DE GRUYTER OPEN

10.1515/jlecol-2016-0006 Journal of Landscape Ecology (2016), **Vol: 9 / No. 2.**

LANDSCAPE CONSERVATION: THE PERSPECTIVES OF EXPERTS AND OTHER STAKEHOLDERS

MARCO AVANZINI[1], STEFANO BUSSOLON[2], LETIZIA CAPORUSSO[3*], GEREMIA GIOS[4], ILARIA GOIO[5]

[1]*MUSE – Museo delle Scienze, Corso del Lavoro e della Scienza 3, 38123 Trento, Italy; e-mail: marco.avanzini@muse.it*
[2]*Department of Psychology and Cognitive Science, University of Trento, 38068 Rovereto, Italy; e-mail: stefano.bussolon@unitn.it*
[3*]*Department of Economics and Management, University of Trento, 38122 Trento, Italy; e-mail: letizia.caporusso@unitn.it, *Corresponding author*
[4]*Department of Economics and Management, University of Trento, 38122 Trento, Italy; e-mail: geremia.gios@unitn.it*
[5]*Department of Economics and Management, University of Trento, 38122 Trento, Italy; e-mail: ilaria.goio@libero.it.*

Received: 15th April 2016, **Accepted:** 7th May 2016

ABSTRACT

The idea that landscape fulfils many different functions and provides multiple benefits for human society is gaining strength. This new vision of landscape changes both, the interests and the needs of the persons involved and the use and management of the landscape itself. The objective of this paper is to study landscape conservation in a particular mountainous area of Italy, which requires an institutional, non-generic approach. Using the contingent valuation method, we investigated whether there is a relationship between experts' and casual observers' evaluations of ten different scenarios in the Leno Valleys. Results show that direct knowledge of the site characteristics increases the awareness of the importance of the site, significantly impacting on conservation choices and strategies.

Keywords: landscape conservation; stakeholders; contingent valuation method.

INTRODUCTION

"Landscape plays a variety of different functions, providing humans with goods (such as food) and intangible services (such as those relating to the regulation of environmental quality or the aesthetic quality)" (Chee, 2004). This new vision brings about a change in users' expectations and requires a revision of landscape conservation and management policies in a broader and more comprehensive framework. As such, local, regional and national policy makers need to be provided with accurate information on different landscape values.

As frequently happens when the same term is adopted by different disciplines, the word landscape has taken on different meanings according to the context in which it is used (Deffontaines, 2004), despite many attempts to reach a comprehensive, shared definition.

One of the most commonly accepted definitions is that proposed in art.1 of the Landscape Convention: "Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (www.coe.int), nonetheless the term is still subject to different interpretations. Landscape: a) "provides a multitude of functions and is subject to many possible land uses" (Chee, 2004; DeFries *et al*., 2004; de Groot, 2006); b) "is influenced by the context in which it appears and it is experienced by people as places that are more than a physical piece of land'' (Bengston, 1994); c) "evolves continuously in a more or less chaotic way and reflects social and economic needs of a particular society at a given moment'' (Antrop, 2006). Changes to the landscape are seen as a threat to existing merits and characteristics; as a consequence, conservation should be both, an aim in itself and means to achieve sustainability (Romani, 1994). The implications of these different interpretations are not only theoretical, given that provisions may need to be made or measures adopted that will modify the landscape. This is because the decision to give precedence to a particular aspect over others determines whether or not it is appropriate to allow more or less significant changes to take place.

The Alpine landscape is the result of a complex interaction and co-evolution of natural ecosystems and human activities dating back thousands of years. In Europe, biodiversity is in large part linked to semi-natural environments and traditional land-use practices (Nagy *et al*., 2003; Fischer *et al*., 2008). Although species diversity in rural European contexts is an unintentional outcome of land use management, the fact that traditional activities have favoured rather than damaged biodiversity is somewhat remarkable. Nevertheless, since the second half of the 20th century, changes in society, the development of tourism and intensification of agriculture have resulted in changes in the ways Alpine regions are used, either towards greater exploitation or towards complete abandonment (Rutherford *et al*., 2008). These changes are considered to be the main causes of the variations observed in species diversity, ecosystem functionality and landscape configuration.

Several studies have shown that changes in land use lead to changes in species composition, interactions between species and available ecosystem services (Quétier *et al*., 2007; Chemini & Rizzoli, 2014). The Alps do, in fact, provide a great number of ecosystem services: protection from natural hazards, CO_2 storage and accumulation in soil or biomass, provision of raw materials, provision of water, genetic diversity and tourism opportunities (Grêt-Regamey *et al*., 2008).

Within this framework, it is clear that when the role of natural resources as input to production processes and their role in the process of growth of economies of scale lost importance, mountains suffered to a greater extent than other regions. The same goes for landscape evolution. The conditions for maintaining an attractive landscape in these areas, from a perspective of sustainability, represent an opportunity to involve not just local populations but also wider communities. Any attempt to remedy this situation involves at least 5 conditions. The first concerns local population having control of natural resources in a context where there is a drive towards a situation where local natural resources are managed by social groups other than residents. The second concerns the ability to involve local population in the processes of environmental protection and promotion. In fact, this involvement not only ensures that the mechanisms set in place are enduring, it is also a way of keeping monitoring costs to acceptable levels and of identifying the region's potential. These aspects are often unforeseen or even ignored. The third concerns the ability to incorporate various initiatives into a coherent framework. The fourth depends on the possibility of innovation, including organisational, aimed at the specific conditions of the mountain environment. Finally, the fifth condition for development is being able to count on flexible regulations adapted to local conditions.

Since environmental resources in general and landscape resources in particular are increasingly desired and subject to competing uses, alternative methods for managing and maintaining these resources need to be found. In this regard, it should be noted that negative past experiences have also shown that the idea that the landscape can only be protected by resorting to regulations of command and control[1] has been superseded. In fact, many different instruments of intervention for managing environmental resources are currently available[2], some of which require calculation of their economic value. These include payment systems for environmental services (PSAs) the financial mechanisms that can introduce market mechanisms into the management of ecosystems. More precisely, the idea is to draw attention to the real value of the natural goods and services provided by introducing incentives that would encourage the locals to produce these goods and services. Other instruments of intervention consist in integrated development and conservation projects, and practices of sustainable management of agro-silvo-pastoral systems having the scope not only of promoting management methods that ensure the availability and quality of such goods over time, but also of drawing the attention of the local people to the existence of these environmental services, including presenting the possibility of them providing a source of supplementary income.

More generally, it should be noted that landscape conservation in particular can only happen through appropriate management methods. Conservation without management is only possible for small areas of land and comes at a high cost. Nonetheless, appropriate management requires awareness, on the one hand, there are boundaries that may, under certain conditions, be overcome but not ignored, and that coevolution mechanisms are decidedly stringent in the medium and long term. This also follows from the irreversibility of certain decisions.

Finally, if there is agreement on the fact that landscape, at least in anthropized areas, acts as a sort of mirror of the intensity and quality of anthropic intervention, there can only be agreement on the fact that the creation of an unattractive landscape is the most obvious symptom of a type of socio-economic intervention destined to a short life. Hence, from this point of view, aesthetic evaluation acquires importance not so much and not only as a value in itself, but as an directly measurable element of the type of socio-economic development taking place in a given contest at a given point in time.

The main objective of this paper is to investigate how landscape is perceived and evaluated by various stakeholders. This analysis is needed in order to give groundings to economic policies aimed at encouraging and promoting conservation and sustainable use of landscape. For this purpose, we used various techniques to investigate the relationship between the assessments given to ten locations in a specific area of the Italian Alps (the Leno valleys, northern Italy) by twenty experts, *i.e.* people who have direct knowledge of the sites, and the willingness of casual observers, *i.e.* respondents to a web survey, to pay for the conservation of these places.

[1] Such as, for example, the zoning of various areas in a region according to different levels of conservation, the identification of protected areas, or the banning of certain activities in given areas.

[2] Taking forest resources, for example, numerous instruments of intervention have been traditionally used. Instruments of command and control consist in restrictive measures imposed directly by law. This type of measure, which is implemented at the end of the production process, poses a final ‘remedy’ but is not a solution that goes to the root of the problem. Other instruments implemented on a voluntary basis appear to be more flexible, these being: a company’s social responsibility, environmental certification and environmental management systems.

Reasons for the growing interest in landscape and environmental conservation

There are many reasons for the growing interest in environmental issues (Musu, 2000), and these can be summarised under two headings: cultural and objective. The latter include demographic trends, technological developments, the speed of environmental change, urbanisation, the growing complexity of anthropic systems, increased energy consumption and pollution (Schmidt di Friedberg, 1992). The same motives behind increased attention to the environment also drive the interest in landscape. It is because those properties relating to the quality of the environment as a whole are frequently linked to the quality of the landscape. The ability of an ecosystem to supply ecosystem services is often, in the view of the majority of the population, associated with the aesthetic aspects that landscape embodies (Romani, 1994).

Landscape is the natural result of the interaction between humans and the natural environment (European Landscape Convention), and given that human society has a moderate ability to modify the environment, such changes once took place slowly, but in more recent times, "developments in ... production techniques and in ... planning, … and, at a more general level, changes in the world economy are in many cases accelerating the transformation of landscapes" (www.coe.int). Thus, these transformations become evident over a short period of time or even over the course of a single generation. As a result, the fragility of the landscape itself also becomes evident as does the way indiscriminate use of it by some users can, over time, drastically reduce the opportunities it presents to other potential users.

Lately, the topic of landscape has in many ways been interwoven with problems of sustainability and therefore with the conditions that will ensure its conservation for the future. Moreover, the increasing attention on this issue led to a process of redefinition and reconsideration that extended the spheres of action and intervention (Oliveira et. Ribeiro, 2012), resulting in landscape gaining increasing economic and political importance.

This evolution led to the implementation of a growing number of political economy tools having the goal of ensuring that landscape evolves in a desirable way. Nonetheless, beyond the statements of principle, it is not easy to identify and apply suitable and effective tools for landscape conservation. This is also because, contrary to what one might be led to believe, there is often a lack of knowledge of the causal factors that need to be controlled.

Landscape may be thought of as a system of tangible and intangible elements, and their relationships. In other words, perceptions of landscape arise from the interpretations that each observer draws from the visible signs in the region (Raffestin, 2005). This is why landscape can only be interpreted dynamically and why the instruments of landscape planning must continually evolve. At the same time, new information must always be available for the evolution to take the desired direction.

ENVIRONMENTAL RESOURCES, ECOSYSTEM FUNCTIONS AND SERVICES

In the past, the prejudice that protecting the environment could be a check on economic development has often set ecology and economy in opposition to one other. In recent years, ecological economy (Costanza *et al.*, 1997; Barret & Farina, 2000; Brown, 2001) has been attempting a constructive dialogue between these two disciplines out of the need to steer current development models in the direction of environmental and social sustainability. Part of this initiative is the attempt to estimate the value of services deriving from ecosystems, the base unit used by ecologists to define natural landscapes.

According to the definition given by the Millennium Ecosystem Assessment (MA, 2005), "ecosystem services" are "the benefits people obtain from ecosystems". According to the MA (Fig. 1), there are four broad categories of ESs: supporting services (*e.g.* soil formation), provisioning services (*e.g.* food), regulation services (e.g. erosion control), and cultural services (*e.g.* aesthetic and recreational). Recent studies tried to understand the effects of diversity on the functioning of ecosystems and have drawn attention to the positive relationships between biodiversity and primary production, and between biodiversity and ecosystem services. Biodiversity becomes a key element in obtaining the goals of economic, social and ecological management.

Fig. 1: Ecosystem Services (Source: MA, 2005)

SUPPORTING SERVICES
Services necessary for the production of all other ecosystem services

- Soil formation
- Nutrient cycling
- Primary production

Provisioning
Products obtained from ecosystems

- Food
- Fresh water
- Wood
- Fiber
- Biochemicals
- Genetic resources

Regulating
Benefits obtained from regulation of ecosystem processes

- Climate regulation
- Flood regulation
- Disease regulation
- Water regulation
- Water purification

Cultural
Nonmaterial benefits obtained from ecosystems

- Aesthetic
- Recreation and ecotourism
- Educational
- Cultural heritage
- Inspirational
- Sense of place
- Spiritual and religious

A key finding stated and elaborated in the MA (MA, 2005) is the link between ESs and the wellbeing of the society. The basic idea is that human welfare generally depends on the services nature provides. As a consequence conservation is firmly anchored to direct and indirect socio-economic benefits that should be preserved, but above all restructured.

The perception of the community is therefore an important aspect. While the 'environmental function' in classical ecology is a generic term for an impact associated with the presence of environmental resources (leaving aside the perception the community may have of this), the new concept 'ecosystem service' is closely related to the well-being of the society using that particular place. Having a wide range of ecosystem services means having greater 'wealth' per capita in terms of natural capital, but it also implies that socio-ecological systems are healthier and more resilient.

Every landscape has an ecosystem value (Odun, 1988) but also an economic value. Given that the latter is only partially excludable and rival, it is frequently underestimated as it rarely gives rise to market cash flows. However, the economic value may not only be calculated, but may also serve as the basis for local development processes and for maintaining a high quality of life.

The widespread desire to exploit an attractive landscape should not, therefore, be thought of only as a desire to maintain a link between anthropic and natural elements, as it is sometimes presented. This may be seen as futile nostalgia for the past reinforced by the illusion that it may serve as a means to maintain a link between anthropic and natural elements as opposed to the tendency towards dehumanisation of the space we live in (Giacomini & Romani, 1992). Thus landscape moves from being a fundamental element in the identification of a region to a productive factor providing the numerous resources and services aimed at satisfying various social needs and new opportunities of use.

In fact, in many cases landscape generates potential utility flows able to satisfy the needs of various types of consumer. It goes without saying that, as often happens when many stakeholders are involved, access to, and maintenance and management of these flows are at times not without conflict (Reimoser, 2005).

An attractive landscape can contribute to improving the quality of life (Priore, 2005), including health, and can, therefore: all other things being equal, increase the value of homes (Tempesta, 2012). In several cases, this may be an essential element in local identity to the point of several distinctive elements being differently evaluated by residents and tourists. Finally, landscape may be an important element in the context of local development, including in the presence of globalisation phenomena, as the resource is not very mobile and is, therefore; less easily transferable to other contexts. In particular, landscape may be an element both, in the development of recreational tourism (Briassoulis, 2002) and in establishing a specific area of internet-based innovative activities.

With regard to tourism (understood in the broad sense), it may either be the crucial factor, a 'container of resources', or it may simply have a background function. In other words, landscape is no longer only an essential element in the identification of a region, it is also a productive factor underlying numerous goods and services aimed at satisfying various social needs and meeting new consumer opportunities. Specifically, landscape can play at least three different roles in the tourism sector.

In the first case, landscape is perceived as a clearly defined resource which users make partial or full use of (Healy, 1994; Jafari, 1982). In the second case, landscape constitutes a generic resource for recreational use. The area occupied is very wide but clearly delimited. Nonetheless, exclusive use cannot be guaranteed. In the third case, landscape is not perceived as a decisive factor in access to the various recreational tourism activities. The area occupied is very wide even though its boundaries are not very clear from the user's point of view and exclusive use cannot be guaranteed (Gios & Clauser, 2009).

It should also be noted that landscape acquires new functions over time and changes arise in the relative importance of the various utility flows it guarantees, therefore to ensure

efficiency and sustainability it is necessary to constantly modify management methods, and it is also necessary to advance knowledge of landscape in all its various aspects.

Mountains as an ideal testing ground for acquiring knowledge on landscape and the environment

There are at least two things that make mountains a natural testing ground for analysing the consequences of policies that address the impact of economic and social developments on landscape. In the first place, after centuries of relatively steady evolution, over the recent decades the Italian - and to a certain extent the European - mountains have over recent decades become increasingly diversified. Indeed, there are regions in mountain areas with very different rates of economic development, anthropic pressure and land use (Batzing, 2006). Such different rates are not always closely related to altitude, while at the same time there are numerous factors governing the various rates of development and these are not stable over time. Secondly, mountains seem to be those parts of a region where boundaries are most evident: it may even be suggested that, from a certain viewpoint, boundaries are the very essence of mountain life. In a dynamic context, such as the current one, boundaries do not function uniformly, as it used to be in relatively static economies such as the agro-silvo-pastoral system. It is well-known that this system has been the foundation of mountain life for a long time, and it is the very emergence of continually varying boundaries that explains the variations in development and in landscape evolution that are currently taking place in mountainous areas.

From a certain perspective, the idea that the boundary or boundaries need to be taken into consideration translates into modern terms as sustainability. And it is in those very areas where the social, economic and environmental boundaries are most evident, *i.e.* the mountain areas, that the solutions that would guarantee sustainability, *i.e.* development that is fair and long-lasting, may first show up. This also goes for landscape and its associated environmental aspects.

The fact that the natural and structural constraints associated with productive activities and quality of life have a stronger impact in mountain areas than elsewhere makes it possible to examine the consequences of the various interventions on landscape in a greater detail. The specific situation regarding mountain agricultural activities is of particular interest to the present investigation. Indeed, the type of agricultural activity that in many cases motivated settlement in the mountains is an essential component in modelling landscape in these areas. At the same time, as primary activities are abandoned, the landscapes of many mountain areas have become degraded making them less desirable as places to live in and as tourism destinations. It is tourism that has drawn attention to the multi-functionality of agricultural activity: since the second half of the 1990s, European Union documents have increasingly referred to the multiple functions (multi-functionality) of agriculture and there has been a proliferation of scientific initiatives aimed at analysing the theoretical and operational implications of this concept in greater depth.

The newly discovered importance of agricultural multi-functionality in mountainous areas, including its relation to landscape, is characterised by at least two distinctive features. The first is internal to the mountain agricultural system, which, as a result of well-known environmental constraints, is less productive and less able to adapt to the advances in productivity that the primary sector has undergone in recent decades. The second, external to the sector, is related to the greater fragility of the mountains: environmental constraints and the negative consequences of attempts to disregard them become apparent here earlier than elsewhere.

The advantages of multi-functionality are frequently stated but not evaluated and as a result their economic importance is underestimated. By way of example and in order to underscore the wide range of variables involved, we report here some of the results from an investigation (Gios & Notaro, 2002) carried out in the Trentino Prealps (Alpe di Campogrosso). It was found that in the case of the studied pasture, the utility flow deriving from it as a recreational landscape is greater than the value it could acquire from livestock raising. In the surveyed location the value of agricultural production over the 2001/2 season could be estimated as being less than a quarter of the benefits obtained from visitors in terms of willingness to pay. These benefits, however; do not automatically translate into income neither for pasture owners nor the people who keep their animals there. Given that the landscape is not, in fact, a private asset, there is no market that can guarantee that owners are remunerated for the resource. New strategies must therefore be devised.

A new model for regional development and policy

It is well-known that up to the 1980s, traditional models of development and policy were based on an approach defined as 'top down', in which "the professional planner is on a higher level than what is being planned and her/his decisions go from the top to the bottom, from the apex to the base, from the centre to the periphery" (Tommasoli, 2002). Later, as the concept of sustainable development took hold and since "globalisation had begun to have an effect, encouraging competition no longer just between companies but also between regions and districts" (OECD, 2001; Camagni, 2002), alternative approaches were developed in which the various stakeholders had greater involvement. This also applied to landscape planning and management. At the time being, participation by stakeholders and the general public is now widely supported an essential part of landscape planning and management (Selman, 2004) and is explicitly stated in the Convention on Biodiversity (1991), the European Landscape Convention (Council of Europe, 2000) and the Aarhus Convention (UNECE, 1998).

A participatory approach, whenever "applied in many areas" (Baker, 2000; Buch & Hoverman, 2000; O'Riordan & Stoll-Kleemann, 2002; Selman, 2004) allows different stakeholders to communicate their ideas, expectations and needs, and to activate "processes of dialogue, negotiation, bargaining and conflict resolution, with a strong emphasis on capacity-building amongst local institutions and individuals, combined with new professional concepts, values and practices" (Pimbert & Pretty, 1997).

Even though "critical aspects have to be considered" (Stenseke, 2009), participation could benefit not only civil society by encouraging "democracy" (Mostert, 2003), "the development of social capital" (Bryner, 2001) and "trust in public institutions" (Richards *et al*., 2004), but also "the capacity of communities to solve their own problems and meet their own needs" (Martin & Sherington, 1997; Bryner, 2001; Reed, 2007).

From what has been said above, it can be concluded that there are two sides to participation: it may be considered both as a *means* of attaining particular objectives within a project by making use of local knowledge, and as *an end in itself* when it reinforces the power of people involved in decision-making processes by assigning an active and dynamic role to individuals and communities and triggering a "far-reaching process of social transformation" (Paolini, 1999).

As a consequence, what should the main characteristics of participation be? According to the literature, "many interpretations and classifications exist" (Lawrence, 2006), some of which take the degree of engagement into consideration. In this regard, Biggs (1989) sees level of engagement as a relationship that can be ''contractual'', ''consultative'', ''collaborative'' and ''collegiate'', while for Farrington (1998) participation can be

‘‘consultative’’, ‘‘functional’’ (*i.e.* facilitating project implementation through local labour and knowledge), or ‘‘empowering’’. Other authors focus on the nature rather than on the degree of engagement of stakeholders: according to Rowe & Frewer (2000) and to Selman (2004) dissemination of information to passive recipients constitutes ‘‘communication’’, gathering information from participants is ‘‘consultation’’, and ‘‘participation’’ is conceptualised as two-way communication between participants and business organisers where information is exchanged through some sort of dialogue or negotiation (Reed, 2008). Beierle (2002) and Reed (2008) distinguish between normative and pragmatic participation. The former suggests that people have a democratic right to participate in decision-making processes, while the latter sees participation as a means of the end. More generally, there seems to be a shared view that participatory processes require a) the goals and the context to be clearly articulated (Reed, 2008); to find out the role of each private or public actor involved (Purnomo *et al.*, 2005), including for managing potential conflicts; c) to develop and foster appropriate motivation and ability to participate, thereby triggering a process that may be defined as ‘educational’. This process presupposes an *a priori* definition of each participant’s knowledge in order to assess his/her level of understanding and awareness of the situation, the project and the policy under investigation with the aim of filling potential gaps.

So-called ‘experts’ are more and more involved in participatory processes, “experts” being either a) local stakeholders, *i.e.* people who have proven and long-standing scientific and operational experience («location-specific») of the area under study; b) external stakeholders, *i.e.* people who have a universal/scientific knowledge of the phenomena under study (McCall, 2003; Fraser & Lepofsky, 2004). These two categories of experts are generally brought in at the same time (Reed & Dougill, 2002; Reed *et al*., 2007) as the combination of local and scientific knowledge may contribute to a more complete understanding of complex systems and processes (Johnson *et al*., 2004), but also in order to open up learning pathways within and between the two evaluators’ groups: a group made up of experts in nature sciences and a second group made up of nature enthusiasts but with no direct experience of the sites under evaluation.

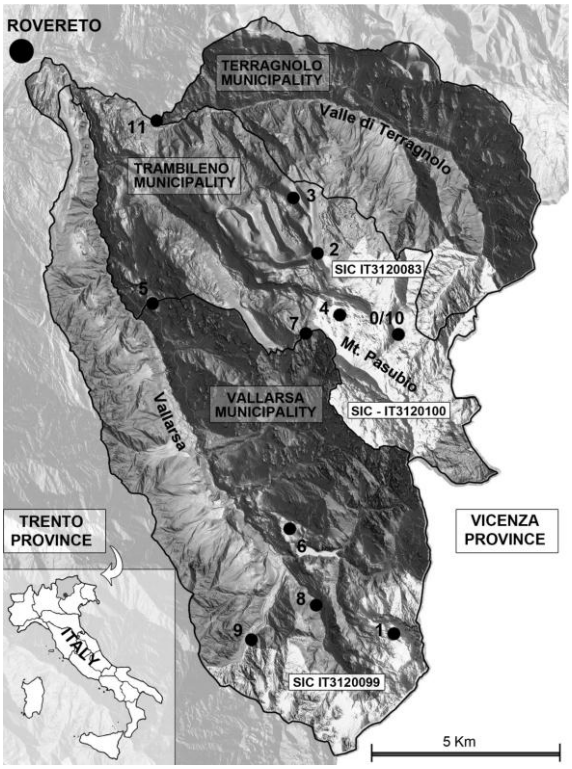
These classifications allow to understand that the participatory process is very complex and that no type of participation is *a priori* better than another; instead, it can take a variety of forms depending on 1) the characteristics of the different contexts, 2) the "different levels of engagement, 3) the objectives to be carried out, and 4) the ability of actors to influence outcomes" (Richards *et al.*, 2004). The literature suggests, however, that moves be made towards a high level of participation or involvement (Arnstein, 1969; Johnson *et al.*, 2004), and some authors (Richards *et al.*, 2004; Reed. 2007) believe that to be successful, participation should, first of all, be institutionalized as a right and not merely as a regulatory objective. This would produce three positive effects, these being: 1) facilitating and encouraging its use and dissemination; 2) "better identifying, according to their knowledge and skills, the role of each actor, public or private" (Purnomo *et al.*, 2005); and 3) motivating stakeholders and fostering a better understanding of the projects and policies.

A case study: the Leno Valleys (Trentino, Italy)

The Leno Valleys (Vallarsa and Terragnolo valley) and the district between them (Trambileno) are situated near the town of Rovereto (north-eastern Italy). Here, the two converging branches of the river Leno isolate the Pasubio massif, which extends southwards as a vast plateau at an altitude between 1,500 and 2,100 metres. Vallarsa is closed on the southern side by the mountains known as the ‘Piccole Dolomiti’ (the ‘Little Dolomites’) and a large area of alpine meadows. Terragnolo is a deeper valley, overlooking

the Venetian Prealps through a narrow pass between the Pasubio and the Folgaria-Lavarone highlands. The towns lie on small, cultivated terraces along the flanks of the valleys, while at higher altitudes are vast grasslands, predominantly pasture. The district of Trambileno lies on a series of large terraces. Overall, the region (a total of 16,813 hectares) has a high level of naturalness and contains three 'Sites of Community Importance' (SCI)[3] with high ecosystem complexity covering a total area of 3,176 hectares.

Fig. 2: The case study area



As already mentioned, our evaluation is based on two different analyses. The first, carried out by the Science Museum of Trento, consists in evaluations made by scientific experts (according to specific parameters that will be explained in the following paragraph) of approximately 10 different 'sites' considered to be of particular environmental significance. The second was conducted by the Department of Economics of the University of Trento with the aim of assessing - using the contingent valuation method – the willingness to pay of casual observers to preserve the same locations (Mitchell & Carson, 1989).

[3] A Site of Community Importance (SCI) is defined in the European Commission Habitats Directive (92/43/EEC) as a site which, in the biogeographical region or regions to which it belongs, contributes significantly to the maintenance or restoration of a favourable conservation status of a natural habitat type or of a species and may also contribute significantly to the coherence of Natura 2000, and/or contributes significantly to the maintenance of biological diversity within the biogeographic region or regions concerned.

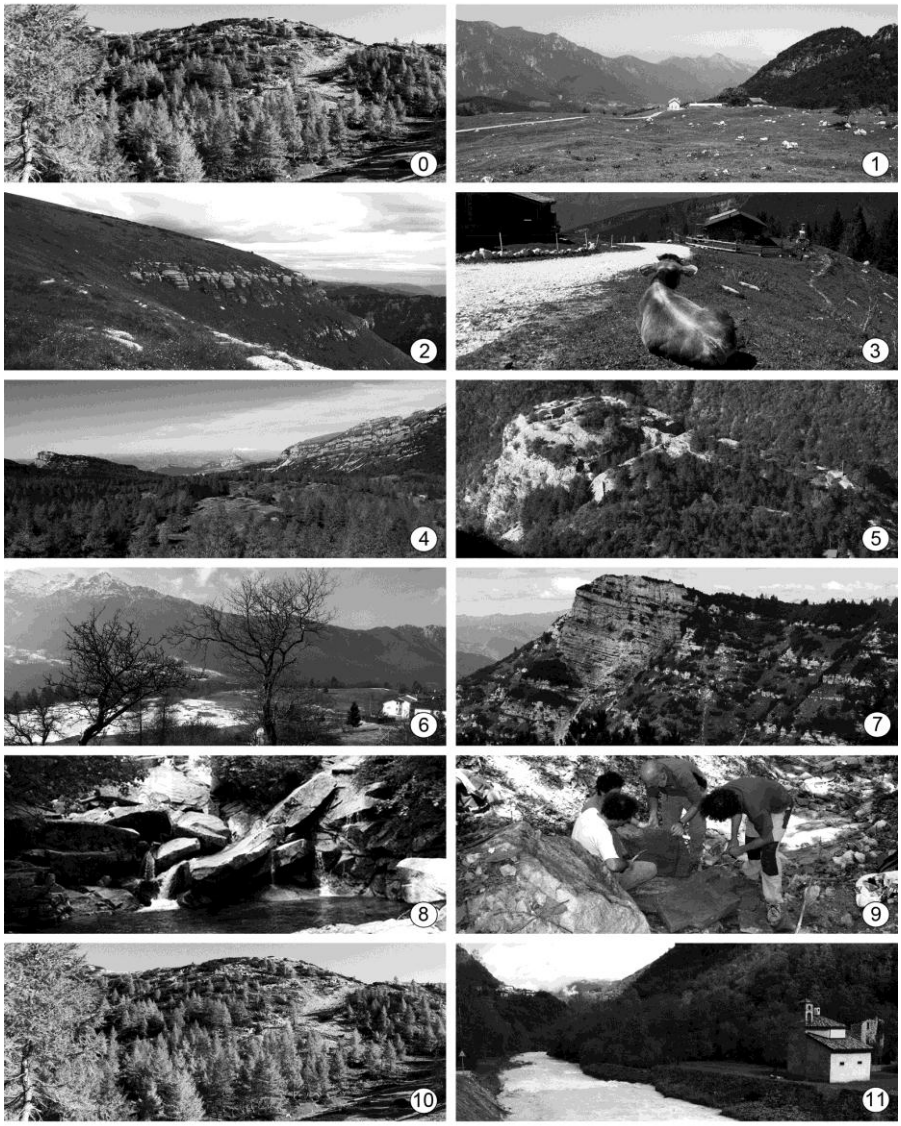
THE EXPERTS' EVALUATIONS

The 'sites' of our analysis are areas with high historical, scientific, landscape or ecosystem value. They are located between 300 and 2,000 metres above sea level and include valley bottoms, anthropic environments, mountain grasslands and open woodlands. One of these sites (Monte Buso) contained two different scenarios: one devoid of interest (depleted) and one where a recent paleontological discovery (dinosaur tracks in unexpected rocks and palaeoenvironments) brought to the revision of the geodynamic models of this part of the Alpine Chain, significantly changing the geological history of the Alps (Petti *et al.*, 2011).

Table 1: The scenarios and their main characteristics

	Site	Altitude m. asl	Short description
0	Monte Buso 0	2000	Rocky Ridge.
1	Malga Boffetal	1435	Dolomitic landscape with cliffs and pastures. Endemic species of fauna, and forest environments.
2	Dos Anziana	2000	Ridge meadow. Rich mountain grassland. Traces of the First World War. Haymakers' huts.
3	Malga Valli-Malga Costoni	1700	Grassy ridge. Alpine meadow with endemic and endangered species. The meadows are used for pasturing.
4	Alpe Pozza	1800	Mountain highlands. SCI - IT3120100 for nesting birds.
5	Valmorbiawerk – Pozzacchio Fortress	882	Rocky promontory. First World War fortress. Endangered botanical species in clearings near the fortress.
6	Piano di Vallarsa	800	Small town located on the edge of a wide flat area. Nesting site for *Otus scops*, a small raptor and excellent bioindicator.
7	Monte Testo	2000	Rocky peak. Complex network of World War I tunnels open to the public.
8	Val Sinello	1000	Narrow river-cut valley. Palaeontological sites. Intact wild environment.
9	Val Gerlano Mines	1000	Deep valley covered by forest. Palaeontological sites. Ancient mines.
10	Monte Buso	2000	Rocky ridge. Dinosaur footprints preserved in a First Word War tunnel. Archaeological findings.
11	Leno River gorge	300	Watercourse in wilderness. Botanical endemism and nesting birds.

Fig. 3: The selected sites: pictures



Using data from the literature and databases from collections housed in the Science Museum of Trento and the Rovereto and Verona Museums of Natural History, alist of flora and invertebrate and vertebrate fauna was created and habitat types were defined for each of these places. Field studies broadened our knowledge of groups of flora and fauna and enabled us to assess the level of biodiversity of each selected site, including those classified as having conservation priority (Gambino, 2001; Jaeger, 2000; APAT 2004). The field studies also allowed us to define an indicator representing a measure of the quality of each unit of landscape from the ecological and environmental perspectives (Johnson *et al.*, 2004;

Boitani *et al.*, 2007). This indicator, following several authors (Avanzini, 2001; Carton *et al.*, 2005; Reynard *et al.*, 2007; Njkamp *et al.*, 2008; Bryner, 2001; Bruschi & Cendero, 2005), is based on evaluation of the eight main components that characterise each site:

- *integrity*, defined as the degree of conservation. It depends on natural and human factors, such as the degree of natural degradation, the presence of anthropogenic elements that affect or have partially destroyed the site, the presence of vandalism, and the presence of structures that protect against agent degradation, both natural and anthropogenic in nature;
- *representativeness* which refers to the shape and/or the process that marks the site; it increases in value if the site is also known outside a scientific context and if it is believed to have educational value, even if not acknowledged by educational materials. It must be representative of a particular natural phenomenon;
- *rarity* in relation to the number of similar sites in the study area;
- *conservation value* in relation to the number of similar sites in the study area;
- *educational value* depending on the presence or absence of clearly visible and interpretable phenomena/associations/structures, on the clarity of the interpretation of the site and on its similarity to theoretical models of interpretation. The value increases if a specific phenomenon/association/structure is mentioned in teaching texts;
- *presence of materials on-site*, referring to whole or parts of objects/artefacts at a given site, which have been collected and which, due to their discovery, have given the site value and/or reputation. When artifacts discovered at an archaeological site can still be appreciated on-site the value increases, when they are stored elsewhere (*e.g.* in a museum) the value decreases;
- *impact on research* with reference to past, present and future research. The value for scientific research can never be zero, otherwise the site could not be considered. This value depends on the quality of the publications dealing with it, how representative the site is as a basis for reconstructing the area's natural and historic assets, its importance in general, and the added value a study can bring to research;
- degree of *knowledge* with reference to the quality and quantity of articles and publications - articles in the local press, scientific publications in international journals and/or doctoral theses - mentioning or dealing with the site.

Twenty experts[4] assigned values using the evaluation grid presented in Table 2 after completing environmental analyses. A total value for each site was obtained by summing the estimated values for each of the attributes considered; the lower scores indicate low scientific interest, the higher scores a high scientific interest. The scores were then added together and normalized to 100.

[4] The experts who took part in the evaluation were researchers from the Trento Science Museum working in the various natural sciences the Museum deals with. Specifically, the research and evaluation project involved 3 geologists, 3 experts in vertebrate fauna, 2 experts in invertebrate fauna, 1 hydrobiologist, 2 botanists, 2 archaeologists, 1 geographer, 1 engineer; they were coordinated by 5 of the Museum's sector managers.

Table 2: Environmental-ecological values assigned by the experts

a. Integrity	insignificant	0
	low	1
	good	2
	high	3
	very high	4
b. Representativeness	insignificant	0
	good	2
	high	3
	very high	4
c. Rarity	>7	0
	5-7	1
	3-4	2
	1-2	3
	exceptional	4
d. Conservation value	low	1
	good	2
	high	3
	very high	4
e. Teaching/educational value	low	0
	good	2
	high	4
f. Local presence of materials	insignificant	0
	partial	1
	complete	2
g. Significance of the research	low	1
	good	2
	high	3
	very high	4

h. Degree of knowledge	insignificant	0
	notes and articles in local and regional newspapers	1
	1 scientific paper	2
	>1 national / international scientific paper	3
	>1 paper, >MSc and PhD thesis	4

Furthermore, the experts assessed the ecological environmental sensitivity: Jaeger's index of fragmentation (Landscape Division Index) (Jaeger, 2000), calculated on natural systems, provides a measure of the intrinsic predisposition of the physiographic landscape unit to (natural and anthropic) degradation as opposed to the site's level of protection. To that measure, a value is added by each site's usability index (visibility, accessibility, seasonality of use, ownership (public or private), which may contribute to the site's total economic value (TEV).

Table 3: Total values of the different scenarios

Site	Ecological environmental value	Ecological environmental sensitivity		Usability (visibility, accessibility, seasonality of use, ownership)
	Scientific value (geodiversity, biodiversity, integrity, representativeness, educational value, level of knowledge)	Protection (positive value)	Vulnerability (negative value)	
Monte Buso 0	80.0	40	20	38.2
Malga Boffetal	73.3	40	25	89.4
Dos Anziana	66.6	10	20	68.4
Malga Valli-Malga Costoni	60.0	0	20	80.3
Alpe Pozza	76.6	30	25	64.5
Pozzacchio fortress	73.3	10	5	89.5
Piano di Vallarsa	80.0	0	65	72.4
Monte Testo	46.6	10	5	48.7
Val Sinello	73.3	10	5	32.8
Val Gerlano mines	83.3	10	0	38.16
Monte Buso	80.0	40	20	38.2
Leno Gorge and S. Antonio	56.6	10	45	89.4

A subdivision of the sites emerged from the various values out of 100 (summarised in Table 3) assigned by the scientific experts involved in the research following their environmental analyses of the sites.

The values assigned by the experts are based on current scientific knowledge of the sites' biotic and abiotic components regardless of actual or potential usability. These components are listed in the table (usability) only as possible added values which could potentially influence decisions on strategies of future use. Insiders' perceptions of the value of each site may therefore be very different from those of potential users.

The "non-expert" evaluation

The second survey was conducted by the Department of Economics of the University of Trento using the contingent valuation method. This type of investigation (Nijkamp *et al.*, 2008; Gios & Notaro, 2001; Carson & Hanemann, 2005) involves collecting data through an online questionnaire drawn up with input from focus groups (Reipus, 2002; Birnbaum *et al.*, 2004; Reipus & Birnbaum; 2011). The main objective of this survey was to evaluate respondents' willingness to pay (WTP - one-off) to preserve the landscape of the sites assessed by the experts.

Recruitment for the online survey made use of two channels: 1. invitation to participate in the research published on selected websites, 2. invitation to participate in the research sent to a University of Trento mailing list. The data were collected over a period of four months, from May to September 2011.

The questionnaire consisted of six web pages introduced by a short description of the nature of the research and a notice guaranteeing anonymity of the data collected. Respondents were asked to express their opinion on five statements to evaluate their attitude towards landscape preservation[5]. Answers were provided on a Likert scale ranging from *completely disagree* to *completely agree*. The 10 scenarios were then described in detail using information provided by the experts and presented along with a picture of the site and its geolocation on Google maps. The participant was informed that an intervention aimed at economically exploiting the area was planned, which would result in landscape disruption. The intervention was described in detail and the participants were asked to say if - and how much - they would be willing to pay to prevent it taking place. Willingness to pay was evaluated in terms of a (one-off) financial contribution to an environmental and/or cultural association, which would buy the area and keep it in its present state. The participant was given 15 options: 0, €1, €2, €3, €5, €7, €10, €12, €15, €20, €25, €30, €50, €100, or more than €100. If participants declared their unwillingness to pay, they were asked to justify their choice by selecting one or more of four options. On the fourth page, participants were asked a few questions relating to their socio-economic status. Given the sensitivity of this type of data, participants were reminded of the anonymity of the survey. Information was also collected on respondents' socio-demographic and economic characteristics, on their membership to environmental and recreational associations and adequate space for comments was provided.

A total of 821 people began the online questionnaire. We had to discard the data from 6 participants due to a server error. Of the 815 remaining people, 675 completed the survey while 140 abandoned it. There was no statistical relationship between the assigned scenario

[5] 1) Natural areas should be protected because they offer recreation and tourism. 2) Natural areas should be protected because they have scientific value. 3) Natural areas should be protected for future generations. 4) The natural areas should be protected to maintain biodiversity. 5) The human economic welfare is more important than the protection of natural areas.

and the drop-out rate. The drop-out rate is, however; in line with the literature on online surveys (Frick *et al*., 1999; Reips, 2000).

The analysis was carried out on the data from participants who completed the survey.

A total of 380 participants declared their willingness to pay, while 295 were unwilling to pay.

Of the latter, 284 gave at least one reason why they would not pay:

- 111 declared they needed further information;
- 172 declared the expense should be covered by the local council;
- 11 declared the landscape was not worth being preserved;
- 70 declared they could not afford the expense;
- 38 provided other reasons.

Participants were allowed to provide more than one answer.

A Kruskal-Wallis rank sum test revealed that willingness to pay was not influenced by the scenario nor is the average amount of money participants are willing to pay[6].

There was also no significant difference (Wilcoxon rank sum test) in willingness to pay between the two control scenarios: scenario 10 (Monte Buso, full description) and scenario 0 (Monte Buso, impoverished description). Perhaps the inability of participants to estimate payment based on the value of the site was due to the methodology (between-subjects design). Partial confirmation of this (although only qualitative) is the fact that among those who were not willing to pay, only a negligible number (11) believed that the area did not merit conservation. Results are summarised in Table 4.

Willingness to pay is mediated by some of the participants' attitudes: it is greater among members of an environmental organisation[7], but not influenced by membership in recreational associations[8]. Participants' place of residence seems to be irrelevant[9].

[6] In the online survey, there was no relationship between scenario and willingness to pay: chi^2 (df = 11) = 9.866, p = 0. 542. Furthermore, there is no relationship between scenario and amount of payment (Kruskal-Wallis rank sum test (df = 11) = 12.934, p = 0.298). There is no difference between the amount of payment in the two control scenarios: 10 (Monte Buso, full description) and 0 (Monte Buso, depleted description) (Wilcoxon rank sum test W = 475, p = 0.816).

[7] An interaction was found between membership of an environmental association and willingness to pay (chi^2 (df = 1) = 19. 155, p = 0).

[8] No interaction was found between membership of a recreational association and willingness to pay (chi2 (df = 1) = 0. 356, p = 0. 55).

[9] A substantial number of the participants said they resided in the province of Trento. No relationship was found between residence in the province of Trento and willingness to pay (chi2 (df = 1) = 0. 457, p = 0. 499).

Table 4: Willingness-to-pay for conservation of site

Scenario	Average all respondents	Variance	Average willing to pay	Variance
0	**19.34**	871.63	**33.00**	1041.27
1	**19.55**	904.34	**38.53**	1055.35
2	**23.60**	1018.68	**41.07**	1056.76
3	**14.39**	572.08	**29.38**	734.51
4	**22.67**	1184.56	**37.98**	1408.59
5	**9.55**	288.36	**20.52**	398.49
6	**22.22**	1021.83	**37.91**	1152.2
7	**18.96**	906.54	**32.03**	1120.25
8	**19.04**	738.08	**28.29**	837.86
9	**8.50**	197.93	**18.31**	248.7
10	**22.95**	1176.33	**41.59**	1362.38
11	**18.02**	873.11	**33.63**	1112.59

"Expert" and "non-expert" evaluation: a comparison

The value attributed by the experts is a result of direct experience with the described sites and in-depth knowledge of all the elements that help define that particular landscape, while the value attributed to the same sites by the online participants is based on the brief description they were given and the value of the evocative image included in the questionnaire.

The correlation coefficient between the values assigned by the experts and the values relating to willingness to pay (based only on those willing to pay) is -0.04, while the correlation coefficient is -0.02 if the average willingness to pay of all respondents is taken into account.

The apparent lack of a relationship between the characteristics of the site and willingness to pay is particularly evident in the two scenarios at the same site (Monte Buso 10 and 0) which were accompanied by two different descriptions (scientifically objective and partial). It could be inferred that participants (*i.e.*, casual observers) are guided more by their emotional reaction to the image of the landscape than by the individual components of the landscape.

This seems to be confirmed by the low value attributed by participants to scenario 9 (the Val Gerlano mines). Although the description included an account of the site's significance for local mining history and mentioned the presence of important palaeontological sites in the surroundings, the unexciting image attached to it seemed to have had a negative impact on the participants.

CONCLUSIONS

Increasing industrialization, urbanization and development rates are bringing about both world-wide and small-scale variations in landscapes. Landscapes are changing in their objective nature but also in the subjective and culturally-driven perception of the observers, whose evaluations are never univocal: a different degree of knowledge and understanding of a landscape properties is reflected in different assessments of its intrinsic value.

Our contribution supports this hypothesis and shows that "experts" and "casual observers" actually provide very different evaluations of the same sites. The lack of agreement is not without consequences: one can argue that landscape assessments should be made by experts because of their knowledge and experiences, whereas general public cannot judge environmental quality. Certainly, professionals have a lot to offer in terms of knowledge and skills. However, people are intrinsically involved with their living environments to survive. They use and shape the physical environment to meet their physical and social needs. While environments are shaped by people, people are inspired and shaped by their environments as well. But in landscape planning and environmental impact assessment studies, evaluation is often based just on assessment of physical characteristics of landscapes (such as topography, land cover etc.) and is done by experts, while public or user preferences are generally neglected (Kaymaz, 2012).

Zube *et al.* (1982)'s "expert" paradigm, based on the visual quality of landscapes, fails to involve landscape's actual users, their environment and their perceptions (Taylor *et al.*, 1987). Kaplan (1988) further specifies that experts perceive visual environment differently from other people, and expert judgments are "a dubious source of objective judgment" about what other people really care about in the landscape. On the other hand, Zube *et al.* (1982) "psychophysical" paradigm involves landscapes evaluation by the general public or special interest groups. Landscapes have a stimulus property which is external to the observer who perceives the landscape without conscious thinking, thus resulting in subjective evaluations which do not take into account scientific information. These viewpoints, though apparently distant, are not necessarily mutually exclusive and both contribute to the overall understanding and appreciation of the environmental perception.

The comparison between value attributed to different landscape fragments by "experts" and "non-experts" seems to confirm the idea that aside from its intrinsic nature, landscape is highly dependent on perception (Cepollaro & Morelli, 2009), and this perception is based on purely emotional aspects (psychophysical paradigm) rather than on mediated concepts (experts paradigm).

Landscape is nowadays considered an emergent property in the space where the inner and outer worlds meet, and hence something that connects individual choices with collective nature (Morelli, 2007). Landscapes are transformed not only by natural processes and human activities but also by ongoing changes in the way they are perceived and judged. In the future, protection of both nature and culture-related aspects of landscape should be taken into account: being human society an inextricable intertwining of nature and culture, landscape cannot be evaluated with reference just to objective/natural/perceptual or subjective/cultural/emotional elements. Though landscape has an intrinsic value that is independent of human mediation, society's values and expectations of the landscape cannot be disregarded.

As a consequence, planning should help to protect the health of ecological systems and the biodiversity they support (including ecosystems, habitats, species and genetic diversity) and at the same time preserve areas with identified environmental and landscape values. Convergence between "experts" and "casual observers" can (and should) be attempted by increasing the population knowledge of the characteristics of living spaces and their

diversity and potentialities, thus providing sounder grounding for long-term results in landscape management even before the implementation of command and control regulations.

ACKNOWLEDGMENTS

The authors would like to take this opportunity to thank the Autonomous Province of Trento (PAT) for providing financial support for the research, which was carried out as part of the project "Public policies and local development: innovation policy and its effects on locally embedded global dynamics (OPENLOC)" (2008-2011; www.openloc.eu).

Author Contributions

The authors contributed equally to this work.

Conflict of Interest

The authors declare no conflict of interest.

REFERENCES

Antrop, M., (2006). Sustainable landscapes: Contradiction, fiction or utopia? *Landscape and Urban Planning*. 75, 187–197.

APAT, (2004). *Carta della Natura alla scala 1:50.000. Metodologia di realizzazione* In APAT, Manuali e Linee Guida n. 30.

Arnstein, A., (1969). A ladder of citizenship participation. *Journal of the American Institute of Planners*. 26, 216–233.

Avanzini, M., (2011). Paesaggi, geositi, valutazioni: la sfida di strutturare l'inafferrabile. In G. De Fino, G. & U. Morelli (Eds.) *Dolomiti paesaggi in rete: per una vivibilità attiva delle Dolomiti.* Trento: TSM.

Baker, J., (2000). *Evaluating the Impact of Development Projects on Poverty: A Handbook for Practitioners.* Washington D.C.: LCSPR/PRMPO, The World Bank

Barret, G. W. & Farina A., (2000). Integrating ecology and economics. *BioSience*. 50, 311-312.

Batzing, W., (2006). Dieci tesi sulle Alpi. *Atti conferenza "Alpi. Quale futuro dopo la grande trasformazione" 23 marzo 2006*. Treviso: Fondazione Benetton Studi e Ricerche. Retrieved March 23, 2006, from: http://www.fbsr.it/.

Beierle, T.C., (2002). The quality of stakeholder-based decisions. *Risk Analysis*, 22, 739–749.

Bengston, D. N., (1994). Changing forest values and ecosystem management, *Society and Natural Resources.* 7, 515–533.

Bennett, G. & Witt, P., (2001). *The development and application of Ecological Networks. A review of proposals, plans and programmes*. AIDEnvironment and IUCN.

Biggs, S., (1989). *Resource-Poor Farmer Participation in Research: a Synthesis of Experiences From Nine National Agricultural Research Systems* OFCOR Comparative Study Paper, 3. The Hague: International Service for National Agricultural Research.

Birnbaum, M., (2004). Human Research and Data Collection via the Internet. *Annual Revue Psychologie.* 55, 803–32.

Boitani, L., Falcucci, A., Maiorano, L. & Rondinini, C., (2007). Ecological networks as conceptual frameworks or operational tools in conservation. *Conservation Biology.* 21(6), 1414-1422.

Briassoulis, H., (2002). Sustainable tourism and the question of the commons. *Annals of Tourism Research.* 29(4), 1065–1085.

Brown, P., (2001). *The Commonwealth of Life*. Montreal: Black Rose Books.

Bruschi, V. & Cendrero, A., (2005). Geosite evaluation: can we measure intangible values? *Il Quaternario.* 18(1), 293-306.

Bryner, G., (2001). Cooperative instruments and policy making: assessing public participation in US environmental regulation. *European Environment.* 11(1), 49–60.

Buch, M. & Hoverman, S., (2000). Understanding public participation in forest planning: a review. *Forest Policy and Economics*. 1, 15–25.

Camagni, R., (2002). *Benchmarking territorial. Quaderni della Programmazione, n°3 "Competitività"*, Trento: Università degli Studi di Trento, Provincia Autonoma di Trento.

Carson, R.T. & Hanemann, W.M., (2005). Contingent Valuation. In Maler, K.G. and Vincent J.R. (Eds) *Handbook of Environmental Economis, vol 2.* Elsevier.

Carton, A., Avanzini, M., Tomasoni, R., Ferrari, C., Masè, V. & Zampedri, G., (2005). *L'Adamello Brenta Geopark. 2005, Dossier di Candidatura e piano di azione. Speciale Adamello Brenta Parco.* Stembo, TN: Parco Adamello Brenta.

Cepollaro, G. & Morelli, U., (2009). *Paesaggio lingua madre*. Trento: Erickson.

Chee, Y.E., (2004). An ecological perspective on the valuation of ecosystem services. *Biological Conservation.* 120, 549–565.

Chemini, C & Rizzoli, A., (2003). Land use change and biodiversity conservation in the Alps. *Journal of Mountain Ecology* 7, 1–7.

Costanza, R., d'Arge, R., de Groot, R., Farberk, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Suttonkk, P. & van den Belt, M., (1997) The value of the world's ecosystem services and natural capital. *Nature*. 387, 253-260.

Council of Europe, (2000). *European Landscape Convention*. Retrieved June 16, 2005, from: http://conventions. coe.int/Treaty/en/Treaties/Html/176.htm.

Deffontaines, J.P., (2004). The object in agricultural space. The glance of a géo-agronomist. *Natural Sciences Companies*. 12, 299-304.

De Fries, R.S., Foley, J.A. & Asner, G.P., (2004). Land-use choices: Balancing human needs and ecosystem function, *Front Ecological Environment*. 2, 249–257.

de Groot, R., (2006). Function-analysis and valuation as a tool to assess land use conflicts in planning for sustainable, multi-functional landscapes, *Landscape and Urban Planning*, 75, 175–186.

Fischer, J., Brosi B., Daily, G.C., Ehrlich, P.R., Goldman, R., Goldstein, J., Lindenmayer, D.B, Manning, A.D., Mooney, H.A., Pejchar, L., Ranganathan, J. & Tallis, H., (2008). Should agricultural policies encourage land sparing or wildlife-friendly farming? *Front Ecological Environment*. 6, 382–387.

Farrington, J., (1998). Organisational roles in farmer participatory research and extension: lessons from the last decade. *Natural Resource Perspectives*, 27.

Fraser, J. & Lepofsky, J., (2004). The Uses of Knowledge in Neighborhood Revitalization. *Community Development Journal.* 39(1), 4–13.

Frick, A., Bächtiger, M.T. & Reips, U.D., (1999). Financial incentives, personal information and drop-out rate in online studies. *Dimensions of Internet science*. 209–219.

Gambino, R., (2001). Reti ecologiche per il territorio europeo. *Quaderni di Gargnano*. 139–144.

Giacomini, V. & Romani, V., (1992). *Uomini e Parchi*. Milano: Franco Angeli.

Gios, G. & Notaro, S., (2001). *La valutazione economica dei beni ambientali: introduzione al metodo della valutazione contingente.* Bologna: CEDAM.

Gios, G. & Clauser, O., (2009). Forest and tourism: economic evaluation and management features under sustainable multifunctionality. *iForest* 2. 192-197.

Grêt-Regamey, A., Bebi, P., Bishop, I.D. & Schmid, W.A., (2008). Linking GIS-based models to value ecosystem services in an Alpine region. *Journal of Environmental Management*. 89. 197–208.

Healy, R., (1994). The 'common pool' problem in tourism landscapes. *Annals of Tourism Research*. 21(3), 596-611.

Kaymaz, I.C., (2012). Landscape Perception, Landscape Planning. In M. Ozyavuz (Ed.) *Landscape Planning.* InTech. Retrieved April 16, 2016, from: http://www.intechopen.com/books/landscape-planning/landscapeperception.

Kaplan, S., (1988). Perception and landscaper: conceptions and misconceptions. In J.L.Nasar (Ed.) *Environmental Aesthetics: theory, research & applications* (pp. 45-55). Cambridge University Press.

Jafari, J., (1982). The Tourism Basket of Goods and Services. In T. Singh, J. Kaur & P. Singh (Eds.) *Studies in Tourism Wildlife Parks Conservation*. New Delhi: Metropolitan Book.

Jaeger, J.A.G., (2000). Landscape division, splitting index and effective mesh size: New measures of landscape fragmentation. *Landscape Ecology.* 15(2), 115-130.

Johnson, N., Lilja, N., Ashby, J.A. & Garcia, J.A., (2004). Practice of participatory research and gender analysis in natural resource management. *Natural Resources Forum*. 28, 189–200.

Lawrence, A., (2006). No personal motive? volunteers, biodiversity, and the false dichotomies of participation. *Ethics, Place and Environment*. 9, 279–298.

MA, (2005). *Millennium Ecosystem Assessment, Business and Industry, Synthesis Report.* Washington, DC: Island Press.

Martin, A. & Sherington, J., (1997). Participatory research methods: implementation, effectiveness and institutional context, *Agricultural Systems* 55, 195–216.

McCall, M.K., (2003). Seeking good governance in participatory GIS: review of processes and governance dimensions in applying GIS to participatory spatial planning, *Habitat International*. 27, 549-573.

Mitchell, R.C. & Carson, R.T., (1989). *Using Surveys to Value Public Goods: The Contingent Valuation Method.* Baltimore, MD: Johns Hopkins University Press.

Morelli, U., (2007). Mindscape/landscape. *Lettera internazionale*. 92, 26-27.

Mostert, E., (2003). The European Water Framework Directive and water management research. *Physics and Chemistry of the Earth*. 28(12-13): 523-527.

Musu, I., (2000). *Introduzione all'economia dell'ambiente*. Bologna: Il Mulino.

Nagy, L., Grabherr, G., Körner, C. & Thompson, D.B.A., (Eds.) (2003). *Alpine Biodiversity in Europe. Ecological studies*. Heidelberg: Springer Verlag.

Nijkamp, P., Vindigni, G. & Nunes, P., (2008). Economic valuation of biodiversity: A comparative study. *Ecological Economics*. 67, 217-231.

Odun, E.P., (1988). Basi di ecologia, Padova: Piccin.

OECD, (2001). *Citizens as Partners: Information, Consultation and Public Participation in Policy-Making.* Paris: OECD Publishing.

Oliveira, M.D. & Ribeiro, J.T., (2012). Landscape (European Landscape Convention) vs. Cultural Landscape (Unesco): towards territorial development based on heritage values. In *Proceedings of the International Conference on Heritage and Sustainable Development Heritage 2012*. 19-22 June 2012 (pp.139-151). Porto (Portugal).

O'Riordan, T. & Stoll-Kleemann, S., (Eds.) (2002). *Biodiversity, Sustainability and Human Communities*. Cambridge: Cambridge University Press.

Paolini, M. (1999). *Partecipazione*, 1999. In Dizionario COCIS.

Petti, F.M., Bernardi, M., Todesco, R. & Avanzini, M., (2011). Dinosaur footprints as ultimate evidence for a terrestrial environment in the Late Sinemurian Trento Carbonate Platform. *Palaios.* 26(10), 601-606.

Pimbert, M. P. & Pretty, J.N., (9-12 February, 1997). Diversity and sustainability in community based conservation. Paper presented at the *UNESCO-IIPA regional workshop on Community-based Conservation*, India.

Priore, R., (2005). Verso l'applicazione della Convenzione europea del paesaggio in Italia. *Aedon*, 3.

Purnomo, H., Mendoza, G.A., Prabhu, R. & Yasmi, Y., (2005). Developing Multi-Stakeholder Forest Management scenarios: a Multi-Agent System Simulation Approach Applied in Indonesia. *Forest Policy and Economics*. 7, 475-491.

Quétier, F., Lavorel, S., Thuiller, W. & Davies, I.D., (2007). Plant trait-based assessment of ecosystem service sensitivity to land-use change in mountain grasslands. *Ecological Applications*. 17, 2377–2386.

Raffestin, C., (2005). *Dalla nostalgia di territorio al desiderio di paesaggio. Elementi per una teoria del paesaggio*. Firenze: Alinea.

Reed, M.S., (2007). Participatory technology development for agroforestry extension: an innovation-decision approach. *African Journal of Agricultural Research.* 2, 334–341.

Reed, M.S., (2008). Stakeholder participation for environmental management: a literature review. *Biological Conservation.* 141, 2417–2431.

Reed, M.S. & Dougill, A.J., (2002). Participatory selection process for indicators of rangeland condition in the Kalahari. *The Geographical Journal*. 168, 224–234.

Reed, M.S., Dougill, A.J. & Taylor, M.J., (2007). Integrating local and scientific knowledge for adaptation to land degradation: Kalahari rangeland management options. *Land Degradation and Development*. 18, 249–268.

Reimoser, F., (2005). Il ruolo della selvicoltura nella gestione faunistica. *Sherwood* 112, 19-23.

Reips, U.D., (2000). The Web experiment method: Advantages, disadvantages, and solutions. *Psychological experiments on the Internet*. 89–117.

Reips, U.D., (2002). Standards for Internet-Based Experimenting. *Experimental Psychology.* 49(4), 243–256.

Reips, U. D. & Birnbaum, M.H., (2011). Behavioral research and data collection via the interne. In: *Handbook of human factors in Web design.* CRC Press Boca Raton.

Reynard, FL., Fontana, E., Kozlik, L. & Scapozza, C., (2007). A method for assessing scientific and additional values of geomorphosites. *Geographica Elvetica*. 62(3), 148-158.

Richards, C., Blackstock, K.L. & Carter, C.E., (2004). *Practical Approaches to Participation SERG Policy Brief No.1.* Aberdeen: Macauley Land Use Research Institute.

Romani, V., (1994). *Il paesaggio. Teoria e pianificazione*. Milano: Franco Angeli.

Rowe, G., & Frewer, L., (2000). Public participation methods: a framework for evaluation in science. *Technology and Human Values*. 25, 3–29.

Rutherford, G., Bebi, P., Edwards, P. & Zimmermann, N., (2008). Assessing land-use statistics to model land cover change in a mountainous landscape in the European Alps. *Ecological Modelling*. 212(3–4), 460–471.

Schmidt di Friedberg, P., (1992). *I limiti dell'ecologismo. Il primate tecnologico nella giungla post-industriale.* Milano: Guerini e Associati.

Selman, P., (2004). Community participation in the planning and management of cultural landscapes. *Journal of Environmental Planning and Management.* 47(3), 365–392.

Stenseke, M., (2009). Local participation in cultural landscape maintenance: Lessons from Sweden. *Land Use Policy.* 26, 214–223.

Tanga, M., (2014). Il paesaggio come bene comune. alla ricerca di "buone pratiche" per l'organizzazione del territorio. *Rivista CNS-Ecologia Politica* 2.

Taylor, J.G, Zube, E.H. & Sell, J.L., (1987). Landscape assessment and perception research methods. In R. B. Bechtel, & R. W. Marans (Eds.) *Methods in Environmental and Behavioral Research* (pp. 361-393). New York: Nostrand Reinhold.

Tempesta, T., (2012). Paesaggio ed economia delle zone rurali. In G. De Fino (Ed.) *Atti del convegno Agricoltura e paesaggio nell'arco alpino.* May 2012 (pp. 71-87). Baselga di Pinè (Tn).

Tommasoli, M., (2002). *Lo sviluppo partecipativo. Analisi sociale e logiche di pianificazione.* Carocci: Roma.

UNECE, (1990). *UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention).* Retrieved April 16, 2016, from: http://www.unece.org/env/pp/treatytext.html.

Zube, E.H., Sell, J.L. & Taylor, J.G., (1982). Landscape perception: research, application and theory. *Landscape and Planning*. 9(1), 1-33.