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Exploring social attitude and willingness to pay for water resources conservation

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ABSTRACT

This research advances the understanding of people's attitude towards water resources valuation. Specifically, it aims to improve confidence in the interpretation of people's willingness to pay (WTP) for water resources protection by enhancing understanding of value relationships. Primary data were obtained from a sample of 510 people living in and visiting the Pinios River in the eastern part of central Greece. Respondents' behaviour was explored by measuring and comparing use and non-use values with the help of a proposed constructed scale for measuring the dimensions of total economic value of a water resource. For this purpose, a combination of applied methodological research techniques like principal component and cluster analyses together with logistic regression was used. The results indicated the relative importance of particular value components in determining water resources conservation preferences, as well as individuals' WTP for protecting them. We have extracted four factors and explored their influence on respondents' WTP and the general attitude towards the area. There were high associations between WTP of individuals towards river protection in relation to their characteristics (like education, income and origin).

1. Introduction

In the last decades there has been an increasing concern about the valuation of ecosystem services because of the potential importance that such values may have in influencing effective public environmental policies. The economic valuation of water resources offers all needed information on the value of water availability, quality and application in alternative uses helping in decision making (Saliba, Bush, Martin, and Brown, 1987; Colby, 1989) and providing an estimation about the costs and benefits of any development projects (de Groot et al., 2006; Turner et al., 2000; Barbier, Acreman, and Knowler, 1997).

In addition to that, values of ecosystem services may provide a link between human behaviour and decisions making for natural systems (Howarth and Farber, 2002) while this link had not yet been determined (Ajzen and Fishbein, 1977; Axelrod, 1994). A large body of research has built up on the issue of what explains human values towards natural areas (Shiell and Rush, 2003; Winter et al., 2003; Winter and Lockwood, 2004; Garcνa-Valiñas et al., 2012; Rulleau and Dachary-Bernard, 2012). Most of it focuses on individual environmental values while an increasing number of studies focus on stated willingness to pay (hereafter WTP) for protecting the environment (Dietz, Fitzgerald, and Shwom, 2005).

Rivers play an important multi-dimensional role on human well being. They can provide many services to humans, including water supply for municipal, industrial and agricultural users, fish habitat and recreation. Some of them are competitive because of the private use, in some cases, of river basin. Perhaps the most important issues in water resources management is their economic valuation because of the potential importance they may have in influencing public opinion and policy decisions (Loomis et al., 2000).

For exploring the river economic value, a sample consisting of different groups of people (visitors and residents) was collected. The contribution of this paper to the literature is twofold. First, it adds to the understanding of the relationship between individuals' general concern for environmental use and conservation. For this task a constructed scale is proposed to measure different environmental values. Second, it contributes to the increasing number of economic valuation studies which investigate the economic value

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of conservation and improvement of water resources quality in general.

More specifically, our current work aims to contribute to research by explaining the links between water resources values, human beliefs, norms and environmental behaviour by providing a way for valuing changes in water resources quantity and quality. To this end there are specific objectives: first, to develop a model for identifying the range of held values across different groups of people for a natural area's future and investigate the range of values of a wetland ecosystem. Second, to identify some of the factors (or variables) shaping the values of individuals for natural. And finally to reflect the way in which people's socioeconomic and environmental characteristics intervene with individuals' preferences for environmental protection and future management.

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 and explains the survey design statistical methods proposed to tackle the problem. Section 4 presents the empirical results obtained together with the analysis used to measure different public perceptions of total economic value. This section ends with a discussion of 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 results and discusses future research directions.

2. Background

While the importance of environmental quality has been certified measuring its economic value has been proved a difficult task for economists (Steinnes, 1992; Halkos, 2013). The difficulty comes from the fact that is hard to estimate the economic value of some environmental goods and services (such as biodiversity, aesthetic beauty of wetlands, etc.) without market prices. Sometimes estimating the monetary value of such goods and services can be costly and difficult in practice (Engel, Pagiola, and Wunder, 2008). The water quality is assigned as suitability for providing recreational activities and for supporting wildlife and plant populations (Del-Saz-Salazar, Hernández-Sancho, and Sala-Garrido, 2009). The decisions on how to manage water quality could be based on benefits (private, social or ecological) that could arise (Johnson, Moran, and Vintenc, 2008). On the other hand the costs involved in the improvement of water quality arises quandary if some alternative use of the money would be more beneficial.

A water quality improvement in surface waters generates a wide variety of economic and social benefits (market and non market). Some of them are not related with the actual use of water resources and are known as non-use values which correspond to a wide range of motivations for people to value environmental improvements in water resources despite their use.

A number of studies tried to explain behaviours and attitudes against management strategies from different groups of people (like farmers, wildlife managers and biologists, loggers and environmentalists) in relation with values that hold to natural environment (Steel, List, and Shindler, 1994; Kempton, Boster, and Hartley, 1995; Bjerke and Kaltenborn, 1999).

A solution to the problem of environmental quality degradation is based on human values towards natural environment, of the theory that values influences people's behaviour (Rokeach, 1979). The link between human behaviour (beliefs, attitudes, social concepts and motivated actions) and decision making for natural systems was the subject and was empirically described in a number of studies related to natural resources management (Manning, Valliere, and Minteer, 1998; Schultz and Zelezny, 1999; Schwartz, 1994; Stern and Dietz, 1994; Stern et al., 1999; Vaske and Donnelly, 1999; Halkos and Matsiori, 2012a). On the other hand, a number of studies tried to describe and explain the different behaviour between different groups of people (like farmers, wildlife managers, biologists, loggers and environmentalists) for supporting management strategies (Kempton et al., 1995; Steel et al., 1994; Bjerke and Kaltenborn, 1999).

People hold values to environment based on their relationship with emotional acting by pure anthropocentric to pure biocentric and ecocentric motives (Dunlap and Van Liere, 1978; Stem et al., 1993; Axelrod, 1994; Steel et al., 1994; Kempton et al., 1995; Bjerke and Kaltenborn, 1999; Edwards-Jones, Davies, and Hussain, 2000; Lück, 2003). Anthropocentric motives lead to the environment's instrumental value (the most common and easily understood value), while biocentric and ecocentric philosophies attribute intrinsic values to the environment.

In the existing literature, when trying to explain why individuals place values on a natural resource, a typical approach is to distinguish between those who use the resource and those who do not (Freeman, 1993). As a result, total economic value is not only use value, but the sum of both use and non-use values. The total economic value (hereafter TEV) framework in the context of water resources is divided into six categories: Direct Use Value, Existence Value, Indirect Use Value, Option Value, Bequest Value and Quasi Option Value (Pearce and Turner, 1990; Spurgeon, 1992; Hanley and Spash, 1993; Pearce and Moran, 1994).

Moreover there is a strong relation between people's WTP and environmental improvement. The economic benefit of water quality improvements is society's WTP for increases in water quality. The Contingent Valuation Method (CVM) is the best known and most widely applied stated preference technique for measuring the TEV (Mitchell and Carson, 1989; Arrow et al., 1993; Carson, Flores, and Meade, 2001; Alberini et al., 2005). According to Mitchell and Carson (1989) CVM uses hypothetical survey questions to what people are willing to pay for specified improvements of public goods.

However, in the last decade, the method has been increasingly applied for valuation of river quality and for measuring WTP for its provided services such as increases to ecosystem services (Boyle, Bishop, and Welsh, 1985; Loomis et al., 2000; Paulrud and Laitila, 2004; Ojeda, Mayer, and Solomon (2008); Barton and Taron, 2010; Kataria, 2009; Birol and Das, 2010; Wang et al., 2010), water quality (Desvousges, Smith, and McGivney, 1983; Desvousges and Smith, 1987; Mitchell and Carson, 1989; Bockstael, McConnell, and Strand, 1989; Green and Tunstall, 1991; Andrews, 2001; Bateman, Day, and Georgiou Lake, 2006; Imandoust and Gadam, 2007; Jones, Sophoulis, and Malesios, 2008; Hitzhusen, 2008), recreational benefits (Daubert and Young, 1981; Brookshire and Smith, 1987; Green and Tunstall, 1991; Sanders, Walsh, and Loomis, 1990; Sanders, Walsh, and McKean, 1991; Duffield, Neher, and Brown, 1992; Weber and Berrens, 2006), enhancing flow (Willis and Garrod, 1999; Garrod et al., 1996; Douglas and Taylor, 1998; Ojeda et al., 2008) and restoration of river's ecosystem (Zhongmin et al., 2003; Collins, Rosenberger, and Fletcher, 2005; Weber and Stewart, 2009; Bliem and Getzner, 2012).

In Greece, to our knowledge, there is no other study exploring the motives behind people's behaviour towards river values.

3. Materials and methods

3.1. Study area

Pinios river is the third longest river in Greece and rises in the Pindos mountains in central Greece at Thessaly region. According