

## **Economical, Heritage and Existential Evaluation of the National Park and Tandureh Protected Area Using the Conditional Method**

**Majid Abbaspoor<sup>1</sup>, Z. Abedi<sup>2</sup>, Aida Shariatmadari<sup>\*3</sup>**

<sup>1</sup>Department of Mechanical Engineering, Sharif University

<sup>2</sup>Environment and Energy, Science & Research branch, Islamic Azad University, Tehran, Iran

<sup>3</sup> Environmental Management, Tehran Research Center

\*Email: [aidashariatmadari@gmail.com](mailto:aidashariatmadari@gmail.com)

### **Abstract**

In this article, a research has been conducted using conditional method, aiming to economically, based on heritage, and existentially, estimate and evaluate the National Park and Tandureh protected area. The required data were collected through libraries and field visits and questionnaires answered by visitors of the National Park and Tandureh protected area. Gender, number of family members, distance and income affected people's willingness to pay and was statistically significant, and ultimately, the economical, heritage-based, and existential evaluation of the National Park and Tandureh protected area was determined by gathering information, collecting qualitative and quantitative data concerning the National Park and Tandureh protected area, visiting the park site, conducting and writing questionnaires, answering the questionnaires by the visitors, and determining the willingness to pay (WTP), and eventually by analyzing the collected information by using the Excel and Eviews.

**Keywords:** Contingent Evaluation, Willingness to Pay, National Park and Protected Area, Tandureh

### **Introduction**

Protecting the rivers, as a national treasure and one of the most important water sources in the fields of agriculture, economics, industry, transportation, health, drinking and entertainment is absolutely necessary. Therefore, it is mandatory to identify this region and evaluate the water sources, due to the fact that this region, because of its natural potentials and diversity, is considered as one of the most important parks of Iran, and a globally important region. Considering the fact that this region is one of the potential places for the growth of plants and different organics due its weather and geographical conditions, which are all closely related to the condition of water and water sources, it can be therefore stated that estimating the value of this region's water sources while considering the ecological and natural conditions, and preserving and protecting the various organic lives present there, is considerably important. The main purpose of this study, is evaluating the Tandureh protected area economically, heritage-based, existentially and based on the organic diversity of the National Park by using the conditional evaluation method.

### **Theoretical Framework**

The results of the study have been obtained by collecting information and qualitative and quantitative data related to the National Park and the Tandureh protected area, visiting the park, conducting and preparing the questionnaires, answering the questionnaires by the visitors, and determining the amount of willingness to pay (WTP) and finally analyzing the data using the subsidizing software, Eviews and Excel, and concluding the study.

## **Methodology**

### ***Conditional Evaluation***

This method was first used by Davis in 1963 in a study on the hunters on mines. But this method was no longer used until mid-70s, when it started to be developed. This method is one of the best and most controversial methods between those that are used in evaluating environmental endowments. Determining the economic value of water sources is as follows:

1) Raising awareness among respondents on the environmental matter under investigation (Collecting reports and documents and base maps and national and international books on the matter)

2) Creating a hypothetical market, which is the most important step. It is required that a hypothetical market be created so that the respondents can feel that they can purchase non-market products. (Conducting and preparing the initial questionnaire)

3) Determining the type of payment, which would provide a rational and decent method for the respondent to pay in hypothetical market conditions. (Providing the relevant forms of information and statistics collection to departments and related organizations)

4) Obtaining the recommended price is a step in which the respondents state their maximum WTP concerning the products and non-market services. (Analyzing the data)

5) Estimating the average WTP. (Obtaining results from answered questionnaires)

6) Investigating the effective factors on accepting the recommendations and WTP amount. (Offering practical suggestions for efficient management based on the findings of the study)

7) Overall data are processes which can transform average price suggestions to whole population evaluation. This evaluation contains all the factors concerning the matter, such as determining the value of the region's water and water sources. To accomplish this, the first step is choosing the study population. The second, is obtaining an average for the whole population, and finally, choosing an environmental benefit time period.

### ***Characteristics of National Park and the Tandureh protected area***

Tandureh national park is located at north-east of Iran, close to Turkmenistan, at 37 degrees and 20 minutes to 37 degrees and 33 minutes of geographical latitude, and 58 degrees and 33 minutes to 58 degrees and 54 minutes of geographical longitude.

Based on the segmentation set, Tandureh is located at the north of Khorasan-e-Razavi state, Dargez province. This region is located at Hari-Roud and Kashf-Roud catchment basin, and Daroungar river watershed. The highest point of this region is the Ghanbar-Ali peak at the south of the span with the height of 2586 meters, and the lowest point having the height of 884 meters is located at the northern part of the region. This region lacks any population centers, and only environmental monitoring stations of Chehel-Mir, Babanestan, Shekarab, Tivan, Darungar, Cherlagh, and Ali Balagh shrine inhabit there.

The Tandureh region does not have any important rivers, concerning its water resources, and springs are its main sources of water. The region's springs are not considerably resourceful, and only Chehel-Mir and Cherlagh spring have relatively more discharge and watering rates compared to other springs. The region's special biological state, soil structure, variations in altitude, the amount of rain and its type, fluctuations and heat has caused the vegetation to be quite diverse. Tandureh National Park is considered as a unique park, due to its environmental and biological potentials, biodiversity and samples of wildlife (Urial ram and ewe), territorial phenomena and other special characteristic. This park is made of a series of high and chained mountains, and does not have a specific mountain range.

### ***The Damaging Process in Tandureh National Park***

Tandureh National Park, as one of the most important national parks of Iran and also an internationally valuable park, is most vulnerable to the aggressions of dairy farmers and a lack support from related institutions. One of the considerable problems of the park is the matter of cattle and livestock, which day by day limits the biological realm of the animals and creates difficulties in their living conditions. Also, another destructive element of the park is the garbage some of the visitors leave in their wake.

Conditional Evaluation method is done by answering two-choice and multiple-choice questions, and is based on the maximum tendency of the respondents to pay. In this method, respondents, based on hypothetical ensured market scenarios, demonstrate that how much they are willing to pay for the protection of this project, or generally pay for the value of environmental products. The first step of this study is initially collecting information from national and international resources and departments and related institutions in Tandureh region. Then, a visit is made to the region, and questionnaires are conducted based on region conditions and characteristics of the people. In the initial phase of questionnaires, a few villages called Dargaz, Daghdar, Nokhandan, Tajodin, Kahu, Gharghiunlu, Yenge-Ghale, and Jashn-Abad from chosen from endemic parts around National Park and Tandureh protected area, and a systematic sampling was randomly done at these villages. Eventually, by resolving the problems of the questionnaire with the help of Kukran test, the number of questionnaires was determined as 69. For calculation, the Kukran Test formula defaults was used.

#### ***Defaults***

Confidence Coefficient= 95%

P=q=0.5

Z=1.96

D=0.1

D, here, is the error rate, and Z is the statistic equivalent of 1.96.

$$1) \quad n = \frac{Z^2 p q}{d^2}$$

$$= (1.96)(1.96)(0.5)(0.5)/(0.1)(0.1)=0.9604/0.01=96.04$$

In order to collect the required information, field, library and questionnaire methods were used.

After answering the questionnaires and attendance of personal interviews, the questionnaires were analyzed by the softwares Excel and Eviews, and from among all the questionnaires, 69 analyzable ones were determined.

### **Results and Discussion**

The lack of environmental resources is an economical problem, since in the case of its dwindling or loss, crucial resources will be lost that are unrecoverable. It is only possible to make a decision on how to use an environmental resource and ultimately judging whether the present losses of a resource are more than usual or not, when this gains and losses are analyzed and calculated correctly. And such an attempt requires that all values that are gained or lost under any conditions of using the particular resource be paid attention to.

As stated before, one of the advantages of CV method is investigating the effective factors on the economic value of the studied environmental resources. When people are asked about the value of natural ecosystem, they would answer based on variables relative to themselves. Therefore,

in stating people's WTP, these relative variables should be paid attention to. These results can be obtained by analyzing people's responses to questionnaires.

The highest number of respondents to questionnaires were between 20 to 30 years old, which it could be concluded that most of the visitors are either young, or are between 20 to 30 years old. As it can be witnessed in the case of the educational level of the respondents, most of them had a diploma, making up 43% of the population, and furthermore, 30% had a lower degree than diploma, 21% had their B.A, and 4.3 had their M.A.

The information collected from the questionnaires shows that men make up 47%, and women make up 52% of the visitors to the National Park and Tandureh protected area, and evidently women have a larger share compared to men.

33.3% of the people who believe the region's water is having an undesirable condition mostly have an opinion on the pollution of water; that there are leeches and environmental polluting materials in the water – garbage left in visitors' wake, and a lack of attention to environmental health conditions – and also a lack of rainfall and piping the water to agricultural pieces of land has intensified this problem and caused severe water pollution.

In the case of authorities' efforts, and what has been done to alter the situation, most respondents to questionnaires believed that nothing has been done, making up 72% of the population, and 17.3% believed that only water piping has been done. Concerning the dependence of plants to water resources, due to the fact this region has various and different kinds of plants, and in some cases medicinal plants, it can be stated that all the plants in this region are dependent on water. The results obtained from questionnaires on the dependence of plants to water was as following: 73.9% agreed with 75 to 100 percent dependence of plants to water, 17.3% agreed with 50 to 75 percent dependence, and 8.6% believed in 25 to 50 percent of plant dependence. In the case of animals' dependence, 76.8% believed in 75 to 100 percent dependence of animals to water sources, and 8.6% believed in 25 to 50 percent dependence.

Since the Tandureh protected area hosts various species of animals, and also rare and unique species such as leopard, ewe, ram, fawn, various birds, reptiles such as snake and viper and etc. which the survival of these species depends on water and water resources, therefore, it is not illogical to conclude that the animals are highly dependent to water sources.

The results of questionnaires concerning the dependence of aquatics to water resources was so that 84% of the population believed that 75 to 100 percent of the aquatics are dependent to water, and 15.99% believed that less than 75 percent of aquatics are dependent to water sources.

In the first part in which social conditions and personal characteristics of respondents were analyzed, it became evident that most of them were quite young; 2.8% had less than 20 years, 43.4% were between 20 to 30 years, 28.9% were between 30 to 40, 15.94% were between 40 to 50, 7.2% were between 50 to 60, and 1.4% had more than 60 years.

Calculating water conservation values for the growth of different plants and preserving the region's ecosystem and biology and various species is the main purpose of this study, and investigating the economic value is an attempt to determine the value of National Park's and Tandureh protected area's water resources. However, the main criterion for determining evaluation calculations are the answers that respondents gave in response to the questionnaires. In this part, these values are determined.

The results for the average value per liter of water state that respondents are willing to pay a minimum of 500 Rials and a maximum of 10000000 Rials. The sum of amounts stated is 39687000 Rials and an average of 57517.39. Now, to obtain the existential value of each liter of National Park's water and Tandureh protected area, we must multiply value averages times the population

living in Dargaz Tandureh, which the number is 41414. The average obtained existential value for each liter of water is 23.82.

The results for the average value of preservation and conservation of biodiversity for each liter of water show that the respondents were willing to pay a minimum of 40 Tomans and a maximum of 1000000. The sum of the amounts stated is 32857400 Rials and the average is 47619.42. To obtain the biodiversity conservation value for each liter of National Park's and Tandureh protected area's water, we must multiply the value averages times the population living in Dargaz Tandureh, which the amount is 41414. The biodiversity preservation value average obtained is 19.72.

The results for the average value of preservation and conservation of plant diversity for each liter of water shows that the respondents were willing to pay a minimum of 300 Rials and a maximum of 1000000. The sum of amount stated is 3264880, and the average is 47317.10. In order to obtain the plant diversity value for each liter of National Park's and Tandureh protected area's water, we must multiply the value averages times the population living in Dargaz Tandureh, which the amount is 41414. The plant diversity preservation value average obtained is 19.59.

The results for the average value of preservation and conservation of water organics diversity for each liter of water shows that the respondents were willing to pay a minimum of 400 Rials and a maximum of 1000000. The sum of amount stated is 2321990, and the average is 33652. In order to obtain the water organics diversity value for National Park and Tandureh protected area's water, we must multiply the value averages times the population living in Dargaz Tandureh, which the amount is 41414. The water organics diversity preservation value average obtained is 13.93.

The results for the average heritage value for each liter of water show that the respondents were willing to pay a minimum of 5000 Rials and a maximum of 10000000. The sum of amount stated is 15125450, and the average is 219209.42. In order to obtain the heritage value of National Park and Tandureh protected area's water, we must multiply the value averages times the population living in Dargaz Tandureh, which the amount is 41414. The water heritage value average obtained is 90.78.

### **Conclusion and recommendation**

The average existential value for each liter of water equals 23.82 of average preservation and conservation of biodiversity value, 19.72 of average preservation and conservation of plant diversity value, 19.59 of average preservation and conservation of water organics diversity value, and 13.93 of average heritage value. The overall amount is 167,840 Rials, equaling the total economic, heritage, existential and biodiversity of National Park and Tandureh protected area.

- Iran's protected areas, such as Tandureh protected area, are deemed highly important. They have numerous benefits, such as softening the air, preserving and protecting different and rare animals. Better and more determined steps must be taken in order to preserve this region, steps that require a comprehensive management.

- Development of general education regarding health care among people – preserving and protecting the environment and preventing any damage being done to the region, would all be effective steps to take in directing more attention to this region (National Park and Tandureh protected area).

- Utilizing legal and administrative instruments in order to preserve and improve the quality of region's water.

- In the case of continuation of incorrect water use, the process of destruction of vegetation cover will still hold strong and continue. It is suggested that economic evaluations be



done in this case, and the costs of damages done to vegetation cover around the National Park and Tandureh protected area be calculated, and required measures be taken to fix this matter.

- Since water is the very necessary element in protecting organic life, and all life is dependent on water, it is suggested that measures be taken in order to preserve the valuable species of the region by the authorities.
- Uncontrolled use of water and water resources and polluting them will cause the obliteration of water organics of the region. Therefore it is suggested that the correct use of this god given resource be taught to the people, so that future generations also be able to use it.
- Regarding the fact that this water is used through piping, and considering that the lack of water resources and rainfall has caused dehydration in springs, it is highly important that a thorough protection and observation be done in this case, and certain rules be set.
- It is suggested that more and further studies be done regarding evaluating the water resources of the National Park and Tandureh protected area.

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