Economic valuation of landscapes: combining landscape ecology and environmental economics methodologies

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Abstract

Aim of the paper is to outline an integrated methodology for deriving economic values of the different landscape components. Our approach integrates landscape ecology principles and non-market valuation methodologies. Firstly, we identify landscape types and quantify their attributes with 'metrics' (i.e., objective components) and use discrete choice experiments to elicit the public's preferences for these landscapes and their attributes (i.e., subjective components). As a case-study we use the Peninsula of Sorrento in Italy, which is a unique Mediterranean landscape, which is increasingly endangered by urban sprawl and decline of traditional farming. Results show the economic value of different types of landscapes and, importantly, provide convincing support for an interdisciplinary approach for landscape valuation.

Summary

The need to implement effective incentive systems and landscape quality objectives for landscape planning and management requires policy makers, stakeholders and planners to understand the values that communities attach to landscape (Council of Europe, 2000). Placing monetary values on the landscape and its characteristics has been challenging economists for the last number of decades because of the complexity of components to take into account when analysing landscapes. Studying landscape needs an interdisciplinary and transdisciplinary approach, integrating analytical methodologies and involving researchers from the different landscape disciplines (Fry et al., 2007). Only in this way is it possible to define a new valuation procedure that integrates both the real landscape—as it exists in the territory—with economic modelling approaches. Some attempts in this direction include Geoghegan et al, 1997; Bell and Irwin, 2002; Bateman et al., 2002; Campbell, 2007).

This paper aims to take advantage of the knowledge and methodologies of different landscape disciplines. It integrates landscape ecology, landscape preference studies and environmental economics, through the analysis of bio-physical and cultural components of the landscape and the public's preferences for the landscape using discrete choice experiments. We argue that this approach represents a common framework where landscape scientists and economists can collaborate on a common goal.

The case study area is the Peninsula of Sorrento, in the South of Italy. It represents a good example of highly valuable Mediterranean landscape that embodies strong identity and cultural values and provides a substantial contribution to the tourist activities in the area. The growth of tourism activities and the decline in traditional farming practices due to economic pressures are leading towards a loss of this unique landscape.

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The first step of our approach is the identification of the landscape types of the study area, which form the bases for the selection of the "attributes" to be used in the monetary valuation of the landscape through the application of choice experiments. A parametric landscape classification methodology using GIS-techniques is applied to the study area (Van Eetvelde and Antrop, 2008), to identify the landscape types and help describe them in terms of their attributes—quantified with metrics (visual indicators). Digital maps are analysed and integrated with the GIS software to identify landscape structural components. The urban density degree and the presence of scattered settlements is also analysed in detail. Subsequently, principal components analysis is used to define homogeneous clusters for all these components, which gives rise to classification of six main landscape types and ten sub-landscape-types (distinct on the basis of altitude and settlement degree).

Based on the landscape classification, the second stage involves taking more than 300 photographs of the study area. To ensure that these photographs were representative, the locations of the pictures were georeferenced and were informed on the basis of the landscape classifications derived in the first stage of the research.

Thirdly, a viewshed analysis for each of the photograph locations is conducted and the attributes of the landscape covered by the view area are quantified in terms of visual indicators and attributes (Ode et al., 2008; McGarigal and Marks, 1995).

Finally, based on these attributes, a sequential experimental design with a Bayesian information structure is used to increase the sampling efficiency of a discrete choice experiment survey. The results from this are used to quantify the non-market benefits of landscapes and their attributes. The paper concludes with various recommendations regarding future landscape management policy and provides some advice for practitioners engaged in landscape research.

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