



# Economic valuation of cultural ecosystem service changes to a landscape in the Swiss Alps



Susanne Rewitzer<sup>a,\*</sup>, Robert Huber<sup>b</sup>, Adrienne Grêt-Regamey<sup>c</sup>, Jan Barkmann<sup>a,d</sup>

<sup>a</sup> Environmental and Resource Economics, Department of Agricultural Economics and Rural Development, Georg-August-Universität Göttingen, Germany

<sup>b</sup> Eidgenössische Forschungsanstalt für Wald, Schnee und Landschaft (WSL), Switzerland

<sup>c</sup> Planning of Landscapes and Urban Systems, ETH Zürich, Switzerland

<sup>d</sup> Risk and Sustainability Sciences, Department of Social Sciences, Hochschule Darmstadt – University of Applied Sciences, Germany

## ARTICLE INFO

### Article history:

Received 23 August 2016

Received in revised form 22 June 2017

Accepted 23 June 2017

Available online 6 July 2017

### Keywords:

Cultural ecosystem services

Economic valuation

Choice experiment

Cultural landscape

Mountain region

## ABSTRACT

Traditionally managed agrarian landscapes provide several cultural ecosystem services (CES). Still, CES are often not adequately considered in decision-making – partly because of challenges in their quantification and economic valuation. We show that a state-of-the-art application of an economic valuation method to CES can generate meaningful data for supporting real-world, regional decision-making processes. After qualitative pre-studies (semi-structured interviews, stakeholder workshop) and a pilot study ( $n = 117$ ), a discrete choice experiment ( $n = 252$  respondents) was administered to a random sample of citizens in the Visp region of the Central Swiss Alps, a site with traditional agrarian landscapes. The design of the choice experiment followed an ecosystem services approach, and uses visualizations to support valuation of aesthetic landscape changes. A response rate of 43% was achieved. Citizen support was expressed for agricultural heritage ( $P < 0.001$ ) and biodiversity-rich dry grasslands ( $P < 0.001$ ). Aesthetic impacts of settlement extension ( $P < 0.001$ ) and of grassland intensification ( $P < 0.001$ ) reduced the economic value of development options impacting the Visp landscape. Estimated marginal willingness-to-pay ranged from 410 CHF (1 CHF approx. 0.8 EUR in 2013)/person/year for 60 additional ha of dry grassland to –833 CHF for the visual impact of settlement expansion (by changes of the tax bill).

© 2017 Elsevier B.V. All rights reserved.

## 1. Introduction

Despite their importance, cultural ecosystem services (CES) have only recently attracted higher levels of scientific attention (e.g. Chan et al., 2012b; Daniel et al., 2012; Schaich et al., 2010; van Berkel and Verburg, 2014). The rigorous analysis of CES and their subsequent inclusion in decision-making remains an interdisciplinary challenge – particularly if quantitative and/or economic valuation is concerned (Daniel et al., 2012). With respect to cultural landscapes, critics claim that their idiosyncrasy, the intangibility of their values and their incommensurability with monetary indicators of value were fundamental hindrances to any economic valuation of typical CES (Schaich et al., 2010; Kirchhoff, 2012).

These doubts are in contrast with many valuation studies that assessed economic values of environmental goods that can be regarded either as CES or as providing CES. Many studies concentrated on aspects of scenic beauty, e.g. in a context of leisure or tourism (e.g., Grêt-Regamey et al., 2007; Yan et al., 2010; Ryffel

et al., 2014; van Berkel and Verburg, 2014). Further examples include studies on elements of cultural heritage (e.g., Barkmann et al., 2010; Barrena et al., 2014) although quantitative valuations are less common. The value of certain species or of species conservation motivated by non-instrumental/non-use reasons have frequently been quantified in economic terms (e.g., Cerda et al., 2014; see also references there). If we accept that these studies successfully assessed the economic value of changes to scenic beauty, cultural heritage and the conservation status of rare or endangered species and habitats, the hindrances to the economic valuation of CES may be less fundamental than proposed (cf. Schaich et al., 2010; Kirchhoff, 2012).

Conceptually, our optimism that CES can be incorporated well into standard preferences methods of value elicitation rests on their rather direct contribution to human interests and values (cf. Boyd et al., 2016). Bio-physically, CES and non-CES are provided by concrete ecosystems, their elements, structures, and/or processes<sup>1</sup>.

\* Corresponding author.

E-mail address: [susanne.rewitzer@gmail.com](mailto:susanne.rewitzer@gmail.com) (S. Rewitzer).

<sup>1</sup> Throughout the paper, we stick to the well-established ecosystem service terminology of the Millennium Ecosystem Assessment (MA, 2005). The MA defines ecosystem services as benefits that ecological systems provide for human beings.

The concept of the ecosystem service (ES) cascade highlights that some benefits are of a rather indirect nature as they provide and/or safeguard the environmental conditions for more immediately useful ('final') benefits (Haines-Young and Potschin, 2010). Hydrological regulation of an un-inhabited inner mountain valley, e.g., is less directly related to human benefits than flood or avalanche protection of a threatened mountain village, or the provisioning with potable or irrigation water for the village (Barkmann et al., 2007). These latter ES qualify as *final* ES that directly benefit humans. In contrast to complex changes to hydrological regulation, lay respondents do not require sophisticated ecological knowledge in order to relate impacts, say, on aesthetic landscape quality to their subjective values and interests. Thus, final ES including CES appear as well-suited objects of economic valuation using stated preference methods.

Against this background, our contribution has a methodological and an applied aim. On the applied side, we intend to contribute to the knowledge on local citizen preferences useful to current spatial planning processes in the Visp region of the Swiss Alps. Methodologically, we intend to show that applications of the choice experiment method to CES can result in meaningful data for such planning and decision-making processes. Specifically, we intend to advance the notion that the economic valuation of CES is, principally, not more problematic than the economic valuation of non-CES. To this aim, we designed and conducted a discrete choice experiment on a small set of CES relating to the cultural landscape of the Visp region. Alongside several CES, we included a non-CES in the valuation study to document that CES do not require a categorically different treatment compared to non-CES in stated preference studies.

With respect to micro economic theory, stated preference methods assess fundamentally subjective preferences with respect to the goods to be valued. In order to be able to meaningfully state such preferences, survey respondents need to be able to relate the proposed environmental changes to their subjective values and interests. Consequently, it is of utmost importance to choose indicators that represent the impact of the changes to survey respondents. To this task, we employed a design strategy for the survey instrument that was developed for the communication of changes to regularly unfamiliar ES to respondents (Barkmann et al., 2008). The respective *ecosystem service approach* translates scientific knowledge on the results of development or conservation options into the language of real-world interests and values of concerned stakeholders ("benefits"). The ecosystem service approach has been applied successfully, e.g., to the valuation of changes to ecosystem hydrology, the supply with non-timber forest products (Barkmann et al., 2008; Glenk et al., 2008), afforestation options to mitigate climate change (Rajmis et al., 2009) or ecosystem protection against unknown ecological risks (Rajmis et al., 2010; Cerda et al., 2014).

Here, we apply a variant of the ecosystem service approach focusing on the question how different categories of CES benefits can be identified and communicated accurately during the valuation interview. This design strategy for the survey instrument requires intensive qualitative social sciences input not only to the wording of the valuation interview but also for the identification of relevant benefits in the first place (cf. Chan et al., 2012b; Riechers et al., 2016). Alongside CES attributes, we include a non-CES attribute in the CE. This allows us to compare design considerations and results between CES and non-CES attributes.

## 2. Methods

### 2.1. Study region

Cultural landscapes are human-nature systems with the capacity to deliver several CES, e.g. CES related to aesthetic pleasures or

cultural identity (Schaich et al., 2010; Plieninger et al., 2013). The Alps landscape of the Valais in southern Switzerland is such a cultural landscape shaped by centuries of agricultural use including the seasonal use of high altitude pastures (Zajc et al., 2003).

The Visp region consists of the city of Visp, the river valleys of the Vispa and Saaser Vispa with 12 municipalities, and the uninhabited Baltschieder Valley. The area is 350 km<sup>2</sup> in size and has ~16,000 inhabitants (see Fig. 1). As an inner-Alpine mountain area with continental climate, Visp is among the driest regions in the Swiss Alps. Regionalized climate change scenarios prognosticate a decline in precipitation in addition to rising temperatures, and subsequent vegetation changes (Huber et al., 2013).

Forest covers 20% of the area, agricultural land 16% (some arable land, mostly grassland); 62% are officially classified as "unproductive" land (Briner et al., 2012). An international pharmaceutical enterprise is the dominating economic actor in the region operating a huge plant in Visp. Agriculture is, generally, in decline resulting in an increase of forest land (Huber et al., 2013). Inhabitants display a keen sense of regional identity, and wish to maintain local traditions (Brand et al., 2013).

The timing of this study profited from a national referendum on the revision of the Swiss spatial planning act, which took place a few months before the main study. Consequently, cultural landscape development could be expected to be of current policy interest not only in politically active citizens but also in the broader population of the study area.

### 2.2. Qualitative and semi-quantitative pre-studies

In addition to a literature review and informal expert interviews with scientists working in the area, we used three instances to obtain structured, qualitative citizen input into the design process of the choice experiment (for further details, see Section 2.3). First, eight semi-structured interviews were conducted in February 2013 to identify which ES are important to respondents focusing on an identification of the benefits respondents recognize. Respondents were selected systematically in order to cover socio-demographic diversity. Using non-technical language, the interviews addressed perceptions of the regional landscape and of changes to it, as well as issues of scenic beauty, local agriculture, biodiversity, and natural hazards. Based on a literature review on CES of cultural mountain landscapes and on the qualitative interviews, a first set of attributes operationalizing the impact of landscape change to (C) ES provisioning was drafted.

Second, a stakeholder workshop was held in Visp with fifteen representatives from forestry, agriculture, regional development,



Fig. 1. Case study area Visp, an inner-Alpine region in Switzerland.

Download English Version:

<https://daneshyari.com/en/article/6463436>

Download Persian Version:

<https://daneshyari.com/article/6463436>

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