



## SOCIO-ECONOMIC BENEFITS OF NATURA 2000

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### CASE STUDY ON THE ECOSYSTEM SERVICES PROVIDED BY NATURAL PARK OF VALE DO GUADIANA (PORTUGAL)

Output of the EC project

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# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>4</b>
<b>1. INTRODUCTION.....</b>	<b>5</b>
<b>1.1. Description of the Natural Park of Vale do Guadiana.....</b>	<b>5</b>
<b>1.2. What is the socio-economic importance of the Guadiana Natural Park? .....</b>	<b>6</b>
<b>2. SCOPE AND AIMS OF THE CASE STUDY.....</b>	<b>7</b>
<b>3. SOCIO-ECONOMIC BENEFITS OF NATURAL PARK OF VALE DO GUADIANA.....</b>	<b>7</b>
<b>4. STATUS &amp; FUTURE TRENDS OF DIFFERENT ECOSYSTEM SERVICES.....</b>	<b>18</b>
<b>5. KEY MESSAGES FOR THE FUTURE MANAGEMENT OF THE SITE</b>	<b>18</b>

## **EXECUTIVE SUMMARY**

The Natural Park of Vale do Guadiana is located in an area dominated by a Mediterranean silvopastoral ecosystem called “montado”. The montado systems are characterised by open, savannah type woodlands of holm and cork oaks with an understory of shrubs and grassland. These mosaic landscapes are also of high conservation value as they are very biodiversity rich and host a number of endangered species.

The montado ecosystems offer a number of ecosystem services (i.e. provide different biodiversity resources and maintain valuable ecological processes) that are important to both local populations and that also benefit regional and international stakeholders. The main socio-economic activities in the area are extensive sheep and cattle herding and game hunting. The latter helps to generate important income in these otherwise marginal agricultural lands. The area is also of high importance for biodiversity and it hosts a number of rare species with touristic value (e.g. bird watching), including different raptors and mammals. Finally, the montado ecosystems also form an important part of the Mediterranean cultural landscape.

The maintenance of montado ecosystems is dependent on the maintenance of the traditional agricultural practices in the area, in particular extensive sheep and cattle grazing. The continuation of these practises is presently heavily dependent on agricultural subsidies (e.g. the EU agricultural funding). If these subsidies are reduced land abandonment, which is already occurring in some areas, may expand and eventually lead to shrub encroachment and overall loss or reduction of montado ecosystems and their services.

It is considered that the identification and valuation of ecosystem services will be of crucial importance in preserving the biodiversity rich montado systems, in particular if agricultural subsidies are reduced. Identifying the variety of ecosystem services (both actual and potential) provided by the montado ecosystems and, ultimately, attributing them monetary value may help to maintain the appropriate management of these systems also in the long-run. For example, sustainable certification schemes such as the Forest Stewardship Council (FSC) may contribute to production of non-timber forest products (e.g. cork, game) and help to diversify economic activities in the area.

This case study is a pioneering attempt to identify the ecosystem services provided by the montado ecosystems of the Natural Park of Vale do Guadiana. Presently, there is no monetary information available on the range of services provided by the area. This case study intends to pave the way for a detailed quantification and valuation of these benefits in the near future. It is also hoped that that this case study will help to raise awareness on the variety of ecosystem service provided by the Vale do Guadiana area.

## 1. INTRODUCTION

### 1.1. Description of the Natural Park of Vale do Guadiana

The natural park of Vale do Guadiana, located in Alentejo, South Portugal, encompasses an area of approximately 70000 ha of mainly private land where agricultural and “montado” ecosystems of holm oak (*Quercus rotundifolia*) but also cork oak (*Q. suber*), create a landscape mosaic of high conservation value. Species such as the endangered imperial eagle (*Aquila adalberti*), golden eagle (*Aquila crasa*) and Bonelli’s eagle (*Hieratus fasciatus*), occur in the park area, with the latter having significant high number of nesting sites within the park boundaries. Also mammals as the wild cat (*Felis silvestris*) are common. The area is also listed in the Portuguese National Plan for the re-introduction of the Iberian Lynx (*Lynx pardina*) as a potential area for the re-introduction of this species.

The park surrounds the Guadiana River ecosystem which forms a Natura 2000 site (PTCON0036 “Guadiana”). The river and its tributaries are characterised by different Iberian endemic fish species. The river banks and cliffs are also important nest sites for raptors as the golden eagle and eagle owl (*Bubo bubo*) or other species as the black stork (*Ciconia nigra*). The park also comprises a Special Zone for Bird Protection.

Apart from the Guadiana River Natura 2000 site, the extensively managed agricultural landscape and the montado ecosystems also make Vale do Guadiana Natural Park invaluable for biodiversity conservation. This is because the traditional land use and management activities in the area help to maintain a number of different habitats suitable for a variety of species. Consequently, the Vale do Guadiana silvopastoral landscape hosts a high diversity of species that can use the layered tree, shrub and grassland cover for nesting, feeding and other activities.



**Figure 1. The Natural Park of Vale do Guadiana is located in South-East Portugal (green shaded area in figure). (Source of image: Management Plan of Natural Park of Guadiana)**



**Figure 2. The Natural Park of Vale do Guadiana hosts a diverse landscape of open montado silvopastoral system and extensive agriculture. This benefits a variety of rare European bird species (source of photos: Management Plan of Natural Park of Guadiana)**

## **1.2. What is the socio-economic importance of the Guadiana Natural Park?**

The main socio-economic activities within the park include extensive animal husbandry (sheep and cattle). The animal husbandry is supported by agricultural subsidies that significantly contribute to maintain the viability of this traditional source of livelihood. Maintaining sheep and cattle in the area would be important as extensive grazing is crucial for maintaining the typical landscape characteristics of the area.

Hunting, particularly the hunting of red-legged partridges (*Alectoris rufa*) and wild boar (*Sus scrofa*), is another important economic activity in the Vale do Guadiana area. Hunting revenues are generated through leasing properties for hunting or organising commercial hunting trips. Populations of the main game species, i.e. the red legged partridge, benefit significantly from the typical mosaic landscape of the area. Therefore, the maintenance of traditional land management activities is crucial also for securing revenues from hunting. In addition, hunting of wild boar is also considered as a culturally important activity in the area. The area as also potential for red deer (*Cervus elaphus*) hunting which populations are increasing in some locals of the park.

Finally, harvesting cork from the cork oaks is also one of the important economic activities in the Vale do Guadiana area. This is especially the case at the left bank of the Guadiana River (Serpa Region). The harvested cork is sold to the industry and mainly used as wine bottle stoppers.

## **2. SCOPE AND AIMS OF THE CASE STUDY**

This case study is a pioneering attempt to identify different ecosystem services and related socio-economic benefits provided by the Natural Park of Vale do Guadiana. It is considered that the identification and valuation of ecosystem services will be of crucial importance in preserving the biodiversity rich montado ecosystems in the future. This is the case in particular if the agricultural subsidies currently supporting the maintenance of traditional land use practises in the area are reduced.

It is hoped that the case study will pave the way for a further, more detailed assessment of the socio-economic benefits provided by the Vale do Guadiana national park. It is foreseen that this type of assessment could, for example, support the establishment of novel funding schemes that could secure the continuation of traditional land use practises in the area. Finally, it is also hoped that that case study will help to raise awareness on the variety of socio-economic benefits provided by park.

The case study is based on the information collected in the course of the public participation process supporting the development of the Vale do Guadiana Natural Park management and conservation plan during 2007 to 2008. This public participation process included several meetings with the different stakeholders (e.g. park management, farmers, representatives of city council, NGOs and research institutions). In addition, direct consultation with park management leading was conducted.

Based on the existing information it was possible to develop a systematic qualitative assessment of the ecosystem services provided by the Guadiana Natural Park, as presented in the case study report. The next important step is to find resources for a detailed quantitative and monetary valuation of the key services identified in this case study.

## **3. SOCIO-ECONOMIC BENEFITS OF NATURAL PARK OF VALE DO GUADIANA**

The Natural Park of Vale do Guadiana maintains a range of ecosystem services that generate significant socio-economic benefits to local populations and also to the wider region. These services range from tangible products (e.g. different biodiversity resources such as food and fibre) to beneficial ecosystem processes (e.g. water purification) and different recreational and cultural benefits (e.g. tourism, recreation and educational activities).

This Chapter provides a systematic initial assessment of the different ecosystem services provided by the Guadiana National Park. It also gives an overview of the

different stakeholders benefiting from these services, including local, regional, national and international beneficiaries.

The identified services have also been ranked according to their importance, varying from 1 (less important) to 5 (highly important) (Figure 3). This ranking has been carried out according to the author's expert opinion, based on the information currently available.

The Table 1 below lists in more detail the current and potential benefits generated by the Natural Park of Vale do Guadiana. It also provides a summary of the current and future status of the service (e.g. whether their maintenance and supply is threatened).

**Food:** Livestock production is important in the area. A part of the animal products is consumed in the park region although other products (e.g. cheese and meat) are distributed more widely. Main beneficiaries of this service are thus local population but also residents outside the park, including urban populations, which have market access to the Guadiana products. Some products such as cheese already have an official labelling certifying its origin. *Estimated importance of the service on a scale of 1-5 – 4.*

**Fiber & natural materials:** Cork harvesting is a relatively important source of livelihood in the area, particularly at the left bank of Guadiana River (Serpa region). Landowners obtaining revenues from cork harvesting are the main beneficiaries of this service. However, the supply of this raw material also benefits a number of regional industries and, naturally, the main final product (i.e. cork bottle stoppers) is used globally. *Estimated importance of the service on a scale of 1-5 – 4.*

**Fuel:** Until some decades ago wood was an important source of energy in the Guadiana area. Even though nowadays most people in the park have access to other sources of energy wood cuttings resulting from tree pruning are still used in areas of the park. *Estimated importance of the service on a scale of 1-5 – 2.*

**Natural medicines:** There is a high diversity of aromatic plants occurring in the park area. Some of these are locally commercialised. There is also potential for expanding this market beyond the study area. Main target group for natural medicines are the local populations although outsiders, mainly tourists, also buy these products. *Estimated importance of the service on a scale of 1-5 – 3.*

**Ornamental resources:** Different aromatic plants may also be used as ornamental resource. There is also potential to develop markets for the ornamental products and some incipient initiatives already exist to explore this possibility. Main beneficiaries of the ornamental plants are local populations, however also people living outside the park area (e.g. urban centres) could benefit from the service in the future. *Estimated importance of the service on a scale of 1-5 – 1.*

**Ecotourism and recreation:** The mosaic and biodiversity rich landscape makes the Guadiana National Park very attractive for ecotourism and recreation, particularly for activities that are associated with the Guadiana River. Some tourism and recreation is already taking place (e.g. trekking, canoeing, cycling and bird watching ) and there is a clear potential for more tourism related activities to be developed and implemented



in the future as Guadiana is one of the few Portuguese rivers with natural river bank vegetation still intact. These recreation and tourism opportunities can be used by locals and visitors alike (E.g. by international tourists). *Estimated importance of the service on a scale of 1-5 – 4.*

**Education, art, research:** There are different local initiatives on environmental education going on within the park area. There is also a high potential to extend these activities to bring in visitors from other areas of the country and Europe as well. As for research, a number of studies by Portuguese and Spanish universities are currently conducted within the area of the park. *Estimated importance of the service on a scale of 1-5 – 4.*

**Cultural and amenity values:** The area is important in terms of archaeological value (ancient Moorish and roman settlements) and thus it has a high cultural value as well. Both local inhabitants and visitors (e.g. international visitors) appreciate this cultural value of the area. There are already a few thematic celebrations occurring regularly in the area, e.g. an Islamic festival, fair of traditional products (e.g. cheese, honey). *Estimated importance of the service on a scale of 1-5 – 4.*

**Regulation of climate & mitigation of climate change:** The typical silvopastoral system is characterised by a relatively low density of old growth trees. Although these trees are an important stock of accumulated carbon their relatively low numbers do not merit high levels of carbon sequestration. Rural abandonment, shrub encroachment and expansion of wooded areas may increase importance of carbon sequestration, however this would be on the expenses of loosing the multifunctional mosaic landscapes. It would also increase the risk of wildfire propagation. *Estimated importance of the service on a scale of 1-5 – 3.*

**Water regulation, purification & waste management:** Guadiana river with its tributaries and river bank vegetation plays an important role in regulating and purifying water. The river and its tributaries are an important source of water for people inhabiting the area. The vegetation along the river is generally well preserved (given its Natura 2000 status) and thus it significantly contributes to regulating the water flow in the river. In addition, the river bank vegetation helps to maintain good water quality by purifying the runoff to the river. Local populations are main beneficiaries of this service. *Estimated importance of the service on a scale of 1-5 – 4.*

**Erosion control and soil conservation:** The fertility of soils in the Guadiana National Park area is generally low. Management actions contributing to the maintenance of tree cover as well as sustainably managed grasslands (e.g. maintaining low levels of grazing) contribute significantly to retaining soil organic matter and maintaining soil fertility. Similarly, maintenance of shrub cover in steeper slopes helps to prevent down-slope erosion. Maintaining the silvopastoral management system plays an important role in securing good soil quality in the area. *Estimated importance of the service on a scale of 1-5 – 4.*

**Fire regulation:** A well-managed silvopastoral system with periodical control of shrub cover will help to mitigate the frequency and intensity of wild fires. The reduced risk of wildfires is important for area's property owners and also other

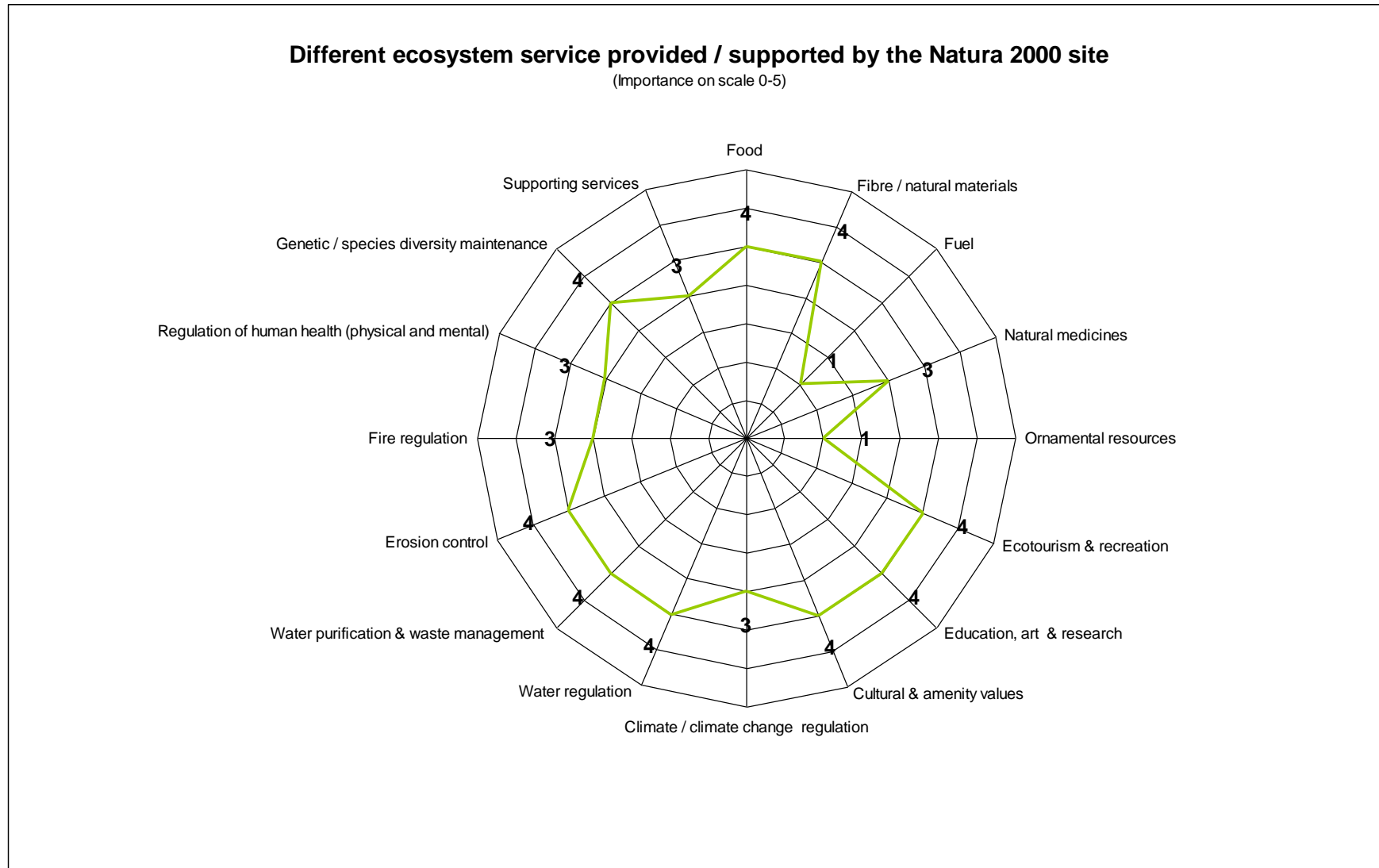
stakeholders using the Guadiana area (e.g. for recreation). *Estimated importance of the service on a scale of 1-5 – 3.*

**Regulation of human health** (physical and mental): The recreational possibilities (e.g. hiking) and beauty of the Guadiana landscape, as other rural landscapes, may provide a welcomed escape from more polluted and stressful urban environments. This might then directly and indirectly contribute to physical and mental health. There are also thermal fountains in the area used by local people for health purposes. The potential beneficiaries of this service range from local to regional and international stakeholders. *Estimated importance of the service on a scale of 1-5 – 3.*

**Genetic/ species diversity maintenance:** The Guadiana National Park has a high diversity of wildlife species. Maintaining biodiversity, e.g. by securing the appropriate management and sustainable practices (e.g. farming, forestry, hunting) in the natural park and its Natura 2000 area, will contribute to the preservation of genetic and species diversity, both in the Guadiana area and also at the European level. *Estimated importance of the service on a scale of 1-5 – 4.*

**Supporting services:** The Guadiana Natural Park maintains a number of important supporting services, i.e. basic ecological processes that form the basis for ecosystem's functioning and all the service it delivers. These supporting functions include, for example, primary production, nutrient cycling and soil formation. In particular, maintenance and possibly increase of actual tree cover would benefit soil formation and fertility in the area. This would be of importance to local populations particularly those engaged in agricultural practices. *Estimated importance of the service on a scale of 1-5 – 3.*

**Figure 3. Overview and relative importance of the ecosystem services provided by the Guadiana National Park area.**



**Table 1. Overview of the ecosystem services (both actual and potential) generated by the Vale do Guadiana National Park**

<b>Provisioning Services</b>	<b>Is this service of relevance at the Guadiana National Park area?</b>	<b>Short description on the service</b>	<b>Given the availability of resources, what kind of value estimates could be obtained in the future</b>	<b>Who are the beneficiaries of the service?</b>	<b>What is the current status of the service?</b>	<b>Is the importance of this service likely to increase in the future?</b>
Food and fibre – agricultural animal products, cork,	YES	Extensive agriculture is common, mostly sheep grazing, although dependent on EU subsidies. Cork is an important NTFP in areas of the park.	Quantitative / monetary	Local population and consumer outside protected area including urban markets. For cork the market for wine bottle stoppers is global.	Sheep grazing is being replaced by cattle grazing which causes more damages to tree regeneration. Abandonment of activity may occur if agricultural subsidies finish.	The competitive remaining exploitation of sheep/cattle grazing may fill a quality niche and remain in the area.
Fuel wood	YES	Harvesting of fuel wood still occurs but at very low levels, mainly focused at wood from oak pruning	Qualitative	Local population	This activity is of limited importance.	No
Natural medicines & ornamental plants	Yes	Aromatic plants are used in some natural medicines and	Qualitative	Local population. Outside visitors to the	Markets only being developed	May grow in future

		in cooking		area		
Fresh water	Yes	River Guadiana and its tributaries are an important source of water in the area	Qualitative possibly quantitative	Local population	River bank vegetation maintaining this service is well preserved with exception of some burnt areas. Restoration has started in some of these burned areas.	With increased likelihood of water scarcity in Mediterranean areas the importance of this service is likely to increase
<b>Regulating services</b>						
Regulation of climate and mitigation of climate change	Yes	Cork and holm oak woodlands occur in the study area. These slow growth species contribute to carbon storage.	Qualitative / quantitative	Global benefits (mitigation of climate change)	Density of trees is relatively low and therefore the provisioning of service (carbon storage & sequestration) is limited	The importance of service is likely to increase in afforested areas as well in abandoned areas where ecological succession may lead to increase of woodland areas
Water regulation (e.g. regulating timing and magnitude of runoff and mitigating floods)  Water purification and waste management	Yes	Guadiana river and its tributaries are important in water regulation	Quantitative / monetary	Local population	River bank vegetation maintaining this service is well preserved with exception of some burnt	Importance of service is likely to increase due to expected water scarcity in Mediterranean

					areas. Restoration has started in some of these burned areas	regions
Erosion control	Yes	Tree cover and sustainably managed grasslands help prevent erosion. Similarly, maintenance of shrub cover in steeper river slopes helps to prevent down-slope erosion	Qualitative	Local populations	River bank vegetation maintaining this service is well preserved.	Likely to increase
Regulation of human diseases / health, e.g. supporting physical and mental health	Yes	The beauty or the cultural landscape may positively affect wellbeing. Also recreational possibilities may contribute to physical and mental health.	Qualitative	Local population, outside visitors	Protected area provides plenty of open landscapes with views that may contribute to human wellbeing, namely visitors from outside	If rural abandonment occurs landscape will change to more scrubland areas. Service may decrease.
Mitigation of wild fires	Yes	Maintenance of the open silvopastoral landscape limits wildfire propagation	Quantitative	Local population (e.g. property owners) and other regional or international beneficiaries	Land abandonment and related changes in the ecosystem will increase the risk for wild fires	Given the increase in periods of drought (due to climate change) and possible increase in the likelihood of

						wild fires, the value of this service might increase in the future.
<b>Cultural and social services</b>						
Landscape and amenity values	Yes	A landscape with high amenity value	Qualitative	Local but particularly outside visitors	Protected area offers plenty of landscapes with amenity values	If abandonment occurs it will probably decrease
Recreation and ecotourism,	Yes	There are some tourism facilities in the area, particularly for activities associated with the Guadiana River. Also, the area receives tourist visitor all year long	Quantitative / monetary	Local and outside including urban populations	Area offers plenty of opportunities for sustainable rural tourism	Likely to increase
Cultural values	Yes	An important cultural landscape and heritage area where different initiatives of environmental education occur. Cultural festivals (e.g. Islamic festival, fair of	Qualitative	Local and outside including urban populations	Steady	May decrease with rural abandonment

		traditional cheeses) are regular through the year and attract many local and outside tourists.				
<b>Supporting services</b>						
Soil formation	Yes	Soil fertility is low in the area. Maintenance of a silvopastoral system with trees, if well managed, may contribute to soil fertility	Quantitative	Local population	Steady	Abandonment will change status of service it may both decrease or increase.
<b>Different economic benefits to local economy supported by N2K site</b>						
Direct and indirect employment supported by the park area	Yes	Tourism, farming, hunting, fishing all provide direct or indirect employment	Quantitative / monetary	Mainly local population	Steady	Likely to increase
Spending created by the park, e.g. spending by park employees / farmers etc.) supporting local economy	Yes	Spending created mainly by the natural park employees	Quantitative / monetary	Mainly local population	Steady	Steady
Spending created by volunteers working in the park and supporting local economy	Yes	There are volunteer activities taking place such as those related to	Qualitative / quantitative	Mainly local population but also outsiders	Steady	Likely to increase



		environmental education				
Park's role in supporting rural and regional development	Yes	Mainly through touristic activities	Quantitative / monetary	Mainly local population but also outsiders	Steady	Likely to increase

#### **4. STATUS & FUTURE TRENDS OF DIFFERENT ECOSYSTEM SERVICES**

The main threat to the Guadiana area and the maintenance of its ecosystem services is land abandonment, which is already occurring in some localised areas, and the related loss of silvopastoral system. Land abandonment leads to shrub encroachment resulting in the homogenisation of the landscape and loss of biodiversity. Although this may have positive implications to some ecosystem services, i.e. mainly carbon sequestration, a number of other important services, such as regulation of water run-off and hunting of red-legged partridge, might be lost. For example, shrub encroachment will change the amenity value of the landscape, increase risk of wildfire and also change of the water balance of the ecosystem. Similarly, there will also be a decrease of the high quality dairy products (e.g. cheese) originating from the area. In general, it is likely that the socio-economic losses due to the loss of area's traditional landscape will exceed any benefits created by the succeeding ecosystems.

Traditional agricultural practises shaping the landscape, e.g. animal husbandry and livestock grazing, are currently maintained by the EU agricultural subsidies. The main risk and uncertainty in the region is what will happen to extensive grazing activities when subsidies vanish. Therefore, innovative ideas and schemes that would help to maintain the economic viability of the area and preserve its typical landscape would be needed.

#### **5. KEY MESSAGES FOR THE FUTURE MANAGEMENT OF THE SITE**

The maintenance of the present silvopastoral system is essential in order to maintain the conservation values of Guadiana National Park (e.g. its role in bird conservation and as a habitat for potential recovery of rare mammals such as the Iberian Lynx). For example, there are different bird species in the area which are dependent on the maintenance of the current open landscape. Consequently, if the characteristic landscape of the Guadiana area is lost this also diminishes the value of the area as a part of the EU Natura 2000 Network.

Park's biodiversity values and the ecosystem services identified in this case study can be sustainably managed and promoted if the traditional land use practices (i.e. extensive agriculture) become more self-sustained (through the production of added value products) and not so heavily dependent on external subsidies. Certification schemes such as the Forest Stewardship Council (FSC) certification may contribute to this. These certification schemes provide specific market credentials to products originating from a certain area that is managed according to a set of environmental and socio-economic principles and criteria. The underlying idea is that the consumers would be willing to pay a higher price for these sustainably produced products.

The Guadiana valley has several non-timber forest products (e.g. cork, game species, honey) that can potentially be certified by schemes such as FSC. The establishment of

certification schemes that create added value to the products originating from the Guadiana area may contribute to fund current silvopastoral practices and help to maintain the conservation value of the landscape.

Additionally, other ecosystem services, such as maintaining water and soil quality, could be maintained with the help of novel payment schemes, e.g. payment for environment services (PES). In the Natural Park of Guadiana 90 per cent of the area is privately owned. Therefore, it would be possible to create a system that rewards landowners that endorse sustainable management practices and help to maintain ecosystem's natural functioning.

However, in order to establish such certification and payments schemes there is a need to quantify and value the ecosystem services in the Guadiana area. It is hoped that this case study will pave the way for a further, more detailed assessment of the socio-economic benefits provided by the Vale do Guadiana national park. The important next step would, therefore, be to find resources for quantitative and monetary valuation of the key services identified in this case study (e.g. different biodiversity resources, water regulation, maintenance of soil fertility and tourism).

The management and conservation plan of the Vale do Guadiana Natural Park was recently finalised. The development of this plan was supported by a wide public participation process including several meetings with the different stakeholders (e.g. park management, tourism sector, farmers, representatives of city council, NGOs and research institutions). The process resulted in a jointly developed plan that identifies several "win-win" situations among different stakeholders. The underlying goal of the plan is to maintain the Guadiana Natural Park's conservation values while simultaneously aiming to promote the wellbeing of local population (e.g. promoting socio-economic activities compatible with areas conservation goals). For instance, the management plan endorses good agricultural and silvicultural practices which, besides their economic benefits, also support the achievement of park's conservation objectives.

Socio-economic factors (e.g. agricultural practises and rural land abandonment) play an important role in affecting the future of the Guadiana National Park area. It would be important to protect the area from land abandonment by maintaining economically viable sources of livelihood in the area. In addition to hosting several species of European importance the silvopastoral systems also provide a variety of ecosystem services that benefit local, regional and even international stakeholders. Therefore, loosing this unique system will lead to loosing several benefits both for biodiversity and people.