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Valuing the benefits of an afforestation project in a peri-urban area with choice experiments

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ABSTRACT

Woodlands on the Veneto region plain have progressively disappeared since the 19th century. This has led to a decrease in environmental and landscape quality with fewer social benefits accruing from the rural land. The demand for environmental conservation and recreational areas has increased in recent years, especially in the urban context. In order to meet these needs the Venice City Council decided to establish an extensive woodland on the Venice hinterland. Due to the high costs of the project it was important to evaluate its benefits in monetary terms and whether a mixed landscape might produce a higher benefits flow than a dense woodland. The objectives of our study are to estimate the willingness to pay (WTP) for different surface allocations of the future Wood of Mestre and to better understand the influence on WTP of the delay in the benefits due to the time needed for tree growth. Our first finding was that people prefer a mixed solution in terms of surface allocation: the wood–meadow mix (75% woodland, 25% meadow) is at the top of the sample preferences. Second, the WTP of the preferred afforestation programme is €51 year/family. The social benefits derived on a 10-year basis considering the presence of animals and lakes in the preferred scenario are €62,755/ha. The research highlighted how WTP has an inverse correlation with age. Nonetheless the WTP of older people is not negligible and this appears to support the hypothesis that the woodland will also have a bequest value. The WTP also tends to decline with the distance of the district where the interviewees live. Finally, CE proves to be a consistent and robust methodology for forest benefit evaluation that can provide both land management and quantitative information to policymakers.

1. Introduction

During the 1990s, the Venice City Council (Italy) decided to establish a natural woodland on the city hinterland (Fig. 1). The aim was to improve the quality of life for the densely populated districts of Mestre and Marghera. The master plan designated an area of about 1200 ha located in the northern part of the municipality near Mestre to be afforested in about ten years. It was an ambitious plan given that only 3% of the land was publicly owned. The only possibility of succeeding therefore relied on either buying or renting the land. In 2003, the Council rented 200 ha from a charitable foundation and made a start to the project. At that point, it was clear that completion of the project would be very expensive. Today, the average land value is about €80,000–100,000/ha, while the land rent amounts to €600/ha per year. Tree planting costs are about €7200/ha. Furthermore, a natural woodland will not provide any income, whereas other land uses that can improve the environment and the landscape (e.g., pasture and meadows) would offer not negligible profits. Note that the Council had no precise idea about the monetary value of the social benefits of the woodland. The original Wood of Mestre project aimed at a full afforestation of the available surface. Nevertheless, from the results of an aesthetic visual analysis on the Wood of Mestre, Tempesta (2006a) found that, from an aesthetic point of view, the most preferred landscape involved a mixed land use (woods, hedges, meadows and pastures) rather than just a dense woodland. The total costs to convert the area with meadows, besides avoiding planting expenditures, are much lower due to the fact that this policy could be implemented with a subsidy scheme that compensates farmers for the revenue losses incurred by giving up crop production.[1] Policymakers need to deal with two different but related problems: estimating the social benefits of the wood and finding the land use scenarios that satisfy residents' expectations, comparing the social benefits of the best territory arrangement with its costs. It is therefore

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[1] Such a policy should guarantee the same results in terms of land conversion to meadows instead of buying/renting the land. The subsidy scheme could be successful for converting crops to meadows but not to woodland given that the Italian law prevents woodland being substituted by crops after it has existed for 30 years. Therefore farmers would be unlikely to accept this kind of policy for a time horizon longer than 30 years and this would undermine the sustainability of the project in the long term.

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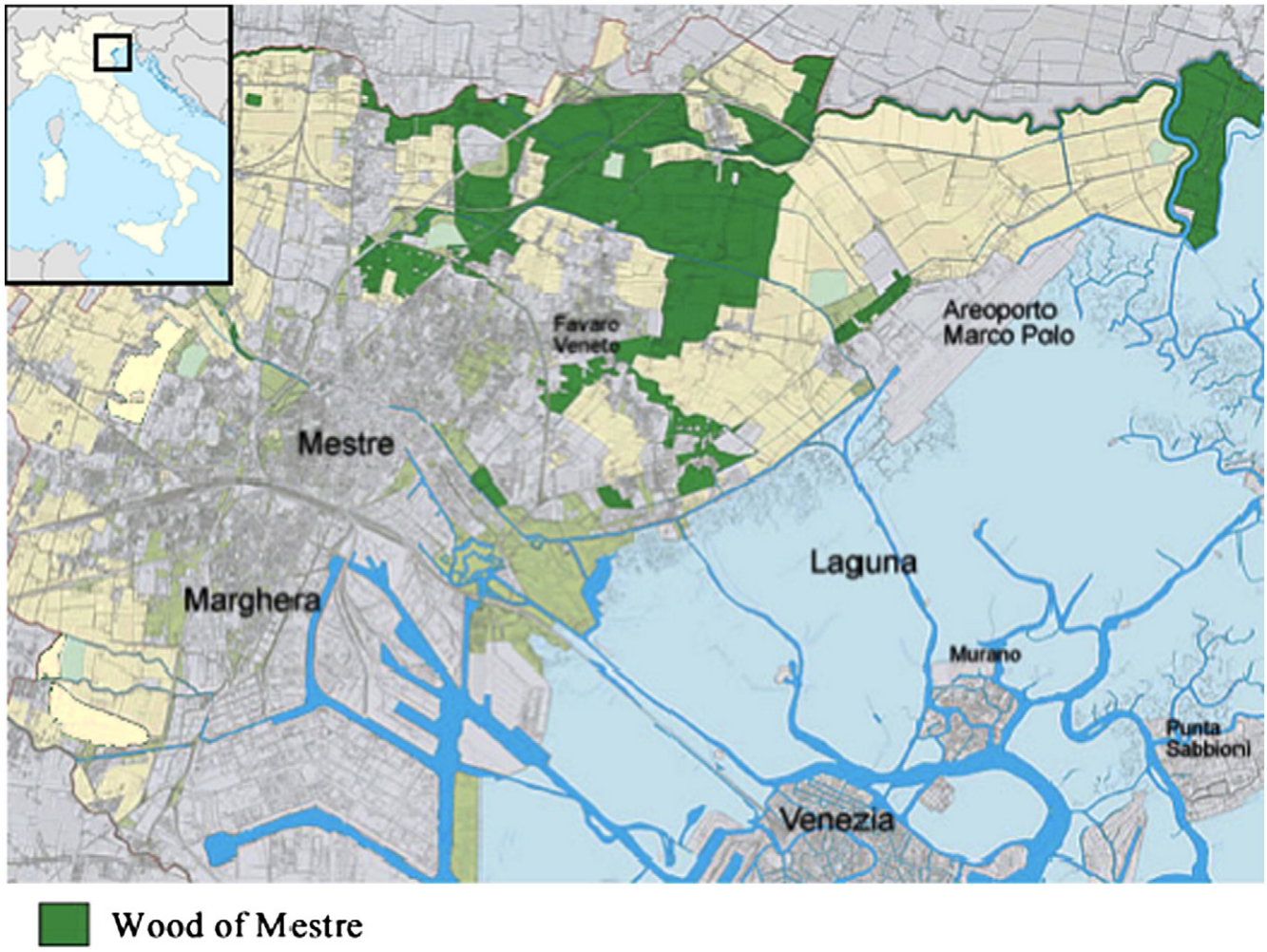

Fig. 1. The Wood of Mestre case study map.

necessary to apply an evaluation methodology capable of eliciting the value of alternative land use scenarios of a non-existent good.

An interesting and original characteristic of the Wood of Mestre case study is the type of environmental good under consideration. In fact the outcome of the project is the creation of a woodland with unique and distinctive characteristics in between an urban park and a forest. Indeed the future Wood of Mestre will share some characteristics with an urban park in terms of location and recreational benefits and others with a typical forest as concerns composition, extension (size) and environmental benefits. While it is possible to find WTP estimates with regard to the two distinct types of good (forest and urban park), as far as we know there are no studies focusing on goods that share the same characteristics as the Wood of Mestre.

In the last twenty years, many surveys have been conducted in order to determine the monetary value of goods and services derived from forest ecosystems (Willis et al., 2000; Krieger, 2001; SCBD, 2001; Jones et al., 2003; Merlo et al., 2005; Lindhjem, 2007; Barrio and Loureiro, 2010).

The common aim of these studies was to quantify the monetary value of the environmental services provided by existing forests. The studies highlighted that the total economic value (TEV) can vary widely across different areas and countries. The relative magnitude of the services is also very varied. In some cases, the recreational value prevails over the other components of TEV, while in others the biological value can be the most important. However, especially in the Mediterranean area, the recreational value accounts for more than half of the forest values (Croitoru and Merlo, 2005), excluding marketable products. Most of the Italian studies were concerned with the recreational value of forests located in mountain areas. Only a few estimated the TEV (Marangon and Tempesta, 2001; Goio et al., 2008; Tempesta and Marangon, 2008). Despite the large number of studies, not many of them (Bullock et al., 1998; Hanley et al., 1998a, 2002; Lehtonen et al., 2003; Mogas et al., 2005; Campbell et al., 2006; Christie et al., 2006, 2007; Rambonilaza and Dachary-Bernard, 2007; Meyerhoff and Liebe, 2009) analysed the intrinsic characteristics affecting the value of forests.

There are also several studies that analysed the value of urban parks and urban forests, both in Italy (Willis, 2003; Fratini et al., 2009; Tempesta, 2010) and abroad (Lockwood and Tracy, 1995; Tyrväinen and Väänänen, 1998; Tyrväinen, 2001; Jim and Chen, 2006; del Saz Salazar and García Menéndez, 2007; Bernath and Roschewitz, 2008; Brander and Koetse, 2011; López-Mosquera and Sánchez, 2011; Chen and Jim, 2012; Lo and Jim, 2012). However the benefits of an afforestation programme have only been analysed in two cases (del Saz Salazar and García Menéndez, 2007; Chen and Jim, 2012). Moreover, with few exceptions, the area of the parks is very small and not comparable to that of the Wood of Mestre.

In an attempt to know whether the benefits of the Wood of Mestre outweigh the costs, a contingent valuation study was undertaken in 2004 by Tempesta (2006a). The study looked at the benefits accruing from a single scenario consisting of devoting the entire area to afforestation (100% forest). Unfortunately it did not include 'mixed' afforestation scenarios. The aim of our study is, first, to estimate the monetary benefits arising from different land use scenarios; second, to find the