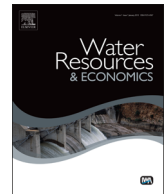




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Determining public attitudes and willingness-to-pay for artificial lakes protection

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ABSTRACT

This study explores factors influencing people's willingness to pay (WTP) for protecting an artificial lake. WTP was derived from a face-to-face survey of 564 recreational users of Plastira Lake, one of the most important constructed wetlands in Greece. Key elements in this research were the uses of adequate econometric models to tackle protest answers and of a scale for measuring the dimensions of Total Economic Value of a water resource. The results indicated relative importance of particular value components in determining water resources conservation preferences and individuals' willingness for protecting them. We extract four factors (water use, production, flora and fauna and quasi-option values) and explore their influence on respondents' WTP. Various demographic variables together with the extracted factors show a strong impact on WTP and the specific amounts stated. The study contributes to understanding of values underlying conservation decisions and help policy makers promoting strategies for protecting water resources.

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1. Introduction

Effective public environmental policies should reflect an understanding of the public's values. Then again many times problems with functions and productive capacity of natural ecosystems are results of human attitude towards natural environments [67]. According to Rokeach [78] a solution to this problem is to explore human values towards natural areas, based on the theory that behaviors are influenced by values. Leitch and Hovde [57] claim that water ecosystems can be valued from several perspectives that lead to at least four different types of value: owner, user, regional and social. For all that, many researchers investigating different aspects of humans' environmental behavior have failed to explain the motives behind the

behavior and environmental concern of different groups of people (Kempton et al., 1995; [12]).

On the other hand sometimes the type of water resources could determine the way that individuals value them and artificial water ecosystems may have higher direct than indirect use values [96]. This information may help the design of effective environmental policies by understanding the benefits and costs of proposed actions and their alternatives. Protection and sustainable development of lakes and water ecosystems require efficient policies based on knowledge about their value among different classes of societies and different uses. So it is important to understand the relationship between people's level of environmental concern and the types of behaviors they are likely to support as well as the way in which individuals hold environmental values in water resources.

Successful protection plans entail the dynamic involvement of local societies in decision-making practices in addition to alterations in awareness in order to combine

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local improvement with environmental conservation [27,32,77]. Indicative features influencing residents' awareness and actions regarding the protection of areas take account of the level of trust towards institutions in charge for environmental management and their effectiveness [13], the modifications entailed throughout the designation of an area to be protected [31] and the level of knowledge among residents and their individual attribution [73].

Based on a range of environmental values and people's characteristics the present study tries to explore people's attitude and opinions towards an artificial lake. The aim of this study is to investigate the influence of environmental attitudes and social factors in the decision of individuals to pay for environmental protection improvement. The contribution of this paper to the literature is threefold. First, it explores the way in which people held economic value to water resources and investigates the motives behind their attitude against management strategies through the use of a proposed scale for measuring water resources' total economic value. It also aims to investigate the determinant factors that affect respondents' willingness to pay (hereafter WTP) for artificial lake conservation. Finally, using adequate econometric model formulations that take into consideration the protest answers we show that there are changes in the influence and the signs of the explanatory variables compared to the usual simple binary model formulations.

This paper contributes to the existing literature in exploring the motives for public goods and natural resources valuation. The use of the proposed scale help to understand the motives behind people's decision to assign economic values to natural environment and the use of adequate econometric model formulations to show how protest answers influence people WTP. The understanding of the correlation between environmental attitude and social-behaviour can help managers and policy makers to adapt more effective practices to environmental conservation. On the other hand the use of the proposed scale contributes to the understanding of the classification of environmental values and provides more evidence about the disagreement for some environmental values (like existent and option values).

To our knowledge there is no study investigating the influence of various motives such as individual preferences and opinions about the total economic value of an artificial lake, the influential factors affecting the WTP for its protection as well as the effect of protest beliefs. As a general contribution of this paper, we provide new evidence that helps filling the gap in the literature of total economic value of water resources, which has focused mostly on motives behind people's attitudes against management strategies.

The structure of the paper is the following. **Section 2** provides the background information of the existing relative literature while **Section 3** discusses the study area, the survey design and the econometric and statistical methods proposed to tackle the problem. Specifically, it discusses the logistic regression together with the Tobit, standard double-hurdle model and its Box-Cox transformation. **Section 4** presents the empirical results obtained together with the principal components analysis used to measure different public perceptions of total economic

value and the adopted econometric models. This section ends discussing the meaning of these results in relation to the existing relative literature. The last section concludes the paper raising a number of policy implications associated with the extracted results.

2. Background

Economic valuation of water resources depends on human perspectives about what impact they have on their wellbeing. Although wetlands are among the most life supporting ecosystems the rate of loss of wetlands is very important for the balance of ecosystems mainly because people do not value wetland goods and services in economic and monetary terms. Valuing all lake's benefits (goods and services) is a challenge and many times these ecosystems are undervalued as people cannot realize the range of products derived from them. People are not familiar with all goods and services provided by interactions among wetland characteristics (biological, chemical and physical), structure and process [90].

Previous psychometric research has commonly identified broad orientations, or collections of values from the data. Anthropocentric (human centered), bio centric (ecosystem centered) and egocentric (self-centered) orientations have been identified [37,85]. Although orientations seem to be useful, they have been unable to explain why groups such as farmers and wildlife managers possess similar orientations but widely divergent behaviors [12]. A typical approach to explain why individuals place values on a natural resource is based on distinguishing between those who use the resource and those who do not [30].

The present research uses the Total Economic Value (TEV) framework to represent the broad range of human perspectives towards an artificial lake. Various classifications have been developed for instrumental values. Specifically we have adopted a system used by environmental economists that has six categories: direct use value, existence value, indirect use value, option value, bequest value and quasi-option value [6,72]. The valuation system can be used both to natural and artificial lakes.

Artificial lakes are made aiming to substitute a natural lake's functions as water storage, flood retention, and water quality improvement for human benefit [48]. They are also constructed for replacing natural lakes' ecological functions and may additionally provide a range of services like support of recreational activities or aesthetic services [9]. According to the results of a meta-analysis of 418 studies constructed and marine wetlands are more highly valued compared to other wetland types [33]. Sometimes artificial water ecosystems have higher direct use values by their construction than indirect use values [96]. Water quality improvement, non-consumptive recreation and provision of natural habitat and biodiversity provide the most valued of constructed ecosystem services [35].

The number of studies valuing the economic values of artificial wetlands is rather limited. The majority of them evaluate some of artificial wetlands' benefits or services (like water quality improvement service, recreational benefits, flood protection, water supply, enhancement of

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