to Hassan Abad village in the north and in south, it goes to Bafq village (Karegaran, 2001). The aim of this study was to estimate the recreational value of the contingent valuation method to calculate the Sadeqabad and people willingness to pay for recreational use of the area.

#### MATERIALS AND METHODS

Contingent valuation method seeks to determine willingness to pay under the hypothetical market scenarios, determine. Among data collection methods, interview is preferred over other methods (Mitchell and Carson, 1989). In this study, single bounded questionnaires were used to select and was completed.

For the model to measure the willingness to pay, it is assumed that the amount proposed to determine the value of non-market is a natural source based on maximizing utility (U) under the circumstances, accepts or rejects (Equation 1) (Amirnejad and Associates, 2006 and Judge et al., 1988).

$$U(1, Y - A, S) + \varepsilon_1 \ge U(0, Y, S) + \varepsilon_0 \tag{1}$$

U is the indirect utility that an individual obtains. A and Y are respectively person's income and the amount proposed and S is other social-economical features which is influenced by personal taste. E0 and  $\epsilon_1$  are random variables with mean zero and independently distributed equally. Utility difference  $\Delta U$  can be described as follows.

$$\Delta \mathbf{U} = \mathbf{U}(\mathbf{1}, \mathbf{Y} - \mathbf{A}, \mathbf{S}) - \mathbf{U}(\mathbf{0}, \mathbf{Y} \, \mathbf{S}) + (\boldsymbol{\varepsilon}_1 - \boldsymbol{\varepsilon}_2) \tag{2}$$

Each respondent will be met with a response of zero or one. As a result, we'll face an econometric model where the dependent variable is zero. To meet binary dependent variable models, logit or probit models are used. Due to the simplicity and reliability of the calculations in logit model, this model was used in this study (Judge et al, 1988).

Linear or logarithmic functions of the form logit models may be estimated. Results of logarithmic and linear forms for estimate of the data showed that a significant amount of MAC Fadan coefficient and the linear form was higher than the logarithmic function in the logarithmic model was used. Logarithmic logit model to estimate individual willingness to pay:

$$E(WTP) = exp(\frac{\alpha^*}{\beta})$$
(3)

Where E (WTP), the expected value of willingness to pay (WTP) for the outing,  $\beta$  coefficient logit model to calculate the logarithm of bids variable (Y) and  $\alpha^*$ , is the sum of the adjusted intercept including social - economical and central intercept ( $\alpha$ ) is (Lee and Han, 2002). Including social - economic variables is the sum of the product of the coefficients of the logit model for each of them out. With a coefficient of variation of the data obtained from the questionnaires and the initial sample is obtained using the following equation:

$$\mathbf{n} = [\frac{\mathbf{t} \times \widehat{\boldsymbol{\delta}}}{\mathbf{d} \times \mathbf{RWTP}}]^2 = [\frac{\mathbf{t} \times \mathbf{CV}}{\mathbf{d}}]^2 \tag{4}$$

The relation (4) n sample size, t -statistic of t-student (96/1), RWTP, the willingness to pay estimate) Average bids obtained from the initial questionnaire) and d is the percentage difference RWTP of TWTP. Acceptable value d in contingent valuation studies between 0.1 to 0.3 (10 to 30 percent) (Mitchell and Carson, 1989).  $\hat{\delta}$  is the standard deviation of bids from the initial questionnaire. With the completion of the initial questionnaire using 30 (Mitchell and Carson, 1989) samples were determined. The questionnaire was completed by 250 of the 37 questions in the questionnaire due to a misunderstanding of WTP and incomplete removals of the 213 questionnaires have been analyzed. Parameters logit model maximum likelihood method using Shazam software and maple math software were estimated.

#### **RESULTS AND DISCUSSION**

In the first part of the questionnaire about the characteristics of the socio - economic self- questioning individuals were collected. Of the 213 respondents, 91 (43 %) women and 122 (57%) are men. Average number of household visits in 27/3 was estimated that this figure represents a desire to visit the families. 213 visits in question, 193 ( 60/90 percent ) feel free to revisit , and 181 ( 84.97 %) had between one and five times in the area to visit , which reflects the attractiveness of the area for visitors to it. Results of the study area as explanatory variables, some visitors describe qualitative variables according to Table 1 and the results are shown in Table 2.

| Variable  |            |         |            | mean          | min           | max           | Standa   | ard deviation |   |
|---|------------|---------|------------|---------------|---------------|---------------|----------|---------------|---|
| Age   |            |         |            | 34.27         | 19            | 56            | 8        |               |   |
| the numb  | er of hous | seholds |            | 3.27          | 2             | 6             | 1.07     |               |   |
| Years of education<br>Number of visits per year<br>Visit time (hours) |            |         | 14         | 4             | 18            | 2.81          | 2.81     |               |   |
|   |            |         |            | 2.40          | 0             | 15            | 2.64     |               |   |
|   |            |         |            | 5.54          | 1             | 24            | 4.44     |               |   |
| Distance to the district (km)   |            | 225.04  | 10         | 1200          | 253.38        | \$            |          |               |   |
| Score region<br>dépenses famille(rials)                               |            |         | 11.87      | 1             | 20            | 4.22          |          |               |   |
|   |            |         |            | 7636150.02    | 1,000,000     | 200,000,000   | 40410    | 90            |   |
| moderate income persons(rials)  |            | ials)   | 8152580.21 | 500,000       | 300,000,000   | 53194         | 10.58    |               |   |
|   | Table 2.   | Result  | s of tł    | ne qualitativ | e variables V | isitors Sadeq | abad Ba  | ıfg           |   |
|   | married    |         |            |               | tors Acceptan | ce of Offer   | Variable |               |   |
| married   | Yes        | No      |            | Yes           | No            |               | variadie | women man     | 5 |
| ç   | 91         | 122     | 42         | 171           | 193           | 20            | 143      | 70            |   |

Main evaluation questions, including questions about the respondent's WTP where five price 500, 1500, 2500.3500 and 7000 randomly questionnaires have been proposed. Out of 213 visits, 143 patients (67.13%) of the bid amount and 70 were accepted (32.86 percent) accepted it.

#### CONCLUSION

Coefficient alpha for the final questionnaire is 0.7 indicating acceptable reliability. Apply detailed analytical analysis of the collected data tested the hypothesis that the best model was estimated in SHAZAM software variables that were not significant were eliminated, the variable Y respondents selected the bids, bid1 logarithm offers, nf the number of households, ed education, dv time Visit and moderate income persons pai respectively. Results of logit model to estimate the coefficients of the explanatory variables, the statistical significance and impact of these variables on the dependent variable using the maximum likelihood method are shown in Table 3.

The most important explanatory variable, the estimated coefficients suggest that the probability of willingness to pay for a percentage of the value of Sadeqabad wilderness outing with the expected negative sign is significant. It shows that under the hypothetical market scenario, the probability of willingness to pay Yeah decreases (increases) the price increases (decreases). In other words, an increase of one percent of the respondents suggested price, yes, and the willingness to pay for the value of wilderness recreation Sadeqabad the 2.34 % deficit occurs. Also with regard to the ultimate effect of this variable, an increase of 10 riyals (\$ 1 USD) amount to offer, the acceptance probability of 0.23 unit decreases.

The coefficient on the number of households is significant at 10% level with a negative sign. Thus, the number of households is higher, thus decreasing the probability of willingness to pay for reduced admission fee proposal. One percent increase in the number of household respondents by stretching out the possibility of accepting the proposal amounts to 044/0 percent decrease. In other words, a person with the increasing number of visitors to the household, the probability of acceptance 0000017/0 unit decreases.

The coefficient of education variable is significant at the 1% level with a positive sign. This symbol indicates that the higher the education level, the probability of acceptance of the proposed fee increases. Other words, a one percent increases in the education level of respondents, the probability of accepting the proposed amount of 67/0 per cent increase. As well as years of schooling increase visitors each year, the probability of accepting the proposed amount of 035/0 unit will increase.

Visit the estimated coefficient of variable duration, at 5% level is significant with the expected positive sign. So the visit duration (hours) is more likely to accept fee increases proposed by the respondent. In other words, a one percent increase visit duration, the probability of accepting the amount offered 0.15 per cent increase. Also increased with time during a visit, the probability of acceptance, 0.020 units will increase.

Estimated coefficient of the income variable is statistically significant at the 5% level with the expected positive sign, which indicates an increased risk tend to pay admission to the recreation area with the increase in revenue. In other words, a one percent increases in income respondents were more likely to accept the proposed amount of 16/0 per cent increase. The ultimate effect of such variables, with a local increase in income, the probability of accepting the proposed amounts, 00000014/0 unit will increase.

Statistics at the bottom of the table (3) below show the explanatory power of the model. Likelihood ratio statistic indicates coefficients significant at all. The likelihood ratio statistic obtained (Table 3) versus 21/55 is. The value of the likelihood ratio statistic (P-Value = 0) indicates that the variation explained by the model is significant at the one percent level.

A good measure of fit, the correct decision to accept or reject the classification criterion is proposed amount. Prediction accuracy of the model estimates, 77 percent. Thus, the model has been estimated that a high percentage of the explanatory variables to predict the dependent variable. Madala factor and also, that the criteria are a good fit, indicating that the explanatory variable , as well as variability models (like paying visitors) explain.

| Variables                | Coefficients                 | T statistic                     | Elasticity at means | Marginal effect |  |  |  |
|--------------------------|------------------------------|---------------------------------|---------------------|-----------------|--|--|--|
| Constant                 | 6.434                        | 3.278                           | 1.591               | -               |  |  |  |
| logarithm offers         | -1.2282***                   | -5.1346                         | -2.3382             | -0.2286         |  |  |  |
| the number of households | -0.916E-05*                  | -1.8282                         | 0.04395             | -0.1678E-05     |  |  |  |
| education                | 0.1898***                    | 3.0873                          | 0.6685              | 0.03533         |  |  |  |
| time Visit               | 0.1087**                     | 2.3022                          | 0.1490              | 0.02024         |  |  |  |
| moderate income persons  | 0.7761E-06**                 | 2.0655                          | 0.1608              | 0.1444E-06      |  |  |  |
|                          | 0.77                         | Percent of Right Prediction     |                     |                 |  |  |  |
|                          | 55.21 Likelihood Ration Test |                                 |                     |                 |  |  |  |
|                          | P-Value 0.0000               |                                 |                     |                 |  |  |  |
|                          | 162                          | Number of Right Predictions     |                     |                 |  |  |  |
|                          | 0.22                         | (L.R.T) McFadden R <sup>2</sup> |                     |                 |  |  |  |
|                          | 0.23                         | Maddala R-Square                |                     |                 |  |  |  |

| Table 3. | Statistical | values | of | logarithmic | logit | model | variable | s |
|----------|-------------|--------|----|-------------|-------|-------|----------|---|
|          |             |        |    |             |       |       |          |   |

\* Significant at the 10% probability level , significant ( \*\* ) at the 5% level , significant ( \*\*\* ) at the 1% level

Expected value of WTP estimates after logarithmic parameters logit model, using equation 6, the calculation of the adjusted intercept (Equation 5) is calculated as follows:

 $\begin{aligned} \alpha &= -(0.0000096*3.27) + (0.193*14.24) + (0.116*5.54) + (26.618*0.07) \\ &+ (0.00000077*815258.21) + 6.445 = 10.371 \end{aligned}$ 

$$E(WTP) = \exp(\frac{\alpha}{\beta}) = \exp(\frac{10.371}{1.22}) = 3852.08$$
(6)

25,000 visitors per year visit the area (Cultural Heritage, Tourism and Handicrafts, 1392), the annual recreational value was calculated as described in Table 5.

Table 5. Estimated annual values recreation area Sadeqabad Bafg

| recreational value of (rials) | Number of Visitors(person) | the expected value of willingness, wtp(nais) |
|-------------------------------|----------------------------|--|
| 963,020,000                   | 25,000                     | 38520  |
|                               |                            |  |

As you can see, the total value is 963,020,000 rials in the recreation area. The average number of family members (27/3), entertainment value is \$ 31,782 per household, which is equivalent to 294,501,529 riyals. According to these figures, according to the 60/90 percent tend to revisit and 84.97% between one to five times a year to visit this area, the study area has high recreational value.

This research suggests a discussion of competitive outing in desert ecosystems and other ecosystems that planners and policymakers in tourism sector, especially given the nature of the states concerned. We have not received any input area for recreational services.

This study showed that 13/67% of the visitors are willing to pay as the input and only 86/32 percent were willing to pay. The results of this study and are willing to pay high for the area and the views of the desert people, suggesting that Knowledge of the values of the desert, and considerably higher authorities and policy makers should pay particular attention to the preservation of wilderness and at least 963,020,000 million dollars to keep these investments are important.

Tourism planning is integrated and sustainable requirements of this region. Direct and significant effect on the amount of income and are willing to pay the financial ability of the logit model showed that the improvement in per capita income and population welfare, recreation programs can accelerate the natural resources and the environment. Obviously, implement strategies; create economic growth for the state and the economic system can hope to benefit from public contributions towards proper utilization of the resources.

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