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Economic Benefits of Karoon River: Does the Society Have Willingness to Pay to Conserve it?

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EXTENDED ABSTRACT

INTRODUCTION

Karoon River is one of the most important rivers in the south and southwest of the country, which plays an influential role in electricity generation, cultivation of various agricultural products, and water consumption in many cities of Khouzestan province. However, despite the great importance of this river, it has suffered from inefficient management and erratic withdrawals, dams without basic studies, and inefficiency in water use in recent years. Today, there is a discussion about transferring water from Karoon springs for drinking to other provinces, which will definitely be non-optimal without considering the actual value of the river water and taking advantage of the market mechanism. All these problems are in the absence of knowledge of the true value of this river as a natural gift. This study tried to extract the indirect benefits of the Karoon River for a small part of its users, i.e., the residents of Ahvaz city, by using the economic value selection modeling method. Obviously, by involving the whole community with the benefits of this river and demonstrating its other benefits, the numbers obtained will be much larger and more accurate. This issue can be the primary goal of future research.

METHODOLOGY

A modeling technique was selected to extract the value of river characteristics, and the Logit model with random parameters was used in two simple and compound forms. There are three steps for choosing a model. The first step is to identify the non-market characteristics of the Karoon River. Then, the selection sets should be specified in the next step, and finally, the relevant questionnaire should be designed. To this end, it was sought to make the most of the experimental background of the research and select the features in such a way as to ensure the necessary compatibility. This study determined the salient features of natural happiness, biodiversity conservation, ecological function, and educational function of the Karoon River. In the third step, for each of the features, three levels were considered. The first level or base level showed the current quality of the river services. The following two levels provided the average and good river quality services compared to the current situation.

Given that this study aims to calculate changes in people's well-being, a monetary option was also posed as the last question. This economic value was calculated based on the entrance cost to national parks in Iran and consulting with experts from the Environmental Protection Organization of Khouzestan Province. The prices used in this study were set at 0, 45,000, and 70,000 Rials, respectively. The required data were collected by completing the questionnaire from households in Ahvaz city in 2015. To design the modeling, five cards were selected. The method of creating the cards was to use the deficit design technique and eliminate unlikely situations in the SPLUS software. Ten different modes were chosen between the four characteristics of the river and the cost of protecting it. Unexpected situations are either a low level of the river feature with a very high conservation cost or a high level of quality with a meager conservation cost. The ten modes obtained in 5 cards had two Z and T scenarios and a basic scenario. To use the opinion of academic experts and improve the quality of the cards, some members of the faculty of environmental economics were interviewed. The cards were accordingly modified and distributed to some (randomly selected) respondents to examine their transparency and comprehensibility. After reviewing the collected cards and collecting the comments of the experts of the Environmental Protection Agency, the cards were finalized. In the present study, the RPL model was used in two simple forms and with action (compound) variables to control the heterogeneity in people's preferences. The collected data were entered into version 12 of the STATA software to estimate the variables and evaluated by the models' maximum correlation method. The results showed that all coefficients (except C3) were statistically significant in the simple model and had the expected sign. The positive sign of the coefficient of river characteristics showed that with the improvement of the river's qualitative aspects, the people's desirability increases. Also, the negative sign of the cost of protection showed that by paying for the protection of the river, people's desirability is reduced. The correlation ratio showed that the null hypothesis of all variables was simultaneously rejected at the level of 1%, and the model was of sufficient validity.

FINDINGS

Comparing the correct logarithm for the two simple and compound RPL models, the superiority of the compound model over the simple model was revealed. With the introduction of action variables into the basic model, the logarithm of correlation decreased from -690-38 to -57.685. Also, based on the correlation ratio of the null hypothesis, all coefficients were rejected at the level of 1% at the same time, and the composite model had sufficient validity. Based on the significance of the coefficients and their sign, the action model was superior to the base model. All the river characteristics, including the natural landscape, ecological function, biodiversity, and educational function, were

positive. The positive sign of these coefficients showed that if any of the characteristics of the river had improved, the responsiveness to the baseline would increase. Also, all of these variables are statistically significant at 1%, 5%, and 10%. The price variable was significant at the 1% level and had a negative sign indicating that respondents preferred to participate in conservation programs that did not require additional costs. Therefore, the negative sign of the payment coefficient indicated its negative effect on the desirability of the individual. Based on the results, by dividing the coefficient of river characteristics by the cost coefficient in the composite RPL model, the willingness to pay the final fee for each characteristic was extracted. The willingness to pay the final exchange between money and the desired feature is assumed to be stable. In other words, the final rate represents the substitution between river characteristics and cost variables. For example, suppose the river's natural landscape improves from an unacceptable to a less satisfactory state (A2). In that case, each of the river's indirect users is willing to pay an average of 12,7810 Rials per month (equivalent to 153,3720 Rials per year). The greatest desire to pay indirect users is related to ecological performance at a reasonable level. The willingness to pay a good level of 212270 Rials per month was achieved for this river feature.

To calculate the annual social benefits of the Karun River, the numbers obtained for marginal willingness to pay for all features were generalized to the total population enjoying them. The number thus obtained was a deduction of the annual social benefits of the Karoon River gained from its quality and non-market services. Therefore, multiplying the population of Ahvaz city (1450,000 people) by the combined marginal willingness to pay for all features at a reasonable level, the annual social benefits resulting from the indirect use of the Karoon River were calculated to be 1249 billion Rials. But the annual social benefits do not reflect the capital value of the river, as these benefits will continue each year and continuously for an extended period of time. Hence the numbers obtained were reduced for a long period. The real interest rate of agriculture and natural resources (20%) was used without social discount rates. The capital value of the indirect use benefits of the river was equal to 19825 billion Rials. Of course, the numbers obtained are only from the valuation of the benefits of the indirect use of the river. Obviously, suppose in future studies, other advantages of the river, both used (direct and potential) and non-used, are calculated and added to the number obtained from this study. In that case, the value of the capital of Karoon River will be more obvious.

CONCLUSION

The results of this study can be used as a baseline study in environmental policymaking. Among them, the results of this study can be used in the economic-environmental assessment of projects that will be implemented in the riverbed or connected with it in the future. Failure to conduct such evaluations will lead to inefficient allocation of river resources and will have detrimental environmental effects such as dust.

The issue of river water allocation should also be considered according to its economic value. Any allocation between water bodies by the government would be a non-optimal allocation, and the mechanism of inter-provincial water markets should be used in this regard. The results of this study can be considered a basis for determining the price of water in this market because the obtained figures reflect the willingness of people to pay for the benefits of the Karoon River. Of course, pricing and valuation methods are very diverse, and this research does not claim to be superior to other processes in the literature.

This study aims to estimate the value of the indirect benefits of the Karoon River for the residents of Ahvaz city.

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