Environmental value and tourists' willingness to pay for preservation of Chabahar coasts The use of contingent valuation method (CVM)

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Abstract

This study was conducted to quantify the environmental value tourists' willingness to pay for the preservation of Chabahar Bay. Environmental capitals have been considered recently. For this purpose, 100 tourists visited this location were selected randomly and they were surveyed in 2016. As this region was pristine, results showed that people willingness to pay for the preservation of the Chabahar coasts varies in terms of the variables of education and environmental index. The results suggest that the mean of tourists' willingness to pay is 328800 Rials and preservation value for each family is 7075500 Rials per year. According to the results obtained, tourists have greater willingness to pay compared to residents, and it is recommended that authorities entrust the Chabahar coasts preservation to private sector and a part of revenues obtained by investments to be allocated for preservation of the coasts. However, Chabahar Bay has particular importance not only for residents of that region but also for many of Iranian people living throughout of the country

Keywords: Contingent valuation, willingness to pay, Chabahar Bay, tourists, environment economy

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Introduction

Economically, value of a commodity is equal to sum of payments of that commodity and consumer surplus, and the consumer surplus of a commodity is defined as difference between willingness to pay by consumer and the price paid for that commodity. However, Chabahar Bay has particular importance not only for residents of that region but also for many of Iranian people living throughout of the country. Environmental services valuation is among the most important prerequisites for an optimal management for planning and budget allocation. This study was conducted to quantify the environmental value of Chabahar coasts using contingent valuation method through selecting two-limit double selection method. The application of this method will provide an optimal economical solution for increasing utility of Chabahar coasts visitors. Valuation of public goods has been considered increasingly in the last decade (for example, by Brouwer, 2001 "Chen et al., 2004," McCain et al, 2010). Several methods are used for valuation of the benefits obtained from free access public goods such as wetlands, coasts, and rivers (Hub and McConnell 2002 "Amir Nejad and AtaeiSsalut, 2011). As environmental value of Chabahar coasts includes both aspects of direct use of services along with unknown and non-consumed values of sea for its users and its enthusiasts, this valuation will be based on willingness through recounted preferences. Parks, natural green spaces, events, and natural areas are necessary aspects of recreation and tourism functions and they have great strategic importance to improve living conditions of human societies. Presence of such locations in addition to environmental function such clearing the air and reducing the pollution promotes the social and psychological wellbeing of the human community residents, since the presence of promenades is due to recreational value, aesthetic appeal and enhancing the statistics of attracting tourists and visitors.Economic development requires creation of healthy and constructive society and it is possible when there is required coordination between economic and welfare plans. For this reason, the implementation of environmental projects, the development of green space, creating the promenade and recreational centers to spend leisure time in all urban and industrial locations are required. Given the increasing demand for promenades and recreational issues, experience and analysis of factors affecting the people demands from the economic and social point of view can contribute to predict recreational needs. One of these factors is value that people give for benefits arise from public recreational centers. The utility created of such spaces is among the direct benefits of promenades and recreational centers that include spending leisure time. In other words, the estimation of monetary value of this type of services

plays significant role in the management. Several studies have been conducted to examine the factors affecting the visitors' willingness to pay and the rate of benefits obtained from the recreational centers using various methods of contingent valuation.The main objective of this study was to examine the environmental value and tourists' willingness to pay for preservation of Chabahar coasts

Secondary objectives:

1. Development the awareness of understanding the cooperation and great contribution of tourism to environment

2. Improving the quality of life of the host society

4. Providing unique experience to visitors

۵.Conservation and preservation of environment

In this regard, Fazlollahi and Ardakani (2015) compared public preferences and willingness of tourists and residents of Sari for preservation of Caspian Sea using contingent valuation method (CVM). Results of their study showed that mean willingness to pay for preservation of Caspian Sea was respectively 229870 and 195,170 Rials. Nekouei and Zibaei (2012) in a study entitled environmental value of river flow of Zzayanderud in Isfahan used two-limit double selection method. Results showed that the social variables including age, sex, and family size have no effect on the formation of the subsequent response. This behavior caused that the mean willingness to pay for use or non-use of river flow to be obtained 11400 Rials in month for each family. Lumis et al (2000) in United States and Gurlak (2006) in Turkey used contingent valuation method to assess the benefits of the development of water-related environmental services including direct benefits and non-consumed value. Ralph and Dayak (2010) tested the consistency validity of results of contingent valuation to value and travel cost in Australia. Results of this study showed that probably combination of factors causes that consumer surplus value obtained by the travel cost method to be more than contingent valuation method. Asghari et al (2001) used contingent valuation method to estimate willingness to pay by visitors of historical site of Ghanjnameh in Hamadan. This study showed that each of the visitors pays 1560 Rials on average to visit this historical legacy. Farajzadeh et al (2009) estimated willingness to pay by those visiting the historical site of Pasarghad. According to this study, the mean willingness to pay was 114530 Rials for each family. In addition, based on willingness to pay by people and the number of visitors, the value of site from

the perspective of visitors and consumer surplus were estimated more than 6640 and 6060 million Rials, respectively. Omidnejad et al (2006) found that the mean willingness to pay by visitors to preserve the Forest park of Sysngan is 6365 Rials for each visitor. According to results, the variables of offered price, income and education level had significant impact on willingness to pay by visitors. Dashti et al (2008) used contingent valuation method in a study and they reported the mean willingness to pay by visitors for Nabovat Recreational Park in Karaj 3300 Rials for each visitor, and they concluded that the offered price, level of education, park appeal, and family size had significant impact on the willingness to pay by visitors. Amiguos, Boulatafl, and Dosaigaes obtained the conservative value of Karen River Coast station in French using linear, Tobit, two-stage semi-logarithmic models 66, 67, 13, and 133 frank, respectively. Leinhoop&Mcmillan(2007) estimated the value of wilderness in Iceland 243.16 Euro per year. White et al (1999) calculated the preservation value of national park of Nuorsiorg in England using contingent valuation method (cvm) and measurement of WTP that mean WTP for each person was obtained 3.10£ per year. Innovative aspect of this article is to quantify the environmental value and willingness to pay by tourists for preservation of Chabahar Bay. Environmental capitals have been considered recently. In this regard, this study has particular focuson the social and environmental capital aspects.

Method

This research is applied in terms of objective, survey-descriptive in terms of data collection, and cross-sectional in terms of method and it is qualitative and quantitative in terms of information. The considered area to do this survey was about 10 km of Chabahar coasts (part of small and big sea). This area was selected since it included major population using the recreational and environmental values of Chabahar coasts. Accordingly, the population of study included all those interested in using environmental and recreational value of Chabahar coasts due to proximity to historical village of TisoSavalelipar located beside the Chabahar coast. This area is considered among the tourist areas interested by visitors of other areas of the country.

Contingent valuation methods

If we define the benefits as preferences of individuals, a person receives a benefit when he loses something against willingness to lose something else that has given for them (Batman e al). Contingent valuation method is a recounted preferences method. In this method, the respondents will be asked to determine the value of income that they are

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willing to ignore to achieve an environmental commodity (Chilton and Hutchinson, 2003). Recounted preferences method is a survey that by using it the willingness of people and families to pay for them in order to improve the environmental facilities is asked (Skin et al., 2008). In this regard, contingent valuation method as a recounted preferences technique extracts the public preferences through direct asking of them on payment to change quality and quantity of one certain environmental commodity or service (Loomis and Helfand, 2001; Skin et al, 2008, Turnero et al, 2010). The format of two-limit selection is the developed form of one-limit selection in which the issue is introduced for respondents by giving a price, similar to one-limit selection method. However, after receiving the response to initial price, the subsequent prices are offered for them and they are asked if they are willing to pay new price (Hatman et al 1991). This method was developed for collecting more information without need to increase the sample size of the study (Jionus et al. 2008). By introduction of the question of the willingness for second payment (subsequent offer) for respondents, more information will be obtained from the distribution of willingness to pay with same number of initial interviewees (Hub and McConnell). The second offer can be followed by giving the third and fourth offers in the form of question package. This follow-up is performed by giving higher offers for responses "yes" to previous offer and the lower offer to the response "no". Comparing the results obtained using two-limit double selection method and this method shows that adding questions does not increase significant efficiency in estimations of willingness to pay. In addition, the highest statistical benefits are obtained through follow-up of an offer after the offer of the initial price (Batman et al 2001). In addition, in some conditions, responses to the second offer are not matched with the first price offer (Batman et al, Baravar et al 2010). In such situation, the levels of willingness to pay are influenced by slope arising from the introduction of initial offers to interviewees (Chin et al, 2005). The one and half-limit contingent valuation method was introduced as alternative method for two-limit double selection method in conditions where responses to first offer do not match with the first offer. This method is applied to resolve the lack of match between responses and size of efficiency reduction due to less information compared to limit double selection method.One of the conditions to use this method is that its superiority compared to two-limit double method is examined and tested in a pilot test (Amirnejad and AtaeiSalut, 2011). Contingent valuation (CV) method is used generally as one of standard and flexible tools for the measurement of non-market consumed and non-consumed values of environmental resources. This method was firstly used by Ciriacy-wantrup in 1947, but Davis for the first time used this

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method experimentally in 1963. Cv method tries to determine the people willingness to pay in given hypothetical market scenarios. In other words, the cv method tries to know how respondents have willingness to pay in safe hypothetical market scenarios. At first glance, this method seems to be simple. In this method, a group of people is asked how much they have willingness to pay for certain goods. To use this technique, not only economic theories are needed, but also several other rules and systems are required in the field of sociology, psychology, statistics, and surveys. In the double selection method, it is assumed that that people have the following utility function.

$$U(Y.S) \tag{1}$$

Where U is indirect utility function, Y is the person income, and S is a vector of other socio-economic factors. Each visitor is ready to pay a part of his income to use environmental resource as the offered sum of A that this use causes utility for him. The created utility as result of using these environmental resources is more than the state in which he does not use environmental resources and it shows the following equation (Hhaneman 1984).

$$U(1, Y - A; S) + \varepsilon_1 \geq U(0, Y; S) + \varepsilon_0 \tag{2}$$

Where θ0 and θ1 are random variables with zero mean, which they are distributed randomly and independent with each other. The difference created in utility (Δ U) caused by using environmental resource is as follows:

$$\Delta U = (1, Y - A; S) - U(0, Y; S) + (\varepsilon_1 - \varepsilon_0) \tag{3}$$

The dual questionnaire structure in investigating the people willingness to pay has one dependent variable with double selection. The logit model was also used to study the effectiveness of various explanatory variables on WTP rate of visitors to determine the recreational value. According to the logit model, the probability P1 that person to accept one of the offers is stated according to the following equation (Haneman, 1984).

Where $F_{\pi}(\Delta U)$ is accumulative distribution function with one standard logistic $\tag{4}$ difference and it includes some of the socio-economic variables such as income, offered sum, age, sex, family size and education. θ, γ, β are estimable coefficients that it is expected to be $\theta \succ 0, \gamma \succ 0, \beta \leq 0$. There are three methods for the calculation of WTP value. The first method is mean WTP used to calculate the expected value of the WTP by numerical integration in the range of zero to infinity. The second method is total mean

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WTP used to calculate the expected value of the WTP by numerical integration in the range of -∞ to ∞, and the third method is partial mean WTP used to calculate the expected value of WTP by numerical integration in the range of zero to maximum offer (A). Among these methods, the third method is better, since this method maintains the stability and adaptability of the limitations with theory, statistical efficiency, and the ability to be summed, which it is calculated according to the following equation (Han, Lee, 2002).

$$E(WTP) = \int_0^{MaxA} F\eta(\Delta u)dA = \int_0^{\max A} (\frac{1}{1+\exp\left[-(a+\beta A)\right]}dA \qquad (\circ) \quad a = (a + \gamma Y + \theta S) \, \text{و}$$

Where E (WTP) is the expected value of willingness to pay and α^0 is adjusted intercept added to the main intercept (α) sentence through socio-economic sentence. To select the appropriate function form using non-nested test of MacKinnon, the equation 6 is estimated (Judge.et al, 1982).

Logy$_1$=b$_0$+Σ b$_1$log X$_{it}$ + θv$_1$ + e$_1$(٦)

After estimation of the above model, the coefficient of the variable v$_1$ is tested using parent test, and if the coefficient of this variable is significant, linear model is used, but if it is non-significant, logarithmic model is selected and it is used for next analyses. Finally, by placing the mean value of quantitative variables and mode value of qualitative variables in the selected regression model, the mean value of willingness to pay is obtained. The parameters of the logit model were estimated using maximum likelihood method. Data were initially were collected through researcher-made questionnaire and they were used to assess the variables in the field form. The final questionnaire as survey tool includes four parts. The first part included the socio-economic features of the respondents including age, sex, family size, education level, income, and occupational status .The second part will be designed to specify the living place and the third part will be designed for identify the promenade and recreational habits of the interviewees. The final part of the questionnaire will begin by giving information on objective of study and its benefits to interviewees. Then, some of the interviewees are given the initial price and one subsequent price offer following to first offer about willingness to pay. The content of the question is as follows. "Suppose that there is a way to manage and preserve the Chabahar coasts so that if people pay annual sum to company of water resources management through tax bills, this company will be able to preserve the coasts forever. Do you have willingness to pay b Rials of your income for this issue?

The population of this research included:

A population of tourism experts in the field of

Socio-cultural and political

Economic-Productive

And environmental

(B)The population of domestic and foreign tourists of the Chabahar determined as the second population

(C) The host community

(D) The population of environmental experts who are aware of environmental issues

Results and discussion

The view of people on the importance and value of Chabahar Bay and the necessity to preserve and conserve the beauty of coasts were evaluated. Among the respondents, 88% of them selected the option of very high and stated that preservation of the coasts beauty is necessary. In addition, 12 of them selected this option along with other options. The willingness of the people to preserve the environment was questioned that 94 % of them selected the option of very high and only 6% selected other options. In Table 1, some of the statistics and results obtained from estimation of model related to studied people are shown. It is noteworthy that variables such as age, family size, and occupation were eliminated from the model due to lack of significance, and variables such as education level, distance from living place, sex, income, and offered price were included in the model.

Table 1) results of estimation of tourists' willingness to pay function

Variable	Coefficient	SD	Statistic t	traction
Intercept	۱۰/۹۱۰***	۳/۱۰۶	-۲/۵۱	۲/۵۰۶
Questionnaire group	۰/۰۷۸	۰/۴۰۸	۰/۱۹	۰/۰۱۸
Distance from living place to sea	-۰/۰۲۲**	۰/۰۱۰	-۲/۱۸	-۰/۰۰۵
Age	۰/۳	۰/۰۲۷	-۰/۵۵	-۰/۰۰۴
Gender	-۲/۳۸۹***	۰/۵۹۴	-۴/۰۱	-۰/۵۴۸
Education	-۰/۳۹۲	۰/۳۰۶	-۱/۲۸	-۰/۰۹۰
Family size	۰/۰۵۸	۰/۱۴۰	۰/۴۱	۰/۰۱۳
Environmental tendencies Developmental index	-۰/۰۰۴	۰/۵۵۹	-۰/۰۱	-۰/۰۰۱
	۰/۲۲	۱/۲۷	۳/۸	۰/۴۳
Occupation	-۰/۴۶۳	۰/۵۵۲	-۰/۸۳	-۰/۱۰۶
Income	۰/۱۷۸*	۰/۰۹۲	۱/۹۴	۰/۰۴۱
Offered price	-۰/۰۰۰۰۲۴***	-۱/۰۵	۲/۷	-۰/۰۰۱

*,**, and ***are respectively significant at the level of 10, 5, and 1 percent

Likelihood Ratio statistic(L.R.Statistic)=440/32

Probablility (L.R.Statistic)=0/000

Mcfadden R-SQUARE=0/295

According to the information of Table 1, it is seen that most of the visitors had education level higher than high school, indicating that by increasing the education level of people, they will give much importance to Chabahar coast entertainments.

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The variable of sex indicated that females compared to males have less willingness to pay and the variable of income indicated that per one percent increase in income, the probability of willingness to pay would increase by 0.04%. Most of tourists have accepted the payment offer. In the case of price, it could be said that if it increases one percent, the probability of person willingness to pay would decrease by 0.001%. Regarding the distance from living place, it could be stated that one percent increase in distance (in km), the probability of the people lack of willingness to pay decreases by 0.005%. In addition, descriptive results of other variables suggest that 85% of tourists have stated the environmental tendencies very high and rest of them has stated high. According to Table (1), the offer coefficient was estimated according to expected mark (minus) and it became significant. Therefore, by increasing the offer, the probability of WTP acceptance decreases for tourists. It is seen that by one percent increase in the offered sum, the probability to accept this sum in willingness to pay to preserve the Chabahar coasts decreases for tourists by 1.5%. The coefficient of developmental index for tourists has positive and significant impact on the model.   In fact, it indicates that tourists are opposed to overfishing and petrochemical plant construction leading to environmental hazards. Environmental index coefficient is positive and significant for tourists indicating that they give great importance to the environment. Macfadden coefficient of determination indicates that the explanatory variables are well explained. In general, statistic LR shows the significance of model that is 99% significant. Our model and statistic R2 indicate that 43% of mean changes in willingness to pay are explained by independent variables. Then, the expected value of WTP was obtained after the estimation of model integration calculations in the form of equations (7) and (8):

$$WTP = 10.91 - 0.022 Dis - 2.389 Gen + 0.178 Y - 0.0034 Bid$$

$$WTP = 10.91 - 0.022 \times 88.8 - 2.389 \times 1.23 + 0.178 \times 6 - 0.0034 Bid$$

$$WTP = 7.084 - 0.0034 Bid$$

$$WTP = \int_{0}^{840000} 1/[1 + e^{-84.084 + 0.0024 Bid}] dBid = 328800$$

The annual recreational value of the coast is calculated according to the following equation:

Recreational value of coast=* ٣٢٨٨٠٠ number visitors per year

Recreational value= 2200*2000= 723360000 Rials

According to results of the study, 86% of the interviewees had the willingness to pay 723360000 Rials for using the coast, which it represents the importance of these locations for people. In

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addition, development, preservation, and revival of the existing environments can lead to increased welfare of people and attraction of tourists. In addition, findings represent that welfare and health facilities are not in good status. Therefore, according to view of visitors, this region has high potential in attracting the tourist due to recreational value of the coast. It is recommended that specified amount of money to be taken from visitors as entrance money in order to increase and improve the service of the region. In order to satisfy the visitors and to increase the welfare level of tourists and the number of visits of this coast, it is recommended that essential actions and measures to be taken, including eliminating the limitation for public visit, creation of recreational and sport locations such as pool, beach, playground, etc. on the sidelines or camp, construction of campaigns for settlement of families, creation of appropriate health services, and possibility of access to medical emergencies. It is recommended that Co2 environmental capital to be considered in the following studies.

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