

How can we link farm management to amenity functions, through the landscape pattern? Application to a case study in Southern Portugal.

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Abstract: *A new role for agriculture is emerging throughout Europe due to significant changes occurring in the rural areas motivating increased attention of landscape functions. Consequently, land managers are in different degrees, adapting their options for land management, in order to provide the functions demanded by society. But what is in fact the demand by society towards the rural areas? And in what degree is connected to the land management options at the farm level? This paper intends to link landscape preferences with land management (demand and supply), in a peripheric area of Southern Portugal, bearing in mind that society's demand is not one, but it is diversified according to the different interests towards rural landscape and therefore differences at the landscape preference level are expected. A photo based survey was applied to different user groups in the study area. Information on land management was also collected through enquiries, done in farm units located in sample areas and representative of the study area. Results indicate clear preference distribution of users in relation to the land use pattern resultant of certain types of management. Hunters and generally eco-tourists, tend to prefer more extensive and bushy patterns, part of more naturalized landscapes; while local inhabitants prefer more clean and ordered mosaic, as part of a truly humanized landscape. A challenge rises for land managers, in the sense of taking advantage from the multifunctionality potentials and broad their management focus, as the new functions can provide or even override farm production income.*

Keywords: *landscape preferences, amenities, multifunctionality, land management*

Introduction

In European rural landscapes, other functions besides farming are being progressively recognized by society (Surová & Pinto-Correia, 2008; Knickel *et al.*, 2005; Parris, 2004; Durand & Huylenbroeck, 2003; Paquette & Domon, 2003; Hall *et al.*, 2004) and public policies (Wiggering *et al.*, 2006), as stressed by the European Landscape Convention (Council of Europe, 2000). In Mediterranean peripheric areas, landscapes resulting from extensive land use systems based on a multitude of components are valued today through functions as leisure and recreation, natural resources preservation, environmental quality, cultural identity and aesthetic appreciation. Despite this multitude of functions, land managers have, so far, been mostly oriented to production.

What is meant by multifunctionality and landscape functions? According to the OECD (2001), multifunctionality refers to the fact that an economic activity may have multiple outputs and therefore contribute to several societal objectives at once. Farming as production of food and fibers is a commodity function for there is a defined market associated; while nature conservation, recreation, water and air quality, hunting, etc., are non-commodity functions, as the market is non-existent or it functions poorly (OECD, 2001). The different functions of rural landscape should improve sustainability of rural territories, as outside capital is channeled to these territories as a direct consequence of society's demand (Wiggering *et al.*, 2006). Multifunctionality is here used as an analytic and non-normative concept, which can help identifying and analyzing the different functions besides production, as well as synergies and conflicts existing in-between them. It is a framework to study complexity, in the sense that multifunctionality offers a new way of considering agriculture and rural areas, where interrelations between functions, place of agriculture within society and relation with sustainable development, could be the components for a future analytical framework as they underline this complexity (Cairol *et al.*, 2005).

The acknowledgment of new roles of farming has led to the debate on the productivism and post-productivism transition, which can also be seen as a multifunctional transition, since both tendencies coexist in temporal, spatial and structural terms (Holmes, 2006; Wilson, 2007). In fact, temporal linearity under this transition fails to encapsulate the diversity and heterogeneity that can be observed in modern agricultural systems (Evans *et al.*, 2002; Wilson, 2007). And therefore, more knowledge about the spatialization of these concepts should provide basis for linkage between supply and demand.

In order to understand the multifunctionality transitions taking place, a first step is to produce more knowledge on the functions besides production that can in fact support or help support rural landscape. As these functions depend mostly on the public demand, the need is there to assess the demand for non-commodity functions by society, relating them to land management options. Delivering on public preferences is rather challenging, since society's demand for non-commodity functions can be diversified, and sometimes contradictory, according to the function considered (Hall *et al.*, 2004). The different users of the rural landscape have different goals, and therefore look for different characteristics of the landscape, which may be more functional or more representative, or even of another kind (Surová and Pinto-Correia, 2008; Tilzey and Potter, 2008).

Considering what is said above, the goal of this paper is: to present and discuss the landscape preferences by different users, in a municipality in Southern Portugal, a peripheric rural area where a characteristic landscape supports today several amenity functions; and to relate these preferences (demand) to the actual land management (supply), which is shaping the landscape. The main questions addressed in this paper are: Which are the different groups of users of the landscape and how can they be defined? Which type of landscape and specific land cover composition and landscape elements are preferred, for different landscape functions, as expressed by the users? Is the land management in place, at the farm level, linked to the expressed preferences, and how is this linkage established ?

Metodology

The methodological approach was structured in the following phases:

a. Castelo de Vide's landscape character assessment

Four landscape areas were identified based on the landscape character assessment approach from D' Abreu *et al.* (2004) integrating public opinion (Menezes, 2007; Swanwick *et al.*, 2002): A – Shist; B – Agro-silvo-pastoral systems; C – Olive Grove Mosaic; and D – S. Mamede Hills (Fig. 2). Information on land use systems and on the most relevant non-commodity functions that were based on interviews to local key informants.

b. Survey design and application

Photographs were used as visual stimuli in the enquiries, as they offer a reliable tool for characterizing preferences on different types of landscape patterns (Bell, 2001; Val *et al.*, 2006; Dramstad *et al.*, 2006). Photographs were collected through a stratified random sampling approach (Ramos & Teixeira, 2006), based on the landscape areas. Photographs were then computer edited due to the underlying fussiness (overlapping of land cover classes and vague boundaries in-between land cover classes) of extensive Mediterranean landscapes (van Doorn & Pinto-Correia, 2007; Pinto-Correia *et al.*, 2009^a). Sixty four photos were produced and organized. Users were asked to choose the photographs according to the activity they represent (hunting, walking, having a week-end house or a house where they leave, farming, etc.). Landowners were asked in a separate enquiry, about the management of their farm unit. A minimum of n=30 for each function was aimed according to the principle of the maximum variation (Patton, 1990). A total of 208 enquiries were done.

c. Data analysis

The enquiries were analyzed through a multiple correspondence analysis, considering as active the variables related to the preferences expressed (choice of photos) and as passive, or explanatory, all

other variables, both those related with the profile of the respondent and those related with the reasons for the choices presented. The multiple correspondence analysis organizes all data in homogeneous groups of characteristics and responses, according to similar relevant behavior, being the active variables those who define the groups and the passive those which illustrate the profile of the group.

Study area

The municipality of Castelo de Vide in Southern Portugal

The municipality of Castelo de Vide, 264.9 km², has a peripheral location, in the Northeast of the Alentejo region, in the southern part of Portugal, close to the Spanish border (Fig. 1). It is integrated in a natural park (*Serra de São Mamede* Natural Park), with almost all its area as *Natura 2000* site. Castelo de Vide has 3700 inhabitants, with a low density of population (14 inhabit. /km²) decreasing since the 1950's (INE, 2008).

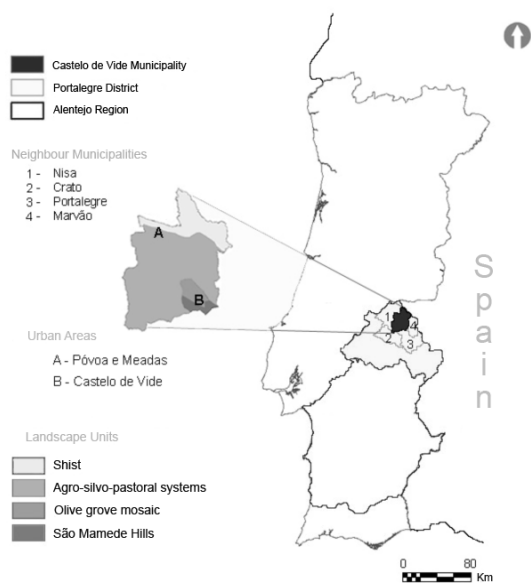


Figure 1: Geographical location of the study area: The Municipality of *Castelo de Vide*, in the District of *Portalegre*, Region of *Alentejo*, Portugal.

The area is characterized by a diversified landscape with conservation and environmental values, with potential for a multifunctional use, maintained through extensive farming systems (Pinto-Correia *et al.*, 2006). The land cover of the area has been rather dynamic during the last years, resulting mainly from the extensification processes of the agro-silvo-pastoral systems, but also from the forestation of agricultural areas. The combination of the bio-physical conditions and extensive agriculture has culminated in diversified land use patterns. Archaeological sites, religious monuments and other man made elements add a heritage value to these already humanized landscapes. Also the presence of rock outcrops has resulted throughout time, in the construction of stone walls, contributing once again as a valued cultural element to the landscape.

Due to this diversity and also its cultural heritage, the municipality has been attracting for some time diverse types of users, both for recreation as for week-end stays and even settlement of neo-rural inhabitants, both Portuguese and foreigners.

Four landscape areas (LA) have been identified in the study area: A – Schists, B – Agro-Silvo-Pastoral, C – Olive grove mosaic; D – *São Mamede* Hills (fig. 2).

The **landscape area of Schist (LA A)** has a very open and harsh character, which can be explained by its very poor soils (formed over schist rock), and consequent vast extension of shrub areas, dispersed tree cover of cork and holm oak *montado* areas (the agro-silvo-pastoral system characteristic of the whole region of Alentejo) and fast growing forest areas (Eucalyptus). The properties here are very large (>100ha, up to 2000 hectares) comparatively with the other landscape areas. There is a high potential for nature conservation and hunting. Although it appears very deserted, a small village (*Póvoa e Meadas*) can be found, integrated in the parish with the same name, with 696 inhabitants (Calha, 2006).

The **Agro-Silvo-Pastoral landscape area (LA B)** represents the largest landscape area in the municipality, where livestock production is the main activity, also in large estates. Pastures are combined with high and low shrubs, broad leaf and evergreen oaks, annual cultures and rock outcrops. These elements can be found all over this area, though the densities in which they occur can change very much, providing more open or more closed areas, while maintaining the same landscape character.

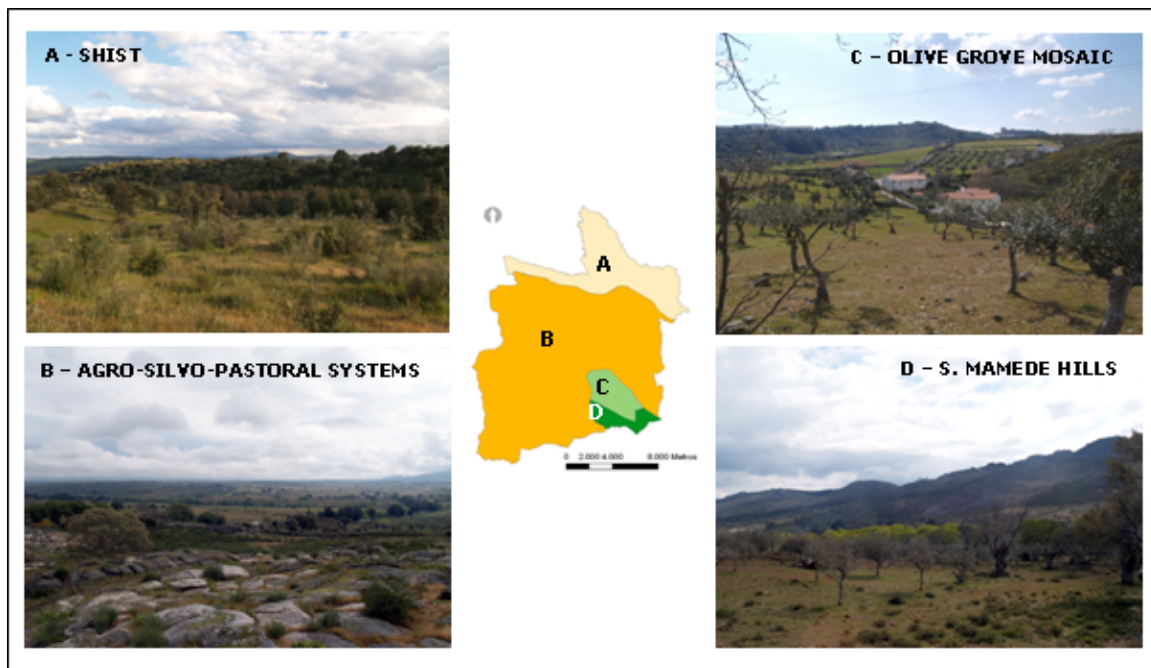


Figure 2. Landscape areas of the study area - Municipality of Castelo de Vide: landscape area of Schist (LA A); Agro-Silvo-Pastoral landscape area (LA B); landscape area of Olive Grove Mosaic (LA C); landscape area *S. Mamede Hills* (LA D).

The **landscape area of Olive Grove Mosaic (LA C)** represents the area where the main town of the municipality, Castelo de Vide, is located. Surrounding the town, mainly to the north, there is an area of smaller properties (<20 ha), with olive groves, vegetable gardens, fruit trees and vineyards, resulting in a very diverse, dynamic and living character mosaic landscape. There is a decrease in vegetable gardens and an increase in permanent cultures, as the olive groves. This trend follows along the increase of neo-rural inhabitants, searching for a better life quality, but not necessarily connected to farming.

The **landscape area *S. Mamede Hills* (LA D)** corresponds to a small part of the Mountains of *S. Mamede*, which continues further south-east. The distinct character of this area has mainly to do with the presence of the hills, which create a microclimate - more humid and with higher precipitation than the surroundings. There are areas of shrub, and also oaks and chestnut trees, but a large part of this landscape area is covered by mono-specific forest plantations, of pine trees mainly. Some have been affected by fires in the last years.

Results

Landscape preferences: Who prefers what in Castelo de Vide?

A multiple correspondence analysis was made with all the photo survey data. Data from the different landscape users, designated by *sample groups*, was joint together for the analysis. Six well defined groups emerged from this analysis, and they are composed according to behavior resemblance (level 7 of the dendrogram in Fig. 3).

The names attributed to the groups refer to several different aspects, and are related to the variables most determinant for the identification of the group. It may be a user group (hunters, landowners, tourists, etc.), a personal characteristic (age, education level, place of origin, residence, gender, etc.) or the landscape preferences, or even the reasons presented for the preference. Although people were enquired as belonging to a specific group among landscape users, similar profiles among hunters, farmers and local inhabitants are many times identified, since individuals may fulfill several of these roles at the same time. There are, for instance, many landowners who happen to be local inhabitants and/or hunters too.

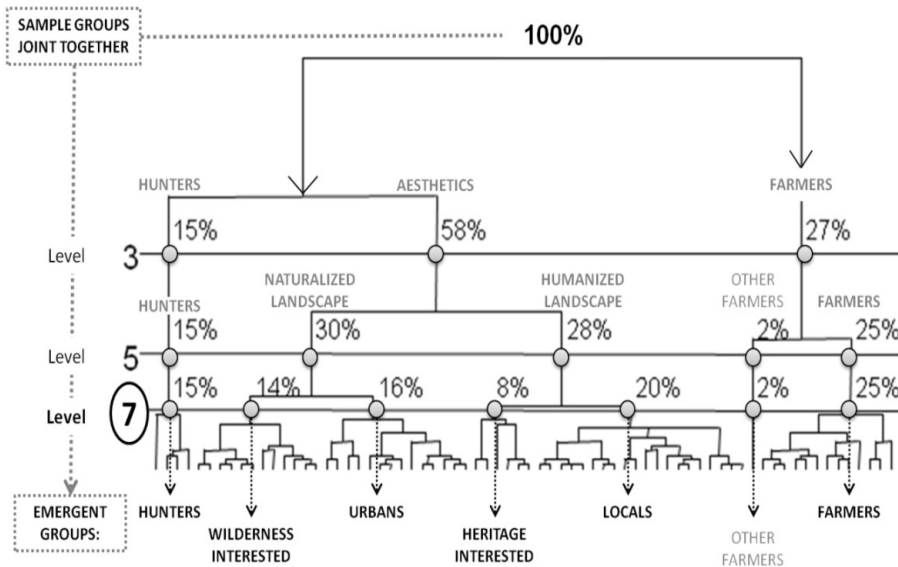


Figure 3. Dendrogram showing *Emergent Groups* in level 7: Hunters, Wilderness Interested, Urbans, Heritage Interested, Locals and Farmers. Each emergent group results from the higher levels 3 and 5, according to behavior similarities based on the active (photographs and photograph elements) and illustrative (personal characteristics and reasons for choice of photographs) variables.

The emergent groups associated to level 7, are grouped in a previous step of the analysis, as illustrated by levels 3 and 5 of the dendrogram (fig. 3). The preceding levels help understanding how the emergent levels were formed. All groups besides the farmers and hunters, have a common root on the aesthetical appreciation on landscape which further develops into two main preference types, *the naturalized landscape*, for the *wilderness interested* and *other urbans*, and the *humanized landscape*, for the *heritage interested* and *local embedded*.

The six groups in level 7 of the dendrogram (Fig. 3) represent the *Emergent Groups*:

- *Hunters* have mostly an *utilitarian* view of the *landscape*, focusing on ecological aspects (food, shelter for species; diversity of species vs landscape diversity) linked to their specific interest among hunting species, as also on the conditions for hunting, like visibility, security and accessibility. In accordance to the initial hypothesis of hunters being straightly connected to dense and shrub rich areas, most enquired hunters tend indeed to prefer the agro-silvo-pastoral systems with shrubs, but combined with other uses. The preference for landscape elements are mainly towards rockoutcrop presence (shelter, diversity) in LA B; whereas in LA C, already a more humanized landscape, no elements are chosen due to hunting limitations around houses and cattle.
- The *Wilderness interested* group has nationality as a very relevant aspect, composed mainly by foreign neo-rurals and eco-tourists, generally highly educated, but also by some hunters. Concerning landscape preference, the more extensively used patterns are the ones more chosen, connected to the idea of nature, which combined with the rockoutcrops (in LA B) and view over the village (LA C), represent the sought harsh and authentic character for foreigners and ideal place for hunting wild species. Justifications among this group change from utilitarian to *natural landscape*.
- The *Other urbans* group is composed mainly by neo-rurals and eco-tourists, women and youngsters, with aesthetical aspects as clearly relevant and connected to nature values (*nature and aesthetics*).
- The *Heritage interested* group value diversified landscapes with a combination of uses, and a mixture of biodiversity support with heritage and man made features (*heritage and aesthetics*). This combination along with composition information (table 3) indicates dominance of the *local eco-tourist* group.

- The *Local embedded group* focus on heritage issues and man-made features, combined with agriculture (cattle) and natural (rockoutcrops) elements, expressing value for all main features of local landscapes. Their multifunctional appreciation of landscapes has still strong base in farming systems, connected to their aesthetical sense as local inhabitants. There is a value of the *living landscape*.
- *Farmers* focus on higher capacity for occupation, choosing useful elements for farming activity as houses and cattle (productive landscape). Also there seems to be a part of “locals group sense” when it comes to valuing heritage. The view to the village represents either a symbol of local identity or closeness to services and help in case of need, which underlines the utilitarian rather than the aesthetical appreciation of landscape.

An interesting relation can be found between the pre-defined groups to whom the survey was applied (hunters, eco-tourists, neo-rurals and people with second housing, local inhabitants and landowners), and the emerging groups, the ones resulting from the multiple correspondence analysis. In any case, this shows that there are clear differences in behavior concerning the landscape, in-between the different types of users.

Landscape management: what are the different management strategies?

Another analysis is under development. It aims to determine land management typologies that should reflect the several management adaptations by landowners which are progressively taking place in face of the new demands by society and the decreasing importance of agriculture. So far, and resulting from an expert analysis to the data collected at the farm level, it is possible to identify general land management trends, linked to the different landscape areas in the municipality, and thus also to the preferences expressed by users.

Land management trends:

- I. *Production oriented management with some diversification*: This trend is usually associated to large properties (>100ha; reaching more than 2000ha) mostly in the northern part of the municipality, in the landscape area of schist. Production goal is at the core motivation of landowners, side by side with an increasing effort for some diversification in order to support the main production goal. Land cover is mostly composed by extensive silvo-pastoral systems (cork and holm oaks) with grazing animals as cattle and black Mediterranean pig. The very extensive character of this management responds to the soil limitations and nature conservation appears as progressively valued by landowners, as hunting activities are also a traditional activity. Consequently, touristic hunting reserves and rural tourism are two of the more appealing functions for these landowners to invest in. A wealthier, and many times urban, public is already searching for these areas to stay and hunt big game species. Besides this specific public, landowners gradually realize that nature watching and trekking are also activities possible to conciliate, especially when hunting season is over.
- II. *Production oriented management*: This trend dominates most of large and medium properties (20-100ha; > 100ha) with strong productivist oriented management, located in the central part of the municipality, in the landscape area of *agro-silvo-pastoral systems*. Meat production (cattle, sheep and goats) is also the main goal and although landowners have also hunting tradition, their areas' size, lower level of education in the majority of cases and lower economic capacity for investments, do not allow them to have touristic hunting reserves, having generally their properties affected to associative and municipal hunting reservations, where hunting is more a friends day out than a profitable activity that supports production. In this part of the municipality, extensive silvo-pastoral systems also dominate (Pyrenean oak with some cork and holm oaks), with higher presence of rockoutcrops and dry stone walls. In this typology, a growing tendency is occurring for those who are young farmers to convert their production to organic, as many times the requirements for more environmental production subsidies involve low management and economic efforts by the landowners.

- III. *Post-productive oriented management based on innovation and multifunctionality*: Medium and small properties (5-100 ha) in the central and southern part of the municipality (including landscape areas *agro-silvo-pastoral systems* and *olive grove mosaic*, around the town) where innovative and multifunctional strategies for management have been appearing, mostly conducted by outsiders, Portuguese and foreigners, generally young and with high academic education. Motivation for these landowners is on the search for balance and sustainable living, providing a break from an urban background and close connection with the land and nature. This strategy is closely connected to nature recreation activities, as eco-tourism, horse and donkey riding, organic farming and gardening, and even activities exploring more esoteric beliefs and practices. Production here is no longer a central function but an important component part of a full-time and lifestyle multifunctional strategy.
- IV. *Gardened oriented management for subsistence and recreation*: This applies mainly to small and very small properties (0-20 ha) around the main town of the municipality, increasingly purchased by outsiders, mainly urbans, looking for second housing for weekends and holidays. Formerly belonging to old local farmers, these properties were once the main vegetable production areas supplying the town of Castelo de Vide, where the municipal market was the centre for these products commercialization. Nowadays, as this type of production is not able to be competitive in a liberalized market, the farmers have no succession and as they get older and older, they just limit to produce for their own. This is a very peasant like strategy as products from these small properties represent important resources in the family economy. As a result of this traditional small farming around the town, there is a very interesting and diversified landscape, composed by a mosaic of olive trees, orchards and vegetable gardens, with actual strong pressure for urbanization, especially from outsiders seeking for pleasant views and enjoying the countryside in a very aesthetical sense. A symbiosis between these two types of landowners is established, as the old local farmers often provide their services to the urban outsiders, to manage the land.

Discussion

How does management comply with the preferences expressed?

Landscape preferences show that there is an actual demand for the existent landscapes in the study area. Preferences are generally dependent on a specific pattern of land use, when connected to a landscape area and/or land cover, but they can also be dependent on general characteristics and elements, independently from the landscape area where they are. The preferred landscape patterns according to each emergent group and the land management trend groups are next summarized in table 1, in order to better illustrate the possible link in-between the two types of knowledge extracted from the data analysis. The preferred landscape patterns can in fact be derive more or less directly from the land management trends groups, as showed the table below.

The *hunters group* includes two main types of hunters, according to the place where they usually hunt: touristic hunting reserves or associative and municipal hunting reserves. In this sense it is possible to respectively link them to *land management tendency groups I. and II.* most present on landscape areas A and B. In the case of trend I, landowners manage already their land for two types of uses directly connected two the income their want to achieve. Therefore they maintain cattle under very extensive grazing conditions, maintaining denser areas with few or none cattle, as a way to promote settlement by the game species their interested. And become many hunters come from outside, several from Lisbon and cities around, they are already investing in tourism structures, spotting this as an extra income for meat production. Although they promote nature conservation conditions, these are mainly for an utilitarian hunting purpose and only some are starting to understand the potential in nature watching activities. The ones that do see this as an opportunity could satisfy also the *wilderness interested group*, including many foreign neo-rurals and eco-tourists, but also some less utilitarian hunters. Many times neo-rurals revealed strong negative feelings towards hunting and so there might be conflicts if management of activities at the farm level is not carefully planned. Besides these large farms with touristic hunting reserves, many others provide

hunting conditions in associative and municipal reserves, as farms under trend II., who because of severe conditions of soils and generalized presence of rockoutcrops, are forced to manage the land in a very extensive way since it is not possible to intensify as they would wish. The majority of these farmers are also hunters, so hunting activities for the locals are assured. And the few interested in nature related activities and extensify very much, are the ones under trend III. located in landscape areas B, C and D, respectively the *agro-silvo-pastoral systems*, where the love for rockoutcrops distinguishes them clearly from the ones under trend II., the *olive grove mosaic*, where they maintain mainly extensive olive groves, and areas on the mountains also maintained with the goal of being idyllic and organic. Trend III. seems to be dominated by a lifestyle, independently from the landscape where they are, which creates conditions for several user groups to enjoy the nature and aesthetic values of landscape, and therefore satisfying both the wilderness interested and the *other urbans* groups. Trend IV. seems to be the result of trend I. and trend III. Interests, mixed in small and very small areas. Here, the ones managing the land are traditional old farmers who are mainly retired but are deeply connected to the work on the land and often keep farming small plots spread around the town, for subsistence goals but also as a reflex of their lifestyle. At the same time, these type of farmers doing hobby farming, do not have succession and are increasingly selling their land once they are too old to manage them. And so they move to the town and their small farms are sold to urban outsiders looking for 2nd houses for holydays and also to neo-rurals wanting to leave in the countryside but living from external income and depending many times of their local neighbor to manage their land. So far a gardened landscape as been maintained, but once the local old farmers disappear, more and more permanent crops will dominate instead of vegetable gardens which will certainly affect the mosaic around the town, compromising the concept of *living landscape*, valued very much by the *heritage interested*, and also the *local embedded*.

Land managers/farm profile	Land management trend groups	Landscape Areas
<ul style="list-style-type: none"> · Large properties; · Laird family business farms; · Meat production; · Touristic hunting reserves and rural tourism. 	I. Production oriented management with some diversification	A
<ul style="list-style-type: none"> · Large and medium properties; · Traditional meat production. · Integration of environmental concerns by young farmers. 	II. Production oriented management	B
<ul style="list-style-type: none"> · Medium and small properties; · Strong ideological motivation; · Neo-rurals with urban background; · Nature, sustainability, aesthetics as strong values. 	III. Post-productivist oriented management based on Innovation and multifunctionality	B, C, D
<ul style="list-style-type: none"> · Small properties around the main town; · Coexistence of old local farmers and urban outsiders; · Symbiotic functions of production and recreation; · Economical survival vs aesthetic pleasure. · Peasant like management for subsistence of insiders and recreation of outsiders. 	IV. Gardened oriented management for subsistence and recreation.	C, D

Table 1. Land management trend groups and associated land managers and/or farm profile. Each land management group is related to an example of a preferred landscape pattern.

As expected, the landscape pattern represents the link between landscape preferences by different users and the land management trends that are or not supporting them. Also it is possible to underline that different landscapes can support different functions, giving place to overlapping of interests and possible conflicts among the different functions. These conflicts should be reduced as land management reflects progressive knowledge of the demand by the different groups. As also illustrated by the management trends, landowners need to be aware of the relation between the way they manage the land and the functions they can provide, but they also need conditions in order to invest in creating new income resources. Lairds and urban outsiders benefit from a strong economical position, which allows them to diversify and be more innovative and multifunctional in the way they manage the land. They are generally more aware on how to attract visitors, as most of

them are also from outside or have been or studied outside. Traditional farmers on the other hand, either in medium or smaller properties, are deeply connected to production goals and their limitations in terms of biophysical and socio-economic conditions, do not allow them to take advantage of the new functions demanded by society. In these cases, conditions for other functions do exist but as a consequence from a production oriented management.

Conclusion

Landowners are generally not aware of the potential for other functions, as also many user groups from outside seem to overlook the role of farming in maintaining the landscape. Traditional farming has created indeed diversified landscapes, in the study area, with great environmental, cultural and scenic values. But as farming in these areas is facing many difficulties, struggling between market liberalization and consequent need for unrealistic competitiveness, there is risk for its disappearance as progressive extensification takes place. Perhaps a more naturalized landscape, less mosaic like, can emerge from extensification tendency, as farmers environmental concerns increase along with hunting and tourism. Large and medium properties in this area could survive out of quality production and diversification. Smaller properties being increasingly purchased by outsiders, will most likely provide a different landscape, as the reduction of the mosaic takes place. At the moment, landscape is still maintained under extensive farming systems with potential for other functions besides farming, which can supply the already existing demand by the different users among the public.

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