

## Contributions of Iberian Silvo-Pastoral Landscapes to the Well-Being of Contemporary Society<sup>☆</sup>



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### ABSTRACT

Assessments of society's perceptions of rangeland systems offer insights into the motivations, cultural beliefs, and values that can support landscape conservation and the everyday decisions of landowners. Silvo-pastoral landscapes, the grazed oak woodlands known as *montado* in Portugal and *dehesa* in Spain, are the main rangelands of southwestern Iberia. At the interface of complex interactions between natural processes and human activities, they have potential to deliver multiple services at the ecosystem level. However, the actual rendering of their potential to the well-being of contemporary society has not been comprehensively documented. This paper aims to enrich research perspectives and identify benefits and challenging aspects of silvo-pastoral landscapes through the lens of society well-being. An integrated socioecological perspective is used to examine one case study in Portugal and one in Spain. To better understand their context, *montado* and *dehesa* are assessed relative to other landscape types in the studied areas. A qualitative approach assesses tangible but also intangible aspects. The interviewed stakeholders include members of rural communities, public authorities, land managers, and researchers. Results reveal similar benefits and challenges in *montado* and *dehesa*. Interviewees considered them to have numerous sociocultural and environmental benefits. These were mainly regulatory services but also intangible benefits such as cultural identity, aesthetic qualities, and local knowledge. Nevertheless, a rendering of their full potential to society well-being has numerous challenges. These systems were believed to struggle economically, due to the low prices for the goods produced and a high dependence on subsidies. Their environmental vulnerability was also highlighted. Critical challenges for future research and policy interventions are identified for both case studies. Moreover, we encourage the wider application of approaches to rangelands focusing on well-being, as they provide a complement to ecological and economic perspectives that can improve understanding of social-ecological systems.

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### Introduction

Assessments of social perceptions of rangeland systems offer insights into the motivations, cultural beliefs, and values that can support landscape conservation and the everyday decisions of landowners

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(Mascia et al., 2003). Both social and ecological perspectives should play their part in articulating more clearly the trade-offs in sustaining valuable social-ecological systems and help to deal with their complexity and change. Studies addressing the social perspectives on social-ecological systems are particularly lacking (Oteros-Rozas et al., 2014), even though this kind of assessment has been recognized as a particularly relevant tool for land management and policy planning (Plieninger et al., 2004; Martín-López et al., 2012). In particular, qualitative valuation from a society-based perspective can bring a more in-depth understanding of social-ecological systems (Garrido et al., 2017) and can also identify the often neglected nonmaterial (intangible) benefits, which are of substantial significance for societal well-being (Chan et al., 2012). It has been recognized that the well-being approach has potential to enrich ecological approaches with the missing societal dimension (Armitage et al., 2012). A perspective centered around well-being provides a more holistic outlook on issues, focused as it is on the

stakeholders while recognizing other aspects and the complexity of priorities, strategies, and actions. It can be helpful in finding 1) adequate thresholds between multiple material and nonmaterial benefits relevant for people and 2) between the individual and the collective, both stepping stones for sustainable development (Kjell, 2011; Costanza et al., 2016).

Several studies have shown the influence of landscapes on the well-being of people (e.g., De Vries, 2006; Russell et al., 2013) and underline the multidimensionality of these relationships (e.g. Abraham et al., 2010; Bieling et al., 2014). The landscape can impact multiple levels of human well-being (i.e., personal, community or societal), and all of them are significant for assessing social-ecological systems (Oteros-Rozas et al., 2014). Scaling up from individual to community and society well-being puts the focus on the interplay among individual, relational, and collective processes including the social, psychological, and cultural aspects required to live well (Deneulin and McGregor, 2010).

Nevertheless, well-being as a concept is not only multidimensional but also context specific. Each sociocultural context develops its model of what matters for well-being (Mathews and Izquierdo, 2010). Research comparing subjective well-being across cultures shows that some experiences are comparable across nations, while others are unique (Tov and Diener, 2007). Context-based knowledge about linkages between landscape and well-being is therefore required (Rogers et al., 2012; Scott, 2012). The ways in which landscape changes affect people's lives should be studied at local and regional scales so that adequate policy and management options can be designed (Egoz, 2011; Bieling, 2014).

Nowadays, well-being is also a policy goal: It is accepted as an objective of development (e.g., MA, 2005; OECD, 2015) despite the challenges of formulating a universal definition. The *Millennium Ecosystem Assessment* (MEA) (MA, 2005) highlights how ecosystems and the services they provide are necessary to achieve human well-being (e.g., Haines-Young and Potschin, 2010; Iniesta-Arandia et al., 2014). More recently, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) has focused on an inclusive valuation of nature that closely connects nature, nature's benefits to people, and a good quality of life, among other aspects (Díaz et al., 2015; Pascual et al., 2017). In European Union (EU) strategic documents, the societal conception of well-being about environmental questions has a growing presence. The "Beyond GDP Initiative" of the European Commission looks at not only economic production but also environmental and societal aspects of development (United Nations, 2012; EC, 2013). In addition, one of the aims of the EU Rural Development Policy is to ensure well-being in rural areas. Nonetheless, this new pathway for development goals requires the identification of general indicators of well-being for policy based on broad research knowledge (EC, 2013).

European silvo-pastoral landscapes combine ecological and societal components in a way that results in rich ecological values and continuous interconnectedness with human society (Hartel and Plieninger, 2014). To date, most studies of these unique landscapes have been ecological and economic assessments (e.g., Campos and Mariscal, 2000; Díaz et al., 2001). Nevertheless, the multiple expectations society increasingly has for these landscapes (e.g., Hartel and Plieninger, 2014; Surová and Pinto-Correia, 2016) indicate the need for deeper knowledge about the entire system using integrative, social-ecological approaches (e.g., Olea and San-Miguel-Ayanz, 2006; Acácio and Holmgren, 2014; Huntsinger and Oviedo, 2014).

In the southwestern Iberian Peninsula, *montado* and *dehesa* are silvo-pastoral landscapes where livestock are grazed in oak woodlands (i.e., *Quercus suber*; *Quercus ilex*). In total, in Portugal and Spain they cover around 3.5–4.0 million ha (Olea and San-Miguel-Ayanz, 2006). This extensive land use is adapted to large-scale property ownership, and silvo-pastoral systems are found on large estates of over 100 ha, frequently more than 500 ha (Hartel and Plieninger, 2014).

The literature on functions and processes in *montado* and *dehesa* is long and involves a variety of disciplines (e.g., Aronson et al., 2009). Yet there is a lack of studies about how these landscapes relate to

contemporary society in holistic terms or how their contribution to humans could be improved in harmony with sustainable development.

These landscapes have been shown to be spatially and temporally dynamic (Acha and Newing, 2015), with abundant diversity in species (Díaz et al., 2001), as well as at the level of landscape patterns (Godinho et al., 2016). Along with ecological benefits, *montado* and *dehesa* offer diverse values to society (e.g., Gaspar et al., 2009; García-Llorente et al., 2012; Carmona et al., 2013; Plieninger et al., 2015; Surová and Pinto-Correia, 2016). Some preference studies reveal that multifunctional landscapes like *montado* are appreciated more than other regional landscapes for production and nonproduction uses (Surová and Pinto-Correia, 2008; Almeida et al., 2016). Similarly, García-Llorente et al. (2012) demonstrate society's appreciation of *dehesa* for aesthetic values, as well as for the combination of regulating and cultural ecosystem services.

Despite the identification of multiple services, values, and functions of these two systems, their future is uncertain. Marginal and less productive areas are undergoing an intensification in land use (Tárrega et al., 2009). Conversely, more central and productive areas have been changing toward more intensive agricultural production (García-Llorente et al., 2012) and grazing intensification (Plieninger et al., 2004), mainly as a response to global food trends (Nonhebel and Kastner, 2011). These changes are reflected in their decreasing distribution (Godinho et al., 2016; Arosa et al., 2017), spatial fragmentation (Godinho et al., 2016), homogenization (Arnaez et al., 2010), lack of tree regeneration (Plieninger et al., 2004; Arosa et al., 2017), vulnerability to ecological disturbances (Guimar et al., 2015), and increased risk of soil degradation (Arnaez et al., 2010; Guerra and Pinto-Correia, 2016). These trends are jeopardizing the multifunctionality and long-term sustainability of Iberian silvo-pastoral landscapes and compromising their capacity to sustain human well-being in the long term (García-Llorente et al., 2012; Nieto-Romero et al., 2014; Sánchez-Zamora et al., 2014).

The paper aims to enrich research perspectives and identify benefits and challenging aspects of silvo-pastoral landscapes in southwestern Iberia as perceived by stakeholders. Two social-ecological landscapes are examined, *montado* in Portugal and *dehesa* in Spain, applying interviews to stakeholders. Using qualitative analysis, we seek to understand the views of members of society more comprehensively. We went beyond the strict focus on ecosystem service categories developed within the MEA and allowed respondents to express themselves more freely about the aspects of *montado* and *dehesa* that from their point of view relate to well-being. Rather than identifying a list ecosystem services delivered by a landscape, the well-being approach applied in this paper aims to identify how the landscape potential is rendering to the well-being of the society. Through focusing on society well-being (Scott, 2012) and not applying some economic or psychological approaches to subjective well-being measurement, we try to jointly focus on collective and individual human needs and obtain more overall, holistic well-being perspective involving not only the economic but also cultural, social, and environmental aspects.

To make compound results more legible, they are divided into three dimensions of sustainable development: sociocultural, economic, and environmental. To better understand the context, the landscapes are assessed relative to other typical landscapes in the studied areas.

## Methods

The qualitative survey was applied in two case studies to obtain data about society's perception of *montado* in Portugal and *dehesa* in Spain. The characteristics of the methods used are presented in Table 1. The locations of the two case studies within the Iberian Peninsula are shown in Figure 1, where the spatial distribution of *montado* is based on the dataset published by Godinho et al. (2016), and the spatial allocation of *dehesa* is from a combination of the European Ecoregion, tree density, and the statistical map of forest species of Brus et al. (2012).

Key informants for the semistructured interviews were purposely chosen to represent different stakeholder groups and thus to get a

**Table 1**  
Methods used in the montado (Alentejo) and dehesa (Sierra Morena) case studies

	Case study	
	Montado (Alentejo)	Dehesa (Sierra Morena)
Survey method	qualitative, semi-structured	
Sampling	purposive snowball	
Data collection	face-to-face, individual, voice-recorded	
Time period of the survey	May - July 2014	May - September 2014
N of respondents	21	32
Language used	Portuguese	Spanish
Variables	categorical	ordinal and categorical
Data analysis	Content analysis and frequency analysis	Likert scale mean values, content analysis and frequency analysis

mixture of societal perceptions (Patton, 2002). The sampling considered people personally involved in rural development, agricultural activities, and/or in research focusing on social, economic, and ecological issues in the studied region. Potential respondents were scientists, land managers, and rural development authorities who had already collaborated with the research group in previous projects. Subsequently, the snowball approach was applied, where first respondents recruited future respondents from among their acquaintances (Groenewald, 2004). Table 2 shows the profile of respondents in both study areas. The sample size was defined on the basis of the available time for data collection, which was 3 months in Portugal and 5 months in Spain. Five volunteers in each studied region participated in an interview pretest.

The question asked in the montado case study was as follows: “In your opinion, what are the sociocultural/economic/environmental benefits and challenging aspects of montado (or other landscape) that influence society’s well-being?” In the dehesa case study, each respondent received a list of potential ecosystem services that was based on previous studies focusing on Mediterranean landscapes (e.g., Oteros-Rozas et al., 2012). While showing this list of ES, the following question was addressed: “Based on your opinion, attribute value to each ecosystem service according to how dehesa (or other landscape) contributes to societal well-being.” The scale ranged from “-1”, indicating the landscape had a negative impact on ecosystem services, to “6”, indicating the maximum positive impact on production of ecosystem services from the landscape. If the landscape was not connected with

ecosystem services in any direction, the value “0” was attributed. In addition, to better understand how the various ecosystem services have been transposed to society well-being, the following open-ended question was asked: “In your opinion, what are the main benefits and challenging aspects of dehesa (or other landscape) that influence society’s well-being?”

The regional context defined the landscape types assessed, based mainly on distinct levels of function diversification. Accordingly, montado was compared with three other agricultural landscapes in the Alentejo: agricultural mosaic; intensive, large-scale agricultural landscape; and, finally, the specialized production of vegetables and aromatic plants often in greenhouses on small-scale farms (Fig. 2). In Andalusia, dehesa landscape was related to agricultural mosaic, traditional olive orchard, Mediterranean forest, and intensive olive orchard (Figure 3). Here, the values assigned to ecosystem services were averaged from values mentioned by respondents.

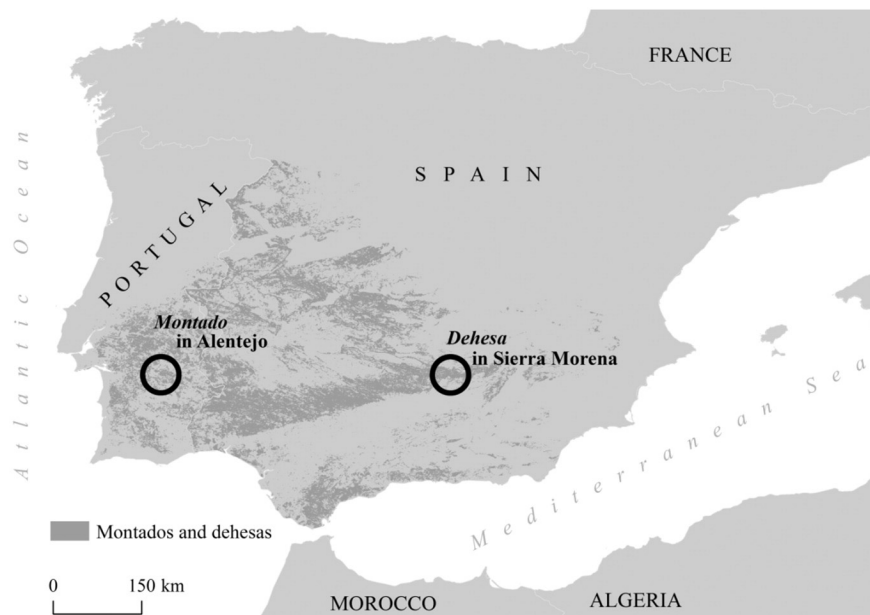
Data from open-ended questions were analyzed using the content analysis for statements, according to the methods applicable to qualitative data collected from surveys (Patton, 2002). First, the interviews were fully transcribed, and, in a subsequent step, the relevant responses were read and sorted into the themes. Responses with similar meaning were grouped and labeled into categories using an inductive method. The categories were then reviewed and organized into three dimensions: socio-cultural, economic, and environmental. Some representative examples of the quotations were also depicted. Next, the categories were quantified using the percentage of respondents mentioning each specific category. In the case of dehesa, categories were scored on the basis of qualitative analysis of the respondents’ statements (evaluations: high = very positive, medium = average positive, low = less positive).

## Results

The following description focuses mainly on aspects identified as distinctive for montado and dehesa in relation to other landscapes in the two case study regions (Tables 3–5).

### Sociocultural Dimension

Montado and dehesa were recognized by the different stakeholders as having multiple societal and cultural benefits. The categories of



**Figure 1.** Location of case studies within the area dominated by silvo-pastoral landscapes in southwestern Iberia.

**Table 2**  
Respondent profiles in Alentejo (Portugal) and the Sierra Morena (Spain)

Respondents' Profile			Sierra Morena		
Alentejo			Sierra Morena		
N	main occupation	Gender	N	main occupation	Gender
A1	Reasercher - rural development and rural policy	woman	S1	Forestry entrepreneur	man
A2	Director of regional agricultural administration	man	S2	Local administration	man
A3	Researcher - agrarian economy and sociology	woman	S3	Art/culture entrepreneur	man
A4	Professor of economy	man	S4	local administration	man
A5	Rural inhabitant and part-time farmer	man	S5	farmer	man
A6	Farmer	man	S6	land manager shepherd	man
A7	Farmer	woman	S7	trashumant shepherd	man
A8	Professor in Economy and Farmer	man	S8	farmer/cattle raiser	man
A9	Researcher - sociologist	woman	S9	hunter and land manager	man
A10	Historian - local traditions	man	S10	farmer	man
A11	Researcher - archeology	man	S11	hunter	man
A12	Inhabitant from agricultural family	woman	S12	trashumant shepherd	woman
A13	Part-time farmer	man	S13	local development agency	woman
A14	Software developer for farmers	man	S14	farmer	man
A15	Representatnt of agrobusiness	man	S15	Ass. NGO environmental conservation	man
A16	Municipality officer	man	S16	trashumant shepherd	man
A17	Farmer	man	S17	local administration	man
A18	Part-time farmer	woman	S18	Art/culture entrepreneur	woman
A19	Researcher - environmental conservation	woman	S19	local administration	man
A20	Researcher - environmental conservation	man	S20	Ass. NGO agriculture	man
A21	Part-time farmer	man	S21	Ass. NGO agriculture	man
			S22	Art/culture entrepreneur	man
			S23	Art/culture entrepreneur	man
			S24	Livestock land owner/entrepreneur	woman
			S25	local administration	woman
			S26	farmer/cattle raiser	man
			S27	Art/culture entrepreneur	woman
			S28	local administration	man
			S29	local administration	man
			S30	Ass. NGO environmental conservation	man
			S31	Ass. NGO environmental conservation	man
			S32	local administration	man

“cultural identity” and “landscape aesthetic quality” appeared with the highest frequency for montado and received the highest scores also for dehesa (see Tables 3 and 4), followed by agricultural mosaic in the Alentejo of Portugal, and by Mediterranean forest and then by agricultural mosaic in the Sierra Morena of Spain. One respondent in Alentejo said: “Montado is our distinctive landscape characteristic, one that can attract people, our typical thing; nothing else equals it” (Interview A3). Citing one respondent in Sierra Morena: “Dehesa is a place of identity, and the maintenance of such a landscape means the preservation of culture and intangible values for future generations” (Interview S23).

Furthermore, “recreational tranquility and retreat” as a value was reported more for montado than for any other landscape in the region. Similarly, in dehesa and the Mediterranean forest, recreational hunting was reported as a substantial benefit to society.

Together with diversified agriculture, montado and dehesa were recognized as the only landscapes maintaining “local traditional knowledge.” For example, “the work in montado involves very particular knowledge, and I don’t want this knowledge to disappear. I think that we should maintain it, at least out of respect to a memory. At the same time, it means a kind of independence. ... I’m not a diehard fan of traditional methods, but I worry that if one day there is a problem with the power supply or some other such issue, there will be no one who knows how to work the land to produce food. ... Nowadays, there might be an embargo, a war, some other big event, and if there is no one who knows how to use any other means than machinery to produce food, how we will survive ...?” (Interview A10). Another mentioned that the benefits of montado and dehesa to society were contributions to “community cohesion” and “regional food security.” However, at least in the case of the Alentejo, these aspects were the most frequently attributed to diversified agriculture.

Few sociocultural challenges were mentioned for montado. The most frequent was the increasing “relational distances between landowner and land, and between community and land.” Specifically, “...

landowners are no longer connected to the territory, ... people living in the villages are increasingly distanced from the countryside. The cities and the countryside have never been as far apart as they are today. ... Before, the countryside was open. Now, there are fences that cut the old tracks, the old cattle paths, ... they have started to close everything and thus it is more difficult to cross the land. So, these populations turned more towards towns and villages and stopped interacting with the land” (Interview A2). As mentioned by respondents in the Sierra Morena, most of the respondents evidenced the risk of loss, with one of them suggesting that, “the traditional management of dehesa has progressively been abandoned. It means a loss of traditional knowledge and cultural identity” (Interview S12).

Often, recreational use for hunting was recognized, but a potential conflict among uses was highlighted as well: “Sixty percent of farms has shifted from livestock breeding to hunting. This is positive in economic terms, but only for few landowners. We are losing traditions and local employment” (Interview S9). Such conflict reflects the disparities in interests between land managers and shepherds on large properties relating to access to the land.

#### Economic Dimension

Montado was positively evaluated for its “tourism potential,” “exclusivity of products,” and relatively high “yield diversity” (Table 3). The following citation refers to these benefits: “Montado does not just mean trees or cork. There’s an understorey of these trees as well. ... Here we find a set of extremely diverse economic activities with very particular characteristics. Firstly, the features of this ecosystem give a unique quality to the products that are typical of montado—cheeses, meats, sheep wool that has little value today, and cereals. All this existed in a certain way due to montado ecosystem. Secondly, I wouldn’t say that montado today is a brand, but to some extent it is an important symbol of the region. Economic

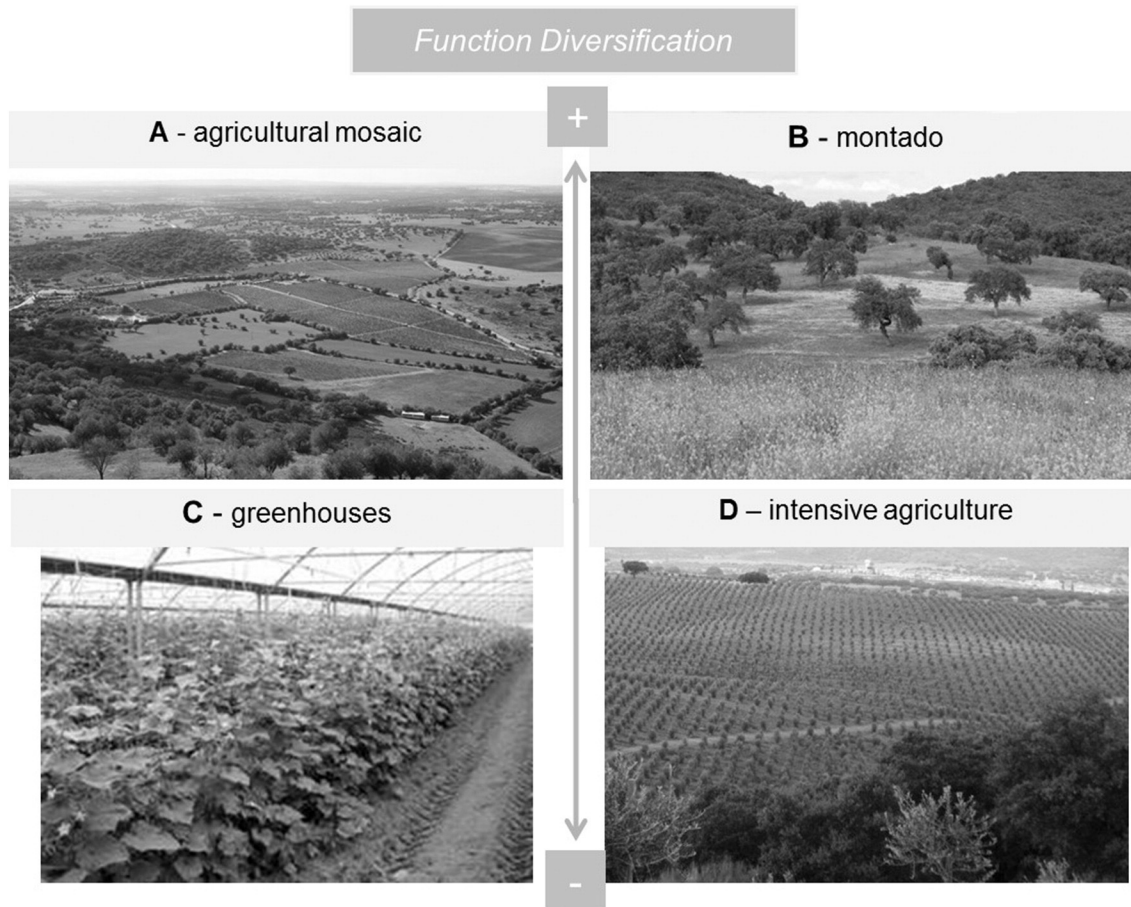


Figure 2. A-D, Illustration of montado and three other landscape types in the Alentejo region.

activity is based around this concept. It has an appeal and can thus contribute towards tourism, and it also gives a value to non-agricultural products that would not exist without this symbolism.” (Interview A8).

Dehesa was acknowledged mainly for its ability to provide “subsistence to local families” (Table 5) but was not highly recognized for the direct provision of food (see Table 4).

Indeed, the challenging economic aspects perceived in montado and dehesa were more numerous than the mentioned benefits. More than 90% of respondents in Alentejo thought that there is still a “lack of value attached to montado goods.” Moreover, they were not seen as “competitive on the market,” neither “supporting the local economy through empowering new shops and services” nor producing high “food quantity” like intensive agriculture.

The most frequently mentioned challenge for montado was “low prices for its products.” “We miss a vision for the business aspects. We need to change it ..., to be more efficient, to take advantage of possible supports for montado, to negotiate better prices, and do better marketing. The problem is not in production—that’s easy—but we need to sell these products as well. ... we need to improve our business capacity” (Interview A13). Furthermore, the dependence of montado and dehesa on subsidies and thus “lack of economic security” was seen by most of the interviewees as a challenge. Specifically, the Common Agricultural Policy (CAP) implemented by the EU is perceived as negative because it doesn’t consider the complex institutional arrangements between landowners and land managers in dehesa. “Under the umbrella of the CAP, traditional extensive livestock management in dehesa cannot maintain its profitability and for this reason is disappearing. We, as shepherds, are more at threat of extinction than the lynx” (Interview S16).

Other worrying aspects mentioned more for montado and dehesa than for other landscapes in the region were their “low employability”

levels and the “required high efficiency” in order to be economically competitive with other, more intensive land uses.

#### Environmental Dimension

Of all the evaluated landscapes, montado and dehesa ranked most highly on the environmental dimension. Aspects for which they received high marks included their “adaptation to local edapho-climatic conditions” and high “biodiversity,” both due to species diversity and to the spatial diversity of different management patches. In addition, almost all respondents associated montado with “quality products” and “healthy environment,” including low-energy inputs, low chemical treatments, and fire resistance. For example: “Montado has the highest biodiversity of all landscapes in the region. It has better shelter for birds due to the large trees and more diversity of plants. The reduced amount of pesticides means growth of more shrubs, more natural vegetation, and thus the system has a high nature value. Moreover, it is more resistant to wild forest fires than landscapes with other tree species” (Interview A20). Other respondents in the Sierra Morena remarked: “Dehesa, with its typical management, makes a major contribution towards soil conservation and natural resources in general” (Interview SM6) and “the major contribution of traditional extensive pasture and wood management is fire control. The Mediterranean ecosystem in semi-arid areas is very sensitive to fire and dehesa controls the spread of fire” (Interview SM25).

Besides, montado and dehesa were seen as vulnerable systems from an ecological point of view, and several stakeholders thought that there was a need or even an urgency for better knowledge about how to maintain these landscapes in the long term. “Montado is a vulnerable system facing many problems such as fragmentation and tree mortality caused by unknown diseases. There is an urgent need for science to find

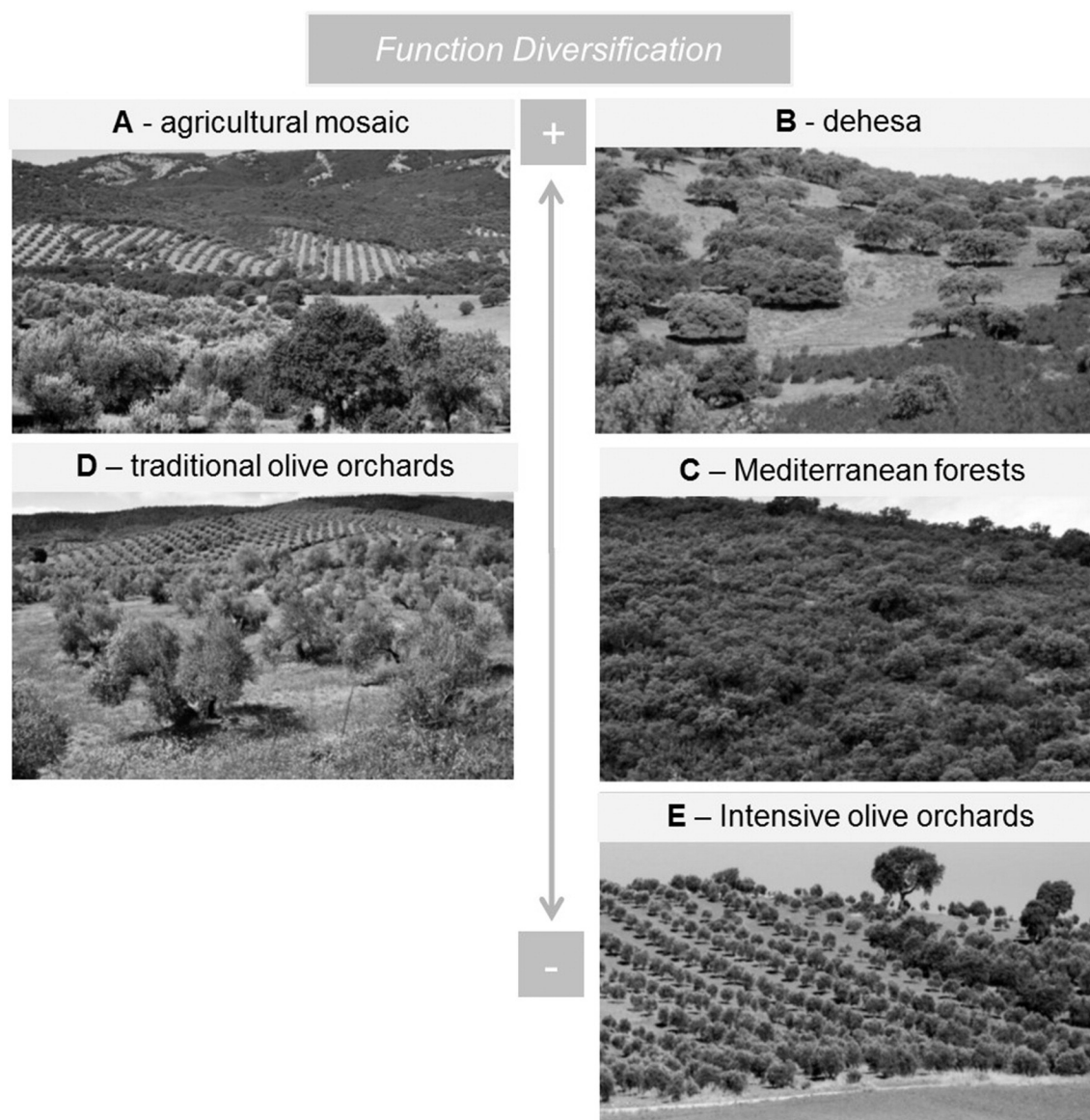


Figure 3. A-E, Illustration of dehesa and four other landscape types in the Sierra Morena region.

solutions for it" (Interview A11). To promote the environmental contribution of dehesa to biodiversity and habitat conservation, some stakeholders, such as environmental NGOs involved in local biodiversity conservation programmes, suggested how to link conservation with economic returns from traditional management: "To help preserve the lynx we need societal acceptance and citizen participation. The meat and milk produced from the extensive management of dehesa should be sold, with some of the money going towards biodiversity conservation in areas of lynx repopulation" (Interview S15). Moreover, "the problem for dehesa is the increased intensification of pastoral use" (Interview S15).

## Discussion

This article provides two examples of assessment of silvo-pastoral landscapes—montado in the Portuguese Alentejo and dehesa in the Spanish Andalucía—from the society well-being perspective. The perceived benefits to well-being and challenges around transposing the landscapes' potential into society's well-being as perceived by stakeholders were identified. It should be seen as a pilot effort to improve knowledge about contextualized relationships between the silvo-pastoral landscapes and people's well-being.

We do not seek to compare quantitatively the results of the two studies presented but rather to discuss some shared questions and compare understandings resulting from both studies.

## Role of Montado and Dehesa in Well-being of Contemporary Society

Our findings show that the montado and dehesa in Southwestern Iberian Peninsula are recognized to have multiple tangible and intangible benefits to society. Relative to other regional landscapes, these extensive silvo-pastoral landscapes stand out to a substantial extent due to their sociocultural and environmental benefits to well-being. According to existing literature, Europe is rich in landscapes holding important cultural benefits for society, with their characteristics depending on the region to which they belong (e.g., Bieling, 2014; Tieskens et al., 2017). As an addition to previous research showing high public preferences for montado (Surová and Pinto-Correia, 2016) and dehesa (García-Llorente et al., 2012), this paper emphasizes the recognition of these landscapes as agents of societal well-being in the regions of Alentejo and Andalucía.

The cultural benefits of a landscape are essential for people's well-being. While the work of Bieling et al. (2014) shows the link between

**Table 3**  
Identified sociocultural, economic, and environmental aspects of the four studied landscapes, influencing well-being in the Alentejo region. The categories most frequently mentioned by respondents are presented. The numbers refer to the percentage of respondents mentioning issues from a particular class. Abbreviations for landscape types: A–diversified agriculture; B–montado silvo-pastoral system; C–vegetable, fruits and greenhouses; D–intensive olive groves and vineyards

IDENTIFIED ASPECTS		LANDSCAPE TYPES				
		<i>functionality</i>	diversified		specialized	
		<i>spatial scale</i>	small	large	small	large
		<i>land covers</i>	A	B	C	D
<b>SOCIO-CULTURAL</b>						
Benefits	CULTURAL IDENTITY	76	<b>91</b>	0	0	
	LANDSCAPE AESTHETIC QUALITY	57	<b>67</b>	0	14	
	RECREATION - tranquility and retreat	48	<b>52</b>	0	10	
	LOCAL TRADITIONAL KNOWLEDGE	<b>76</b>	62	10	0	
	COMMUNITY COHESION	<b>71</b>	14	0	0	
	REGIONAL FOOD SECURITY	<b>81</b>	33	14	0	
	TECHNOLOGICAL INNOVATION	10	14	<b>62</b>	57	
	Challenges	RELATIONAL DETACHEMENT: owner - land; community - land	5	57	29	<b>71</b>
		UNEFFECTIVE RURAL DEVELOPMENT ACTIONS	<b>67</b>	38	14	24
		LOSS OF LOCAL KNOWLEDGE and SKILLS	14	33	71	<b>81</b>
LOSS OF IDENTITY - territorial and cultural		0	0	86	<b>86</b>	
	DIMINISHING DIVERSITY of products and professions	24	10	33	<b>91</b>	
<b>ECONOMIC</b>						
Benefits	TOURISM POTENTIAL	57	<b>86</b>	14	0	
	EXCLUSIVITY of products - regional / local specialities	43	<b>71</b>	10	14	
	YIELD DIVERSITY	57	<b>62</b>	0	0	
	INFORMAL ECONOMY - support endogenous dynamics	<b>91</b>	24	0	0	
	IMPACT ON LOCAL ECONOMY - shops, services	5	19	48	<b>67</b>	
	COMPETITIVENESS ON THE MARKET	0	0	14	<b>95</b>	
	Challenges	LACK OF GOODS VALORISATION	71	<b>91</b>	0	0
LACK OF ECONOMIC SECURITY - subsidies dependent		29	<b>86</b>	19	0	
LOW EMPLOYABILITY		48	<b>81</b>	19	38	
REQUIRES EFFICIENCY - extensive system		52	<b>71</b>	0	0	
	LARGE INVESTMENT	14	0	81	<b>86</b>	
<b>ENVIRONMENTAL</b>						
Benefits	LOCALLY ADAPTATED	71	<b>91</b>	0	0	
	BIODIVERSITY	86	<b>95</b>	10	0	
	HEALTHY ENVIRONMENT and QUALITY PRODUCTS	57	<b>91</b>	0	0	
Challenges	BIODIVERSITY LOSS	0	0	81	<b>91</b>	
	UNCLEAR HUMAN HEALTH IMPACT	10	0	71	<b>76</b>	
	MISSING KNOWLEDGE ABOUT SUSTAINABILITY	0	<b>71</b>	33	62	
	SYSTEM'S VULNERABILITY	33	<b>43</b>	0	0	

**Table 4**  
Average values for ecosystem services for the five studied dehesa landscapes in the Sierra Morena. The numbers refer to the mean values attributed by respondents on a scale of (–1) to (6). The averages above 5 are highlighted in bold. Abbreviations for landscape types: A–diversified agriculture; B–dehesa silvo-pastoral system; C–Mediterranean forests; D–traditional olive orchards; E – intensive olive groves

ECOSYSTEM SERVICES		LANDSCAPE TYPES					
		<i>functionality</i>	diversified		specialized		
		<i>landscape types</i>	A	B	C	D	E
<b>SOCIAL and CULTURAL</b>							
	CULTURAL IDENTITY	4.3	<b>5.8</b>	4.9	4.0	2.5	
	LANDSCAPE AESTHETIC QUALITY	4.2	<b>5.8</b>	4.8	3.8	1.1	
	TOURISM (nature, rural, cultural)	4.1	<b>5.6</b>	4.8	3.0	1.4	
	RECREATIONAL HUNTING and FISHING	4.8	<b>5.4</b>	<b>5.4</b>	4.2	1.6	
	EDUCATION and RESEARCH	4.6	<b>5.5</b>	4.7	4.3	2.1	
<b>PROVISIONING</b>							
	FOOD QUALITY	4.1	0.7	0.3	4.9	0.6	
	FOOD QUANTITY				1.1	<b>5.6</b>	
	PASTURE FOR LIVESTOCK	2.9	<b>5.7</b>	2.6	3.3	0.2	
	BIOTIC MATERIAL (fiber, wood etc.)	3.2	<b>4.3</b>	3.0	3.0	2.7	
	WILD FOOD (wild fruits, medicinal plants, mushrooms)	3.3	<b>5.0</b>	4.3	3.1	0.2	
<b>REGULATING</b>							
	PREVENTION and MITIGATION OF FIRE	3.9	4.0	1.5	4.1	<b>5.7</b>	
	SOIL FERTILITY and EROSION CONTROL	3.1	<b>5.4</b>	<b>5.7</b>	3.8	–0.3	
	WATER REGULATION	2.8	<b>5.4</b>	<b>5.7</b>	3.6	–0.3	
	FAVORABLE CLIMATE MITIGATION	3.6	<b>5.3</b>	4.9	3.3	1.6	
	PREVENTION and CONTROL of PESTS	3.9	<b>5.1</b>	<b>5.2</b>	3.8	0.5	
	POLLINATION and DISPERSAL OF PLANTS and CROPS	4.0	<b>5.4</b>	<b>5.6</b>	4.3	0.7	

**Table 5**

The contribution levels of dehesa to the well-being of society, structured in three dimensions: sociocultural, economic, and environmental

		Well-being priorities (% of respondents)	Dehesa's contribution	
Sociocultural	Knowledge and educational skills	< 10	Low	
	Enjoyment of unique and peaceful landscape/ecosystem	> 25	High	
	Contribution to healthy food and regional food security	10–25	High	
	Conservation of local culture, traditions, identity values	> 25	High	
	Social connectedness	10–25	Medium	
	Citizen participation in natural resources conservation	< 10	Low	
	Cohesion with rural life and local environment	10–25	High	
	Recreation (hunting and fishing)	< 10	Medium	
	Aesthetic and other intangible values (i.e. spiritual values)	10–25	High	
	Economic	Increase and diversification of employment sources - decreases migration of young people	> 25	Low
Guarantees subsistence of local families		> 25	High	
Economic efficiency of local farms (energetic, economic)		< 10	Low	
Creation of value added and novel agrifood chains		10–25	Low	
Economic rentability of conservation of local cultural and environmental heritage		> 25	Medium	
Economic diversification and autonomy		10–25	Low	
Community development and generation of income sources (e.g. ecotourism, services)		< 10	Low	
More efficient livestock management		< 10	Low	
Environmental		Supports good climatic conditions (fire control, climate mitigation etc.)	< 10	High
		Healthy environment	> 25	High
	Soil conservation against erosion	< 10	High	
	Biodiversity and landscape diversity	> 25	Medium	
	Quality of water	< 10	High	
	Conservation of natural and cultural heritage	10–25	High	

cultural services and individual well-being, this work illustrates the linkage at a broader, society-wide level. Indeed, several aspects identified in this study as benefits for the well-being of society are shown in literature as needed for individual well-being as well. For example, research on environmental psychology has recently demonstrated the positive correlation between biodiversity and subjective well-being (Dallimer et al., 2012). Moreover, perceived tranquillity and retreat in an environment, called also *restorativeness*, positively correlates with emotional well-being (e.g., Korpela et al., 2014).

The current management of silvo-pastoral landscapes is considered to maintain local ecological knowledge and skills in both studied contexts. The extensive management of trees and pastures requires a know-how in practices that are often gained in situ and transmitted from generation to generation. Practices based on local knowledge are also helpful in defining adaptive strategies to cope with global environmental change (Oteros-Rozas et al., 2013). This “knowledge capital” is also highly valuable for a co-construction of knowledge that incorporates local and scientific expertise to find appropriate management interventions for these landscapes (e.g., Bracken et al., 2015).

The aforementioned sociocultural benefit relates to the way in which montado and dehesa adapt to local ecological conditions identified within the environmental dimension of well-being. It is one of the indications that silvo-pastoral landscapes are indeed complex systems without clear division between sociocultural and environmental subsystems. It highlights previous statements that the benefits of social-ecological landscapes are interconnected (Chan et al., 2012).

Further environmental benefits of silvo-pastoral landscapes highly recognized by social actors are species and visual pattern diversity. These characteristics have been validated in previous research (Aronson et al., 2009). Next, unique and quality food products as outcomes of a specific and healthy environment relying on low chemical inputs and extensive management are valued. Southwestern Iberia as a Mediterranean area holds food to be a structural component and marker of its identity; today, it also increasingly seeks that food to be connected to animal welfare and human well-being (Fonte, 2008; Brunori et al., 2013).

The economic aspects related to well-being comprise the diversity and exclusivity of montado and dehesa products and the potential for tourism as a commercial activity. In the Alentejo region, these three potentials are recognized more in the montado than in any other agricultural landscape. In the case of dehesa, most recent studies show that activities such as eco-tourism and bird watching have been increasing

(Garrido et al., 2017), while recreational hunting is already a standard economic activity on private properties (Moreno and Pulido, 2009).

Moreover, comparison of different agricultural landscapes exhibited the variability of benefits to well-being depending on management intensity. For instance, while cultural identity, recreation benefits, or positive environmental aspects are often associated with silvo-pastoral landscapes in Southwestern Iberia, they are absent in comparison with landscapes with intensive, irrigated agriculture. The way in which different agricultural management characteristics in different sociocultural contexts impact the well-being of society, rural communities, and individuals needs more research attention, especially in an era of extensive and rapid changes (Bennett and Balvanera, 2007).

#### Shared Challenges to Society's Well-being from Montado and Dehesa

Montado and dehesa are facing several common challenges in supporting the well-being of society. Several of these challenges relate to the appropriation and translation of the existing potential (ecosystem services) into the well-being of society. Therefore, some of these obstacles are societal challenges around values, priorities, and social-economic capitals.

At a sociocultural level, one issue is the growing detachment between landowners and land, but also between local community and land. This perception is probably influenced on the one hand by the changing lifestyle of contemporary society shifting away from direct involvement in agricultural activities due to the availability of machinery; by wage rises associated with general economic growth; and by the migration of the rural population to cities. Some authors argue that the latifundia social structure in Alentejo and Andalucía (Plieninger et al., 2004), the prevailing institutional arrangements, and the ageing rural population are some of the societal challenges that delay innovative diversification of agriculture (e.g., Moreno et al., 2004; Rodrigo and Veiga, 2009). Latifundia mean predomination of large properties where the landowners, particularly the largest ones, are not rural residents. Eventually, the opportunities for direct interaction of contemporary society with rural landscapes become less and less apparent.

In addition, both silvo-pastoral landscapes are known to have relatively weak market competitiveness. Nevertheless, stakeholders believe in their multifunctional potential and that the multiple products and services should be appropriately promoted and marketed. While tourism in dehesa seems to be working, especially regarding hunting activities, montado still has a long way to go in this direction. As such,



attention from academics is needed to find solutions for better involvement of people in silvo-pastoral landscapes, aiming at a beneficial impact on well-being, in harmony with landscape sustainability. Sustainable tourism development requires a sensitive assessment of the landscape's limits so that it generates benefits for the host communities and strives to anticipate and prevent economic, environmental, and sociocultural degradation (Torres and Momsen, 2011). Even if society recognizes the numerous environmental benefits of montado and dehesa, their vulnerability is also acknowledged. Moreover, existing agricultural policy incentives do not seem to fit well with extensive silvo-pastoral landscapes, as the results illustrate.

#### *Well-being as a Research Perspective on Social-ecological Landscapes*

The well-being perspective applied in this paper reveals social perceptions of silvo-pastoral systems. This approach identified multiple benefits, as well as challenges for montado and dehesa areas, all relevant to contemporary society. These outputs support previous research results indicating that society well-being is an appropriate conceptual tool to help see through social-ecological complexity and its implications for human beings (Armitage et al., 2012).

Moreover, by using the well-being approach to social-ecological systems, one is closer to identify social challenges that go beyond the potential to deliver services by an ecosystem and relate to actual rendering of these services into the well-being of an individual, specific community, or to society as a whole. This rendering often depends on social-economical and policy mechanisms, as shown in this paper. However, the well-being approach applied to landscapes also requires awareness about the diversity of possible perceptions, priorities, and values depending, among others, on whom we ask, at which scale and in which dimension.

The typology of well-being, adapted from the three pillars of sustainable development involving sociocultural, environmental, and economic dimensions, is just one of many possible typologies for well-being components. For instance, the recent IPBES approach divides nature's contribution to the human quality of life among intrinsic, instrumental, and relational domains (Pascual et al., 2017). In montado and dehesa, all three domains are represented in interviewee comments. For example, cultural identity would fit the relational domain, aesthetic appreciation and diverse products would fit the instrumental domain, and biodiversity or adaptation to local ecological conditions could represent the intrinsic value domain (Díaz et al., 2015). Thus, within this typology, montado and dehesa probably represent landscapes with pluralistic values relevant to the well-being of society. This reveals that restricting attention just to one dimension (e.g., economic) is insufficient to picture the whole social-ecological system. More holistic approaches involving transdisciplinary collaboration across a broad range of natural and societal sciences, as well as other knowledge systems, are needed (Pascual et al., 2017) when these landscapes are addressed as agents in societal well-being.

The qualitative, open-ended questions allow us to identify some landscape aspects that are important for well-being, but which are not enumerated in the MEA ecosystem services list, and highlighted the more holistic perceptions among respondents. In order to capture the intangible landscape benefits in greater detail, Bieling et al. (2014) used a landscape value typology in addition to the ecosystem services framework. In this paper, in particular, characteristics like societal interaction, changing relational tendencies between landscape and society and the diversity of products identified in studied landscapes would not be captured by applying only the list of services from the ecosystem services framework. It shows the need to develop more inclusive frameworks for landscapes to capture the holistic, well-being – related perceptions better.

More scientific discussion can highlight the most appropriate conceptual frameworks of well-being to organize and integrate multiple aspects of landscapes relevant to the well-being of individuals and society.

Moreover, novel approaches and methodologies should be developed to connect and quantify these relationships meaningfully.

## Conclusions

Our empirical evidence shows that silvo-pastoral landscapes in Iberia are recognized as playing an important role in social-cultural, economic, and environmental dimensions of societal well-being.

Compared with other landscapes, montado and dehesa are of outstanding importance for cultural and ecological balance in the regions in which they exist. A disappearance of these landscapes would mean negative consequences on society's well-being in southwestern Iberia regarding not only material but also several nonmaterial values. Moreover, these landscapes are also facing several societal challenges regarding how their potential is rendered to the societal well-being.

Using the lenses of social well-being can highlight numerous aspects of landscapes in relation to society that often remains less visible when the provisions of ecosystem services are addressed.

There is a challenge to balance the long-term cultural and environmental benefits of these landscapes, with rapidly changing societal and economic conditions occurring globally. For this, more systemic research approaches with a holistic, well-being – centered vision are needed to find new strategies for sustainable development of Iberian silvo-pastoral landscapes. Transboundary research and policy efforts would be useful for addressing similar challenges in montado and dehesa. A shared initiative, in this case between Portugal and Spain, would mean a higher likelihood of finding practical solutions for existing problems in these social-ecological landscapes. A clear awareness of the processes taking place and needed interventions are probably hindered by a time lag between the actual process and reduction of benefits. However, acknowledgement of this threat by decision makers is urgent now to make these landscapes sustainable in the long term.

## Implications

Research should give more attention to approaching rangelands from the people's well-being perspective, to gain a complement to ecological and economic perspectives that can improve understanding of social-ecological systems.

Iberian silvo-pastoral landscapes have the potential to deliver multiple essential benefits to society at the ecosystem and landscape level. However, several socioeconomic issues exist; they hinder the rendering of their full potential to human society well-being. If these social problems are not urgently addressed by public policies and innovative management approaches, there is a risk of impairing delivered services and a risk of disappearance of these landscapes in the long term.

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