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THE INTERCONNECTION OF MOUNTAIN AND LOWLAND LANDSCAPES IN HISTORICAL PERSPECTIVE

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Keywords: Cultural landscape, Mountain landscape, Landscape history, Historic routes, Animal husbandry, Transhumance

Abstract: Most historic landscape research takes place within individual countries or even regions. However, landscapes and regions have always been interconnected and we cannot understand any landscape without taking their connections into account. This is certainly the case with mountain landscapes, which were often framed as remote, isolated and self-supporting, but in reality were always connected to the outside world. Exchange with lowland regions existed in different forms: in transhumance systems, in specialised forms of agriculture and in specific products. Over the long run, the resilience of mountain landscapes was not connected to stability, but to creative adaptation to ever changing eternal conditions.

Introduction

The theme of the 27th edition of the Permanent European Conference for the Study of the Rural Landscape was *Mountains, uplands, lowlands*. Within the conference, the Eucaland Network organised a special session on *New activities in historic mountain landscapes*. The present paper, meant as an introduction to that session, looks at the long-term perspective. In the author's opinion, most landscapes, and that is certainly true for mountain landscapes, have been framed too often, by people from elsewhere as well as by the inhabitants, as remote, isolated, self-supporting and as characterised by long-term continuity. As a result, modern developments related to globalisation, are often one-sidedly described as threats. In this paper, I want to show that these landscapes have always been connected to the outside world and often derived income from long-distance transport routes, for example. Not only in the present, but also in the past the lives and landscapes of people in the mountains have been connected to what happened elsewhere. When using a long-term perspective, it becomes clear how resilient these landscapes are. People and their landscapes have survived by the flexibility of the local and regional societies. The paper will look at different aspects of the long-term connectedness. One of these aspects is the movement of animals within mountainous regions as well as between mountains and lowlands, movements that are long-standing, but at the same time have a dynamic history. Another is the variety in agrarian production in different parts of the mountain landscapes. A third aspect is the existence of long-distance trade routes crossing the mountains.

Relations between mountains and lowlands existed on different scales. A classification into three different scales, as will be followed here, fits the aims of this paper but is very much simplified, as the three scales intermingle and the distances within each level vary immensely (Øye 2009).

Firstly, there is the local scale of biotopes within a village territory. Figure 1 distinguishes between 'traditional' and 'modernized' situations. In the modern period, the range of movement of the farmer is reduced, because of changes in agriculture (replacing hay by fodder and dairying by less labour-intensive meat production) and by the growth of non-agrarian activities such as tourism and second homes (Parish 2002). In general, the role of the high pastures in agriculture has diminished.

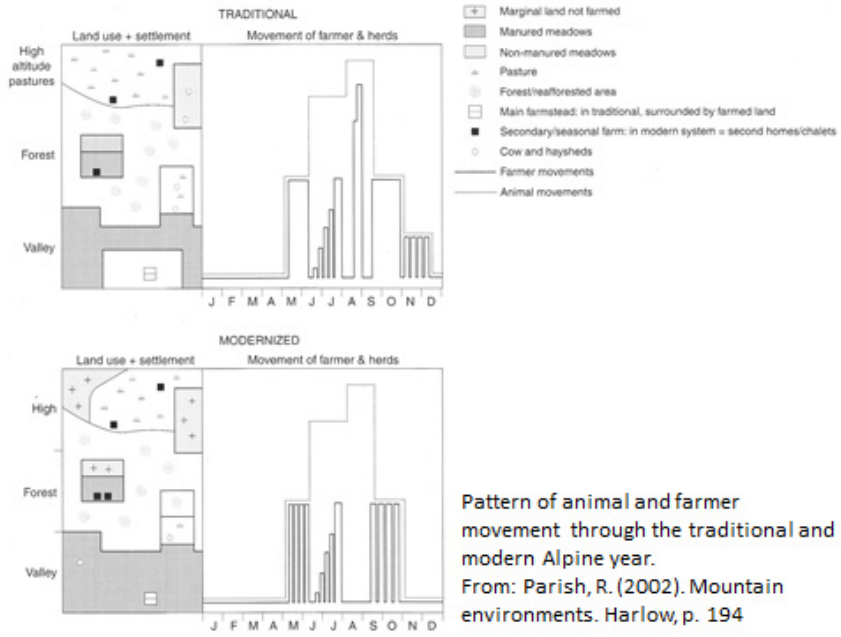

Figure 1. Pattern of animal and farmer movement through the traditional and modern Alpine year (Parish, 2002)

Secondly, there is the regional scale, of transhumance. Such relations have already been described by Braudel as one of the constant systems in Mediterranean landscapes. The literature is overwhelmingly regional and local and focuses strongly on 'traditional' systems and on their (recent) disappearance. Less has however been written on the earlier history of transhumance and on the large variety in systems.

Historic settlement systems and transhumance have always shown a large variation. On the one hand, systems exist in which one settlement exploits the whole range of landscapes from the valley bottom to the high Alps. Elsewhere, the exploitation takes place from a central settlement together with a number of subsidiary, usual seasonal, settlements. And in yet other systems, permanent settlements exist on different levels in the mountain landscape, meaning specialisation and intensive exchange (Parish 2002).

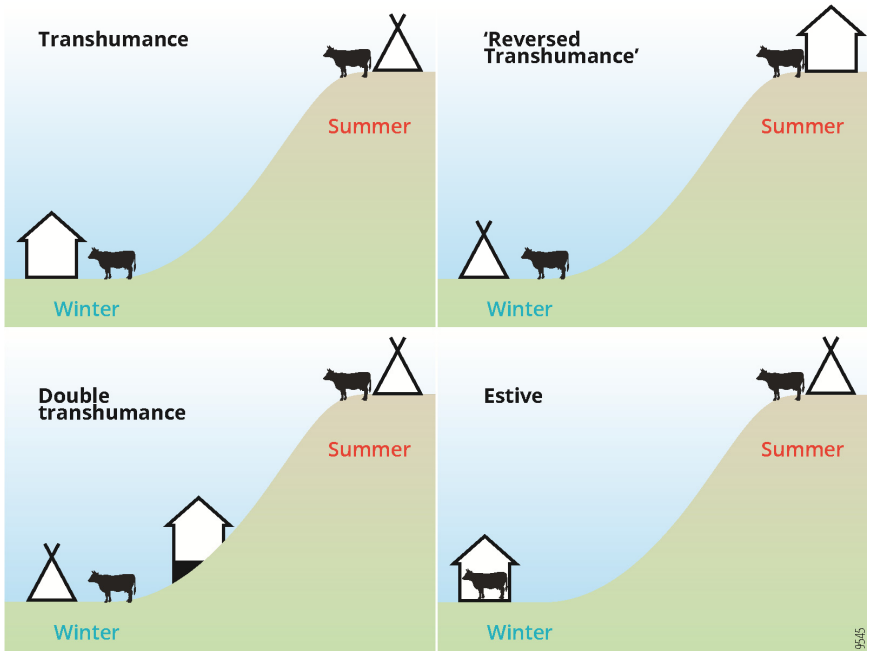

Figure 2. Different types of transhumance after De Vooys (1959)

The term transhumance is often used nowadays as an umbrella for what again used to be a whole range of systems. In the late 1950s, the Dutch geographer Adriaan de Vooys, wrote a series of articles on what we might call the fuzzification of geographical terminology and one of the themes was transhumance, partly based on his fieldwork in Greece (De Vooys 1959). In his opinion, it was important to distinguish between a number of different systems.

For De Vooys, the term transhumance stands for a situation in which the main settlements are located in the valleys, but part of the community and animals spend the summer in a seasonal settlement in the high mountains. There also existed an opposite system, 'reversed transhumance' (Figure 2), in which the main settlement was located on the mountain and the seasonal settlement, usually used in winter, was situated in the lowlands. A third version, double transhumance', was where the main settlements had an intermediate location and seasonal settlements existed in the high mountains as well as in the lowlands. The fourth type, called 'estive' was characterised by cattle that was kept inside during winter.

All types come from the wish to use different biotopes within a farming system. The common ground is that the high mountains provide good pastures and meadows in summer, but are too cold and harsh in winter. The lowlands, on the other hand, can accommodate animals during winter (inside the farms or outside in the fields), but are less hospital for animals during summer, in some regions because of malaria (in Mediterranean lowlands), elsewhere because of intensive arable culture.

The scope is even wider, as transhumance not only takes place between mountains and lowlands, but can also function in a horizontal direction, between regions with different physical-geographical circumstances. When transhumance in most mountainous regions takes place on a local, village, scale (therefore the term 'lesser transhumance'), other systems such as the Spanish *mesta* and the Italian *dogana* were on a much larger geographical scale and, hence, were called 'greater transhumance'.

Even broader, we can look at a wider range of types of seasonal settlements, such as fishing settlements on the seasides or lakesides, or mining settlements in the mountains. So apart from movements of animals, mountains as well as lowlands show not only permanent villages and towns, but also a wide range of seasonal and sometimes temporary settlements that were usually specialised and that therefore had intensive contacts with the permanent settlements.

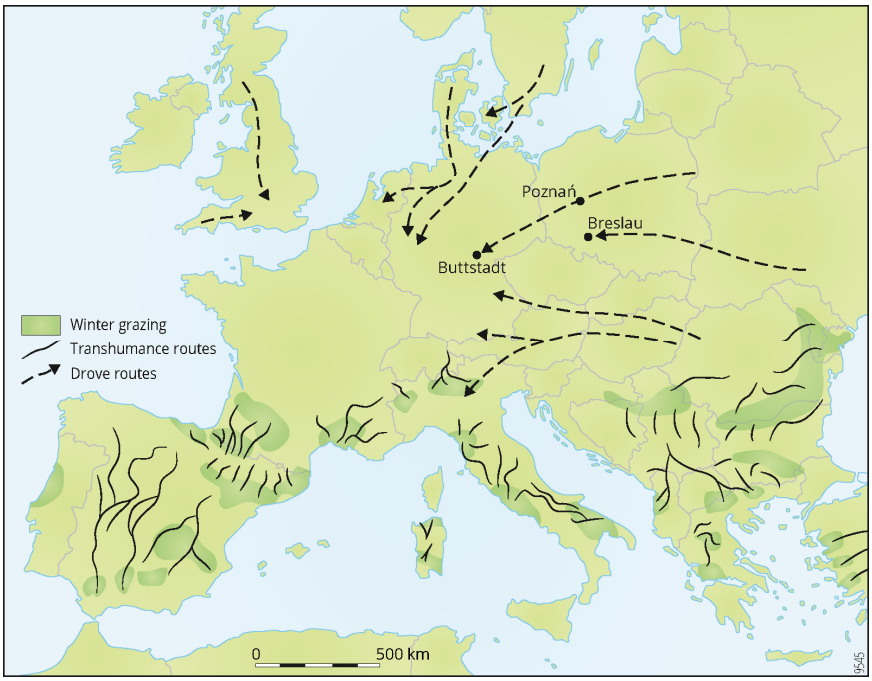

Figure 3. Transhumance and drove routes after Pounds (1990)

For the complete picture, also a third group of movements, the so-called drove-routes, has to be mentioned (Figure 3). These routes connected regions that exported animals to urban markets. Drove routes differ from transhumance systems in one essential point: they are one-way, at least for the animals involved. The products are different too: where the drove roads aim at delivering animals and, especially, meat, the products of transhumance are wool, cheese and other products that are, again seen from the perspective of the animal, renewable products.

Drove roads are part of long-distance exchange systems and have been, therefore, subject to large-scale and long-term demographic and economic dynamics. Already around 1600 a number of regions, often regions that were too far from inland shipping routes to compete on the markets for arable products, specialised on the raising of animals for meat (Becker 1998, Nitz 1993). Those animals than walked to the urban markets. Hungary exported cattle to Northern Italy and to Southern Germany (Zimányi 1993). From Denmark large herds of oxen walked, or were shipped, to Holland (Gijsbers 1999). Southern Sweden exported cattle southward during the late Middle Ages, but later turned northward when the growth of mining in Central Sweden caused a growing demand for meat there (Poulsen 1992, Gijsbers 1999, 2002). On the British Isles, large herds of animals walked from Scotland, Wales and Southwest-England to the densely populated Southeast-England. Here, the heydays were the eighteenth and early nineteenth centuries, after which railways and steamships took over (Hindle 1993).

So it seems that these systems of drove roads were clearly influenced by the markets and therefore were subject to economic fluctuations, whereas the transhumance systems were part of local and regional agrarian systems and were therefore less dependent on market forces. But is this true?

Research into transhumance and drove systems has a long tradition in geography and, in some regions, in history, anthropology, ethnology and ecology. In geography this type of studies went out of fashion and very few geographers show an interest nowadays. On the other hand, there is a growing amount of work by landscape archaeologists, who try to unravel lost settlements in mountainous areas and are, better than others, equipped to distinguish between permanent, temporary and seasonal settlements (Collis et al. 2016). However, there is a strong necessity of new synthetic works. Figure 3 was derived from the *Historical geography of Europe* by Norman Pounds, published in 1990, and gives a picture of the dispersion of transhumance and drove systems that goes back to older – often much older – literature. Since that time, the map has not been improved and is still being republished (i.e. Emanuelsson 2009).

The map needs revision, not only because Scandinavia is lacking, but also because of new research that, although mostly regional or even local in scope, provided additional material for overviews, by adding evidence of former transhumance in North-western Europe (see for example Bunce et al. 2004). In the UK, the late Harold Fox wrote a fascinating book on the traces of medieval transhumance in England, particularly around Dartmoor in Southwest-England (Fox et al. 2012, Herring 2009). Also in Scotland and Wales transhumance existed, on some of the Scottish islands even until the early twentieth century (Adams 1976, Jones and Winnfre 2004). In Germany, research focuses on Southern Germany, where systems survived into the nineteenth century (Luick 2004).

But not just the geography but also the history is important. A new map of transhumance should distinguish between different periods. The drove systems as well as some transhumance systems, such as the Mesta in Spain, have been described as historical processes (see below). But the large majority of literature on transhumance describes the phenomenon as old-established and implicitly takes long-term stability for granted. Especially the study of the lesser transhumance is often characterised by more geography than history.

References to transhumance during the classical period are mainly given to suggest long-term continuity. Even a great historian as Fernand Braudel, described transhumance in France as "an ancient practice, as old as the world" (Braudel 1991). The website of the town of Madrid mentions a transhumance system that has been revived in 2010 on routes that go back to Neanderthal populations (http1).

Transhumance as a historical phenomenon

Let's start with the greater transhumance. The Mesta in Spain consisted of a system of drove roads that was already established in the course of the thirteenth century, when the southern part of the Iberian Peninsula was still firmly under Muslim rule, but the political division seems to have had little influence on the movements. Rights of moving animals to use unenclosed land and wilderness must have existed before, but the Mesta seems to have brought the system of transhumance to a larger scale. Professional shepherds drove large flocks of sheep from the winter pastures in the south of Spain to the summer pastures in the north and to the mountains, over fixed routes (the so-called cañadas) that ran over distances varying from 250 to more than 700 kilometres. The sheep could roam over most uncultivated land and could also graze on the stubbles.

The sheep were mainly kept for their wool and particularly during the thirteenth century Spain became a large exporter of wool, mainly to England and Flanders. During the fifteenth and sixteenth centuries, the number of sheep fluctuated around 2.5 million. During that period, a comparable system, the *Dogana delle Mene della Pecore*, was introduced in Southern Italy by the (Spanish) kings of Naples. Both systems fluctuated with the demand for wool and the tidal movements of competition from arable. In Spain as well as in Italy a long period of decline was followed by the dissolution of the organisations during the nineteenth century (Klein 1920; Delano Smith 1979).

But also the lesser or local transhumance may not be seen as a timeless system that has existed for thousands of years. These systems also have a history. One type of fluctuations was the development of temporary into permanent settlements and back. Many permanent settlements carry names that refer to former seasonal settlements. We find such names all over Europe. Typical names for shielings were *hafod* in Wales and *seter* in Scandinavia but also in parts of northern England. Gunnerside in the Yorkshire Dales (Figure 4) is nowadays a substantial village, but the name was explained by the archaeologist Andrew Fleming (1999) as Gunnar's setr, or the shieling of a man, probably from Norwegian origin, named Gunnar.

Figure 4. Gunnerside (Yorkshire, Northern England) probably started as a 'shieling' that was only inhabited during summer. ©Colin Grice (Wikimedia Commons; http 4).

Although some of such shielings had already developed into permanent settlements during the 10th or 11th century, the majority of such developments took place during the expansion period of the High Middle Ages. During the late-medieval demographic and economic crisis, the opposite development could take place, when permanent settlements on high altitudes were deserted and arable and intensive grasslands gave way to forests and rough grazings. It is highly probable that many former permanent settlements on high altitudes were turned into seasonal settlements, although the archaeological evidence for such developments is still scarce.

Such developments already make clear that external influences have been important. As the English historian Chris Wickham stated: Pastoralism is not an indication for underdevelopment but rather the opposite: specialization of economic activity predicated on a certain amount of exchange (Horden and Purcell 2000). Also interesting in this perspective are the different chronologies for each mountain range. A few words on the Alps and Pyrenees.

In the Pyrenees, hunting and gathering remained important during prehistory. During the Roman period, agriculture, including arable as well as pasture, grew, but after the Roman period most arable disappeared again. The use of the high pastures started during the period of population pressure of the High Middle Ages, but these pastures were partly deserted again during the following crisis period, to recover during the fifteenth century. Population pressure during the nineteenth century brought the growth of potatoes and an intensification of animal husbandry with a growing number of sheep and goats. During summer they grazed on the slopes, during winter on the stubbles in the lowlands. During the 20th century the main products became meat and dairy products, and the products of the arable were mainly used as fodder. The poorest soils and many high pastures were deserted. Nowadays, tourism and energy (electricity) become more important (Parish 2002).

The landscape history of the Alps shows more or less the same chronology, but agriculture seems to have started earlier here: the use of high summer pastures started already around the eighth century. The Alps show a strong contrast between the northern and southern slopes, with the southern slopes having a stronger focus on arable and an intensive seasonal use of the high pastures. On the northern slopes the conditions for arable were more difficult and from the eighteenth century potatoes partly replaced grain. Here, animal husbandry developed early as the core business of agriculture. The problematic production of fodder on the arable made it necessary to sell part of the animals during the autumn. Animals that grew up in the mountains were hardened by the difficult circumstances and were therefore quite popular among lowland farmers. So here, we see a combination of transhumance with the one-way travel system that was earlier described as a characteristic of the drove roads.

As in the Pyrenees, settlement in the Alps expanded during the High Middle Ages. The high pastures grew at the cost of forests. The late medieval crisis saw a retreat of settlement and a further growth of the emphasis on animal husbandry. Even during the crisis period the number of specialised dairy farms high in the East Alpine mountains, the so-called Schwaighöfe, grew (Becker 1978, Pawson and Egli 2001, Meyer 1990, Pacher 1993). During the late Middle Ages the production of butter expanded and the techniques of production of hard cheese, such as the cheese from the Gruyère region near Fribourg, were developed. The production of such cheeses expanded during de Early Modern period, when they became an important export product for the Swiss Alpine regions. This specialisation was only possible by exchange with the grain-producing open field regions in the lowlands of Switzerland, an exchange that was organised from the towns in these lowlands (Aerni 1990).

It is important to realise that the mountain regions of Europe have rarely, if ever, been isolated and self-supporting. Neither have they ever been purely agrarian regions. Until the

late nineteenth century development of geology, mining of minerals was strongly concentrated in mountainous regions, as hillside surfaces were the only places where mineral resources were visible.

Another resource was wood. The large medieval reclamations left mountainous regions as the largest remaining forests. For transport these regions were at an advantage, as wood could drift downstream in streams and, from there, rivers that transported the wood very conveniently to the large towns near the coast. In many mountain regions, facilities were built, such as artificial streams and wooden runways, to bring wood to the streams (Brönnimann 1997). In all parts of Europe, large amounts of wood could be seen drifting the rivers, bound together in rafts. During the seventeenth century, for example, the northern Black Forest was heavily exploited for the demand for wood in Holland (Van Prooije 1990). Another well-developed route was between the Alps and Venice (Appuhn 2009).

But also long-distance roads have crossed the mountains since prehistory (Smaedecke 2009). The local population facilitated transport by acting as guides and by offering man and animal power as well as facilities for overnight stay. As there were not many possible crossings of the high mountains, the roads show a strong continuity. The five biggest towns in present-day Switzerland all have Roman roots, which illustrates this continuity (Aerni 1990). Of course there have been shifts in the course of time. In the thirteenth century the town of Milan invested heavily in a shorter route to the north over the St Gotthard pass. From around 1530 the bishop of Salzburg improved the road over the Tauern to attract a larger share of the traffic from Venice to the north (Braudel 1975). The general picture of mountain regions that not only divided but also connected, remained intact.

Returning to transhumance: the way that connected the mountains to the lowlands meant that the farmers were influenced by developments in both. In the Mediterranean, particularly the lowlands were subject to periods of reclamation and abandonment, changing the opportunities for winter grazing. In periods in which the use of the lowlands was intensified, the possibilities for transhumance diminished. On the other hand, in periods of crisis, when the arable disappeared from many Mediterranean lowlands, pastoralists took over (Tabak 2008, Tauger 2011).

Also the numbers of transhumant animals rose or declined with the demand for animal products in the towns. In periods of high demand for wool, for example, farmers in the mountains could profit by expanding their flocks. In practice, however, this was undercut by another tendency, namely for urban capitalists to invest in flocks themselves, at the cost of the mountain farmers (Blanks 1995). In time, agriculture on the high pastures has changed by new products, such as the export of cheese and young animals that was already mentioned, and by technical improvements. Many pastures and meadows in the high mountains show traces of terracing (Perko et al. 2017) and, sometimes more difficult to find, of water meadows (Leibundgut and Vonderstrass 2016). These must have meant an increase of production, although the chronology is still unclear in most cases.

Stability and change

Often a division between traditional and modernized landscapes is presented, related to the idea that fast transitions of landscapes since the 19th century contrast with slow and unproblematic processes of change in earlier periods. However, the real world is much more complex. Landscapes have a long history of transformations and the history of the landscape is not only more complicated, but also much more interesting than a gradual and linear development to a kind of nineteenth-century climax. On the other hand, there are also surprising continuities (Renes 2015).

Figure 5. Historical route of the Mesta near Segovia. ©Luis Fernández García L. Fdez, 2005; http3.

Particularly in the uplands, many traces of former transhumance can still be found, including the pastures themselves, but also many shielings and huts. Some found new uses as second homes, particularly in Scandinavia, or as tourist accommodation, particularly in the Alps. Also some of the old routes are preserved and attract increasingly attention as heritage routes (Figure 5). Part of this heritage are also the many stories about life on the routes and on the summer pastures.

But the complex histories also have wider implications. In the present globalised agricultural system, many landscapes have become marginal. In these landscapes, agriculture and rural society are threatened. For some ecologists, this is a window of opportunity for the creation of new wilderness, in which there is no room for agriculture and only for a very small human presence.

However, in other regions local societies are searching for new economic models to find a future for agrarian landscapes. Landscapes do not develop in a linear way and still offer surprises, such as the Italian valleys that were almost deserted and are now reoccupied.

A vision on the long-term development of landscapes shows how local societies have survived, and sometimes recovered from crises, by adapting to ever changing socio-economic contexts and circumstances. During these processes, the landscape structures have changed, but in many cases also survive or, formulated differently, show a large resilience. This may give a better fundament for thinking about new futures for old landscapes.

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RENEWABLE ENERGY TECHNOLOGIES IN THE ALPINE LANDSCAPE AND LOCAL COMMUNITIES' PERCEPTION OF CHANGE

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Abstract

The article addresses the issue of social perception of landscape change connected to energy production from renewables, in an Alpine area. The Alpine regions have undergone extensive transformations in the last century, and energy has played a key role in socio-economic phenomena and in landscape change, because of the availability of oil products and the impact of hydroelectric plants. Currently, a variety of renewable energy technologies (RETs) are available, providing new opportunities for mountain areas but producing important effects on the landscape. Their use require a change in the frames of reference of the actors involved and a new perception of landscape values by local communities. The paper analyses how the insertion of RETs in the landscape of Trentino, in the Italian Alps, is impacting on the social perception. The methodology builds on the results of recent research conducted in the province of Trento on the perception of landscape characters. This allows identification of the values at stake when making use of a new technology in the open space, and analysis of how and why impacts are coherent with local communities' perception of landscape. This analysis makes it possible to frame the crucial issues concerning use of such technologies in the Alpine landscape and to discuss how such a change is perceived, drawing some conclusions of general interest.

Keywords: Energy landscapes; Social perception; Alps, Trentino

The Alpine landscape in transition

In recent decades, the Alpine regions have undergone extensive transformations reflecting wider socio-economic phenomena, in particular the crisis of traditional agriculture and the consolidation of a post-industrial economy. Energy has played a key role in these phenomena, because it has been the availability of fossil fuel that has wrought a profound change in lifestyles and local economies, supporting mobility, the development of new energy-intensive activities, and the abandonment of the previous large-scale use of firewood. We can recognise, in the evolution of this process, the first three stages identified by Pasqualetti (2013) in the history of humankind: the organic, mineral, and electric economy. The task today is to construct the fourth one: the sustainable economic stage.

In the early 1900s, the Alps became an energy landscape because of the availability of water, which allowed the development of an impressive hydro-electric industry. This was a sudden modernization process, which invested more remote and higher mountain areas with huge dams, tunnels, electric power stations, power lines etc. Hydropower played (and still plays) a key role in energy production. In Italy, until the early 1960s, nearly all electricity was provided by hydropower, while the diffusion of renewable energy technologies (RETs) has encountered difficulties, in particular due to their perception in the landscape.

After the completion of the hydro-electric infrastructures, a slow process of re-naturalization started to change the features of what were considered controversial signs of modernity: vegetation covered building sites, access roads became forest lanes, some residual water flowed along the riverbeds. It was not only a matter of healing scars but also of an evolving perception: man-made lakes became part of the landscape, and some huge works are today considered monuments.

The current phase, characterised by a post-industrial economy, allows use to be made of new technologies taking advantage of material and immaterial resources which were not previously exploited, thus supporting the energy transition (Puttilli 2010). In particular, the role of RETs is becoming increasingly important. RETs provide new opportunities but they

require a change in the frames of reference of the actors involved and a new perception of landscape values by local communities.

Questions arise, therefore, about how local communities perceive landscape transformation. In particular, while rapid change is occurring due to new economic activities, changing lifestyles and urbanisation processes, the perception of how the landscape – by which is meant the living space of communities – is transformed, links not only to personal sensitivity but also to the collective process of construction of imagery connected to education, regulations, and communication. Material change and cultural elaboration proceed at a different pace, creating friction and, in some cases conflicts.

The paper addresses such questions with particular attention paid to an Alpine region, Trentino, in Northern Italy. Here, the landscape has long been a key issue for local policies aimed at development, considering conservation and valorisation of natural and man-made features of the territory key strategies for a sustainable future of a mountain area. The results of a research study, which has been conducted on perception of the landscape, is a basis for better understanding how innovative technologies for energy production can be accepted in the landscape.

Landscape perception

Perception is the key for definition of the landscape, according to the European Landscape Convention (ELC). In fact, this document states 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" (Council of Europe 2000). Therefore, "the term landscape does not simply refer to the environment, but to the world 'as perceived by people' ", and this allows "the concept of landscape to be used to make connections between people, between people and places, and between society and its environment" (Blaschke et al. 2013).

The ELC definition stresses that landscape does not exist *per se*. It is a cultural construction concerning what we perceive (combining material and immaterial aspects), as well as the meanings and the values that we attach to the different patterns of the environment. Understanding how people, as persons and communities, perceive their living space is crucial for defining what values are to be preserved. The ELC definition implies the reformulation of assessment approaches and methods, as well as defence procedures and planning practices, giving a different task to experts and leaving more space to the expression of people's feelings and wills.

In short, landscape perception is a complex process which involves physical facts regarding the human senses (not only vision), personal preferences and values (connected to memory, education, and intention of use), collective frames of reference (in relation to the use of space and resources, regulations, rhetoric). Therefore, past, present and future co-exist in our perception of landscape, because memory and education define some of the aspects that we see and appreciate (or reject), the current use of spaces defines our living space, and the coherence between the ongoing change and what we plan (or expect) for the future defines a crucial aspect of positive (or negative) perception. In this regard, a number of theories have been elaborated over time.

The human brain elaborates visual images on the basis of patterns which allow us to understand the environment. Gestalt psychology (started in the first half of the 20th century by Wertheimer 1958) highlighted the basic principles of pattern recognition (figure and ground, closure, nearness and similarity), but affirmed that perception is a holistic process whereby the result is more that the sum of the single parts. Such principles tend, however, to be more descriptive than explanatory (Bell 2001).

Our basic relationships with the environment are based, on the one hand, to utilitarian factors (food availability, protection, control of the space) and, on the other to cultural factors and personal and social behaviours. The Biophilia Theory (Wilson 1984) affirms that the natural environment activates primordial feelings of empathy. However, the relationships with the natural processes are complex and mediated by the culture of individuals and communities, and contradictory feelings of comfort, on the one hand, and of fear, on the other, towards natural phenomena, are present.

The ecological theory of perception elaborated by Gibson (1979) stresses that "we do not perceive our environment neutrally, but view it in terms of what it affords us" (Bell 2001). The consequence is that we consider as aesthetically attractive some patterns that we recognise as more meaningful (and useful) to us. And this, in turn, is related to our knowledge, culture, and ability to make appropriate use of the environmental opportunities. Information and education are therefore crucial in determining landscape perception, in particular when change is expected.

Another important aspect concerns the alternative factors of visibility and protection. The prospect-refuge theory (Appleton 1975) highlights that high positions in the landscape are crucial, allowing to control a large space, but at the same time that hidden places are important, providing shelter and protection.

As regards landscape analysis, in general it is based on expert knowledge. Making use of visual-perceptive approaches, it considers natural features as well as historical-cultural ones (Scazzosi 2004). Some terms highlight the nature of the problems: recognition of the 'character' of a landscape is different from identification of its 'quality', which has a normative content; in parallel, 'assessment' (more neutral) is different from 'evaluation' (value-laden). For instance, Landscape Character Assessment (a methodology developed in UK and used also in other countries) aims at describing the elements that make one landscape different from another, although human perception – and in particular local communities' perceptions – is being increasingly considered (Tudor 2014).

Landscape as a cultural construction becomes clear when considering aesthetic values, which are connected to personal education, social environment, as well as to the utilitarian perspective ('affordances') attached to the diverse patterns of the environment.

Information contents of landscape can be read, following some authors (Kaplan and Kaplan, 1989, Kaplan et al. 1998), on the basis of the combination of four factors: coherence, complexity, readability and mystery. The first two factors tend to be in opposition, while the first is in accordance with the third one – corresponding to a comprehension process – and the second with the fourth – reflecting an exploration attitude -. Landscape perception is therefore the result of the interaction of these different factors.

Concerning visual analysis, beyond physiological processes other factors must be considered, involving both our deep – primordial – relationships with the environment - regarding utilitarian aspects - and personal and communities' cultures and behaviours. Such factors are combined within different 'dimensions' of the landscape, from the utilitarian one to others that are more cultural and value-laden (ecological, scientific, aesthetic, symbolic, political etc.), which make people not only appreciate but also 'see' different objects and processes.

An example of landscape assessment based on visual aspects is the Visual landscape assessment recently developed by Ode et al. (2008). The interest of the method resides in its basis composed of a series of nine visual concepts, derived from the literature, which characterize the visual landscape. They are: complexity, coherence, disturbance, stewardship, imageability, visual scale, naturalness, historicity, and ephemera. These concepts refer to "different theories explaining people's experience of landscape and their landscape preferences" (Ode et al. 2008). What emerges is that visual perception is far from being

simply a physiological phenomenon; on the contrary, it involves complex cognitive processes. Therefore, the analysis of landscape perception requires more integrated approaches and methods able to interact with people and communities.

Alpine landscape and energy

The Alpine landscapes have a strong character, but they are perceived from alternative perspectives: internal (inhabitants, local communities) and external (visitors, tourists), in connection to consolidated patterns remembering the past and the memory (collective and individual) or, on the contrary, to innovative uses regarding enjoyment of the natural space, the quality of human settlements, or the availability of tourism infrastructure.

Perception, as said, is not only a physiological process connected to vision; it is also the result of a more complex mechanism by which we select objects and detect meanings and values on the basis of our culture, preferences, intentions, etc. When looking at an alpine landscape, what do we perceive? The beauty of the scenery or the geological phenomena? The natural environment or the traditional human settlements? The strength of the environment or the scars produced by man? To what are we giving a positive or a negative meaning? How do we perceive energy technologies?

As already said, energy is part of the Alpine landscape because the Alps were traditionally a source of energy (wood, water), and settlements were characterised by the presence of hydraulic machines. In recent times, hydropower has been a key transformation factor, producing new landscapes which are seen at the same time as negative facts or as the image of modernization. Currently, the increasing cost of energy and the awareness of the limits of fossil sources, as well as of their effects in terms of climate change and environmental degradation, are pushing towards the intensification of energy production from renewable energy sources. But the awareness of the fragility of the environment and the importance assigned to human landscapes, as well as other kinds of conflicts, are hampering the diffusion of the new technologies.

A key issue concerning ‘energy transition’ is that RES, such as wind, solar, and biomass, are “spatially dispersed, requiring substantial land resources in comparison to conventional energy sources” (Frantál et al. 2014). Moreover, renewable energy is “dependent on specific physical landscape characteristics that may be much more prevalent in some areas than in others” (Nadaï and Van der Horst 2010), thus restricting the alternatives for the localization of energy plants. In fact, the geographical features of places and the landscape’s characters define a framework of obstacles and opportunities for energy production (availability of resources, solar exposure, micro-climate, fragility, uniqueness etc.), while the spatial organisation of human settlements, the urban form and density, and the features of buildings, impinge on energy needs (Zanon and Verones 2013).

Energy production and use has therefore become an issue that is more “location and site specific” (Howard et al. 2013), requiring a new awareness of the quality of places and the ability to detect opportunities, to address technical aspects in an appropriate way, and to manage divergent points of view and conflicts on the values at stake. Sustainability is the goal, with particular regard to the construction of sustainable landscapes, and this endeavour requires the ability “to maintain the outputs of ecosystem goods and services that people value or need”, (Potschin and Haines-Young 2006).

A sustainable energy landscape can be defined as “a physical environment that can evolve on the basis of locally available renewable energy sources without compromising landscape quality, biodiversity, food production, and other life-supporting ecosystem services” (Stremke and van den Dobbelsteen 2013). The key issues concern on the one hand the ability to modify the landscape respecting its functionality and its cultural values, and on

the other, the need to support a process oriented to accepting change or, in other words, to learning how "to love the landscapes of carbon-neutrality" (Selman 2010). Such a learning process is social in nature and implies endorsing the "underlying narrative" (Selman 2010) of the new landscapes reflecting new ways of conceiving natural values, economic and technological development, human progress and well-being.

There is huge potential for a more intensive use of renewable energy sources in the Alps, but there are still many difficulties, partly technological and organisational, but mostly cultural. For instance, a recent document issued by an Italian environmentalist association, Legambiente, stressed the need to make a more appropriate use of RES, and advanced a number of proposals. But it did not address the social acceptance and the landscape issues attached to such proposals (Legambiente 2016).

Landscape management in Trentino, Italy. The challenge of energy production

The following sections describe the landscape characters of Trentino, Italy, and the main results of an inquiry, recently conducted, into the perception of landscape. The intention is to frame how change connected to energy production making use of renewable energy technologies can be accepted by local communities.

Trentino (Autonomous Province of Trento) is an Alpine province in the southern part of the Region Trentino-Alto Adige-Südtirol. The province's landscape values have been recognised by numerous international documents and provisions (the Alpine Convention, many Natura 2000 sites, some UNESCO listed sites), which highlight both the environmental features and the role of human activities.

Figure 1. Autonomous province of Trento (Trentino) and Italy

Trentino started along a development path in the 1960s, and the pivotal instrument with which to elaborate strategies and to regulate land use change was a 'territorial plan' aimed at supporting socio-economic development by combining 'modernization' with 'conservation' of natural areas and landscape (PAT 1968). Other planning documents and environment protection actions have followed in recent decades (Zanon 1993; 2001; 2014), until the operating spatial plan (2008) which assumes the concept of landscape as introduced by ELC.

The governance of resources and territory in Trentino has required the development of specific legal frameworks and administrative organisation, and the devising of specialized knowledge and professional practices. This has reinforced the frames of reference orienting the institutional agenda setting, and consequently decisions and actions. Currently, large parts of the province are protected. Landscape control is not the only procedure involved, because forestlands, pasturelands, natural areas, water bodies, and at-risk areas are all strictly controlled, and the use of natural resources is centrally governed as well.

As regards energy, a recent Energy Plan (PAT, 2013) has defined a balance for Trentino, and has set new objectives in terms of both saving and improvement of the use of RES. It makes brief reference to the different sources, which have, until now, been only partially considered because they are ruled by sectoral policies, regulations, and control procedures (woodlands, agriculture, buildings etc.). In recent times, the energy concern has stimulated the application of energy saving methods and plants, and the installation of technologies for on-site energy production at the building scale, namely solar thermal and PV panels.

As regards energy production, hydroelectric energy is a key asset, although it is only partially controlled by local actors and authorities. There are 152 plants, with a total power of 1560 MW, corresponding to 8.7% of the total hydroelectric power installed in Italy, and most of the production is delivered to other regions. The production in 2010 was 3600 GWh (PAT, 2013, p. 40). This positive balance does not mean that additional production is not important, because a huge amount of fossil fuel is consumed for transport and heating, and its replacement with other sources, or the abatement of its use, must be a goal for the near future.

The Energy Plan reflects the new Italian and European frameworks and the goal of becoming self-sufficient within 2050. As regards emissions, the goal is a 50% reduction with respect to 1990 by 2030 and a 90% reduction by 2050 (PAT, 2013, p. 7). The role of renewable energy sources should increase, respecting a governmental provision (a decree, confirmed by the law n. 56, 2012, called burden sharing), from 28.6% of final consumption in 2005 to 35.5% in 2020. Also solar thermal and biomasses (firewood, in particular) contribute significantly, covering 22% of home heating. In the province there are more than 126,000 m^2 of solar thermal panels (6.3% of the total in Italy), corresponding to 238 m^2/1000 inhabitants (Italy: 33 m^2/1000 inh.; EU: 64.9 m^2/1000 inh.)

As regards photovoltaic plants, there is a total power installed of 117 MW (0.92% of the total in Italy), corresponding to 220 W/inhabitant (Italy: 209 W/inh.). Most of the plants have a power output of less than 20 kW. This is the result of fragmented actions because mainly single households are installing home plants, also as the effect of specific rules impeding the installation of panels on the ground and encouraging their placement on roofs, in particular of large industrial buildings (PAT 2013).

Other interesting sectors are agriculture, which could provide firewood from trimming and culture renovation (11 ktoe), and forestry. The effective use of such amounts of biomass requires re-organisation of the supply and production chains. The use of firewood is a traditional way to heat homes in rural areas, and it is based on household collection of firewood from families' properties or in the commons, while the new technologies, in particular wood pellets stoves, require a market chain. The use of firewood in home stoves is

not problem-free, however, because of incomplete combustion and the production of particles; therefore, on the occasion of certain meteorological conditions, even small villages suffer from air pollution.

The Energy Plan considers the improvement in the use of renewables, and recognises that it is impeded by difficulties and conflicts. In particular, hydro-electric power production cannot be improved significantly because it is necessary to preserve the quality of water bodies, releasing the 'minimum flow' of water to sustain the ecosystem. As regards mini-hydro plants, their potential is not significant (17 ktoe). Solar thermal technology may be able to produce 20 ktoe of energy by 2020, after 250000 m^2 of new panels are installed (PAT 2013). As for photovoltaic technology, there is currently a potential of 144 MW installed and, as said, the policy is to install small plants on roofs. Finally, eolic technology is not an important potential source because winds are constant only in some particular areas, i.e. the top of some mountains, and it is clear that wind towers could have a negative impact on the Alpine scenery. The plan does not state prospects for this technology.

An inquiry into landscape perception

Within the framework described, an inquiry was recently conducted in Trentino in order to gain better understanding of how people perceive the landscape and what the main concerns are. The author did not take part directly into the inquiry, which had general goals and was not specifically intended to determine the level of acceptance of energy technologies (PAT 2015). However, some orientations can be inferred on that issue.

In short, the aim of the inquiry was to understand the processes of elaboration of the sense of belonging to the landscape by people and local communities. It sought to determine what representations and meanings tend to consolidate and which ones tend to disappear rapidly. The research project was developed in three steps: a preliminary phase consisted in a series of semi-structured interviews with experts and selected observers. A second step regarded a Delphi process, aimed at focusing better on the most representative expressions of the local society in regard to the landscape. The most demanding phase consisted in a survey of a representative sample of the population managed by the Statistical Institute of the Autonomous Province of Trento.

The interviews with 25 experts were conducted on a semi-structured basis, with nine questions concerning three areas: meanings, representations and perception. The questions on this last area were supported by the use of photographic images. The results stressed the 'epochal change' of the landscape as the mirror of a wider socio-economic transition. Physical transformation due to urbanisation processes, extension of the infrastructure, and abandonment of traditional agriculture were the critical aspects most frequently cited by the experts interviewed. As regards values and potentials, both natural values and selected human interventions are considered positive: quality buildings, specialised agricultural spaces, high-level tourism places etc., tend to become the bases for new 'traditional landscapes'. Change is not seen as negative *per se*. Close attention is paid to decisional procedures and planning methods and regulations. Landscape, as the mirror of the society, includes political processes.

The Delphi process involved 20 experts and opinion makers in a three-step cycle of questions, sent by e-mail, on the potentials and critical points of the local landscapes, on resistance to change and on education.

The sample survey involved more than 1400 people, statistically representing the population, interviewed by a team of 29 trained interviewers, making use of the Computer Assisted Personal Interview (CAPI) technique. In total, 2400 families were contacted and 1457 interviews were conducted, posing 11 questions, 6 of which regarded the evaluation of 52 items, in particular photographic images. The main goal was to represent the 'common

sense' on landscape that supports the sense of belonging and the identity of local communities, by detecting the relationships representation-perception-meaning. A first aim was to identify the predominant representations of the landscape of Trentino, whether they are visual-aesthetic or economic, natural, cultural, ecological, exceptional. Then investigated were the threat factors that were socially perceived. The intention was to better understanding the extent to which the landscape is a key feature for the local population, able to distinguish Trentino from other territories, and part of the identity of the inhabitants.

As regards the concept of landscape, this seems to be a familiar term which no longer pertains to a traditional aesthetic vision but rather to a more complex concept representing the natural as well as the cultural assets of a locality. The predominant images of the landscape concern on the one hand the natural assets of Trentino ('mountain and woodlands' was the answer given by more than 51.6% of interviewees), and the potentials for leisure ('mountains for tourism', 17.6%), while the agricultural landscape was mentioned by only 8.5% of interviewees, and settlements, historic landmarks and infrastructure were mentioned by only a few respondents.

More variegated were the answers concerning detrimental factors. Traffic, impoverishment of natural places, urbanisation processes, urban peripheries and pollution were mentioned by more than half of the interviewees. On the contrary, less impacting factors were considered ski-lifts (72.7%), extension of woods over previous agricultural land (72.2%), use of water courses (71.6%), structures for specialised agriculture (69.3%), roads (68.7%), followed by odours, noise, and urban expansion.

Finally, a high level of awareness of the value of landscape emerged, together with the confidence that local policies are well orientated towards protection.

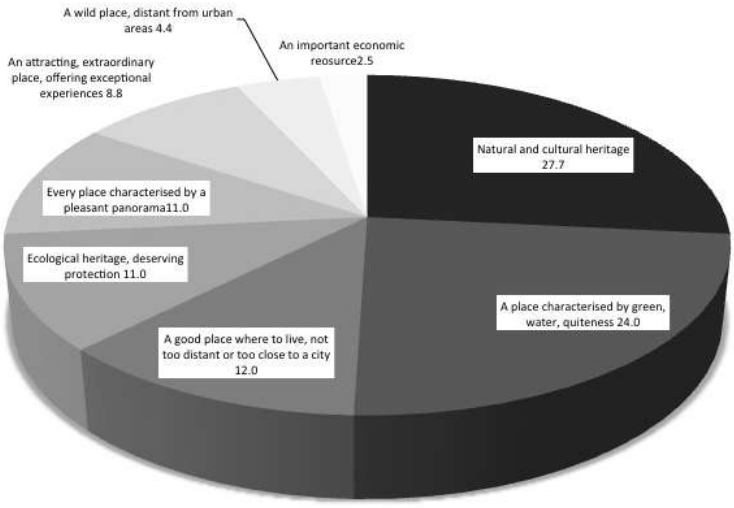

Figure 2. Definition of landscape (Source: Pat, 2015, redrawn)

The diverse social and age groups show different attitudes. In particular, people over 60 years define landscape preferably as a 'quite place, characterised by green and water' (32.9%), with a significant difference compared to younger generations (18–35 years: 19.2%; 36–59 years: 20.1%). Landscape as a 'natural and cultural heritage' is chosen only by 18.0% of the elderly, while it is significant for the younger generations (18–35 years: 30.1%; 36–59 years: 31.3%).

In general, the economic and commercial values of landscape are not considered of primary importance.

As regards the place of residence of respondents, people living in set apart mountain areas define landscape as a 'quite place, characterised by green and water' (29.5%), response

not so frequently given by people residing in the developed mountain areas (20.4%). In such places, landscape is defined preferably as a 'natural and cultural heritage' (28.7%), similarly to the responses of people from dynamic lowland municipalities (28.1%), and differently from set apart mountain areas residents (16.6%).

Interpretation of the research results is not simple, in particular if specific changes, such as those required by RETs, are considered. In general, while there is wide appreciation of the role and value of the landscape, its various components are differently considered by experts and laypeople. Natural features are dominant in respondents' descriptions, but a utilitarian vision emerges when the potential uses of spaces and resources are stressed, also when they require change of traditional uses and the construction of equipment. Side-effects (odours, pollution etc.) are generally underestimated, while, on the contrary, the perception of a 'well managed landscape' is well considered.

The impacts of energy production by renewable energy technologies

Energy production by renewable sources affects the landscape in different ways, in relation to the specificities of the environment involved and the technology used. Perception of the impacts depends not only on the real change of landscape, but on the way landscape is perceived. Therefore, what impacts are caused by RETs? What landscape factors are affected?

A tentative classification can be made on the bases of the principles driving the diverse theories of landscape perception. In short, the following impacts on the major factors involved can be identified.

Natural environment (the biophilia theory of Wilson (1984)). Alteration of a consolidated natural system is an impact, and human perception tends to be sympathetic with the natural condition. It must be stressed, however, that the concept of naturalness is debatable, and especially in the case of an environment heavily transformed by man over the centuries like the Alps. In many cases, biodiversity is the result of such interventions. Also re-naturalization processes caused by the abandonment of fields and pasturelands produce a shrinkage of the human landscape. The perception of the 'natural landscape' is therefore strongly affected by personal attitudes and culture.

Visibility and protection (the prospect-refuge theory of Appleton, 1975). Dominant points in the landscape are obviously central in perception processes. Many approaches and theories are based on the concept that landscape is what is seen from a specific point (this was the basis of the first Italian landscape defence law of 1939). The protection of such points is usually the main purpose of policies, plans and defence association actions. On the contrary, hide-out areas, closed spaces and less visible places are usually not strictly protected, although in many cases they are highly valuable from an eco-systemic point of view and can be of great interest due to their characters (canyons, gorges, forest canopies etc.).

Cultural landscapes. Many approaches and theories, as well as protection actions, are concerned with man-made landscapes. They regard a variety of cases, but in general the layers of history form a complex stock of signs, meanings, and values for individuals and communities which must be appreciated and protected. Landscape perception, in this case, is activated by the personal culture and memory, and change is often perceived as a threat to be carefully evaluated.

Functional landscapes (the affordance principle of Gibson, 1979). Perception, as said, is closely connected to personal culture. This means that we see what we tend to look for. In particular, we are sensitive to the opportunities offered by the environment we are experiencing. Therefore, we appreciate a well-cultivated landscape even when it is the result of intensive agriculture, while we feel uncomfortable in front of an abandoned field (or a country house, or a village). The presence of a community taking care of the space is usually

well perceived, even when this implies change of the traditional organisation. There are, however, different perceptions of the same landscape depending on the personal attitudes of cultural, natural interest, sport practice kind.

Landscape and information (Kaplan and Kaplan 1989, Kaplan et al. 1998). The inclusion of new technologies in a natural environment or in a human landscape are interpreted also on the bases of the information conveyed. In general, coherence is rarely found in such a coupling, but the notion of complexity can explain why new components are accepted in the heterogeneous system of the landscape. Legibility concerns the possibility to understand why a context has been changed, and what benefits such action has provided; mystery, on the other hand, can stimulate curiosity, but it can also be a factor explaining the opposition to change. Anyhow, some energy projects, concerning both hydro-electric plants and other technologies (PV, wind plants), have leveraged on legibility (of the function) and on mystery (combination of technology and nature) by developing a peculiar design characterized by geometric lines and technological materials in the natural environment and the open space.

Discussion and conclusions

The insertion of renewable energy technologies in complex and fragile landscapes, as in the case of the Alpine regions, is differently perceived by people and communities. We can refer to the framework of the perception patterns outlined above to extract some insights from the survey conducted in Trentino.

What emerges is, together with the appropriateness of the ELC definition of the landscape, a local politico-administrative experience characterized by the elaboration of a discourse on landscape oriented not only at preserving an asset deserving attention, but at taking advantage of its values and at reinforcing the sense of belonging of local communities. The inquiry analysed highlights that landscape is generally considered not simply as a ‘panorama’, but as the living space of people and communities, composed of natural and man-made spaces, material components and immaterial meanings and values. The interviewees’ answers often mixed substantive aspects with politico-administrative and planning issues.

However, the experts exhibited a different sensitivity with respect to local communities, one more orientated to a functional concept of the landscape. In this regard, landscape values are strongly attached to the opportunities offered – and created – for an efficient economy and a qualified level of living. And such perspectives differently characterize individual communities, thus explaining why some proposals are accepted and seen as positive in some places, while they provoke opposition in others.

The visibility of the technology in the landscape is certainly a key issue, together with the transformation of consolidated landscapes. But the survey showed that visibility and change are not ‘the’ problems. More complex mechanisms operate in perception, as testified by many answers and by a number of conflicts over RETs projects in recent times, where similar proposals have been differently accepted by local communities.

As said, in many cases the perception of communities is oriented by a utilitarian vision: if the technology is perceived as necessary or useful, it becomes part of the landscape. Of course, an appropriate (technical, but also procedural) ability to manage the transformation is required (and in general this is recognised in the case of Trentino). An example concerns ski-lifts and ski-slopes, which are largely seen as part of the contemporary ‘mountain (tourism) landscape’.

Similarly, the huge works required by hydropower production were not mentioned as detrimental factors, either in the case of large and visible modification of the landscape (dams, lakes etc.). In recent times, major plants, planned by famous engineers and architects, have

been proposed as interesting places of visit. A controversial attitude emerges in the case of hide-out places, which are not so visible - and therefore not so much protected in the past -, but are important because of their eco-systemic role, and because they well represent a tract of landscape which can be considered a refuge. The sensitivity towards such features has increased in the recent years, as testified by a number of recent initiatives which have valorised gorges, canyons, and hide-out places.

The impacts on naturalness, in particular of protected areas, are crucial, but this does not imply that change cannot be planned, because the concept of 'natural' is largely influenced by the personal and community culture. In any case, by-effects can be important and must be managed. In particular, the oscillation of the water level in reservoirs or the diversion of water from torrents in the case of hydropower plants can impinge not only on the ecosystem but also on leisure activities (fishing, canoeing and rafting, in particular). On the contrary, the artificial abundance of water during specific timetables, downstream some dams, allows the practice of water sports

Cultural landscapes are not seen as static. The collective memory of the traditional cultivation methods is almost lost, and the ongoing change in terms of abandonment of agricultural land (in many cases terraced landscapes) or in specialisation (requiring new field patterns and new equipment) is not perceived as a loss of values. Again, a utilitarian perception emerges, and this leaves space for the installation of RETs.

Also the traditional image of settlements and the historical heritage were not cited as key components of landscapes. Probably the inquiry underestimated such values, but there is certainly space for intervening in the urbanised space with new technologies. In particular, their insertion along major roads and in urban areas has already been done without controversies.

More difficult is consideration of the concepts of coherence/legibility and complexity/mystery, which combine physical perception and cultural aspects. The history of the Alpine landscape reflects the evolution of the perception of nature and the well-known elaboration of the concepts of sublime, horror, and picturesque. What we perceive as coherent, legible, or complex and mysterious depends on our vision of the world, and on our intentions. In this regard, architects are long discussing the way new buildings must be designed to be appropriately inserted in an Alpine landscape, between tradition and innovation; mimetic intervention and dissonance. Also the new energy plants deserve a similar attention to the peculiar landscape values, as well as a better design.

Similar issues raised by the insertion of RETs concern the coherence of the use of the source (in particular water and biomass; to a lesser extent, sun and wind) and the relationship of the technology with the environment, the skyline or the cultural landscape and the built environment. This is the case of wind towers, which need to be placed on elevations, of equipment installed on agricultural land, of PV panels on the roofs of ancient buildings. There are also conflicts between alternative uses of resources or spaces, as in the case of the use of the water of a torrent for hydropower production or for leisure activities or irrigation, or the detrimental effects of technologies on the quality of green areas.

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UNESCO WORLD HERITAGE SITES AND RENEWABLE ENERGIES IN SPAIN: CURRENT TRENDS IN THE LEGISLATIONS

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Summary: Renewable energies, in particular wind power, represent a large part of the energy production in Spain. At the same time, Spain hosts a large number of UNESCO World Heritage Sites. Although the development of renewable energies represents a necessity, the installations often have a great impact on the landscape. In the case of an impact of these installations on UNESCO World Heritage Sites, a conflict might arise if the UNESCO World Heritage Committee considers this impact as a threat to the UNESCO World Heritage Site in question. In this context, the legislations on heritage protection, nature conservation and renewable energies should regulate this kind of possible situation in order to avoid potential conflicts. This article aims at offering an overview of the current trends in these three legislations (heritage protection, nature conservation, renewable energies) in Spain at the national and regional levels. In order to conduct this research a legal in-depth analysis of the legislations at national and regional levels has been implemented. The results show a great disparity among the autonomous communities legislations and also between the national level and the regional level. Finally, some recommendations are elaborated upon the most advanced legislations.

Introduction

Spain hosts a large number of UNESCO World Heritage Sites. At the same time, renewable energy infrastructures, in particular wind power, have been proliferating all over Spain during the last 15 years. Although the development of renewable energies represents a necessity, the installations often have a great impact on the landscape. The nomination of World Heritage cultural sites, natural sites, and mixed sites since 1972 as defined in the World Heritage Convention and in the Operational Guidelines implies the protection of their authenticity, integrity and Outstanding Universal Value in order to ensure their transmission to the future generations. Furthermore, the introduction of the cultural landscapes in 1992 as a new category of sites to be nominated as World Heritage broadens the scope of the World Heritage Convention to the protection of landscapes as well. Once inscribed on the UNESCO World Heritage List, these sites are submitted to a legal protection at international and national levels. Consequently, any development project having an impact on them – including the installation of renewable energies – shall be regulated in the corresponding legislations.

Study Area

Situation with world heritage protection and renewable energy development in Spain

World Heritage in Spain

Spain has accepted the World Heritage Convention on 4th of May 1982. As of September 2016, 40 cultural sites, 3 natural sites, 2 mixed sites have been inscribed on the World Heritage List between 1984 and 2012 (Figure 1). Spain is the third country in the world most represented on the World Heritage List (with 45 sites in total), after Italy (51 sites), China (50 sites) and before France (42 sites) and Germany (41 sites). Additionally, there are 32 sites on the current Tentative List (1996-2016).

Figure 1. Repartition of the UNESCO World Heritage Sites in Spain (Source: Daniel Herrero)

The following table presents the repartition of the UNESCO World Heritage Sites in the 17 autonomous communities. As some of these sites can be found on the territory of several autonomous communities, they are counted several times (e.g. Routes of Santiago de Compostela).

Table 1: Repartition of the UNESCO World Heritage Sites in the 17 autonomous communities. Source: Ministry for Education, Culture and Sport (http1)

Autonomous Communities
UNESCO World Heritage Sites
Andalusia (6)
• Alhambra, Generalife and Albaizín, Granada • Historic Centre of Cordoba • Cathedral, Alcázar and Archivo de Indias in Seville • Doñana National Park • Rock Art of the Mediterranean Basin on the Iberian Peninsula • Renaissance Monumental Ensembles of Úbeda and Baeza
Aragon (4)
• Mudejar Architecture of Aragon • Pyrénées - Mont Perdu • Routes of Santiago de Compostela: Camino Francés and Routes of Northern Spain • Rock Art of the Mediterranean Basin on the Iberian Peninsula
Asturias (1)
• Monuments of Oviedo and the Kingdom of the Asturias
Balearic Islands (2)
• Ibiza, Biodiversity and Culture • Cultural Landscape of the Serra de Tramuntana
Basque Country (2)
• Vizcaya Bridge • Cave of Altamira and Paleolithic Cave Art of Northern Spain
Canary Islands (3)
• Garajonay National Park • San Cristóbal de la Laguna • Teide National Park
Cantabria (1)
• Cave of Altamira and Paleolithic Cave Art of Northern Spain

Castilla La Mancha (4)
• Historic Walled Town of Cuenca • Historic City of Toledo • Rock Art of the Mediterranean Basin on the Iberian Peninsula • Heritage of Mercury. Almadén and Idrija
Castilla y Leon (8)
• Burgos Cathedral • Old Town of Segovia and its Aqueduct • Old Town of Ávila with its Extra-Muros Churches • Old City of Salamanca • Archaeological Site of Atapuerca • Las Médulas • Routes of Santiago de Compostela: Camino Francés and Routes of Northern Spain • Prehistoric Rock Art Sites in the Côa Valley and Siega Verde
Catalonia (6)
• Works of Antoni Gaudí • Palau de la Música Catalana and Hospital de Sant Pau, Barcelona • Catalan Romanesque Churches of the Vall de Boí • Poblet Monastery • Archaeological Ensemble of Tárraco • Rock Art of the Mediterranean Basin on the Iberian Peninsula
Extremadura (3)
• Old Town of Cáceres • Archaeological Ensemble of Mérida • Royal Monastery of Santa María de Guadalupe
Galicia (4)
• Santiago de Compostela (Old Town) • Roman Walls of Lugo • Routes of Santiago de Compostela: Camino Francés and Routes of Northern Spain • Tower of Hercules
Madrid (3)
• Monastery and Site of the Escurial, Madrid • University and Historic Precinct of Alcalá de Henares • Aranjuez Cultural Landscape
Murcia (1)
• Rock Art of the Mediterranean Basin on the Iberian Peninsula
Navarre (1)
• Routes of Santiago de Compostela: Camino Francés and Routes of Northern Spain
La Rioja (2)
• San Millán Yuso and Suso Monasteries • Routes of Santiago de Compostela: Camino Francés and Routes of Northern Spain
Valencia (3)
• La Lonja de la Seda de Valencia • Palmeral of Elche • Rock Art of the Mediterranean Basin on the Iberian Peninsula

A great disparity in number of World Heritage Sites among the autonomous communities can be observed. While Asturias, Cantabria, Murcia and Navarre host respectively one World Heritage Site, Castilla y Leon have eight World Heritage Sites and Andalusia and Catalonia count each six World Heritage Sites on their respective territory. This is explained by the Spanish system for the process of the candidacies: each autonomous community selects the potential sites to be nominated as World Heritage. In this case, such a disparity depends on the respective policies regarding heritage protection of the 17 autonomous communities.

According to Montoya et al., in 2014 the installed renewable energy of 32,472 MW represented 11.6% of the country's primary energy consumption. Furthermore, the installed renewable energy average of electric power in Spain was 0.7 kW per capita and 59 kW/km². Biomass, wind and hydropower constitute the main sources of renewable energy. In terms of power generation, the gross renewable energy production amounted to 86,600 GW h, or 29.7% of the country's total. This distribution implies that renewable energies are the main source of electrical energy for the country, surpassing natural gas (28.9%) and nuclear power (19.7%). The distribution within the renewable energy sector by type has indicated an 84% contribution by wind and hydropower (49% and 35%, respectively), which is an 11% decrease from 2010 due to a year of reduced hydraulic and wind resource availability. The following table shows the repartition of the renewable energy production (solar, wind, hydro and biomass) in the 17 autonomous communities.

Table 2: Repartition of the renewable energy production. Source: Montoya et al. (2014)

Renewable energy production by autonomous community (MW): solar, wind, hydro, and biomass.

Autonomous community	Wind	Solar	Hydro	Biomass	Total	Area (km²)	Average (kW/km²)	Population	kW/citizen
Castilla and Leon	5532.6	493.4	250.5	28.1	**6305**	94,221	67	2,546,078	2.5
Andalucia	3274.8	1824.3	147.1	199.7	**5446**	87,598	62	8,449,985	0.6
Castilla-La Mancha	3841.8	1268.7	126.5	50.9	**5288**	79,462	67	2,121,888	2.5
Galicia	3317.0	15.6	498.2	39.1	**3870**	29,574	131	2,781,498	1.4
Aragon	1883.2	167.6	275.6	6.2	**2333**	47,720	49	1,349,467	1.7
Cataluña	1309.7	288.8	281.2	52.2	**1932**	32,113	60	7,570,908	0.3
NAVARRA	1234.7	160.0	162.1	36.8	**1594**	10,390	153	644,566	2.5
C. Valenciana	1193.2	344.4	31.4	17.3	**1586**	23,255	68	5,129,266	0.3
Extremadura	0.0	1161.6	19.6	17.1	**1198**	41,635	29	1,108,130	1.1
MURCIA	262.0	474.6	11.4	4.8	**753**	11,313	67	1,474,449	0.5
ASTURIAS	507.4	0.8	84.7	86.0	**679**	10,604	64	1,077,360	0.6
RIOJA, LA	448.1	85.6	22.8	4.3	**561**	5045	111	323,609	1.7
Islas Canarias	145.8	166.2	1.2	3.7	**317**	7447	43	2,118,344	0.1
Pais Vasco	153.3	23.8	50.2	26.5	**254**	7235	35	2,193,093	0.1
MADRID	0.0	62.0	44.2	42.6	**149**	8028	19	6,498,560	0.0
CANTABRIA	35.3	2.1	76.2	12.9	**127**	5327	24	593,861	0.2
BALEARS, ILLES	3.7	77.7	0.0	2.1	**83**	4992	17	1,119,439	0.1
MELILLA	0.0	0.1	0.0	0.0	**0**	13	5	80,802	0.0
Total or average	**23,142.4**	**6617.3**	**2083.0**	**630.2**	**32,473**	**505,972**	**59**	**47,181,303**	**0.7**

The following maps indicate the locations of the World Heritage Sites in Spain (cultural/natural/mixed) and the locations of the different sources of renewable energies present in Spain (Figure 2.). The first map shows bioenergy, hydroelectricity, flowing and pumping; the second map presents solar panels and thermosolar; the third map indicates wind energy; and the fourth map represents hydroelectricity. The observation of these four maps shows that among the installations creating the most power, pumping exists around three World Heritage Sites, thermosolar can be found around four World Heritage Sites, wind power can be found around eleven World Heritage Sites and hydroelectricity can be found around nine World Heritage Sites. They all possibly have impacts on these World Heritage Sites and thus lead to potential conflicts if these installations do not guarantee the sustainable protection of these sites under the 1972 World Heritage Convention.

I. Bioenergy, hydroelectricity, flowing and pumping

II. Solar Panels and Thermosolar

III. Wind energy

IV. Hydroelectricity

Figure 2. Repartition of renewable energies and UNESCO World Heritage Sites in Spain (Source: Daniel Herrero)

Materials and Methods

Numerous researches have been conducted on the impact of renewable energies on landscapes, such as Frolova (2010), Frolova and Perez Perez (2008) and on landscape policies in Spain with regard to the European Landscape Convention, e.g. Frolova (2009). Elorrieta and Sanchez-Aguilera (2011) have studied landscape planning and legislation. Equally, Hernandez Hernandez (1996) and Perez Galan (2011) have researched on the legislation of cultural and natural heritage protection in Spain. In addition, a study of world heritage in Spain has been compiled by Salinas (2008). The repartition of competencies concerning renewable energies in the autonomous community has been analysed by Bacigalupo Saggese (2010). More precisely, Frolova (2010) and Iglesias et al. (2011) have conducted a research respectively on the landscape of wind energy in Spain and on wind energy policy and authorisation in Spain.

The RENFORUS (Renewable Energy Futures for UNESCO Sites, http2) initiative of the UNESCO aims at integrating renewable energies sources and World Heritage Sites as a model of best practices. However, such a policy requires adequate legislations in order to be implemented successfully. Since the creation of this initiative, a compilation of best practices has been published (UNESCO 2013). But the analysis of the legislations concerning heritage protection, nature conservation and renewable energies through the angle of the potential impact of renewable energies on the World Heritage Sites remains an innovative research.

Confronting the installation of renewable energies and the protection of UNESCO World Heritage Sites in Spain has led us to three main questions:

(1) What is the state-of-the-art in terms of legislations in Spain concerning the various renewable energies and the UNESCO World Heritage Sites?

(2) Are the UNESCO World Heritage Sites protected under Spanish legislation?

(3) Based on this comparative analysis, what kind of recommendations for the legislations can be proposed?

In order to deal with these questions an in-depth analysis of primary sources such as the Spanish legislation about renewable energies, heritage protection and nature conservation at regional and national level has been implemented. Equally UNESCO documents and European documents concerning both renewable energies and heritage protection have been

analysed. In order to anchor this research in both fields of (1) renewable energies and of (2) heritage protection and nature conservation, secondary sources have also been analysed.

Results and Discussions

Legislations concerning heritage protection

As Salinas (2008) explains, the competence of culture is transferred to the 17 autonomous communities (comunidades autónomas). The Ministry of Culture takes care of the management of new candidacies for World Heritage and of the Tentative List. In addition, the Council of Historical Heritage (Consejo del Patrimonio Histórico) is the institution in which representatives of the Ministry of Culture and the ministries of culture of the different autonomous communities are represented.

The National Plans for Conservation (Planos Nacionales de Conservación) are a policy or instruments developed in the middle of the 1980's after the competence of heritage protection had been transferred to the autonomous communities and the adoption of the new Law 16/1985 dated 25 June, on the Spanish Historical Heritage (Official State Bulletin of 29 June 1985). This law does not mention the concept of World Heritage although Spain had accepted the 1972 World Heritage Convention in 1982. As Hernandez Hernandez (1996) shows, the preamble of the Spanish Constitution of 1978 states that "the Spanish Nation […] proclaims its will to […] protect all Spaniards and peoples of Spain in the exercise of human rights, of their cultures and traditions, and of their languages and institutions". The next paragraph specifies "promote the progress of culture and of the economy in order to ensure a worthy quality of life for all". However, the Spanish Constitution does not mention landscape as showed by Elorrieta and Sanchez-Aguilera (2011): "By contrast, the Statutes of some of the autonomous communities do make mention of this concept, which can be interpreted as an assumption of competence in this field. However, this issue remains largely unexplored."

Since the 17 autonomous communities have the competency for the protection of heritage, their respective legislation concerning heritage protection has been analysed and summed up in chronological order in the following tables elaborated based on Perez Galan (2011).

The elements of comparison taken for this analysis are the following: (1) UNESCO World Heritage Convention; (2) Definition of cultural heritage; (3) inclusion of Environmental or Cultural/Heritage Impact Assessment; (4) Inclusion of cultural landscapes; (5) Installation of Renewable Energies.

Table 3. Abstracts of the legislations of the 17 autonomous communities concerning heritage protection in chronological order. Source: Bénédicte Gaillard

Title of the Law
Category of Heritage
BASQUE COUNTRY Law 7/1990, dated 3rd July, of Basque Cultural Heritage
- Title I, Art. 2 Para. 2: monument, monumental ensemble, cultural space - Title II, Chapter 1, Art. 13: in the treatment of environmental impact assessments that can directly or indirectly affect qualified or the inventoried ones cultural properties, the competent administration will collect the necessary information to include in the declaration of environmental impact the considerations or conditions resulting from the quoted report
CATALONIA Law 9/1993, dated 30 September, of Catalan Cultural Heritage

- Title I, Chapter 1, Art. 7: historical monument, historical ensemble, historical garden, historical place, area of ethnological interest, archaeological area, paleontological area - Title II, Chapter 2, Art. 35 Para. 3.: the volume, the typology, the morphology and the chromaticism of the interventions in the environments of protection of the immovable properties of national interest cannot alter the architectural and landscape character of the area nor disturb the visualisation of the property
VALENCIA Law 4/1998, dated 11 June, of Valencian Cultural Heritage
- Title I, Chapter 2, Art. 11: the studies of environmental impact relative to all sorts of projects, public or private, which can affect the properties constituents of the Valencian cultural heritage should incorporate the report of the council competent for culture concerning the conformity of the project with the legislation of cultural heritage protection [...] - Title II, Chapter 3, Art. 26: monument, historical ensemble, historical garden, ethnological space, historical site, archaeological area, paleontological area, cultural park
CANTABRIA Law 11/1998, dated 13 October, of Cultural Heritage of Cantabria
- Title III, Chapter 1, Art. 46 Para. 3: In the procedure of all the environmental impact assessments, the administrative organ competent for environment will request report of the council of culture and sport and will include the considerations and conditions resulting from such report. - Title III, Chapter 2, Art. 49: monument, historical ensemble, cultural place (historical garden, historical site, place of ethnographical interest, cultural landscape, cultural route), archaeological area, natural place
BALEARIC ISLANDS Law 12/1998, dated 21 December, of Historical Heritage of the Balearic Islands
- Title I, Chapter 1, Art. 6: monument, historical ensemble, historical garden, historical place, place of ethnological interest, archaeological area, paleontological area
ARAGON Law 3/1999, dated 10 March, of the Aragonese Cultural Heritage
- Preamble, I: mention of the 1972 UNESCO World Heritage Convention - Title 1, Chapter 1, Art. 12 Para. 12: monument, ensemble of cultural interest (including historical ensemble, historical garden, historical site, paleontological area, archaeological area, place of ethnographical interest)
CANARY ISLANDS Law 4/1999, dated 15 March, of the Historical Heritage of the Canary Islands
- Title II, Chapter 1, Section 1, Art. 18: monument, historical ensemble, historical garden, historical site, archaeological area, paleontological area, ethnological site
EXTREMADURA Law 2/1999, dated 29 March, of the Historical and Cultural Heritage of Extremadura
- Title I, Chapter 1, Art. 6: monuments, historical ensembles, historical garden, historical sites, archaeological area, paleontological area, places of ethnological interest, archaeological sites, spaces of archaeological protection - Title II, Chapter 2, Art. 30 Para. 1: In the procedure of the environmental impact assessments (for programmes, plans or projects) that can affect the properties constituents of the Extremaduran historical and cultural heritage, it will be mandatory to obtain a report of the General Direction of Cultural Heritage and the considerations or conditions resulting of such a report will be included in the declaration of environmental impact
ASTURIAS Law 1/2001, dated 6 March, of Cultural Heritage
- Title I, Chapter 1, Art. 11: monument, historical ensemble, historical garden, historical site, archaeological area, historical route
CASTILLA Y LEON Law 12/2002, dated 11 July, of Cultural Heritage of Castilla y Leon
- Title I, Chapter 1, Art. 8 Para. 3: monument, historical garden, historical ensemble, historical site, archaeological area, ethnological ensemble, historical route
LA RIOJA Law 7/2004, dated 18 October, of Cultural, Historical and Artistic Heritage of La Rioja
- Title I, Chapter 1, Art. 12: monument, historical ensemble, cultural place (historical gardens, historical sites, archaeological areas, paleontological areas, places of ethnographical interest, cultural routes, cultural landscapes) - Title II, Chapter 2, Art. 31 Para. 2: In particular, any project submitted to an environmental impact assessment

that can affect properties belonging to the cultural, historical and artistic heritage of La Rioja, will have to rely on a mandatory report of the Council competent for culture, which will hear the High Council of the Cultural, Historical and Artistic Heritage of La Rioja, for this purpose. The considerations and conditions resulting from this report will have to be included in the declaration of environmental impact that guarantee the protection and safeguarding of the affected cultural properties
NAVARRE Regional Law 14/2005, dated 22 November, of the Cultural Heritage of Navarre
- Explanatory Memorandum 2: mention of the 1972 UNESCO World Heritage Convention - Title III, Chapter 1, Art. 15: monuments, historical ensemble, historical site, archaeological area, cultural landscape, historical route, historical garden - Title IV, Chapter 2, Section 1, Art. 32 Para. 1: The instruments of territorial planning and urban planning, as well as the environmental evaluations of plans and programmes and the projects that are subject to an environmental impact assessment will have to contain, within its documentation, determinations to guarantee the conservation and protection of the properties inscribed on the Register of Properties of the Cultural Heritage of Navarre or collected in the Archaeological Inventory of Navarre
MURCIA Law 4/2007, dated 16 March, of Cultural Heritage of the Autonomous Community of the Region of Murcia
- Preliminary Title, Chapter 1, Art. 3 Para. 3: monument, historical ensemble, historical garden, historical site, archaeological area, paleontological area, place of ethnographical interest - Preliminary Title, Chapter 2, Art. 12 Para. 2: When an activity, work, project, plan or programme requires an environmental impact assessment or an integrated environmental authorisation, the environmental organ will gather mandatory report of the general direction with competencies for cultural heritage, which will have to be emitted within ten days and whose considerations or conditions will incorporate the corresponding declaration or authorisation. - Title IV, Art. 61 Para. 2: mention of cultural landscapes
ANDALUSIA Law 14/2007, dated 26 November, of the Historical Heritage of Andalusia
- Title I, Chapter 3, Art. 19: Measures to be taken by municipalities on the territory of which are located properties inscribed on the General Catalogue of historical heritage of Andalusia to avoid its visual or perceptive contamination, it concerns among others the control of the necessary installations for the energetic supply, generation and consumption - Title III, Chapter 1, Art. 25: monuments, historical ensembles, historical gardens, historical sites, archaeological areas, places of ethnological interest, places of industrial interest, heritage areas - Title III, Chapter 1, Art. 26 Para. 8: in the heritage areas the landscape and environmental values are included - Title 9, Chapter 2, Art. 77: cultural spaces are cultural ensembles and parks
CASTILLA-LA MANCHA Law 4/2013, dated 16 May, of the Cultural Heritage of Castilla-La Mancha
- Preliminary Title, Art. 1 Para. 2: Movable and immovable property, intangible manifestations - Title 1, Chapter 1, Art. 8: Immovable properties are monument, historical garden, historical ensemble, historical site, archaeological area, paleontological site - Title II, Chapter 1, Art. 26 Para. 1: The competent council for cultural heritage will have to issue a report of the process of acceptation, modification, and revision of the instruments of territorial and spatial planning and of the activities to which the Environmental Impact Assessment applies that are constraining in the matters that affect the cultural heritage - Title II, Chapter 3, Section 1, Art. 39 Para. 1: The conservation of the historical ensemble includes the maintenance of the architectural, urban and landscape structure
MADRID Law 3/2013, dated 18 June, of Historical Heritage of the Community of Madrid
- Preliminary Title, Art. 3: monument, historical ensemble, cultural landscape, historical garden, historical site or territory, property of ethnological or industrial interest, area archaeological and/or paleontological interest
GALICIA Law 5/2016, dated 4 May, of Galician Cultural Heritage
- Title I, Chapter 1, Art. 10: monument, historical garden, historical site, field or archaeological area, cultural routes, place of ethnological value, historical ensemble, cultural landscape, historical territory - Title II, Chapter 4, Art. 47Para. 2.c.: despite for its scope and the risk of deterioration or destruction of its cultural values derived from its territorial implantation, the prior authorisation will be required of the competent council for cultural heritage in the following interventions: […] installations of the energetic industry such as refineries, thermal centrals, of fossil fuel, hydraulic, wind power, solar panels, nuclear, or of any other type of production, transport or depository

The analysis of the legislations concerning heritage protection reveals a great disparity between them. For example, only a few legislations integrate the concept of cultural landscape as developed by UNESCO (Cantabria, La Rioja, Navarre, Murcia, Madrid, Galicia). Furthermore, solely Aragon and Navarre mention the 1972 UNESCO World Heritage Convention in their legislation and only Galicia mentions that the installations of all types of renewable energies require prior authorisation in view of the risk of deterioration of the cultural heritage. Nevertheless, Andalusia also mentions the control of the installations of energetic supply, without precision about renewable energies. Furthermore, eight autonomous communities adopt a monumental approach in their definition (Basque Country, Balearic Islands, Aragon, Canary Islands, Extremadura, Asturias, Castilla y Leon and Murcia) while the definition of the nine others adopts an approach combining cultural and natural features (Catalonia, Valencia, Cantabria, La Rioja, Navarre, Andalusia, Castilla-La-Mancha, Madrid and Galicia). In addition, solely Catalonia and Andalusia take into account the landscape character and only Castilla-La-Mancha refers to intangible heritage. Finally, seven autonomous communities state in their legislations that Environmental Impact Assessments shall take into consideration cultural heritage (Basque Country, Valencia, Extremadura, La Rioja, Navarre, Murcia, and Castilla-La-Mancha).

Legislations concerning nature conservation

The Law 15/1975 dated 2nd May on the Protected Natural Areas does not mention the concept of natural heritage or the 1972 World Heritage Convention, which had not yet been accepted by Spain. On the contrary, the Law 42/2007 dated 13 December on the Natural Heritage and Biodiversity does integrate the concept of natural heritage and of landscape, with reference to the European Landscape Convention. Its Art. 49, Title II Chapter 4, refers to the areas protected by international instruments and explicitly mentions the natural sites inscribed on the UNESCO World Heritage List. This law serves for actualisation of the Spanish legislation against numerous international norms (Diaz-Martinez et al. 2008).

The analysis of the 17 legislations for nature conservation has been implemented using the same elements of comparison as in the above section.

Table 4. Abstracts of the legislations concerning nature conservation in the 17 autonomous communities in chronological order. Source: Bénédicte Gaillard

Title of the Law
Elements specified in the Law
ASTURIAS Law 5/1991, dated 5 April, of Conservation of the Natural Areas
- Title III, Chapter 2, Art. 20: The protected landscapes are such concrete places of the natural environment that, for their aesthetical and cultural values, deserve a special protection
MURCIA Law 4/1992, dated 30 July, of Planning and Protection of the Territory of the Region of Murcia
- Title VI, Chapter 3, Art. 48 Para. 1: the definition of protected landscapes is the one used in the Law 4/1989, dated 27 March (Title III, Chapter 2, Art. 17: The protected landscapes are such concrete places of the natural environment that, for its aesthetical and cultural values, deserve a special protection.)
VALENCIA Law 11/1994, dated 27 December, of the Generalitat Valenciana, of nature protection areas of the Valencian Community
- Title I, Chapter 2, Art. 13 Para. 1: The protected landscapes are areas both natural as transformed, meriting a special protection as well as significant examples of a harmonious relation between man and the natural environment or for its special aesthetical or cultural values
MADRID Law 16/1995, dated 4 May, Forestry and of Protection of the Nature in the Community of Madrid
- No mention
NAVARRE

Law 9/1996, dated 17 June, of Natural Areas of Navarre
- Chapter 1, Section 1, Art. 3 Para. 1: The protected landscapes are such concrete places of the natural environment that, for their aesthetical and cultural values, deserve a special protection
EXTREMADURA Law 8/1998, dated 23 December, of Conservation of the Nature and Natural Areas of Extremadura
-Title I, Art. 3: Natural heritage: The ensemble of natural resources, independently from the ownerships that are exercised over them, existing within a determined territorial framework, including the waters, the living beings, the gea, the soils and the dynamic effects derived from themselves or from the atmosphere. - Title III, Chapter 1, Art. 20 Para. 1: Are such concrete places of the natural environment that, for their aesthetical and cultural values, deserve a special protection
CASTILLA LA MANCHA Law 9/1999, dated 26 May, of Conservation of Nature
- Title III, Chapter 1, Art. 46 Para. 1: Are protected landscapes such concrete places that, for their aesthetical and cultural values, deserve a special protection. Will be understood in these assumptions the agricultural traditional and extensive of meadows landscapes, clove meadows, hay meadows and cereal steppes that, additionally to its aesthetical and cultural valorisation, contribute to the conservation of an important part of the biodiversity of the region.
CANARY ISLANDS Legislative Decree 1/2000, dated 8 may, approving the Restated Text of the Law of Planning of the Territory of Canary Islands and of Natural Areas of Canary Islands
- Title II, Chapter 1, Art. 48 Para. 12: The protected landscapes are such areas of the territory that, for their aesthetical and cultural values are declared as such, to achieve their special protection
GALICIA Law 9/2001, dated 21 August, of Conservation of the Nature
-Title I, Chapter 3, Art. 15 Para. 1: The protected landscapes are areas that deserve a special protection for their singular, aesthetical and cultural values or for the harmonious relation between man and the natural environment
LA RIOJA Law 4/2003, dated 26 March, of Conservation of Natural Areas of La Rioja
- Title III, Chapter 1, Art. 16: The protected landscapes are such places of the natural environment that, for their natural, aesthetical and cultural values, deserve a special protection
BALEARIC ISLANDS Law 5/2005, dated 26 May, for the conservation of the areas of environmental relevance (LECO)
-Title III, Chapter 1, Art. 16: The protected landscapes are such concrete areas of the natural environment that, for their aesthetical and cultural values, deserve a special protection
CATALONIA Law 8/2005, dated 8 June, of protection, management and planning of the landscape
- Chapter 1, Art. 13: Is understood as landscape, for the purpose of the present law, any part of the territory, as the community perceives it, whose character results from the action of natural or human factors and of its interrelations
CANTABRIA Law 4/2006, dated 19 May, of Conservation of the Nature of Cantabria
- Title II, Chapter 1, Art. 13: The protected landscapes are such concrete areas of the natural environment that for their aesthetical and cultural values, deserve a special protection
ANDALUSIA Law 42/2007, dated 13 December, of the Natural Heritage and Biodiversity
- Preliminary Title, Art. 3 Para. 26: definition of landscape as any part of the territory whose character is the result of the action and the interaction of natural and/or human factors, as the population perceives it
BASQUE COUNTRY Legislative Decree 1/2014, dated 15 April, approving the Restated Text of the Law of Conservation of Nature of the Basque Country
- No mention
CASTILLA Y LEON Law 4/2015, dated 24 March, of the Natural Heritage of Castilla y Leon
-Title II, Art. 15: The landscape, as it appears defined in the article 3.26 of the Law 42/2007, of 13 December, constitutes an integrative element of the natural heritage of Castilla y Leon For this purpose, the Regional Government of Castilla y Leon will adopt the necessary legislation to guarantee the recognition, protection, management and planning of the landscape in order to preserve its natural, patrimonial, cultural, social, economic values within the framework of sustainable development

Title II, Art. 19 Para. 2: Likewise the criteria to follow to achieve the landscape integration in the following actions will be determined: construction and other installations on rural land, forest management, agricultural reorganisation, introduction of linear infrastructures and wind farms, as well as the restoration of grounds affected by extractive activities
ARAGON Legislative Decree 1/2015, dated 29 May, of the Government of Aragon, approving the Restated Text of the Law of Protected Areas of Aragon
-Title II, Chapter 1, Art. 13 Para. 1: The protected landscapes are concrete places of the natural environment that deserve a special protection in accordance with the Council of Europe Landscape Convention, for their natural, aesthetical and cultural values - Title III, Chapter 5, Art. 67: The Government of Aragon will contribute to the recognition and application of the Convention about the protection of World Cultural and Natural Heritage that considers property of Natural Heritage […] - Title III, Chapter 5, Art. 68 Para. 5: The regime of protection will be articulated in accordance with the article 5 of the Convention concerning the Protection of the World Cultural and Natural Heritage, signed in Paris on 16 November 1972

In the same vein, there exists a great disparity between the legislations concerning nature conservation. For example, even though a majority of autonomous communities defines landscapes as a combination of cultural and natural values (Cantabria, Balearic Islands, Aragon, Canary Islands, Extremadura, Asturias, La Rioja, Navarre, Murcia, Castilla-La-Mancha and Galicia), the legislations of Madrid and Basque Country do not mention protected landscapes. Furthermore, Catalonia, Valencia and Andalusia define landscapes as the interrelation between man and nature, while Extremadura and Castilla y Leon define landscapes as natural heritage. Additionally, as with the legislation concerning heritage protection, Aragon is the only autonomous community that mentions the 1972 UNESCO World Heritage Convention in its legislation concerning nature conservation. Finally, solely Aragon mentions the European Landscape Convention and solely Castilla y Leon refers to the integration of landscapes in other policies and actions such as construction and other installations on rural land, forest management, agricultural reorganisation, introduction of linear infrastructures and wind farms, as well as the restoration of grounds affected by extractive activities.

Legislations concerning renewable energies

Spanish wind energy is subject to environmental legislation that limits it by forbidding installation in national and natural parks (Montoya et al. 2014).

According to Iglesias et al. (2011), the three levels of public administration in Spain (central government, autonomous communities, local administrations) have competencies concerning renewable energy sources. As a matter of fact, Iglesias et al. decompose the competencies of each level (Table 5.).

Administrative level	Competencies
Central government level	• Electricity sector legislation • FIT scheme • Central registry of RES-E plants and pre-registry • Indicative planning. Renewable targets • Binding planning: participation of the AACC • Administrative authorisations for RES-E plants > 50 MW
Regional level	• Regional legislation • RES-E/wind energy planning • Environmental and territorial planning competencies • Administrative authorisations for RES-E plants ≤ 50 MW • Regional registry of RES-E plants

Local level	• Municipal land-use plans • Building permits

Table 5. Repartition of the competencies for renewable energies between the three administrative levels. Source: Iglesias et al. (2011)

As described by Bacigalupo Saggese (2010), the Spanish legislation regulates renewable energies within the electricity production. Additionally, the competencies in terms of renewable energies are concurrent between the different decisional levels.

The following comparison of the legislations concerning renewable energies uses the same scheme as the two above sections.

Title of the Law
Mention of cultural/natural heritage, landscape
BASQUE COUNTRY
No legislation
BALEARIC ISLANDS
No legislation
GALICIA Decree 205/1995, dated 6 July, regulating the procedure of the wind energy in the Autonomous Community of Galicia
No mention
NAVARRE Foral Decree 125/1996, dated 26 February, regulating the implantation of the wind farms
-Art. 2 Para. 2.a.: In no case wind farms may be established on grounds categorised as Natural Areas, with the exception of the Natural Parks, the provisions in their respective Management Plans of the Natural Resources; high agricultural productivity, protected waters, non-wind existing or planned infrastructures, in the surroundings of population centres, in the surrounding of immovable properties of cultural interest, glens and zones of protection in the Camino de Santiago or of other itineraries of interest - Art. 2 Para. 2.d.: In no case wind farms may be established within fifty meters of immovable properties of cultural interest or of buildings of interest that participate in the historical, cultural or environmental values. The urban planning may establish justifiably other distances, higher or lower, that always continue to guarantee the preservation of the immediate surroundings of this type of properties of cultural interest
CASTILLA Y LEON Decree 189/1997, dated 26 September, which regulates the procedure for the authorisation of the electricity production installations from the wind energy
No mention
LA RIOJA Decree 48/1998, dated 24 July, which regulates the procedure for the authorisation of the installations of electric energy production from the wind energy, within the Autonomous Community of La Rioja
- Chapter II, Art. 6 Para. 5: Environmental impact assessment of the project of Wind Farm, including the complementary works that evaluate the conditions that could be produced on the landscape, the vegetation, the fauna and the protected natural areas
ASTURIAS Decree 13/1999, dated 11 March, which regulates the procedure for the installation of Wind Farms in the Principality of Asturias
In the annex to the decree regulating the authorisations of electric energy production installations from the wind energy, the content of the environmental impact assessments is stated and it includes among others protected landscapes, natural reserves, historical heritage, the impact on the landscape and on the historical heritage and the respective corrective measures
VALENCIA Agreement of 26 July 2001, of the Valencian Government, approving the Wind Plan of the Valencian Community
- Chapter 2, Second section, Art. 13: The evaluation of environmental impact must understand the consideration of the direct and indirect effects derived from the implementation of the project, on the population, the fauna, the flora, the vegetation, the gea, the ground, the water, the climate, the landscape, the structure and function of the ecosystems, on the historical-cultural heritage […]
MADRID Order 98/2005, dated 13 January, of the Council of Economy and Technological Innovation, regulating the

granting of aids for the promotion of the renewable energies and of the economy and energy efficiency for the period 2005-2007
No mention
CANARY ISLANDS Decree 6/2005, dated 30 January, approving the regulation that rules the installation and exploitation of the Wind Farms in the Canary Islands
No mention
EXTREMADURA Decree 192/2005, dated 30 August, regulating the procedure for the authorisation of the electric energy production installations from the wind energy, through wind farms, within the Autonomous Community of Extremadura
No mention
MURCIA Law 10/2006, dated 21 December, of renewable energies and economy and energetic efficiency of the Region of Murcia
- Title I, Chapter 1, Art. 6 Para. 1: When is raised the territorial implantation of a project of use of renewable energies that through its size, innovative nature or other relevant circumstance, suppose a benefice for the Region in its ensemble, whether within the public services, the economy, the conservation of the environment, the historical heritage or the improvement of the communal wellbeing, may be declared of regional interest, with the processing, effects and planned deadlines for this type of actions in the territorial and urban legislation
CASTILLA LA MANCHA Law 1/2007, 15 February 2007, encouraging the renewable energies and incentive of the economy and energetic efficiency in Castilla La Mancha
- Title I, Chapter 1, Art. 5 Para. 1: In the frame of the Strategic Plan for the Energetic Development of Castilla La Mancha established in the Article 11, the Council competent for energy will proceed in the elaboration and approval of a Programme of Promotion of the Renewable Energies that will take into account territorial, environmental, cultural, urban and infrastructural constraints, for the purpose of energy zoning
ANDALUSIA Law 2/2007, dated 27 March, encouraging the renewable energies and the economy and energetic efficiency of Andalusia
-Title I, Art. 11 Para. 1: In line with the energetic planning of the Government of Andalusia, the Council competent for energy will elaborate a Programme for the promotion of the renewable energies that will take into account the territorial, environmental, cultural, urban and infrastructural constraints established in other planning Such programme of promotion will take into consideration the plan with incidence on the planning of the territory of those planned in the section I of the annex of the Law 1/1994, dated 11 January, of Planning of the Territory of the Autonomous Community of Andalusia - Title I, Art. 14: The buildings and installations of use and public service property of the Government of Andalusia and its autonomous organisms will have to incorporate solar installations that may be complemented or substituted with any other installation of use of renewable energy of cogeneration or of use of residual heats. The applicable requirements and their exceptions will be determined legally, with special attention to the following circumstances: Intended use of the building or installation. Intended energetic consumption. Limitations of access to the sun by existence of external barriers. Limitations derived from the prior configuration of the building or installation, or of the applicable urban regulation. Clamps of the building or installation to characters of historical-artistic protection. Architectural, aesthetical and landscape integration. Relation between the costs of the measures to adopt and the obtained energetic economy
CATALONIA Decree 147/2009, dated 22 September, regulating the applicable administrative procedures for the implantation of wind farms and photovoltaic installations in Catalonia
- Chapter 1, Art. 1.a.: establish the requirements for the installation of wind farms and define the energetic, environmental, urban and landscape criteria that have to rule the installation of the wind farms - Chapter 3, Art. 13.2.: In all cases, the organ competent for energy will have to request a report from the city council or city councils corresponding to the department competent for agriculture, as well as the department competent for culture in order to comply with the governing regulations of the Catalan cultural heritage
ARAGON Decree 124/2010, dated 22 June, of the Government of Aragon, which regulates the procedures of prioritisation and authorisation of installations of electric energy production from wind energy in the Autonomous Community of Aragon
- Chapter III, Art. 8 Para. 2.2.b.: The technical criteria of situation that from the point of view of wind resource use, optimisation of the electric evacuation and transportation network planning, regarding the historical-

cultural heritage and the environmental values have been followed to choose the grounds on which the installation will concretely be placed.
CANTABRIA Law of Cantabria 7/2013, dated 25 November, which regulates the wind use in the Autonomous Community of Cantabria
No mention

Table 6. Abstracts of the legislations concerning renewable energies in the 17 autonomous communities in chronological order. Source: Bénédicte Gaillard

Regarding the renewable energies legislations in the 17 autonomous communities, two autonomous communities do not have legislation at all (Basque Country and Balearic Islands). The rest of the autonomous communities have adopted a law (Murcia, Castilla La Mancha, Andalusia, Cantabria), a decree (Galicia, Navarre, Castilla y Leon, La Rioja, Asturias, Canary Islands, Extremadura, Catalonia, Aragon), an agreement (Valencia) or an order (Madrid). Additionally, although diverse legislations have been adopted, some do not mention heritage protection, nature conservation, and/or protected landscape (Galicia, Castilla y Leon, Madrid, Canary Islands, Extremadura, Cantabria). Among the legislations mentioning heritage protection, nature conservation, and/or protected landscape, one solely takes into account the natural, environmental, landscape aspects (La Rioja) while all the others consider the natural and cultural aspects (Navarre, Asturias, Valencia, Murcia, Castilla La Mancha, Andalusia, Catalonia, Aragon).

Conclusions

To conclude, the findings of this research are summarised and some recommendations concerning the respective legislations in terms of heritage protection, nature conservation and renewable energies can be elaborated based on the results of this research.

While heritage protection and nature conservation are a competence of the autonomous communities, renewable energies are a concurrent competence at the national level and the regional level. Only the World Heritage Sites located on the territory of the autonomous communities that clearly state the World Heritage Convention in their legislations concerning heritage protection and concerning nature conservation are fully protected under the World Heritage Convention. Great disparities between the 17 autonomous communities concerning the legislations of heritage protection, nature conservation and renewable energies have been found in terms of definitions and approaches adopted.

First, concerning heritage protection, all the legislations of the 17 autonomous communities should explicitly mention the World Heritage Convention as well as cultural landscapes. Furthermore, they should state that before installing renewable energies, a heritage impact assessment should be conducted.

Secondly, concerning nature conservation, the legislations of the 17 autonomous communities should follow the model of the national legislation concerning nature conservation and thus mention the World Heritage Convention. Additionally, as for the legislations concerning heritage protection, the legislations concerning nature conservation should state that before installing renewable energies, an environmental impact assessment should be conducted.

Thirdly, concerning renewable energies, the autonomous communities without proper legislation on renewable energies yet should adopt one based on the existing ones. Moreover they should all mention cultural and natural heritage as well as the World Heritage Convention and cultural landscapes. The implementation of both a heritage impact assessment and an environmental impact assessment concerning the installation of renewable energies should be regulated.

Finally, a harmonisation between the legislations of the 17 autonomous communities concerning heritage protection, nature conservation and renewable energies should be implemented in order to guarantee an equal protection of the UNESCO World Heritage Sites located in Spain independently from their repartition among the 17 autonomous communities.

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[Legislation on Heritage Protection]

Law 16/1985 dated 25 June, on the Spanish Historical Heritage

Law 7/1990, dated 3rd July, of Basque Cultural Heritage

Law 9/1993, dated 30 September, of Catalan Cultural Heritage

Law 4/1998, dated 11 June, of Valencian Cultural Heritage

Law 11/1998, dated 13 October, of Cultural Heritage of Cantabria

Law 12/1998, dated 21 December, of Historical Heritage of the Balearic Islands

Law 3/1999, dated 10 March, of the Aragonese Cultural Heritage

Law 4/1999, dated 15 March, of the Historical Heritage of the Canary Islands

Law 2/1999, dated 29 March, of the Historical and Cultural Heritage of Extremadura

Law 1/2001, dated 6 March, of Cultural Heritage (Asturias)

Law 12/2002, dated 11 July, of Cultural Heritage of Castilla y Leon

Law 7/2004, dated 18 October, of Cultural, Historical and Artistic Heritage of La Rioja

Regional Law 14/2005, dated 22 November, of the Cultural Heritage of Navarre

Law 4/2007, dated 16 March, of Cultural Heritage of the Autonomous Community of the Region of Murcia

Law 14/2007, dated 26 November, of the Historical Heritage of Andalusia

Law 4/2013, dated 16 May, of the Cultural Heritage of Castilla-La Mancha

Law 3/2013, dated 18 June, of Historical Heritage of the Community of Madrid

Law 5/2016, dated 4 May, of Galician Cultural Heritage

[Legislation on Nature Conservation]
Law 15/1975, dated 2nd May, on the Protected Natural Areas
Law 42/2007, dated 13 December, on the Natural Heritage and Biodiversity
Law 5/1991, dated 5 April, of Conservation of the Natural Areas (Asturias)
Law 4/1992, dated 30 July, of Planning and Protection of the Territory of the Region of Murcia
Law 11/1994, dated 27 December, of the Generalitat Valenciana, of nature protection areas of the Valencian Community
Law 16/1995, dated 4 May, Forestry and of Protection of the Nature in the Community of Madrid
Law 9/1996, dated 17 June, of Natural Areas of Navarre
Law 8/1998, dated 23 December, of Conservation of the Nature and Natural Areas of Extremadura
Law 9/1999, dated 26 May, of Conservation of Nature (Castilla La Mancha)
Legislative Decree 1/2000, dated 8 may, approving the Restated Text of the Law of Planning of the Territory of Canary Islands and of Natural Areas of Canary Islands
Law 9/2001, dated 21 August, of Conservation of the Nature (Galicia)
Law 4/2003, dated 26 March, of Conservation of Natural Areas of La Rioja
Law 5/2005, dated 26 May, for the conservation of the areas of environmental relevance (LECO) (Balearic Islands)
Law 8/2005, dated 8 June, of protection, management and planning of the landscape (Catalonia)
Law 4/2006, dated 19 May, of Conservation of the Nature of Cantabria
Law 42/2007, dated 13 December, of the Natural Heritage and Biodiversity (Andalusia)
Legislative Decree 1/2014, dated 15 April, approving the Restated Text of the Law of Conservation of Nature of the Basque Country
Law 4/2015, dated 24 March, of the Natural Heritage of Castilla y Leon
Legislative Decree 1/2015, dated 29 May, of the Government of Aragon, approving the Restated Text of the Law of Protected Areas of Aragon
[Legislation on Renewable Energy]
Decree 205/1995, dated 6 July, regulating the procedure of the wind energy in the Autonomous Community of Galicia
Foral Decree 125/1996, dated 26 February, regulating the implantation of the wind farms (Navarre)
Decree 189/1997, dated 26 September, which regulates the procedure for the authorisation of the electricity production installations from the wind energy (Castilla y Leon)
Decree 48/1998, dated 24 July, which regulates the procedure for the authorisation of the installations of electric energy production from the wind energy, within the Autonomous Community of La Rioja
Decree 13/1999, dated 11 March, which regulates the procedure for the installation of Wind Farms in the Principality of Asturias
Agreement of 26 July 2001, of the Valencian Government, approving the Wind Plan of the Valencian Community
Order 98/2005, dated 13 January, of the Council of Economy and Technological Innovation, regulating the granting of aids for the promotion of the renewable energies and of the economy and energy efficiency for the period 2005-2007 (Madrid)
Decree 6/2005, dated 30 January, approving the regulation that rules the installation and exploitation of the Wind Farms in the Canary Islands
Decree 192/2005, dated 30 August, regulating the procedure for the authorisation of the electric energy production installations from the wind energy, through wind farms, within the Autonomous Community of Extremadura
Law 10/2006, dated 21 December, of renewable energies and economy and energetic efficiency of the Region of Murcia
Law 1/2007, 15 February 2007, encouraging the renewable energies and incentive of the economy and energetic efficiency in Castilla La Mancha
Law 2/2007, dated 27 March, encouraging the renewable energies and the economy and energetic efficiency of Andalusia
Decree 147/2009, dated 22 September, regulating the applicable administrative procedures for the implantation of wind farms and photovoltaic installations in Catalonia
Decree 124/2010, dated 22 June, of the Government of Aragon, which regulates the procedures of prioritisation and authorisation of installations of electric energy production from wind energy in the Autonomous Community of Aragon
Law of Cantabria 7/2013, dated 25 November, which regulates the wind use in the Autonomous Community of Cantabria

http1: http://www.mecd.gob.es/cultura-mecd/areas-cultura/patrimonio/mc/patrimoniomundial/bienes-declarados/por-ccaa.html
http2: http://www.unesco.org/new/en/natural-sciences/science-technology/engineering/renewable-and-alternative-energies/renewable-energy-futures-for-unesco-sites-renforus/

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UNESCO WORLD HERITAGE AS AN OPPORTUNITY FOR MOUNTAIN LANDSCAPES – A TRIGGER FOR DEVELOPMENT NOT ONLY IN THE ALPS

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Abstract
Transhumance creates unique landscapes, especially in mountain regions. These landscape types, but also the herewith connected economy, are often threatened by abandonment. On the other hand, the so created landscapes and products are highly appreciated by the people – not only the tourists. Being listed as UNESCO World Heritage might be a trigger to raise awareness (also among politicians and deciders) and, more important, to motivate farmers to go ahead with their very special living conditions and to foster sense of place/proudness of the place. The process, which leads to the nomination itself, is demanding on one side, but also often a starting point to consider the region, the site differently and to develop new processes, initiate structural changes and is in the end often highly appreciated by the population.

Introduction

Transhumance in mountain regions is a sophisticated way of agricultural production, adapted to geographic, animal and human needs as well as to the specific climate conditions. Traditional farming on different levels of altitude according to the change in temperature and vegetation along the year can be found worldwide in mountain landscapes (also in flat regions but there with a different character). Traditional production forms, tools, habits and architecture, always with very specific regional or even local characteristics are the result. Not only the landscape but also cultural traditions and last but not least the social conditions within families and village communities are the result. Although decreasing in the past years due to agricultural intensification, transhumance is today still and again present in mountain regions.

More than ever, farmers have to look for new ways of generating income. In particular, remote areas suffer on the one hand from their isolated situation with disadvantages in accessibility, infrastructure and often low profile. On the other hand, they are facing many different, sometimes even contradictory demands: Maintaining the cultural landscape, natural and cultural heritage on the one hand, providing living and recreation space for locals and tourists on the other but also find a (personal/family) livelihood. The challenge is to initiate and foster win-win situations.

The article focuses on the use of UNESCO World Heritage (WH) listing to support the sustaining of this particular cultural heritage. The concept bases on an audit made on the non-successful nomination of the region of Bregenzerwald in Austria, considering the results of the Alpine convention as well the transhumance working group of UNESCO. The example of Bregenzerwald has perfectly shown the impact WH work can have on a region and the various integrating development processes and initiatives.

UNESCO World Heritage

The UNESCO World Heritage Convention was established in 1972 and was ratified until 2016 by 192 states. In 2016 1052 Sites (814 culture sites including 88 Cultural Landscapes,

203 nature sites and 35 mixed sites) in 165 countries had been inscribed in the UNESCO World Heritage list (Figure 1, http1).

The procedure of becoming a World Heritage site is described in the so-called "Operational Guidelines". The main bodies of the Convention are the Committee the Secretariat (UNESCO WH Centre, Paris) and the advisory bodies. Inscriptions are only possible after formal nomination by a States Party, they have to follow a catalogue of guidelines and fulfil given criteria. The proposal has to be listed on the national Tentative List at least one year prior to the submission of a complete proposal. The evaluation will be conducted by the Advisory Bodies, ICOMOS for sites with cultural attributes and IUCN for sites with natural ones. In the case of cultural landscapes and mixed nominations, both advisory bodies are involved.

Figure 1. Location of World Heritage Sites in 2016: yellow = culture sites, green = nature sites, yellow-green = mixed sites, red = sites inscribed on the "List of Danger" (Source: http2)

Main reasons today for seeking the prestigious inscription on the WH-list are conservation needs and expectations based on the financial return. The latter is most often connected to tourism expectations, as the following figures will demonstrate. Around 900.000 people come to the Plitvice Lakes (http3) in Croatia each year (Figure 2a,b).

Figure 2.a and 2.b. People waiting for a boat shuttle on the Plitvice Lakes (left) and going on the wooden paths (right), it is hard to take a picture of the nature without people on it (Photo: A. Kruse 2010)

The Chinese WH site South China Karst (http4) counts 4.2 million visitors per year (2007). According to Global Heritage Fund (http5) the Great Wall of China is the most visited WH site ever, with 8.2 million non-Chinese visitors per year. The number of visitors imposes such a high pressure on the infrastructure of the site that additional 13.5 km had been opened in order to allow a more even distribution of the crowds. According to SEPA and World Bank 12 billion Australian Dollar have been generated in 2009 by 17 Australian WH sites and thus guaranteeing over 120.000 jobs. The Wet Tropics WH Area alone has turned out 426 million Australian Dollar in 2007. These figures show the economic importance that WH places may play. Therefore, further case studies and analysis about the income generating factor of WHC are on the way (http6).

Involving the people in World Heritage

In "Business Planning for Natural World Heritage Sites – A Toolkit" the local people are not considered among "customers". The fact that inhabitants or local people are not mentioned in the WH convention and in prior editions of the Operation Guidelines (OG), may seem inadequate. We have to take in mind that the OG are the implementation tool and like any other "manual" are under constant refinement and improvement. Therefore, today, we find in § 123 OG that locals are considered: "… their participation within the nomination process is welcome and warmestly recommended". A development that is underlined by the adoption in 2007 of the fifth C "Community", enlarging the Budapest Declaration from 2002. Community therein becoming one of five pillars of the implementation of the World Heritage Convention. The Five "Cs", based on the Budapest Declaration (2002), and adopted in 2007 are:

- Credibility: strengthen the Credibility of the World Heritage List, as a representative and geographically balanced testimony of cultural and natural properties of outstanding universal value;
- Conservation: ensure the effective Conservation of World Heritage properties;
- Capacity-building: promote the development of Capacity-building measures, including assistance for preparing the nomination of properties, implementation of the World Heritage Convention and related instruments;
- Communication: increase public awareness, involvement and support for World Heritage through Communication.
- Communities: enhance the role of Communities in the implementation of the World Heritage Convention.

Involving and working with local people (Figure 3) in any case but especially in the WH context, means at first to ensure that everyone understands, is informed and has the possibility to participate – according to his or her means. To ensure that everyone understands the values, goals, purposes, rules, costs and benefits of a World Heritage site denomination and the management connected to it. In order to make participation possible, local power structures must be studied and adapted: To establish a steering board is the very first and important step. Participation implies on the part of the project or WH manager the ability and readiness to hear, to understand and to react on the differing point of views and on values expressed by the community. Managing is as well an understanding of incentives among all stakeholders who benefit from WH site management and the possible negative impacts of WH status, including e.g. lost access to resources, and the potential need for compensation.

Participatory processes need relationship building through a continuous process of dialogue to create trust between and among the various groups of stakeholders. A successful process needs the participation of all stakeholders, including empowerment of communities to

take responsibility and acquire a sense of ownership, and the provision of incentives to encourage investment of people‘s time and resources.

A flexible and adaptable process in the face of the prevailing dynamic relationships between sometimes dangerous wildlife, cultural perspectives, land-use patterns, and peoples’ expectations are all likely to change over time. Community conversation must therefore constantly adapt to take into account these expectations. To ensure a long-lasting favourable WH site does also require monitoring activities to provide the baseline data necessary to assess and evaluate the state of conservation of heritage properties and the socio-economic development of the surrounding area.

Figure 3. Public Hearing in Heiligenblut, a community with 1022 inhabitants, during the process of a WH nomination in 2016 with presentations, followed by Q&A and a come together around local dishes. The number of people present illustrate the huge interest in the topic. The organisers have received a list with thematic representatives for further workshops and information. (Photo: A. Kruse)

The “Enhancing our Heritage (EoH)” is such a toolkit. It uses the WCPA (World Commission on Protected Areas – IUCN (= International Union for Conservation of Nature) framework to develop a range of more detailed assessment tools for managers of natural WH sites. The toolkit can be used to develop comprehensive site-based systems for assessing management effectiveness. It was developed over a seven-year period, working primarily with WH site managers in Africa, Asia, and Central and Latin America; it contains 12 tools.

- Identifying site values and management objectives
- Identifying threats
- Relationship with stakeholders
- Review of national context
- Design assessment
- Assessment of management planning
- Assessment of management needs and inputs
- Assessment of management processes
- Assessment of plan implementation
- Work / site output indicators
- Assessing the outcomes of management
- Review of management effectiveness assessment results

Similar to SWOT analyses, the following table explains the different and various aspects, which have to be in mind when working with local people. But not only with accordance to the people. These kind of reflections are also necessary in order to create WH sites which are sustainable and stable – as we are talking of the heritage of the world which implies necessarily a long term view.

Table 1. WH Management Tool Kit (UNESCO 2008b:39)

Theme	**Strengths**	**Weaknesses**
Processes	High productivity	Slow time to market
Management	Good at acquisitions	Poor staff management
Marketing and sales	Good at direct sales	Poor market research
Other skills	Excellent R&D	Poor maintenance
Experiences	Success overseas	Health and safety problems
Intellectual property	Branding, trade secrets	Expiring patent
Premises	Excellent location	Unwanted lease
Plant and machinery	Specialist equipment	Worn-out plant
Information technology	Good management information	Poor automation
Finance	Healthy cash flow	Burden of debts
Theme	**Opportunities**	**Challenges**
Market	Market growing rapidly	Market reaching maturity
Industry	Competition fragmented	Competitors have strong R&D
Industry association	Compliance with standards	Meeting standards = increasing costs
Labour market	Locally available skills	Disruptive strikes
Financial markets	Low-cost funds	Higher borrowing costs = reduced demand
Exchange rates	Cheaper imported raw materials	Cheaper competing products
Green (environmental) lobby	Sell more eco-friendly products	Cost of anti-pollution legislation
Economic trends	Economic expansion = boost demand	Growing unemployment = reduced demand
Government policies	Tax holiday	Incentives for rival companies
Natural disasters	Sell specialized equipment	Loss of production or data

Even if the authors are not completely in-line with the above showed table, it is presented nevertheless in order to show that WH has become a well-analysed and well-established item in recent years, a long way from the requirements of a nomination file adding up to 20 odd A4 pages in the 80ies. Many other points may be added, e.g. the non-fulfillment of expectations towards safeguarding and protection (see e.g. Croatia, Syria), the over fulfillment of expectations (e.g. too many visitors), the conflict between nature and the local people living there, e.g. in the North of India where the population of tigers has finally increased again – a great success from the animal and nature protection point of view. But now, the local people have to leave their villages because it has become too dangerous for them to live in their original villages.

The concept of Transhumance (in mountain regions)

Transhumance (see also the article by Hans Renes in this volume) derives from the Latin words trans (through, across) and humus (area, region, but also soil in the sense of agriculture). In some regions the word Agropastoralism used to describe the activity, but covers a larger theme (see below). Anyhow, it describes a production and farming system

where the grasslands (Figure 4) are alternated according to the seasons, depending on the country or region with different animals (sheep, cows, yaks, goats, camel, Dromedaries, reindeer, horses etc.). The trail can be between some days up to several months. The herding is carried out from small groups to large herds. With the aspect of smaller herds, we often find that the owner himself is the shepherd, very similar with the overall agricultural pattern. One prerequisite is that there are at least two pasture regions alternating per year. Sometimes a distance of 800 km is covered by the animals in this slow movement.

The term agropastoralism (Latin *ager* = field and *pastor* = herdsman, protector) means a combination of agriculture with cattle raising. Agropastoralists can be based at one place, or can live in forms of transhumance or nomadism. To live at one place means that there is a solid house which is in use over the whole year. There is no displacement of several days or weeks in order to find fodder as we would define it in nomadism. Nomads change their place of settlement according to the need of finding food and therefore have mobile houses (like tents or carriages) or use opportunities given by the nature (caves). Often nomads live in tribes, clans, (extended tribal) families or in groups (Figure 5).

Figure 4. Photo: Transhumance with sheep, cows and horses in the French Pyrenees (Photo:A. Kruse, 2008/08/17-21.)

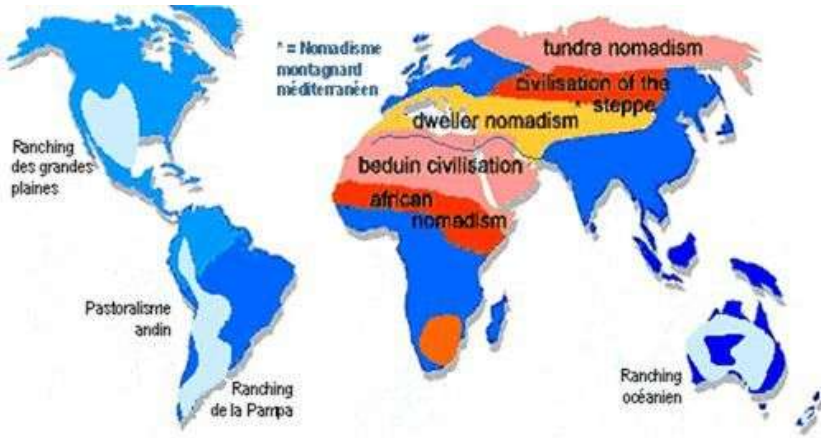

Figure 5. Overview Transhumance in the World (Source: Alain Bourbouze and Jean-Paul Chassany, Sep 2007, see Pierre Bonte)

Transhumance is known since the pre-history. Since the end of the 19th century, its significance is in decline and in some former important areas has completely disappeared. In other regions, including the Alps, the Maghreb and Central African countries, we observe more recently the opposite trend with an increase of pastoralism or at least a stable intensity. Until the 19th century, it was still present in the arid and semiarid regions of Africa and in large zones of the Mediterranean. Furthermore, especially in mountain countries, where, in the higher altitudes, the summer climate is cooler and more humid and the winter is cold and the earth is covered with snow, making a natural feeding impossible. However, transhumance exists also in flat countries, which are dry in summer, but warm and humid in winter. This shows that transhumance is / was present in a wide geographical area.

Important aspects of transhumance are: seasonal and within limited, defined areas – always around the same geographical scope … Even if several hundred kilometres are covered, the herdsmen, with their herds, always return to their places of origin (http7).

These parameters are very important in order to understand why the concerned regions today need special programs and specific ideas. It is not possible simply to take a concept from any other agricultural area where cattle is grown and which works under completely different circumstances well, but might definitively be non-adapted here in this context or this special area.

Looking at the World Heritage list, we are able to state that pastoralism cultures, agricultural production forms and transhumance in general are underrepresented.

Inscribed transhumance sites on the list are:

- Lapponian area, Sweden, inscribed in 1996 as a mixed site
- Mont Perdu/Pyrénées, transborder France/Spain, inscribed in 1997/1999 as a Cultural Landscape and mixed site
- Orkhon Valley Cultural Landscape in Mongolia listed in 2004
- The Causses and the Cévennes, Mediterranean agro-pastoral Cultural Landscape, France have been added to the WH list in 2011
- Hortobágy National Park - the Puszta in Hungary is since 1999 as a Cultural Landscape on the WH list.

The case of Bregenzerwald (Forest of Bregenz) in Austria

The traditional three-level-farming falls into the classic definition of transhumance: seasonal, vertical movement of herds. The herdsmen have solid buildings/housing in the valleys and

sometime also in the mountains at a higher altitude, most often permanent lodges, built of wood or stone. The three-level farming in Bregenzerwald can be described as follows:

In winter cattle stays in stables in the valley villages, where the whole family lives together. End of April and from October until first snow the cattle grazes at home pastures in the valley villages. Beginning of June cattle go to the so-called Vorsäss, locally also "Maisäss" (säss from sitting). Until mid-October the animals return to the Vorsäss before they decent to the valleys again. From 8th July to mid-October the cattle is transferred to the High-Alp. The animals stay during the whole time with a herdsman.

The Bregenzerwald region is a traditional rural country side with 10.6 % employees in agriculture, in the steep regions up to 13,4 %. The percentage of the alp meadows varies between 30 % in lower part of the area (Vorwald), 45 % in the Middle part, while in the Back part, which is the highest part, it goes up to 75 %. About 1/3 of farms own 10 ha or less, many farms are only secondary income (Figure 6). 98 % are considered as so-called disadvantaged areas, which receive subventions for maintenance of agriculture and of the Cultural Landscape. Before the nomination dossier was submitted, there was a shrinking tendency – many farm assignments by parallel growing entities.

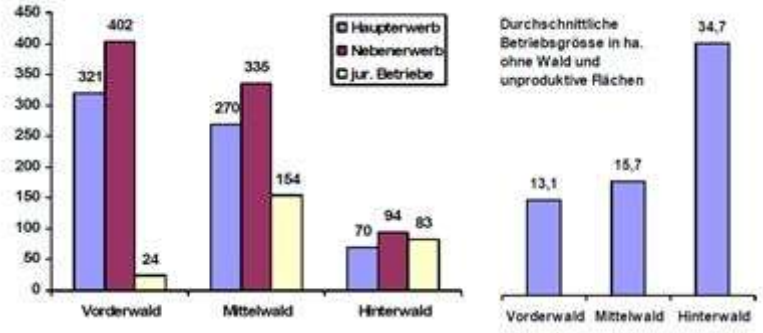

Figure 6. Differentiation of farm types in the three Bregenzerwald areas: Left: violet = professional farmers, dark red = secondary farmers, yellow = legal entities. Right: Average size of the farms without forest and unproductive surface (Nomination dossier 2005/6)

The region of Bregenzerwald is considered as disadvantaged area due to inclination, steepness, slopes, altitude, distance from market and infrastructure:

- surface of 555 km^2, 22 communes, 32,000 inhabitants,
- 35,000 cows with 11,000 milk cows, which produce 45,000 t milk,
- 1,000 milk farmer families, with 800 full-time farmers,
- 90 alp farms with cheese production (130 in total Vorarlberg!) (Figure 7),
- 13,700 guest beds in all categories, 1423 on farms (= approx. 10 %) and 1.6 million overnight guests/year,
- 2000 km hiking trails with corporate design and signposts,
- 700 km sign posted winter hiking trails and cross-country ski run,
- 4 large and several familial ski-resorts.

Abbildung 49: Alp-Sennküche

Abbildung 50: Alp-Käsekeller

Figure 7. Regional cheese production (Bergkäse = Mountain cheese) in one of 90 cheese producing alp farms of Bregenzerwald (Source: Nomination dossier 2006)

The Bregenzerwald was presented in 2005 and 2006 for inscription as a cultural landscape by the Republic of Austria (Figure 8-10.). The World Heritage Committee decided on it's 31st session in Christchurch/New Zealand to defer the inscription. This means that Bregenzerwald was not inscribed but could have been re-presented within a certain time. The nomination failed for formal reasons: Missing management plan, the way the outstanding universal value (OUV) was drafted did not convince the evaluators, nor the chosen criteria iii, iv, v. Furthermore, it was stated that the protection scheme was not adequate, that the enforcement of traditional local crafts was considered necessary (knowledge transfer) as well as a management plan or system, which should include an inventory of the landscape and architecture elements. The evaluators' recommended as well, to collaborate with other transhumance regions and/or nations, at least to underline the full significance of this management system as part of the wider Alps.

The regional council commissioned a consulting company to analyse the failed nomination dossiers in order to better understand the reasons for failure and to depict a SWOT analysis of different alternatives. After a detailed hearing and presentation, the regional council decided not to go ahead with the WH nomination efforts, based mainly on an overall waging, that the legal implications may not be solved in due time. The protection of cultural landscapes is still an open issue in Austria. Many of the sites inscribed under the cultural landscape framework on the World Heritage list in Austria, such as the Wachau and

the Hallstatt Salzkammergut, suffer still today in 2016 from the lack of an overall legal framework and are therefore constantly exposed to international criticism in the handling of the site.

The important issue with the people and representatives of the Bregenzerwald in the process, even if it did not lead up to a listing, was, that they took a positive impact from the measures taken on the way. The conclusion was that the region has won 100 % within the long process - for themselves. This analysis is remarkable and shows the value and effect of a participatory, bottom-up nomination process: Many local movements had been started during the nomination efforts: cultural trails had been set-up, handicrafts had been re-introduced or newly recognised, the regional trade mark (KäseStrasse Bregenzerwald, see further down) was created. Many new opportunities arose from the WH application work.

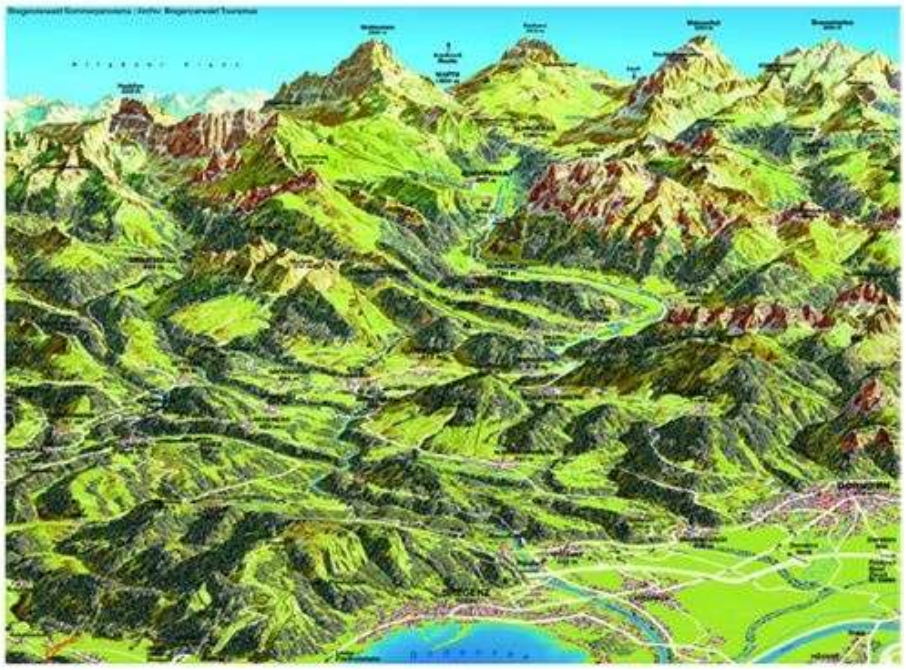

Figure 8. Geographic location of Bregenzerwald in the Austrian Alps. (Source: Nomination dossier 2006)

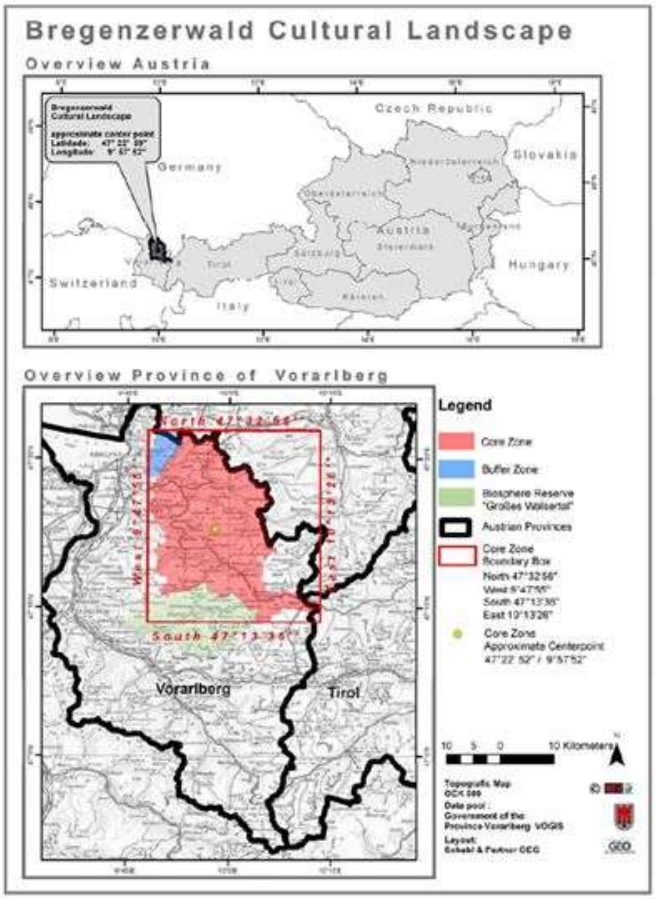

Figure 9. Location of the proposed site "Cultural Landscape Bregenzerwald in Austria (Source: Nomination dossier 2006)

Figure 10. This photo shows a typical aspect of the Bregenzerwald region, where extensive meadows (including fens/peat and poor grasslands) which are used for hay making alternate with pastures in the higher levels. Trees are coming in as use is too extensive for keeping the grasslands open which gives the floor to a number of rare species. The little houses, locally called Maisäß – houses where the herdsmen spend a part of their time during their transhumance season. (Source: Cultural landscape inventory Montafon KLIM, Oberes Netzamaisäß, author: Gortipohl. ht)

The nomination was from the beginning a bottom-up approach with the involvement of local people and with the goal to stimulate this remote area. Even after the submission of the nomination dossier, the local participation processes continued. E.g. in 2007, 140 committed women and men from Bregenzerwald („140 engagierte Bregenzerwälderinnen und Bregenzerwälder“ (http9) had been in charge with drafting and discussing the development objectives for the region Bregenzerwald. They have worked in four thematic groups:

- Construction, Space, Cultural Goods
- Agriculture and Forestry, Nature and Environment
- Tourism, Economy, Transport
- Cultural Life.

The actors asked themselves: „Why didn‘t we started this earlier?“ Certainly, there had been ups and downs during the moderation process. But in the end there were many objectives achieved and future orientated activities installed:

- cultural trails had been initiated,
- handicrafts had been re-introduced or newly recognised,
- the regional trade mark was further promoted (KäseStrasse Bregenzerwald),
- a cadastre of the cultural landscape elements including the architectural local heritage was initiated (Strasser 2008).

The project NATURHAUTNAH (Nature hands on) allows visitors to experience up close the world of the farm and everything that comes with it: taste of farm and regional products, guided tours, workshops and further offers. The Molke Metzler family-run enterprise with its large variety of products and activities has developed quickly and is receiving also international attention, e.g. in The Netherlands, France, Russia and certainly in Germany and Switzerland.

The project NATURHAUTNAH has created a place for energy-efficient and sustainable farming where visitors can experience all agricultural processes up close and in person. Visitors can grasp, literally and figuratively, life at the farm, an experience that inspires an appetite for nature. From the imposing cow pens and the turbulent goat romping house with its visitor gallery, to the small animal cuddling zone, the herb garden, the high-tech cooling and heating system, through to the cheese production, on to whey-based cosmetic processing and last but not least the farm shop (Figure 11). During workshops in their own Alpine dairy school, making cheese - with a focus on smelling, touching and tasting is offered.

Figure 11. This screenshot from the enterprises website shows the variety of offers with which tourists and locals are addressed. It also demonstrates that having good local products is sometimes not even enough for being successful and competitive: Today many different aspects have to be considered (Source: http10).

In the following some more activities and products which have been developed in the last years – in order to address local people as well as visitors, will be very roughly presented. The standard of living and the quality of life raised and several of these offers are a direct follow-up of the nomination working groups and/or the regional development strategy that evolved during the participatory process.

An interactive map of Bregenzerwald was created as a modern way of addressing a new/additional public – with proposals what to do (Figure 12).

Figure 12. Interactive map of Bregenzerwald: every type of Sports is possible, information via internet are easy and common good today. The same is true for cultural sites and events etc. (source: http11).

In 1998 the label KäseStrasse Bregenzerwald was founded which includes several parts of the Bregenzerwald. The appendant association "KäseStrasse" counts more than 200 members. It centers on agricultural producers: farmers with farm shops, cheese production, diaries in the village as well as on the alpine areas. Local hotels, restaurants and food stops are also members and use not only the regional products but also transfer the traditional philosophy. Commercial operations produce traditional but also recent/modern products. A local producer's-production-chain, based on special lighthouse products like Bregenzerwald alp cheese and Bregenzerwald mountain cheese have been established. Also leisure and tourism attractions, like mountain cable cars (Bergbahnen) and their mountain restaurants or

sportive outdoor-contractors and suppliers: all of them show the “KäseStrassen-Sign”. They all support the label “KäseStrasse Bregenzerwald”, and commit themselves to the use and commerce of local products.

Furthermore, there is a non-profit association for the promotion of the Bregenzerwald cheese culture with the aim of preserving and promoting the regional added value, maintenance of local dispatched structures and profiling of the Bregenzerwald cheese region. 180 firms from different branches and various origin are member of the association. Cooperation partners are amongst others: Bregenzerwald Tourismus, Regionalplanungsgemeinschaft Bregenzerwald Handelspartner: Sutterlüty (Vorarlberg), Merkur Markt und Billa (ganz Österreich) – which show the professionalism that was reached in the meanwhile.

In 2001, the Käsehaus (http12) was founded which is based on the slogan: “Learning by eating”. They are accompanied since 2009 by the „Bregenzerwälder Genusstage“ – landscape and eating – a „Bregenzerwälder declaration“ was adopted in 2009.

Architecture between tradition and future (http13) - Vorarlberg is in Austria THE place for ecology combined with modern construction. It is one of the pioneers of ecological architecture and farming.

As a direct follow-up of ICOMOS evaluator’s recommendations, the region started to build-up an inventory of the alpine built heritage (Figure 13). The so called “Maiensäss Inventar” was conducted since 2008 by Peter Strasser. All information can be found in the internet (http14-16)

Figure 13. Cultural landscape inventory of the region Montafon where Bregenzerwald is located (http14)

The inventory does not only give descriptions and information about the built heritage. It also contains intangible heritage, compiled in personal interviews with locals in order to prevent souvenirs, family knowledge and history from getting lost (Figure 14).

Figure 14. Personal interviews conducted by interns in order to collect intangible knowledge and heritage within the project "Cultural landscape inventory of the region Montafon KLIM" (http14)

In line with the inventory, a cadastre of Vorarlberg (VoGIS) was created which is also public, free of charge and online accessible (http15, http16, Figure 15).

Figure 15. VoGIS – Cadaster of Vorarlberg – the Federal State of Austria, where the region Montafon with Bregenzerwald are located (http17)

And, to come to an end, the following list summarises the actions that had been taken within the framework of the nomination or as a follow-up. They all have contributed to the new understanding of the regions identification and spirit, have helped to create a modern area, addressing to the today people, offering job opportunities and triggering the local economy:

- Since 2000 inventory projects:
  - Register of the intangible cultural heritage of Austria
  - Three-level-agriculture in the Bregenzerwald
  - Maisäß-Inventary Montafon (related to the alpine diary activity)

- Search machines: [Google Search] ⇒ Dreistufen-Landwirtschaft im Bregenzerwald
- Many actions related to local cheese, among others.
    - Vorarlberger Cheese
    - Jagdberger Heumilchkäse
    - Kleine Warenkunde + Rezeptheft zum "Sura Kees"
    - Vorarlberger Käsknöpfle oder Vorarlberger Kässpätzle?
- Valorising the cultural landscape for tourism – among others:
- Kluge FREIZEIT mit Vorarlbergs Naturfreunden; since 2015 12 hiking tours with 10 steelpilars for (traditional) buildings, special CL elements or (traditional) craftsman works: walk life (1,5–4 h) (http18)

12 new hiking trails through villages in the Bregenzerwald, each guided by 10 steel columns with explanations, e.g. for buildings, special aspects of the cultural landscape or handy craft traditions. In that manor, the visitor and hiker will be introduced in the living and life culture of Bregenzerwald. More information: http19.

Conclusions

„If the world is not interested in us, we are not interested in the world“ The regional council of Bregenzerwald summarised its decision with these words, explaining why not to do another attempt to nominate as World Heritage. They added: “During the whole process, we have learnt so much about our region, our history, about us, we have started so many activities, that we don‘t consider ourselves as losers, but as winners.“

A local article drew 2008 as well an optimistic résumé of the efforts: “In the last 9 years, about 200.000 Euro had been invested in the Bregenzerwald in order to achieve the title UNESCO World Heritage. Even if we do not go on; the investment was not in vain. During the research and moderation process, many themes had been newly introduced and valorized (http20). Today, people have new opportunities, hopes and alternative options. In a way one can draw the conclusion that the world heritage nomination process was the trigger to start dealing with the own identity, bringing in new ideas, starting projects and allow the people being creative but traditional at the same time. The new gained knowledge led to a new and even stronger proud and sense of place. This again led to new activities and new attractively which is mirrored in increasing tourism, but more important towards economic growth. It is clear that in the process the resilience of the Bregenzerwald region was reinforced, the economic options diversified and a strong sense of belonging was reinforced based on positive values.

The presented case of Bregenzerwald, but also further experiences from other projects of the authors, underline that a UNESCO World Heritage nomination process, even if finally not successful, can

- triggers local identification processes,
- raises local/regional awareness,
- creates sustainable business and therefore,
- can change a region without changing the cultural and landscape values,
- Reinforces the resilience.

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http5: http://globalheritagefund.org/index.php/who-we-are/beyond-monuments/

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