

The infield-outfield farming system as a major solution for sustainable management of the semi-natural and cultural heritage in Parque Natural da Serra da Estrela

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Abstract: Jansen, J. *The infield-outfield farming system as a major solution for sustainable management of the semi-natural and cultural heritage in Parque Natural da Serra da Estrela. Lazaroa 29: 19-26 (2008).*

In this presentation a concise rationale is given to conserve landscape, semi-natural habitats and related cultural aspects in a large Natura 2000 area. It is explained why farmers and shepherds already functioned as managers of plant communities and EU directives *avant-la-lettre*.

So far in Serra da Estrela restoration is needed for natural communities (mainly forests) only. As for semi-natural communities conservation is needed and continuation of the infield-outfield system is the provisional solution until new varieties of the traditional land-use system become available meeting modern criteria for socio-economic sustainability. The living cultural landscape of the Serra da Estrela might be used as a laboratory where many interrelationships on the species, community and landscape levels can be studied *in situ*, which can be useful as a reference to restoration projects in similar landscapes of by-gone days in Europe. Some examples are given of functional links between agriculture and nature. Until it is known in detail and including quantitative data of how these processes function, no reliable predictions on changes in biodiversity as a result of modern alternatives can be made.

Keywords: Management, Infield-outfield system, Phytosociology, Cultural Heritage, Natura 2000 biotopes, Semi-natural communities.

Resumen: Jansen, J. *El sistema de laboreo tradicional como una solución para el manejo sostenible de los hábitat seminaturales y de la herencia cultural en el Parque Natural de Serra da Estrela. Lazaroa 29: 19-26 (2008).*

La conservación del paisaje y de los hábitats seminaturales, así como de los aspectos culturales de un vasto territorio que se encuentra dentro de la red Natura 2000, como es Serra da Estrela, es presentado en este trabajo. Granjeros y pastores han sido los principales responsables del manejo de las comunidades vegetales en esta área antes de la aparición de las directivas europeas.

La restauración en Serra da Estrela es necesario sólo para las comunidades forestales naturales. Sin embargo, para las seminaturales es necesario que sean conservadas y eso sólo puede ser hecho desde los sistema tradicionales de cultivo y pastoreo. El paisaje cultural de la Sierra da Estrela puede ser utilizado como un laboratorio donde las interrelaciones entre las especies, las comunidades vegetales y el paisaje podrían ser de gran utilidad como referencia la proyectos de restauración en otras partes de Europa. Algunos ejemplos sobre las uniones funcionales entre agricultura y naturaleza son descritos en este trabajo. Para ello, aunque se conoce de forma cuantitativa dicho proceso, no existen predicciones de los cambios resultantes en la biodiversidad, como resultado de dichas nuevas alternativas.

Palabras clave: Manejo, Sistemas tradicionales de cultivos y pastores, Fitosociología, Herencia cultural, Red Natura 2000, Comunidades vegetales semi-naturales.

INTRODUCTION

The Serra da Estrela is situated in central-east Portugal and a large part of the mountain lies within the limits of the Parque Natural da Serra da Estrela. The Park covers around 1000 km² and is a major crossroad in Portugal's interior

ecological network (JANSEN, 2002). It has both a natural and land-use history linked to much variation in topography, geology, geomorphology, and climate. These combinations have lead to a high diversity in the environment including a number of climatic and edapho-climatic vegetation series and semi-natural communities.

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The phytogeographic position of Serra da Estrela is rather complicated, since in or near its territory two regions coincide, namely the Euro-Siberian region including the Euro-Atlantic province and the Mediterranean region including the Carpetano-Leonesean and Luso-Extremadurean subprovinces. The Estrela constitutes its proper phytogeographic sector (Estrellense) and around it several sectors are arranged, i.e. sector Salmantino, sector Lusitano-Duriense, sector Toledano-Tagano, sector Divisório Português. The Estrelean sector is usually assigned to the Carpetano-Leonesean subprovince (COSTA & *al.*, 1998).

The temperate and Mediterranean climates meet in Serra da Estrela, but its flora includes not only species with Atlantic and Mediterranean affinities, but also Continental, Boreo-Alpine and Arctic-Alpine elements. Many European plant species attain their south-western range limits here. The area is one of the biodiversity hotspots in the Iberian Peninsula.

The diversity of vegetation and terrain provides habitats for a wide range of flora and fauna species, both native and introduced.

For various reasons, biodiversity investigations have been intensified during the last fifteen years, resulting in new findings of vascular plant species, plant associations, cryptogams and even a new bird species.

There are strictly endemic flora and fauna species and many species are on red lists and mentioned in the annexes of the Habitat and Bird Directive. The vascular plant flora counts nearly 1000 species, the bryophyte flora almost 400. An up-to-date survey of lichen species is lacking except for the area over 1600 m that includes some 250 species. Approximately forty mammal species and around hundred breeding bird species, thirty species of reptiles and amphibians, eight fish species and numerous invertebrate species, live in the Serra da Estrela. More than 40 phytosociological classes and well over 30 Natura 2000 habitats have been observed. (most references in GARCÍA, 2001; GARCÍA & *al.*, 2008; JANSEN, 2002; RIVAS-MARTÍNEZ & *al.*, 2000; VAN DEN BOOM & JANSEN, 2002).

However our present knowledge of the vegetation of the Serra da Estrela is still not sufficient enough to manage all the existing biotopes in a proper way. In particular little is known about the complex interrelationships between plants, animals, plant associations, and land use. But even when there would be enough technical-ecological multidisciplinary knowledge to manage the Estrelean biodiversity in a proper way, still

socio-economic developments are expected to have impacts that can hardly be predicted.

At least the species and biotopes that are unique will need more study. Others may be similar to biotopes from other regions and their management may be based on experiences elsewhere.

According to their naturalness the existing biotopes can be divided into two groups: the natural and semi-natural biotopes. Generally the former need to be restored, and the latter to be conserved.

The natural biotopes are the climax communities (climatic as well as edaphoclimatic). These biotopes used to be ruled by natural forces and would not need management ("passive management") if man had not interfered. But virgin forests disappeared, although other more or less natural biotopes still occur in some aquatic and rocky environments. Nature management should aim at ecological restoration of the natural forests. It is estimated that about ten different potential climax forest types from four phytosociological classes could grow in the area: *Salicetea pupureae*, *Pino-Juniperetea*, *Quercetea ilicis* and *Querceto-Fagetetea*. Most forests may be developed in reasonably sized areas, where quasi no activities are allowed except for sustainable management. For that purpose special areas can be designated for undisturbed development towards mature forests. In some cases introduction of species from the regional species gene pool that have very low dispersal capacity may be an option for accelerated recolonisation processes.

The special future forest areas may be chosen in a way that all phytogeographic variations are included, if possible at least one excellent example of climax forest for each phytogeographic unit. Although we have little information on the dispersal capacity of targeted species, special corridors could be designated such as certain sparsely populated valleys and ridges where phytogeographic areas integrate. Here, depending on the presence of dispersal vectors, transport processes of seed or other plant propagules may be facilitated by natural forces. In this way the function of the mountain range as the major ecological crossroad of the country would be optimised.

However in the current presentation we will focus on the semi-natural communities.

In contrast to the poorly represented native forest types, semi-natural habitats are still well represented in the present plant cover of Serra da Estrela. These semi-natural habitats are the major constituents of the cultural landscape (JANSEN & DIEMONT, 2005). They have been escaped by sustainable practices of land management that

have survived for centuries and the infield-outfield farming system was the basic principle.

OUTFIELD-INFIELD SYSTEM

Until the nineteenth century the European land-use system has basically everywhere the same structure: on the one hand close to the settlements there are small labour-intensive areas where man raises its crops (mostly called infields) and further away there are large labour-extensive areas where man keeps its animals for grazing.

The crops need large quantities of nourishment for plant production. This is delivered by the outfield where animals graze and organic material can be collected. In all these systems there is a net flux of nutrients and energy from the outfields to the infields (HAALAND, 2002). In a romantic way outfields can be regarded as the realm of the greek god Pan and the infield as of Demeter, which was illustrated during the jornadas with the Spanish premiere of the film *Fields of Demeter* (see <http://ecl.cultland.org/>).

THREATS

The traditional infield-outfield management system is threatened as it does not seem to provide enough economic value to continue. This was already the case in most of the West-European countries, not only in densely populated areas with shortage of land, but also in remote areas where land is abundant (DIEMONT & JANSEN, 2005). Serra da Estrela is one of the last living examples of such a traditional land-use system. The soils stayed poor in nutrients and remained of high quality biodiversity (JANSEN, 2002; JANSEN, 2005).

The Estrelean cultural landscape could function as a living model of sustainable use of the natural resources and could provide information useful for the future management of similar landscapes elsewhere in Europe where they once existed. But also in Serra da Estrela semi-natural habitats are threatened (mainly forestation and abandonment). And as a result the mosaic-like structure of the cultural landscape would become more homogeneous and coarse. Changes will affect the whole ecosystem with its refined infrastructure and many invisible (and yet unknown) interrelationships that do have consequences for biodiversity.

The semi-natural biotopes need active management to keep them preserved. And as long as there are no modern alternatives, continuation of traditional agro-

pastoral activities based on the infield-outfield system would probably be the best solution. In the meanwhile economic, social, cultural and ecologic relations with the system should be studied and quantified in order to find efficient modern management alternatives for the future.

MATERIAL & METHODS

Based on long-term observations and experiences in the study area of Serra da Estrela and literature from elsewhere, a short desktop study is made to qualify the benefits of the infield-outfield land-use system for both biodiversity management and rural development in a large Natura 2000 area where this traditional system still functions as one of the last in Western Europe. Possibilities are analysed whether the area could be used as a laboratory for testing and researching the quantitative aspects of biodiversity processes related to the outfield-infield farming system.

RESULTS & DISCUSSION

HISTORIC DEVELOPMENT

Prior to the arrival of farming the early people must have harvested from nature. They were hunters and collectors in the natural landscape. That landscape must have been hardly changed by their actions. But the introduction of farming has changed wilderness into a cultural landscape and the roaming humans into sedentary people with a whole new culture.

Palaeobiological studies show that in the Estrela more than 5,000 years ago human activity increased to such an extent that at least in some areas it became the dominant factor in the forest dynamics (VAN DEN BRINK & JANSSEN, 1985; VAN DER KNAAP & VAN LEEUWEN, 1995). Nearly all plant assemblages must have been modified, perhaps with exception of some aquatic and rupicolous communities.

With the loss of primary biotopes many plant species mostly associated with forests, fringes and gaps both invaded and became dependent on the newly created semi-natural biotopes and subsequently on the farming practices that make and maintain them. Moreover, a number of plant species were deliberately introduced, especially cereals, vegetables, fruits and tree species.

Through the years farmers and shepherds have gradually created a semi-natural infrastructure with complex

dispersion patterns between a multitude of habitats. A large part of the flora, fauna and plant communities became dependent on the traditional land use.

CULTURAL LANDSCAPES AND THE BENEFITS OF TRADITIONAL LAND USE

Cultural landscapes are obviously influenced by the same factors as natural systems but in addition human intervention is also important. As a result of human impact, habitat conditions are usually substantially altered so that the system becomes more regulated by management and less by internal dynamics. Some species are filtered out because they are not adapted to the disturbance regime; others have sufficient resilience or tolerance to survive while still others invade the newly created, managed ecosystem from surrounding habitats. A cultural landscape ecosystem can therefore be considered an alternative state, brought about by human activity, to the original natural system.

The present landscapes of Serra da Estrela include many plant communities as a heritage of the centuries-old traditional land-uses that were part of the economy. It is clear that the semi-natural habitats will vanish because traditional management does not seem to keep up with modern economic development. On the other hand if ecologic conditions are neglected, modern economic development may face serious problems in future.

In fact there is already loss of economic capital because many subsidized wood plantations of highly flammable pine and eucalyptus, since first half of 20st century planted as an alternative to the traditional agro-pastoral system, went up in fire. However, traditionally managed Estrelean chestnut forests that usually support a major part of the characteristic Pyrenean oak forest biodiversity, do not or hardly seem to suffer from wildfires and survived. But it is not only the costs of planting and the loss of timber; also other costs are involved that are more difficult to calculate and are related to erosion, landslides, blocked rivers, purifying drink water, CO₂ production, hazards for barrages of water storage reservoirs (JANSEN, 2007a).

Traditional land-use as a production factor of numerous other by-products was so far often overlooked and as a result these factors have not been incorporated in the calculation of its benefits (JANSEN & VAN DER STRAATEN 2004). Take for instance the effectiveness of terraces against erosion. Or the strengthening of regional identity which is important in marketing products and the use of so-called unique selling points, etc. Or its

support of sustainable tourism, the connection between city and country-side, relating people for instance to the roots of their ancestors (JANSEN & *al.*, 2007). Traditional land use stimulated social cohesion where now the country-side faces abandonment and fragmentation of local societies.

The agro-pastoral system triggered the origination of regional traditional products (meat, milk, cheese, wool, rye, etc.), gastronomy, local breeds of animals and crop varieties, and so on. But even social organisation, architecture and clothing can be seen as products of the sedentary way of living which has been made possible when the agro-pastoral system opened a new way of life for mankind after a long period of hunting and collecting.

Finally there is not only an ecologic but also an economic motive to conserve instead of restoring afterwards as is explained in the following example of reconstruction in The Netherlands, albeit that comparing a densely populated country with a marginal region is rather precarious.

RECONSTRUCTION IN THE NETHERLANDS AS A CONSEQUENCE OF MODERN AGRICULTURAL PRODUCTION

In contrast to traditional farming, modern agricultural techniques made it possible to produce much more food on much less area of land and with less people. A small country like Netherlands is still one of the world's three largest exporters of agricultural produce. But according to the government growth is no longer a priority anymore. The priorities now are the environment, animal welfare and the quality of produce (MINISTRY OF FOREIGN AFFAIRS, 2008).

Because the Dutch production is very high, a large part of the country-side becomes available for other functions than food production such as tourism, nature conservation, water management, housing, etc. (RURAL EUROPEAN PLATFORM, 2007). As a result rural areas in the Netherlands are restructured by reinforcing the multifunctional character of the countryside. Production becomes located in special areas whereas in other designated areas an optimal development of other functions is stimulated, for instance nature development. The process is called Reconstruction and is guided by a comprehensive and area-based governance strategy that involves many public and private actors. It is a very complicated process especially in densely populated areas. Generally, in order to make the processes work, rather robust areas are designated for nature and recreational functions.

High costs are involved. For example, in a for Dutch circumstances comparatively robust area of about 15,000 ha in the province of Noord-Brabant (The Netherlands) almost 30,000,000 € is costed to subsidise restoration projects to improve the quality of the cultural, natural and environmental aspects of the agricultural landscape for the coming decade only (ANONYMOUS, 2002). Applied to Estrela that would give a restoration amount of some 200,000,000 €! Moreover, the question remains if all restoration projects will be successful.

THE LIVING CULTURAL LANDSCAPE OF THE SERRA DA ESTRELA AS A LABORATORY

The Serra da Estrela can be seen as a large laboratory and an archive of the living cultural landscape. It can be useful as a reference area to other countries, such as Netherlands, that at present are trying to restore certain plant communities, habitats and landscapes in designated areas (JANSEN, 2005). Some of these areas are part of the Natura 2000 network, implicating governmental obligations. So far reference areas in Netherlands were sought after in Ireland in the west and Poland in the east. But with climate change Estrela and comparable areas will become more and more interesting. The more so while the higher plateau areas of Estrela presently support many habitats and species, both floral and faunal that are important targets in Dutch nature conservation policies. So far restoration projects have been mainly focussed on restoring abiotic conditions and especially in fragmented landscapes the resulting vegetation developments have often been disappointing. Frequently endangered species had no chance to recolonise the restored habitats since their seeds or other plant propagules were not available anymore and transport processes of seeds which are assumed to take place in traditional land-use systems were lacking in the fragmented modern agricultural landscape (OZINGA, 2008).

Little do we know about the dispersal vectors and Serra da Estrela would be an interesting area where dispersal linked to land-use still can be studied at present, a situation that elsewhere in West-Europe is hardly possible anymore.

A visit to Serra da Estrela will raise our insight in ecological cohesion within the landscape where farmers and shepherds are actually defragmenting while connecting the various biotopes by applying traditional management.

The shepherds and their live-stock transport energy, nutrients and diaspores with dung, fur and hoofs from

various habitats in the outfields via a finely veined network of routes to the infields and settlements. This subtle crisscross pattern both in time and space is not only partly visible through the presence of fences such as hedges, shrublands, walls, banks and windbreaks all frequently supporting high biodiversity, but also through the presence of special plant and animal species that specifically thrive in gradients caused by grazing and trampling on the tracks or nearby in the verges. Some animals linger in the lee site of the hedge, others profit from the sheltered environment to predate on animals that prefer open sites on the routes.

To put it briefly, plants as well as animals are influencing each another in a steering matrix of pointed and linear, vertical and horizontal structures or other patterns produced by the agro-pastoral system.

This phenomenon is reflected in a multiple of special plant communities on and along drove roads, such as ephemeral miniature or periodically inundated cart tracks (e.g. *Juncetum nanae*, *Molinierio-Illecebreteum*). Or more typical trampled vegetation (*Bryo-Saginetum*, *Crassulo-Saginetum*, *Matricario-Saginetum*) or related communities (*Trifolio-Periballion*). But also nitrophilous, ruderal, fringe, matagal and fence communities that mainly belong to the following syntaxonomic classes: *Galio-Urticetea*, *Artemisietea*, *Trifolio-Geranietea*, *Rhamno-Prunetea*, *Parietarietea* and *Anomodonto-Polypodietea*. Most of these plant communities have not been well studied. And the same goes for most of the other plant communities related to the farming system. To mention the major syntaxa on the class level: *Stellarietea mediae*, *Helianthemetea*, *Stipo giganteae-Agrostietea castellanae*, *Molinio-Arrhenatheretea*, *Nardetea*, *Calluno-Ulicetea*, *Cisto-Lavanduletea*, *Cytisetea scopario-striati* and *Pino-Juniperetea*. In Jansen (2002) an extended syntaxonomic scheme is given with for each class state of knowledge, characteristic species and detected presence of syntaxa from class to the association or lower levels.

The shepherds know exactly where, which season, when and how long they can have their live-stock grazing. They also know when they need to burn and how they can prevent damage to both vegetation and soils (JANSEN & al., 1997).

They know how to maintain the *Nardus* grasslands at the cost of *Calluna* heaths. The reciprocity between land use and nature has left behind infinite ingenious patterns that until the present day have not been totally revealed nor explained. The intensity of grazing, the periodicity and also the nature of the grazing animals have influence on the pattern, structure and floristic composition of the

vegetation in the various compartments of the landscape. Of course natural forces are also responsible for the occurrence of ecological niches and *teselas*, but in case of semi-natural habitats land-use systems have at least a comparable effect.

The traditional farmers know how to lay fallow and labour their fields to cultivate yet undescribed species-rich rye fields.

They made the hay meadows and maintain them. So far the species-rich irrigated upland hay meadows of Estrela have never been studied except for a quick scan (JANSEN, 1997). The meadows are extremely vulnerable to land-use change. But the traditional farmers know that they need hay meadows for their livestock and when they need to be mown and when they can be grazed afterwards (DIEMONT & JANSEN, 1998).

They know since many centuries how they have to irrigate in order to protect hay meadows against frost and how to enrich them with minerals of water from the irrigation channels that have been tapped off from brooks and rivers that in turn spread diaspores and create hydrologic gradients. In this manner all these landscape components get closely interwoven and it is the farmer and shepherd that steer and maintain this functional coherence of flora, fauna, and landscape elements. The décor of this subtle landscape theatre can only exist if the related specific role-playing is performed by the required actors: infield-outfield farmers, shepherds, their livestock, and the present floral and faunal heritage elements. In addition the local abiotic circumstances bring about special variations without external nutrient input. And so the nutrient cycle stays closed within the region.

Stubble fields of rye and oat are fertilized with droppings from sheep and goats when the shepherd stays there together with his herd. This can happen during the day. But overnight, enclosed in moveable fences, livestock is forced to stay longer at the same place to produce a higher concentration of fertilizers. Several kinds of scrub and other species are being used to temporarily cover the floor of the stable in order to mix them with the droppings of the animals. Afterwards the material is brought to the fields, containing both nutrients and plant propagules.

Whatever the farmers and shepherds do, they always use local or regional material and as a result the energy and nutrient cycle lies enclosed within the area and to a large extent genetic drift also. The Serra da Estrela region is large enough to support viable plant populations.

Until the middle of the last century there was genetic exchange over large distances as a result of the transhu-

mance that linked the territory to remote regions that often were situated up to several hundreds of kilometres (MARTINHO, 1981). One of these regions had a more Mediterranean, the other a more Atlantic, the next a more Temperate or the fourth a more continental influence. The drove roads functioned as human-induced ecological corridors that mainly lead through valleys and over relatively well accessible mountain ridges. After the period from autumn to spring, the shepherds with their flocks travelled back to the high pastures. At lower elevations there was and still is grazing throughout the year. The long-distance movements diminished after the Second World War and nowadays livestock transport is little more than local movements, limited from piedmont areas to the summit areas and backwards (summer and winter migration).

Remaining vegetation patterns related to these long-distance movements may nowadays already be regarded in terms of HARDING & *al.* (1998) as the "ghost of land-use past".

As a result of long time selection processes some local breeds developed. Live-stock and crops have been gone through a long selection process and are optimally adapted to the local circumstances. Crops such as rye (*Secale cereale*) have never been studied, but live-stock has.

Two indigenous breeds of sheep originated, the Mondegueira and the Bordaleira da Serra da Estrela. The latter is considered the best breed for milk production. The strong Serra da Estrela shepherd dog (Cão Serra da Estrela) was bred to guard and defend the herds against wolves. Goats of the Serrana breed originated from the Serra da Estrela and are nowadays the most common breed in the country, being predominantly present north of the Tagus river (MINISTÉRIO DA AGRICULTURA PORTUGAL, 1992). Indeed pastoralism and farming contributed a lot to the agrodiversity and the cultural Estrelean heritage, including architecture, gastronomy, social organisation, folklore, etc.

The famous Estrela cheese is partly the result of the floristic composition of the fodder and so linked to the plant communities along the routes that shepherds take with their sheep and to the plant communities of the fields where they graze.

It is not inconceivable that it would have negative consequences for the maintenance of the agrodiversity when livestock would exclusively be fenced in enclosures and shepherd culture would disappear. After all breed selection was the consequence of the appropriateness under the local ecologic circumstances.

Moreover it is expected that the exclusive use of unherded animals in fenced areas will have negative

consequences for the floristic composition of the plant communities.

Unherded grazing as a tool for nature management is popular in the Netherlands, mainly because of the relatively low economic costs of fenced-in grazing compared to herded grazing. But when these dispersal vectors are framed, the refined reallocation processes of energy, nutrients and diaspores will be reduced to redistribution within the parcel where “station grazing” is applied. Expectations are that the formerly connected plant communities will become impoverished or even totally will disappear. The intricate quality of the cultural landscape will degrade and become blurred. And at the same time with this all the knowledge and skills of the shepherds will vanish.

Therefore before applying new management techniques, experimental studies should be undertaken to predict the consequences for future vegetation. But in the first place research is needed to gain sufficient knowledge about the effects of traditional land use, and especially about the role of dispersal.

CONCLUSIONS

The aspects of the Estrela as a living laboratory described in this paper should be quantified as soon as possible before the processes come to an end as a result of the socio-economic developments. Quantification of infield-outfield land-use related cross-scale ecological processes on the landscape, plant community and both floral and faunal species organisation level is needed. As they are the major managers of the living cultural landscape income possibilities for farmers and shepherds should be studied, quantifying income from sustainable tourism, labelled regional products, water management and many other side-products and services related to the cultural landscape management (SANTOS QUEIRÓS & *al.*, 2008). Quantification is also needed of costs related to the cycle that starts with pine and eucalyptus plantation, followed by wildfire, CO₂ production, erosion, landslides, obstructed rivers, risks of floods, water pollution and loss of biodiversity.

Once all these processes are quantified a realistic multidiscipline cost-benefit analysis can be made and so politicians will have better tools to base their future decisions on.

This paper raised some of the following questions.

For century's farmers and shepherds from Serra da Estrela amply meet the new demands from Brussels such

as Bird, Habitat, Water and Nitrate Directives. Brussels also propagates production. Why not really economically valuing the traditional agro-pastoral system as a production factor of high-quality semi-natural biotopes? A part from many technical-ecological, additional recreative and socio-cultural services delivered by farmers and shepherds were not as such or so far hardly valued in Brussels nor in Lisbon.

It seems that there is a slow change coming. Would it be in time to save the last shepherds and farmers that practise the traditional infield-outfield system in and around the Natura 2000 area of Serra da Estrela or will they follow their hundreds of thousands European colleagues that had to stop their work and abandon the land or had to shift to modern farming techniques through which so much of the biodiversity and the environment has been demolished?

In some parts of Europe billions are spent on restoration projects to get back a fraction of the ancient biodiversity while at other places biodiversity is disappearing with European agricultural subsidies. Will it ever be possible to maintain European biodiversity and other side-products and services of traditional land-use systems, if the EU continues to apply this inefficient EU-subsidy pattern?

Relatively recently a number of museums and interpretation centres have been founded in the surrounding municipalities, such as the Museu Nacional do Pão and Centro de Interpretação da Serra da Estrela in Seia, the Museu do Agricultor e do Queijo and Museu Lagar do Azeite in Celorico da Beira, the Ecomuseu do Zêzere in Belmonte and the Museu dos Lanifícios in Covilhã. Museums can contribute to raising the consciousness of the public and without the support of consumers and general appreciation of the important issues at stake, sustainable cultural landscapes cannot be guaranteed. The question remains whether in future traces of the agro-pastoral system will only be left visible in museums. Or is the cultural landscape of Serra da Estrela here to stay as an outstanding example of a living monument that still will be able to testify both its cultural and natural heritage?

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