

People's preferences and landscape evaluation in Italy: a review

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Jel Classification: H4; Q2; Q58

1. Introduction

The purpose of this paper is to undertake a review of the Italian literature in the field of landscape evaluation. These studies can be of particular interest because laws for landscape conservation were first adopted in Italy a long time ago and today encompass various policy instruments. As will be described below, to efficiently and correctly implement the policies aimed at preserving or improving the landscape quality it is necessary to evaluate the social benefits that they can produce. Starting from the needs for landscape evaluation provided for by the Italian legislation, scholars have conducted many studies in the last fifteen years using both monetary and non-monetary approaches. Numerous methodologies have been applied and tested with reference to different landscape policy scenarios.

The need for public intervention in this field derives from the economic characteristics of landscape. As is well known, the rural landscape is a pure public good and an externality (positive or negative) of farming and other economic activities that exploit and modify the land (Vanslebrouk and van Huylensbroeck, 2005). Especially in Italy, the rural landscape can be considered a cultural good because it preserves important features of past farming practices (Antrop, 2005; Sereni, 1961; Cosgrove, 1993; Antrop, 2005; Sereni, 1961). From this point

Abstract

Italy passed its first landscape conservation law in 1922. The need for public intervention in this field comes from the economic characteristics of landscape that is a pure public good and an externality of the economic activities. The landscape policies in Italy are currently essentially based on landscape transformation control and on the payment of subsidies to farmers. Since the landscape policies have a cost for the citizens, in both cases it is necessary to evaluate the benefits coming from public intervention. There are several approaches that could be useful for this but they have to be tailored to the policy instrument adopted. With reference to the Italian experience the paper reviews the researches carried out in Italy in the last fifteen years highlighting strengths and weaknesses of the studies.

Keywords: economic evaluation; rural landscape; public intervention.

Résumé

L'Italie a adopté sa première loi pour la préservation du paysage en 1922. La nécessité d'une intervention des pouvoirs publics dans ce domaine provient des caractéristiques économiques du paysage, lequel qui est un bien public et une externalité des activités économiques. Actuellement, les politiques mises en œuvre pour la sauvegarde du paysage en Italie sont essentiellement basées sur le contrôle des transformations du paysage, et sur le paiement des subventions aux agriculteurs. Étant donné que les politiques du paysage ont un coût pour le contribuable, dans les deux cas, il est nécessaire d'évaluer les avantages provenant de l'intervention publique. Pour cela, il existe plusieurs approches qui pourraient être utiles mais celles-ci dernières doivent être adaptées aux instruments de la politique en vigueur. En nous basant sur l'expérience italienne nous allons passer en revue les recherches menées au cours des quinze dernières années, mettant en évidence les points forts et les points faibles de ces études.

Mots-clés: évaluation économique; paysage rural, conservation publique.

of view it can be considered a merit good and therefore a market price cannot exist for cultural rural landscape. According to economic theory, in the case of merit goods, the benefits perceived by the citizens, because of their lack of knowledge, are lower than those effectively enjoyed or which future generations can enjoy (Klamer and Zuidhof, 1998; Leon and Tuccini, 2011). Also, for this kind of good, the spontaneous activities of economic agents lead to an inefficient land use arrangement. There are many useful tools that can correct these market failures, which can be broadly divided into two main categories: command and control instruments and financial incentives (Tietenberg, 1984; Randall, 1987; Tietenberg, 1984).

Command and control policies are based on the definition of standards to be respected in land transformation (especially building activities). In general, standards can state: a) an absolute prohibition (especially for actions that can produce extremely significant transformations); b) a threshold of maximum landscape impact. In either case the constraints cause some social or private costs. In order to respect the landscape regulations, the citizen or businessman who wants to start up an activity that involves a landscape modification will have to bear higher costs or renounce some possible returns. It is consequently necessary to clearly define the characteristics and value of the benefits of landscape policies: the social benefits will in any case exceed the private costs.

Command and control instruments only allow the negative

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impacts of active and voluntary actions to be reduced. They are ineffective in opposing passive transformations due to an activity being abandoned that in some way contributes to the landscape maintenance. The degradation of the landscape in hilly and mountain areas caused by the abandoning of agriculture and pastures is a typical case. Command and control instruments cannot support landscape quality improvement. Only the provision of financial incentives can allow the maintenance or improvement of the landscape.

Moreover, command and control instruments cannot support landscape quality improvement. In these cases only monetary incentives can pursue rural landscape quality objectives.

Both controlling land use transformation and subsidising landscape preservation or improvement impose some costs (private or public) on the citizens that in either case have to be lower than the benefits (Santos, 1998). As a consequence, to efficiently implement landscape policies it is necessary to evaluate the benefits from public intervention.

This last point is of fundamental importance: when a public action involves some costs charged to the citizens or the payment of monetary incentives, the policy-maker will always have to evaluate the effectiveness or efficiency of the action. Adequate evaluation methods are therefore indispensable.

In this respect reviewing the Italian experience could be useful. In Italy there are several policy instruments aimed at preserving and improving landscape. The decree law n. 42 of 2004, the “*Codex of cultural heritage and landscape*” (amended by decree law 157 of 2006, 62 and 63 of 2008) states that, in an area of particular landscape interest, any interventions that could alter the view have to be submitted to the valuation of the public authorities. People that modify the landscape without state permission have to restore the landscape and pay the value of any landscape damage.

With reference to the provision of financial incentives, in Italy as in the other countries of the European Union, the farmers can be paid to preserve or improve landscape. In this case the Common Agricultural Policy requires that the effects of the subsidies have to be evaluated by the Regions or by the States.

In the following sections, after clarifying the concept of landscape, the main results of these studies will be summarized. The strengths and weaknesses of the Italian experience in this field will lastly be discussed.

2. The concept of landscape

The term “landscape” has various and sometimes strongly contrasting meanings. For some authors landscape is synonymous with environment or ecosystem; for others it has a purely aesthetic connotation (Daniel, 2001; Gobster *et al.*, 2007). The formulation of as precise a definition as possible is fundamental in order to establish what the objectives of the landscape policy are to be. The European Landscape Convention, signed in Florence in 2000, has given a clear definition of the concept of landscape and the objectives of landscape policy. Art. 1 indicates that “landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”. Landscape policy must

allow “specific measures aimed at the protection, management and planning of landscapes” to be adopted in order to satisfy the “aspirations of the public with regard to the landscape features of their surroundings”.

According to this definition it can be said that:

- the landscape is the visible aspect of a natural or anthropogenic ecosystem as it is perceived by the people;
- the quality of the landscape depends on the objective character of the territory and on the aspirations of the people who live there or use it for a variety of purposes;
- landscape policies should be based on the value that the population ascribes to the landscape and must deal both with landscapes of high quality (to be protected) and degraded ones (to be improved);
- the landscape is the result of the interaction between the natural environment and past and present human activities. So in some contexts it can be considered as a historical-cultural good and as such should be subject to appropriate conservation actions.

3. The landscape benefits

Many researches works in the last decades highlighted that landscape quality affects people’s wellbeing. It has been seen that the quality of the landscape interacts with numerous physiological parameters of an individual and that more pleasant landscapes tend to improve overall personal health (Ulrich, 1984; Ulrich *et al.*, 1991; Hartig *et al.*, 2003; Berto, 2005; Hartig *et al.*, 2003; Munoz, 2009; Ulrich, 1984; Ulrich *et al.*, 1991; Velaverde *et al.*, 2007; Munoz, 2009). As stated by the Sustainable Development Commission (2008, p. 3) “The knowledge base shows that exposure to natural spaces – everything from parks and countryside to gardens and other green spaces – is good for health”. Some researches works pointed out that the more pleasant landscapes have in general a restorative effect on the people (Kaplan, 1995; van den Berg, 2003).

It can be argued that man prefers landscapes where he feels better, and, in general, he tries to pass as much time as possible in such landscapes, so it is possible to state that a demand exists for landscape quality.

On the other hand, it has to be considered that the rural landscape is always the result of the layering and overlaying of human interventions in the past. In some areas, notwithstanding the major changes after the Second World War, landscapes that were formed in times past may still be found. More often, landscapes have been altered but retain elements of the agriculture of the past. These landscapes are part of our cultural heritage and will be preserved for future generations (Antrop, 2005). Given that culture plays a central role in human evolution, preservation of the cultural heritage responds to basic needs, especially within a context of sustainable development.

According to the above observations on landscape benefits it is possible to identify two types of landscape demand (and value components). One demand, which can be generically defined as “recreational”, comes from the tendency of people to pass part of their time in environments that are more pleasant, or more interesting, from an aesthetic-perceptive

point of view. Also, when able to choose, people will often prefer to have their home in a pleasant landscape, so the landscape quality can affect the real estate market.

When the landscape is considered as a historical good, its demand has to be placed in relation to the need for cultural heritage conservation. Note that the two types of demand are, at least to some extent, independent of one another, even if the traditional elements can affect the aesthetic perception by making the landscape more pleasant.

4. Landscape policies and evaluation methods

In Italy there are numerous and different policy instruments aimed at the conservation and/or improvement of landscape quality. Considering the type of intervention, they can be grouped into four main categories (Table 1): protection of cultural landscapes (decree law n.No 42 of 2004 – article 135); landscape transformation control (decree law n.No 42 of 2004 – article 146); payment of subsidies to the farmers to improve the landscape (Council Regulation EC No 1698/05); evaluation of the damage caused by landscape transformations (decree law n.No 42 of 2004 – articles 160 and 167).

In the past several evaluation methods have been proposed by scholars that in general can be classified as follows:

- a) Non-monetary (Daniel and Booster, 1976)
 - a1) based on expert judgement
 - a2) based on the judgement of the population
- b) Monetary (Santos, 1998; Vanslebrouck and van Huylenbroek, 2005)
 - b1) supply based
 - b2) demand based
 - b2.1) revealed preferences
 - b2.2) stated preferences

With the exception of the protection of historical landscapes, in order to fulfil the European Landscape Convention and the Italian legislation prescriptions, the approaches based on people's preferences analysis have to be preferred (a2 and b2).

In some cases (e.g., the impact of buildings, roads, pylons, etc.) non-monetary methods are more suitable than the monetary ones. Consider, for example, the situation where a new farm building can alter the landscape. In this case it is possible to preserve the quality of landscape by simply analyzing the visual aesthetic impact of the new building and trying to find a better position or mask it with hedges or trees. The Italian legislation only requires a cost-benefit analysis in the case of larger infrastructure, and consequently, a monetary landscape valuation.

Another important field of landscape monetary valuation is the analysis of the effectiveness of financial subsidies paid to the farmers within the Common Agricultural Policy. The subsi-

Type of intervention	Aim	Evaluation method
Protection of historical landscapes	Preservation of landscapes against degradation caused by the abandonment or, in general, lack of care.	Scale of merit defined by experts or local communities with analysis of defensive expenditures or, with some caution, revealed preference approaches
Landscape transformation control	<i>Small projects</i> Definition of thresholds of admissibility in territory transformations	Aesthetic-perceptive non-monetary valuation method based on population judgment
	<i>Big projects</i> Analyzing the monetary value of the landscape change	Landscape monetary valuation through stated preference methods
Payment of subsidies to the farmers to improve the landscape or other landscape investments	<i>Presence of budget constraints</i> Maximizing the social benefits if it is not possible to assign a monetary value to the effect of the policy or when the budget is constrained	Aesthetic-perceptive non-monetary valuation method based on population judgment, associated with analysis of the farmers' opportunity costs
	<i>Absence of budget constraints</i> Comparing costs and benefits of landscape policies	Landscape monetary valuation through revealed preference methods
Repayment of the damage caused by landscape transformations	Imposition of payment for landscape damage caused by unauthorized landscape transformations	Analysis of the restoration costs. Landscape monetary valuation through revealed preference methods

dies can be paid in order to preserve or to improve the landscape. From this point of view the kind of evaluation required depends first on the level at which a public authority operates. At the national level it is possible to quantify the amount of money to be spent for any specific agro-environmental intervention. In this case the expenditure has to equal the benefits and it is necessary to evaluate the monetary value of the benefits.

In other cases the public decision-maker cannot decide the amount of money to be spent. He simply has to spend a given amount of money in an efficient or effective manner. The amount of money to be spent is usually decided at a national or international level. In this case a monetary valuation of the landscape would not be necessary. It would be possible to use some mixed approaches based on the aesthetic, non-monetary evaluation (through the so-called psychophysical approaches) and the analysis of the farmers' opportunity costs. Sometimes the public authorities have also made direct investments aimed at improving the landscape quality and a cost-benefit analysis was then necessary to evaluate the efficiency of the public expenditure.

Finally it has to be remembered that the Italian legislation, in some cases, requires a monetary repayment of landscape damage, but this is an extreme measure that has to be undertaken when it is not possible to restore it.

5. Non-monetary evaluation researches

The non-monetary methods are useful in order to find thresholds of aesthetic impact to be respected by the landowner. They can also be utilised to pay the farmer who improves the landscape quality of his farm by changing the land use. In the first case it is necessary to find the relationship between the landscape aesthetic quality and the in-

cidence of a manmade intervention on a particular view. In the second, the relationship between the landscape aesthetic quality and the land use has to be analysed.

Many non-monetary methods to assess landscape were proposed and tested in the past (Daniel and Boster, 1976; Zube *et al.*, 1982; Aoki, 1999; Swaffield and Foster, 2000; Daniel and Boster, 1976; Daniel, 2001; Stamps, 2004; Swaffield and Foster, 2000; Stamps, 2004; Zube *et al.*, 1982), but only a few are useful for the implementation of landscape policies. It is necessary that the method permits a mathematical relationship to be found between landscape aesthetic quality and land use or view composition.

The non-monetary methods can be divided into two broad categories (Daniel, 2001):

- based on expert judgement;
- based on the judgement of the population.

The methods based on experts' opinion cannot be considered entirely reliable. Some studies have shown that very often the experts' judgement on the aesthetic quality of landscape differs greatly from that of users (residents and tourists) (Daniel, 2001; Daniel and Boster, 1976; Kaplan, 1985).

Instead, methods based on the opinion of the population tend to reveal the users' landscape preferences and are, from this point of view, consistent with the statements of the European Landscape Convention.

Among these, the psychophysical approaches are of particular interest. They try to identify a statistical relationship between the territorial layout (usually illustrated by photographs or slides) and the value assigned to the landscape by the population (usually through scores).

These functions allow the contribution of each item to the aesthetic perceptive quality to be identified. They can therefore provide planners with the objective knowledge necessary to draw up more effective and efficient landscape policies.

However lay people are sometimes not able to understand the true historical importance of a landscape. In this case only the experts can propose a scale of merit to be considered in order to allocate the funds assigned by the public authorities. Nevertheless, to identify the areas and actions that will be subsidised it is necessary to analyse the costs (implicit or explicit) faced by the owner (usually the farmers) in order to preserve some historical elements of the landscape (see section 6.1).

5. 1. Land use and landscape preferences

In the 1990s, studies were conducted in Italy that tried to identify which factors improve or worsen the aesthetic-perceptive quality of the rural landscape (Aldegheri, 2003; Bonotto, 1995; Favalli, 1996; Tempesta, 1998; Tempesta and Crivellaro, 1999; Aldegheri, 2003; Tempesta, 2006; Tempesta and Crivellaro, 1999). These studies were carried out in the Veneto and Friuli Venezia Giulia Regions and used a similar approach regarding the ways in which the pictures were taken, interviews collected, and data processed and analysed. Real images were generally used. Images obtained through photomontages were only used in one study.

The results obtained are therefore substantially comparable.

The studies covered areas of the plains and low hills with arable land, meadows, orchards and vineyards, but other elements were also present (woods, poplar plantations, hedges, tree rows and scattered trees).

Sometimes there were also historic landscape features, such as interspersed vine-mulberry rows, hilly surface or plain field layouts ("cavini", "cigionamenti", etc). Interviewees were all resident in the regions, usually close to or within the studied areas, so their cultural and social background was quite homogeneous. In three researchesworks, interviewees were just students, while in the others samples were more diversified with regard to age, educational qualifications and employment.

Images were submitted to the interviewees for about ten seconds so the score concerned first impressions. In all studies, the score was expressed on a 1 to 10 scale, while land use was expressed as a percentage of the territory or as a dummy variable.

In order to understand which elements affect the landscape appreciation in each of the studies a model was estimated using a stepwise approach (Table 2). All the regression coefficients are statistically significant ($p < 0.05$) and collinearity is absent.

Despite the diversity of both the territory and the people interviewed, some regularity can be detected:

- arable fields, especially when the soil is bare, have a negative effect;
- uncultivated land and intensive cultivation (orchards, horticultural field crops, greenhouses, etc.), have a negative effect;
- other human elements (modern houses, shopping malls, factories, high voltage transmission lines, etc.) generally have a significant negative impact;
- meadows, hedges and woods have a positive effect, as well as scattered trees and rows of trees;
- the presence of water bodies (streams, rivers, etc.) improves the aesthetic value;
- if present, elements of the traditional agrarian landscape improve the aesthetic-perceptive value.

It is interesting to observe that the regression coefficients of the various components of the landscape usually have the same sign and are quite similar to one another despite the diversity of landscapes analysed.

These results are coherent with the findings of the international literature in this field (Schroeder, 1988; Cook and Cable, 1995; Arriaza *et al.*, 2004; Cook and Cable, 1994; Kaplan *et al.*, Taskin and Onenc, 2006; Rogge *et al.*, 2007; Palmer, 2008; Rogge *et al.*, 2007; Schroeder, 1988). Generally, also within rural landscapes, all the elements perceived as natural increase the appreciation. Cultural perception also seems to play an important role: people prefer mulberry tree rows on the plain and scattered olive trees on the hills.

5.2. View composition and landscape preferences

The psychophysical method is also useful for the detection of impact thresholds to be used, for example, in environmental impact assessment or in strategic environmental assessment. In a study carried out in Italy (Tempesta and Thiene, 2007) the re-

Table 2 - Factors affecting the aesthetic-perceptive appreciation of the landscape resulting from six studies conducted in North-East Italy.

Land use and cultural-historical elements	Euganean Hills Natural Park (PD)	Venice lagoon basin plain	Udine province hill and plain	Veneto east plain	Veneto west plain	Veneto plain (photomontage)
Horticultural field crops %	-0.069	-0.044	-0.035			
uncultivated land %	-0.018	-0.032				
arable crops %	-0.019	-0.017	-0.021	-0.014		
meadows %	0.018	0.017	0.014		0.019	0.025
cattle pasture %						0.031
alfalfa %					0.028	
orchards (young trees) %					-0.020	
hedges %	0.060	0.024	0.028	0.050	0.015	0.066
hedge height > 6 m (*)					1.144	
hedge height from 3 to 6 m (*)					0.607	
woodland %	0.006		0.036			0.041
scattered olive trees (*)	1.069					
ditches, streams (*)	0.619	1.482		2.318		
scattered trees (*)	0.732	1.455	0.942		0.644	0.181
tree rows (*)	1.225				0.941	0.643
paths (*)	3.717	1.322				
high voltage pylons (*)	-2.346			-2.478	-2.638	
sprinkler (*)					-1.022	
modern buildings (*)	-0.709					
non visible morphology(*)	-1.417					
historical field layouts	0.375					
wasteland (herbaceous) (*)	0.831					
vineyards %			-0.014	0.059		
tree rows (*)		0.032				
asphalt road (*)		-1.809				
pylons, urban buildings, etc. (*)		-0.850	-0.926			
mulberry tree rows (*)			0.132			
hills (*)			0.704			
photograph quality (*)			0.736			
Constant	5.542	4.380	5.780	5.159	4.630	3.452
Adjusted r squared	0.43	0.62	0.63	0.25	0.75	0.26

(*) Dummy variables; land percentage otherwise.

relationships were identified between the proportion of a view occupied by high-voltage pylons, factories and modern houses and the aesthetic-perceptive value. The research highlighted that just a slight intrusion into the rural landscape of pylons and factories can determine a strong reduction in the aesthetic quality (Figure 1). It should also be noted that the greatest degradation is caused by the initial intrusion of any element, whereas the marginal effect tends to diminish when the part of the view occupied increases.

In a subsequent study the impact of modern buildings, modern large-plot vineyards, greenness (percentage of the view occupied by green: hedges, woods and meadows), traditional buildings and Venetian Villas on landscape appreciation was analysed (Tempesta, 2010). The results confirmed that people dislike modern buildings and like greenness and traditional or historical buildings. Also in this case the presence of a non-linear relationship emerged between landscape aesthetic value and the percentage of a view occupied by any elements.

6. Monetary evaluations

The monetary landscape evaluation methods can be divided into two broad categories, depending on whether they are based on the costs required to improve/preserve the landscape or on the demand for the landscape itself. So we can distinguish:

- 1) supply- based methods:
 - analysis of the farmers' opportunity cost of the landscape improvement;
- 2) demand based methods:
 - revealed preferences;
 - stated preferences.

6.1. Supply- based methods

The opportunity cost of improving the landscape

Farms, like any other business enterprise, use inputs in order to maximise their income so fail to take into account the externalities that they produce (positive or negative). Modern agriculture has progressively simplified the landscape in an effort to maximise the productivity of inputs.

Some elements that strongly contribute to improving the aesthetic quality (such as small woodlands, hedges, rows of trees, scattered trees, meadows, etc) have thus been eliminated.

These elements can be reintroduced only by reducing the farmer's income. These losses are the opportunity cost of the landscape improvement.

The use of methods such as multi-objective programming or goals programming make it possible to identify optimal compromise solutions between landscape quality and farm income (Marangon and Tempesta, 1998; Bazzani *et al.*, 2004; Borin *et al.*, 20109; Bazzani *et al.*, Tempesta and Thiene, 2004; Marangon and Tempesta, 1998). To implement these approaches it is necessary to estimate the relationship between

land use and landscape quality and, on the other hand, between land use and farm income. Starting from these functions it is possible to find the efficient compromise solutions between income and landscape quality.

As an example, figure 2 presents a diagram illustrating the trade-off between landscape quality (quantified by a visual aesthetic index per hectare ranging from one to ten) and gross income with reference to arable farms on the Veneto plain

Figure 1 - Visual-aesthetic index (VAI) and percentage of the view occupied by pylons, non-residential buildings (factories) and scattered houses.

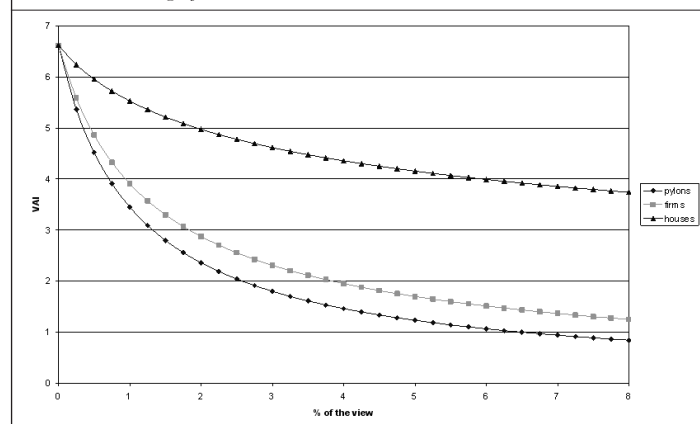
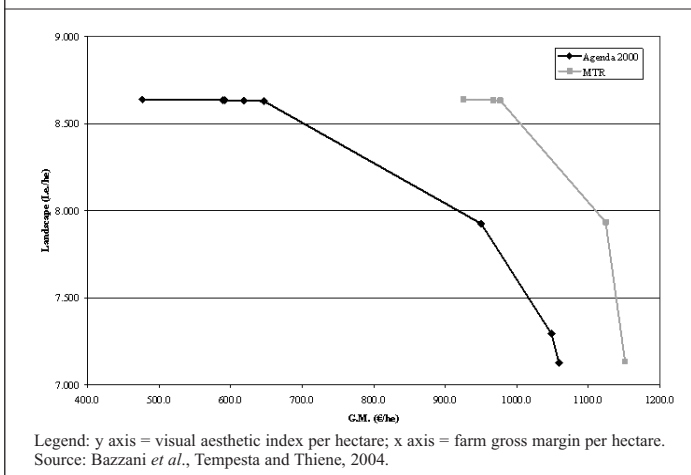


Figure 2 - Efficiency frontier: arable farm comparing Agenda 2000 and Mid- Term Review scenario.



(Bazzani *et al.*, Tempesta and Thiene, 2004). The graph identifies all the efficient compromise solutions between landscape and income, making it possible to calculate the opportunity cost of improving the landscape on the Veneto plain under two different policy scenarios.

It is possible to highlight that the entry into force of the Fischer reform of the Common Agricultural Policy in 2003 has significantly reduced the opportunity cost of landscape improvement.

6.2. Demand-based methods

Both stated and revealed preferences methods can be used to estimate the monetary value of the landscape. However in Italy the stated preference approaches have been used almost exclusively. The approach commonly employed has been the Contingent Valuation Method (CVM), while some Discrete Choice Experiments (DCE) have only recently been undertaken. In general, by means of these methods the scholars ask people to state their Willingness To Pay (WTP) to preserve or to improve the landscape quality. By means of the CVM the WTP is asked directly (Mitchell and Carson, 1989) while by means of DCE the WTP is inferred analysing the choice made by the people with reference to alternative landscape scenarios (Birol and Kundouri, 2008). It is worth underlining that DCE present an important advantage with respect to the CVM. By means of this method it is possible to estimate the value of all landscape elements considered by the experiment while, on the contrary, the CVM permits only one landscape asset to be evaluated at a time or, in other words, the effect of the presence or absence of a particular feature. By means of the stated preferences methods scholars estimate the average WTP (per family or per person) and then compare this figure to the average costs (per family or per person) necessary to implement preservation or improvement policies.

Contingent valuation studies

The CVM studies in Italy mainly concerned the preservation of existing rural landscape against possible sources of degradation, but there were also studies aimed at assessing the impor-

tance of improving landscape, for example through the planting of forests on the plains or the laying of underground high voltage transmission lines.

Both donations and taxes were used as payment vehicle. For taxes, two different contingent market formulations were proposed. Sometimes an increase was assumed in order to preserve the landscape in its current form and so people were asked to state their WTP. In other cases it was proposed to waive a reduction in taxes paid in order to continue to pay subsidies to farmers whose interventions ensure the conservation of the landscape. Willingness to accept (WTA) was therefore sought.

Different contingent market designs were also adopted as regards donations: a) one shot donation (residents) (Signorello *et al.*, 2001; Signorello *et al.*, 2005); b) unlimited annual donation (residents) (Idda *et al.*, 2006); c) limited annual donation (tourists) (Tempesta and Thiene, 2004). In the last case, the interviewees were also asked to state the number of years of payment. Obviously, in the first case the estimated benefits cannot be compared with those obtained when the contingent market considers a permanent increase in taxes or a continuative donation over time. In the case of one-shot donation, for reasons of comparability, it is necessary to annualise the amount obtained with the average WTP, with reference to a certain period.

The calculation of the benefits when the contingent market involves a donation made for several years by tourists is equally complex. In this case, the duration of the donation depends on the number of years the tourists think they will be visiting the same location in the future.

However, in Italy tourists rarely visit the same location for more than two or three years, with the exception of the owners of holiday homes. When the average number of years in which tourists visit a certain area is equal to the average number of years for which they are willing to pay a contribution, then the annual declared WTP can be considered the annual flow of future benefits. Otherwise, the WTP must be appropriately increased or decreased.

In the Italian studies, the elicitation method is generally the dichotomous choice.

Another important element of diversification among the studies reviewed is the economic agent supposed to pay the contribution, which in some cases is the family, while in others it is an individual. This second solution, although not always theoretically correct, is the only one possible when, for example, the contingent market supposes the introduction of a tourism tax, expressed in euros per person per day's stay. Again, to compare the different results it becomes necessary to make some assumptions about the average number of components per family.

In order to compare the results of the researches, the amounts were discounted and expressed in constant euro 2005. Secondly, the WTP was annualised when it was expressed as a one shot payment. Finally, an average WTP/WTA was calculated per family, as if it had been estimated per person, considering an average number of 2.5 persons per family.

As can be seen in table 3, the estimated values are very diverse considering both the value per family and per

hectare. This can partly be ascribed to the differences between the studies described above, but probably also depends on the characteristics of the landscape considered. In fact the highest value per hectare has been estimated in the case of a peri-urban afforestation programme (13,554 € per hectare) (Tempesta, 2006) that, to certain extent, is comparable to an urban park. Instead, the lowest value has been estimated in the case of the Sardinia pastoral landscape (Idda, 2006) that does not seem to be threatened by phenomena of degradation or abandonment.

It is interesting to note that the benefits of landscape preservation are in general higher than the subsidies paid yearly to the farmers through the CAP accompanying measures for landscape preservation in Italy (Antonelli *et al.*, 2006; Tempesta, 1998; Tempesta and Thiene, 2004; Antonelli *et al.*, 2006; Torquati and Musotti, 2007).

Discrete choice experiments applications

There have been only a few estimates of landscape value using DCE in Italy.

The first was carried out by Bottazzi and Mondini in 2006. The results obtained appear contradictory. This was probably due to the way in which the choice experiment was set up. It was highlighted that, paradoxically, the WTP for conserving the traditional landscape of the “Cinque Terre” National Park (Liguria) is negative because the foreign tourists tend to prefer a more natural arrangement.

Madau and Pulina (2011) analysed tourists’ preferences with reference to the rural landscape of Gallura (Sardinia). The authors found that the most appreciated characteristics are the presence of forests (WTP = 49.5 € per capita), followed by vineyards (16.5 € per capita) and grazing (6.65 € per capita). Also in this case the tourists seem to prefer a more natural landscape than traditional (grazing) or agricultural (vineyards) ones.

Analysing the riverscape impact of alternative water management scenarios, Tempesta and Vecchiato (2011) found that the inhabitants are willing to pay 82.5 € per family per year to guarantee a minimum in-stream flow of 10% and 26.7 € per family per year to increase the presence of forests and hedgerows by 10% along the river Serio (Lombardia). The research, by means of a latent class approach, also highlighted the presence of a not negligible heterogeneity of the preferences among the people living in the municipalities located along the river. About one third of the interviewees did not ascribe any value to the increase of forests and hedgerows while the others considered the greening of the river banks more important than the guarantee of the minimum in-stream flow.

5. Conclusions

Until recently landscape policy in Italy followed an essentially top-down approach. Still today there is evident difficulty in favouring and stimulating a participatory process that, directly involving the population, could improve the effectiveness of the public intervention. The possibility that landscape can have a value is sometimes rejected a priori. The interactions between landscape and economy are so strong that they cannot be ignored by the public authorities. Amongst other things, landscape

quality can influence human health, tourism flows and consumer habits in terms of produce and the real estate market.

Landscape preservation has costs and benefits that have to be carefully considered by the public decision-maker. In this respect, following the European Landscape Convention, it is possible to state that the benefits have to be estimated starting from the analysis of people’s preferences. Obviously, this does not mean that the experts’ opinions have to be ignored, but simply that if these diverge from the lay people’s preferences it is necessary to interact with the latter to make them conscious of the importance of preserving some landscape features.

In this respect it is of basic importance to correctly reveal people’s landscape preferences. The implementation of landscape policies involves a need for reliable assessment methods that can correctly guide the public choices.

In this paper, an overview is provided of the possible valuation methods with reference to the Italian legislation. As discussed above, there are many approaches that make it possible to estimate the value of the landscape (both monetary and non-monetary). These methods can be used both for the assessment of the landscape impact (usually negative) of changes in land use, and to implement actions for the conservation and improvement of the landscape. The review of the Italian studies suggests that these approaches have elements of strength and weakness. The psychophysical approaches, widely applied in Italy, use photographs or photomontages as a proxy for in the field landscape perception, but it is well known that in some cases images and in the field rating can diverge. Moreover, the preference functions are additive and do not take into account the interaction between landscape elements. On the other hand the results of the Italian researches are quite coherent and permit a system of preferences to be identified that is substantially shared by the people.

With reference to the monetary valuation methods, the Italian studies highlighted that, in the case of landscape valuation, these approaches can have some important drawbacks. The estimated value can be biased by a lot of factors and the researchers have to be very careful in order to prevent any possible source of error. In particular, economists sometimes neglect to specify the landscape transformations to be evaluated and incur in the so-called hypothetical bias.

Despite these criticisms, the Italian studies appear to be useful in order to correctly implement the land use and agricultural policies. With reference to the land use policies the Italian researches works highlighted that modern buildings (in particular industrial ones) constitute one of the most important sources of degradation of the landscape aesthetic quality. In this respect the master plans should in future try to limit urban sprawl and preserve the rural areas where the landscape is not yet compromised by the diffusion of new buildings.

Considering the agricultural policy, the Italian studies seem to suggest that especially on the plain the Common Agricultural Policy should devote more financial resources to afforestation programmes (in particular near urban areas) since woods can produce a relevant flow of benefits for the inhabitants. On the other hand a not negligible demand has been found for the p-

Table 3 - Monetary landscape evaluation studies done in Italy with the contingent valuation method.

Authors and year	Area	Interviewee characteristics	Aim of the evaluation	Landscape	Elicitation method*	Payment vehicle	Benefits estimation (current prices)	Average yearly benefits (constant prices 2005 per family/year)	
								Total	Per ha
Tempesta, 1998	Plain between Is onzo and Tagliamento rivers (Udine)	Residents	Landscape conservation	Plain natural meadows	OE	mixed	WTP average = 2.17€ per family/year	2.9	473.8
Tempesta, 1998	Plain between Is onzo and Tagliamento rivers (Udine)	Residents	Landscape conservation	Plain meadows and hedgerows	OE	mixed	WTP average = 4.21€ per family/year	5.6	3,079.9
Tempesta, 1998	Plain between Is onzo and Tagliamento rivers (Udine)	Residents	Landscape conservation	Plain wood	OE	mixed	WTP average = 3.72€ per family/year	4.9	1,494.2
Marangon and Tempesta, 2001	Hills of the Collio Area (Friuli Venezia Giulia Region)	Residents	Landscape conservation	Traditional vineyards	DC	tax (reduction renouance)	WTA median = 72.3€ per family/year	78.8	332.0
Marangon and Tempesta, 2001	Western Hills (Friuli Venezia Giulia Region)	Residents	Landscape conservation	Traditional vineyards	DC	tax (reduction renouance)	WTA median = 112.7€ per family/year	122.8	621.6
Ciccia and Scarpa, 1999	Cilento National Park	Tourists	Landscape conservation	Natural	DC	new local tax	WTP average = 18.0€ per person/year	51.3	270.4
Tempesta and Thiene, 2004	Cortina d'Ampezzo Valley - Dolomites (Belluno)	Tourists	Landscape conservation	Mountain meadows	OE	donation	WTP average = 27.4€ per family more years	4.4	759.0
Signorello <i>et al.</i> , 2001	Erna Volcano area (Catania)	Residents	Landscape conservation	Traditional pistachio cultivation	OE-DC	donation	WTP average = 51.6€ one shot per family	2.8	273.9
Marazzi and Tempesta, 2005	Italy	Residents	Laying underground high voltage lines	Countryside landscape	DC	tax (increase)	WTP median = 156€ per family/year	162.2	184,891.7**
Marazzi and Tempesta, 2005	Italy	Residents	Laying underground high voltage lines	Countryside landscape	DC	tax (reduction renouance)	WTA median = 389€ per family/year	404.6	461,203**
Tempesta, 2006	Plain of the Venice Municipality	Residents	Landscape improvement	Plain wood	DC	tax (increase)	WTP median = 20.1€ per person/year	50.2	13,554.0
Torquati and Musotti, 2007	Umbria Region hills and mountains	Residents	Landscape conservation	Traditional landscapes (pasture, meadows, olive trees, hedgerows, dry stone walls)	DC	tax (increase)	WTP average = 47€ per family/year	47.0	1,692.0
Idda <i>et al.</i> , 2006	Sardinia - Thiesi hills area (Sassari)	Residents	Landscape conservation	Traditional pasture and meadows	DC	donation	WTP average = 53.3€ per family/year	53.3	10.2
Idda <i>et al.</i> , 2006	Sardinia	Tourists	Landscape conservation	Traditional pasture and meadows	DC	new local tax	WTP median = 15.9€ per person/year	39.7	65.7
Signorello <i>et al.</i> , 2005	Viola coast (Reggio Calabria)	Residents	Landscape conservation	Traditional vineyards	DC	donation	WTP average = 183.7€ one shot per family	9.2	-
Antonelli <i>et al.</i> , 2006	Marche Region - hills and mountains	Residents	Landscape conservation	Traditional landscapes (pasture, meadows, hedgerows)	DC	tax (increase)	WTP median = 74.3€ per person/year	74.3	3,980.6
Marangon <i>et al.</i> , 2007	Hills of the Collio Area both Italy and Slovenia	Residents	Landscape conservation	Traditional olive trees cultivation	DC	tax (increase)	WTP median = 22.8€ per family/year	22.8	-

(*) OE = open ended; DC = dichotomous choice; (**) € per km.

reservation of traditional landscapes on the hills and mountains. Also in this case the Italian research works provided evidence that more financial subsidies should be devoted to the preservation of the fragile landscapes of these areas to contrast the abandonment of pastures and meadows.

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