



## Analysis

# Measurement of Bequest Value Using a Non-monetary Payment in a Choice Experiment—The Case of Improving Forest Ecosystem Services for the Benefit of Local Communities in Rural Kenya

Iason Diafas<sup>a,\*</sup>, Jan Barkmann<sup>a</sup>, John Mburu<sup>b</sup><sup>a</sup> Faculty of Agricultural Sciences, University of Goettingen, Büsgenweg 5, 37077 Göttingen, Germany<sup>b</sup> Centre for Development Research, University of Bonn, Walter-Flex-Straße 3, 53113 Bonn, Germany

## ARTICLE INFO

## Article history:

Received 19 June 2016

Received in revised form 29 April 2017

Accepted 2 May 2017

Available online 12 May 2017

## ABSTRACT

This paper adds to the limited literature on the bequest value of environmental resources. A choice experiment (CE) was carried out in order to estimate the economic value of changes in ecosystem services that impact on the welfare of rural communities in the vicinity of a rainforest in Kenya. Our results demonstrate that, in addition to valuing immediate benefits, respondents were willing to pay 1750Kshs for the use of forest resources by posterity. The results also establish that the chosen non-monetary payment vehicle was not evaluated differently to a standard cash payment.

© 2017 Elsevier B.V. All rights reserved.

## 1. Introduction

Despite the burgeoning use and diversity of stated preference techniques in the valuation of environmental resources (CE) in developing countries, the majority of cases share a couple of traits: First, the focus is largely on estimating direct and indirect-use values. Estimates of non-use values, on the other hand, have been fewer in comparison (Bennett and Birol, 2010). Moreover, attempts to estimate non-use values are thus far found mainly in the Contingent Valuation (CV) literature.

Non-use values are but one component of the Total Economic Value (TEV) concept. What sets them apart from direct and indirect use values is that they reflect economic value in addition to, or independently of that which arises from a resource's use. Thus individuals may make little or no use of a given environmental resource but would nevertheless feel a 'loss' if it were to vanish (Turner et al., 2003). According to the respective motivations, non-use values are often treated either as option, existence or bequest values. Option value relates to the willingness to pay a premium to retain an asset in order to keep alive the option to use it at some point in the future. This premium is to be paid in addition to consumer surplus from actual use (Walsh et al., 1984). Existence value is the willingness to pay (WTP) to secure the existence of a natural resource/species even though no use of it is expected; and bequest value

represents the economic importance that people attribute to the preservation of an environmental asset for future generations. Whether or not these generations actually use the asset is irrelevant. What matters is the knowledge that future generations will have the opportunity to do so, should they please.

Despite these value definitions, the distinction between the TEV sub-components is not always clear-cut in practice. This is due to the fact that they arise from environmental changes that may affect people's welfare, yet they are not reflected in any observable behavior. Nevertheless, the importance of non-use values has been repeatedly documented in a number of valuation studies, probably the most well known of which, the Exxon Valdez damage assessment (Carson et al., 2003), confirmed people's WTP for a resource or place they might never get to use or even see firsthand. Other studies have also attempted to estimate non-use values. While some of them make no distinction between the three types of non-use values (Adamowicz et al., 1998; Rolfe et al., 2000; Casey et al., 2008), others have actually attempted to assign the inferred WTP to a specific type (Rolfe and Windle, 2005; Walsh et al., 1984; Langford et al., 2004; Vesely, 2007; Cerda et al., 2013). What such studies have in common is that they are mostly carried out in mid to high-income countries. Unfortunately the quantification of non-use values in low-income and subsistence economies has been, to our knowledge, very limited to date. According to O'Garra (2009), this fact may reflect a pervasive view that non-use values can only be held by rich people, which is the flip side of the commonly-held view that low-income countries are too poor to be green.

To the best of the authors' knowledge, there are only a handful of published CE studies on economic estimates of non-use values in low-income settings. In the earliest one, Casey et al. (2008) used a choice

\* Corresponding author.

E-mail address: [iason.diafas@pbl.nl](mailto:iason.diafas@pbl.nl) (I. Diafas).<sup>1</sup> Present address: Baarsjesweg 271/3, Amsterdam 1058AD, Netherlands.

experiment to test whether rainforest communities by the Amazon River hold economic values for ecosystem preservation independently of direct impacts of environmental change. They found that the surveyed communities demanded significant amounts of compensation for oil-related environmental damage, which was on top of compensation required for any direct damages as a result of loss of access to productive resources. The authors do not, however, ascribe the estimated amount to any particular sub-component of non-use value. By contrast, two other studies focus on the estimation of bequest value (O'Garra, 2009; Oleson et al., 2015). Interestingly, both of them set out to estimate bequest values held among indigenous fishing communities; one in Fiji (O'Garra, 2009) and the other in Madagascar. The Fiji study used a CV in order to estimate bequest values to local users of a traditional fishing ground on the Coral Coast of Fiji. The Madagascar study used a CE to estimate fishermen's WTP 'for cultural bequest gains from management actions in a locally managed marine area' (p. 104). These gains were framed as the number of future generations that will be able to maintain the local cultural identity, known as *Vezo*, if certain marine management measures were to be enacted.

The other feature commonly encountered in the overwhelming majority of CE studies is willingness to pay (WTP) being almost universally elicited using monetary means of payment. This is in contrast to a growing body of work in the Contingent Valuation (CV) literature where WTP has been expressed in forms other than money.

The justification for the use of non-monetary payment vehicles is usually the subsistence nature of the surveyed population coupled with an absence of an organized market economy. Eom and Larson (2006) argued that economic theory would suggest that when choices are constrained by time and money, welfare values can be elicited using either monetary or in-kind forms. Some of the CV studies using in-kind payment vehicles have used tangible goods as payment methods, such as bags of rice (Shyamsundar and Kramer, 1996; Akter et al., 2007) and maize (Sutton et al., 2002). However, the most commonly used non-monetary payment vehicle has been *time* contributed to various activities aiming at the delivery of certain goods and services (Khorshed and Marinova, 2003; Mekonnen, 2000; Swallow and Woudyalew, 1994; Echessah et al., 1997; Hung et al., 2007). With regard to CE studies, it is only in the work of Rai and Scarborough (2013) that a non-monetary payment, namely *labour*, is used to estimate WTP to mitigate damages caused by invasive plant species in rural Nepal. Our study adds to the very limited body of CE studies using non-monetary payment vehicles.

In fact, it is the first CE in the literature to estimate bequest value by employing a non-monetary vehicle. In particular, the study adopts a locale-specific payment vehicle in order to elicit rural households' WTP for improvement in a number of goods and services that these communities enjoy thanks to their proximity to Kakamega forest in Kenya.<sup>2</sup> One of the many benefits afforded to the local communities is the supply of a wide range of timber and non-timber forest products (TNTFPs). Normally, the economic value of these products falls under the direct-use value component of TEV. However, it is the economic value that the households place on the supply of TNTFPs *well into the future* that this study quantifies, thus giving rise to the bequest-value component.

The remainder of the paper proceeds as follows. The next section provides information on the case study area, followed by sections on the study design, methods used and presentation of results. It then concludes with a discussion of the findings.

## 2. Study Area

The study was carried out in several locations around Kakamega forest in Kenya. Kakamega forest is situated in the Lake Victoria basin on the easternmost edge of the Central African rainforest area about

40 km north of Kisumu. It is one of the remnants of the equatorial Guineo-Congolese rainforest in the Eastern fringes of Africa (Government of Kenya, 2001). Kakamega forest is known for the high levels of biodiversity characterising its plant and animal communities. It is home to some of the most rare flora and fauna in the East African region, as it hosts a large number of rare primates, a stark variety of butterfly species and some endemic plant species.

With an average population density of 515 people per km<sup>2</sup>, the Kakamega district belongs to some of Africa's most densely populated rural regions (KIHBS, 2006). The biggest town in the area is the forest's namesake, Kakamega town (population 39,000). The majority of the population is engaged in agriculture, mainly as subsistence farmers. The area surrounding the forest is used intensively for growing sugar cane, maize and tea. The forest itself is used by local communities for the collection of a variety of timber and non-timber forest products (Guthiga, 2007). At the same time, people rely on the ecosystem services provided by the forest. For example, the forest ensures a more-or-less stable water supply, and prevents soil erosion (KFMP, 1994). These benefits are all the more important because irrigation infrastructure and wide-ranging soil conservation schemes are lacking in the area.

Despite the importance of Kakamega forest to local livelihoods, over the years the forest has been subjected to various disturbances. Bleher et al. (2006) have documented the history of high-level human impact throughout the forest. Due to a series of extractive activities, such as commercial logging, gold mining, fuel-wood collection for cooking and charcoal production, compounded by high population growth and the consequent conversion of forest to farmland, the size of Kakamega forest has been shrinking rapidly in the last century. Lung and Schaab (2004) indicate that approximately 20% of the forest cover was lost over the past three decades alone (Fig. 1).

Notwithstanding the extensive research that has been conducted on various levels of biodiversity in Kakamega forest, there is a paucity of data on regulatory functions of the forest. However, the existing data suggest that the disturbance that the local ecosystems have been subjected to over the past decades has led to deterioration in the environmental quality on which local communities rely. For instance, Waswa (2012), in his assessment of land degradation at various sites around Kakamega forest, found that at least 70% of sampled farms experienced sheet erosion. At the same time, "major soil chemical properties were found to be below the critical thresholds needed to support meaningful crop production" (p. 4). Waswa identifies agricultural expansion as the activity most responsible for these problems. In addition, the conversion of Kakamega forest to agriculture has been associated with increased water discharge and storm runoff (Recha et al., 2012).

## 3. Methodology

### 3.1. Choice Experiment

The lack of sufficiently detailed data on the relationship between Kakamega forest and the various ecosystem services that flow from it render the use of revealed preference methods for the estimation of the relevant indirect-use values problematic. For example, there is little technical knowledge on how forest cover affects the regional supply of water. Without such information, production function methods that relate water supply to agricultural income cannot be used in order to value the hydrological functions of Kakamega forest.

The absence of data that would facilitate the use of revealed preference methods, coupled with a keen interest in exploring the potential for the existence of non-use values held by local people, rendered the use of stated preference techniques appropriate (Freeman, 2003); as mentioned at the beginning of this paper, the chosen technique was a choice experiment (CE). As CEs are used widely nowadays in the environmental economics literature, a detailed exposition of the technique is outside the remit of this paper. For the purposes of this study, a Nested Logit model was employed, as the Hausman test revealed a violation of

<sup>2</sup> This study formed part of a broader attempt to estimate the forest's TEV. More related results can be found in Guthiga (2007) and Kasina et al. (2009).

Download English Version:

<https://daneshyari.com/en/article/5048628>

Download Persian Version:

<https://daneshyari.com/article/5048628>

[Daneshyari.com](https://daneshyari.com)