

## Identifying land management typologies: Transition to multifunctionality in Mediterranean extensive farming systems

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**Abstract:** *European peripheric rural areas have been under significant changes, affecting agriculture and landscape pattern. In this context, opposite terms as productivism versus post-productivism arise, pointing to a shift within the actors in the rural world, in particular those who directly manage the land. Mediterranean landscapes, maintained through a traditional management mainly focusing on production, have created conditions for establishing other functions (nature conservation, recreation, etc.) motivating the increase of urban influence on the countryside. The growing inflow of urban people to the countryside has encouraged the emergence of new ways of managing the land, with external production income, and with different concerns. As a result, diversification within the landowners group, more correctly called nowadays by land managers, has occurred, linked to a more heterogeneous and diversified management.. Based on a case study applied in a municipally located in southern Portugal, this paper presents a analysis of land management typologies based on a expert analysis. From the data collected through enquiries to landowners, differences concerning management were identified. The knowledge generated through these land management typologies could highlight the importance of creating new sources of income through innovative management, capable of supporting the rural development in peripheral areas.*

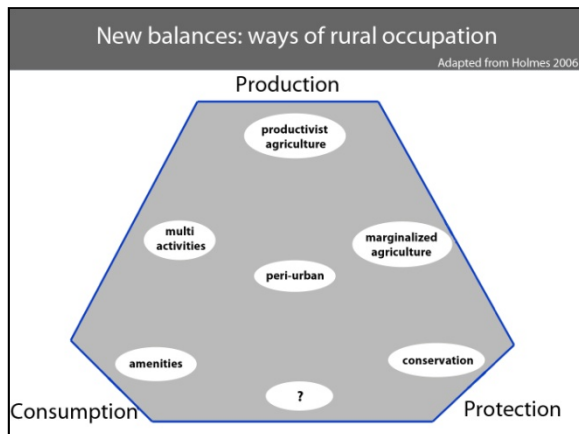
**Keywords:** *Farm typologies, Neo-rurals, Local farmers, Inovative land managers, Productivism and Post-productivism.*

### Introduction

Farming in the EU is at the centre of a maelstrom of global issues surrounding food safety, climate change and energy, while there's also a need to sustain competitiveness of EU agriculture in world markets, guarantee higher standards of food production and respond to new demands for public goods and services. Additionally, household incomes from farming have largely declined in recent years, due to decreases in subsidies and fluctuating commodity prices. This raises the question whether dynamic, enterprising individuals and households who are willing to assure the demand for rural areas, will be able to maintain farm management in the new terms required.

The transition theory suggests that there is a spatial, temporal and structural co-existence of several processes of transition from productivism to post-productivism going on in rural areas (Wilson, 2007). This is particularly true for Mediterranean landscapes dominated by extensive agro-silvo-pastoral systems or small-scale mosaic farming, which in some cases are just entering the productivist phase, let alone moving towards post-productivism (Onate & Peco, 2005; Robinson, 2008; Tilzey & Potter, 2008; Vieira & Eden, 2005), both in terms of discourse and management practices. However, these are areas of a specific landscape character, increasingly valued by society due to their potential for non-commodity functions such as recreation, hunting, environmental quality, landscape appreciation (Paquette & Domon, 2003; Pinto-Correia & Vos, 2004; Romero-Calcerrada & Perry, 2004). Research of the team, on the processes of change affecting rural areas in Portugal, concerning separately the land cover, the agricultural sector and the community (Pinto-Correia & Breman, 2008, 2009), has showed a differentiation trend going on, where the multiple dimensions of the rural areas are getting strengthened differently in the different areas. From strictly a production oriented area, many rural areas in Portugal are becoming clearly also spaces of consumption and/or environmental conservation, in different combinations in the different types of areas in the country. The spatial expression of these different types makes it possible to recognize separate areas, with particular potentials and limitations. Many peripheral areas revealed a decline in

the social and economic role of agriculture, but a strong potential for other public goods that society expects nowadays from the countryside, as nature conservation and hunting, as well as tourism, if the landscape until now maintained by agriculture will be managed with similar results in the future (Pinto-Correia & Primdahl, 2009). Results from studies made by the team (Oliveira et al., 2007; Pinto-Correia et al., 2007; Pinto-Correia et al., 2009) showed a clear connection between the landscape as produced by the land use systems in place, and the preferences of landscape users in relation to the amenity functions they expect from the countryside (farmers, hunters, eco-tourists, local inhabitants, neo-rural inhabitants). This encourages new ways of managing the land, combining production with other income sources, and new strategies for farm survival (Marsden, 2003; van der Ploeg, 2008).



**Figure 1.** Possible existent combinations in rural landscapes depending on the balance between production, consumption and conservation (Holmes

Multifunctional transitions might be taking place, both at farm and at local landscape level, leading to an increase differentiation of the countryside (Marsden, 2003). Multifunctionality appears as the leading principle for a wider management of the countryside, specially needed in areas where production is not globally competitive (Durand & van Huylenbroeke, 2003; van der Ploeg, 2008). In fact, the debate surrounding multifunctionality continues to dominate academic and policy debates in the rural field (Mander et al., 2007; Ramniceanu & Ackrill, 2007; Wilson, 2008). It becomes evident that while some farmers have continued with a productivist strategy, others have opted for pathways closer to the non-productivist end of the decision-making spectrum including the commoditisation of the countryside and a re-evaluation of the meaning of ‘farming’ itself (Marsden, 2003).

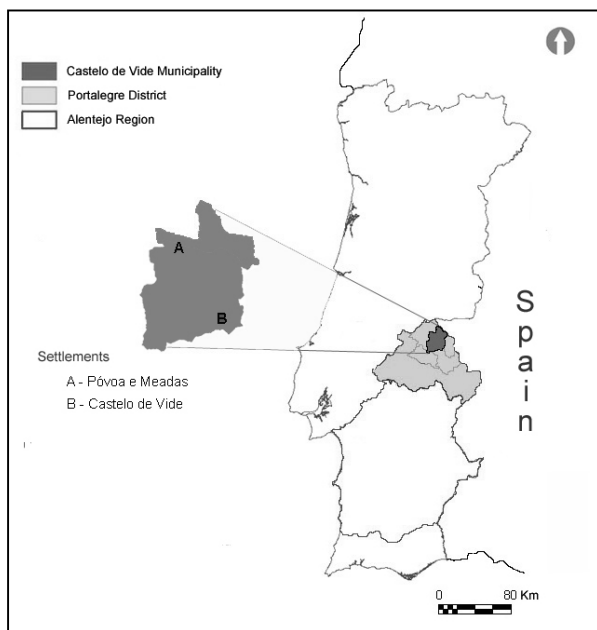
It is this wide spectrum of decision-making opportunities open to farmers that is referred to as the ‘multifunctional’ spectrum of decision making (Hollander, 2004; Holmes, 2006; Wilson, 2007, 2008). Multifunctionality should be about territorial expression of actions, and that it should have tangible expression at the local level of the farmed landscape (Wilson, 2009). Hence, the diversity of the activity systems of farm households need to be assessed in a different way, taking into account the roles of this diversity for meeting new social and environmental purposes (van der Ploeg et al., 2009). These new farming paradigms could maintain some of the still existing specific landscapes through new forms of management and compensation (van der Ploeg, 2008). If these would not be maintained, former agricultural systems could decay or disappear, unable to be competitive in a world market without the post-productivism discourses being reflected in practices. In between the above described extremes, many combinations may exist (fig.1), reflecting differences in the landscape per se, in farm management and in the local and regional context, and so differences in the balance between production, consumption and conservation (Holmes, 2006).

The current challenge for land managers, in peripheral areas, is to combine in innovative ways the multiple functions their farm may support, and their integration at the landscape scale, as the previous research consistently indicate (Pinto-Correia, 2010; Pinto-Correia et al., 2010). There is thus a need to produce new knowledge on the strategies needed for a multifunctional management at the farm and the landscape level. And thus, also a need to develop new approaches that make it possible to grasp the innovation capacity of land managers, as those who are more or less prone to

proceed in a transition pathway that will lead them to new management orientations, and the factors that have a role, both individual and in the local context and the institutional and policy framework. Further, the knowledge on the different types of land management taking place at a specific area, allows mapping the multifunctionality expression, which until now as mainly contributed to the theoretical framing, facilitating interpretation of trends for change and the role of agriculture in the rural landscape management.

Based on these requirements and assumptions described above, the analysis presented here intends to focus on rural areas in transition, in Mediterranean Europe, based on a case-study in Southern Portugal, a peripheric rural area where a characteristic landscape supports today several amenity functions. Based on data collected from landowners the main goal of this paper is to analyze the different farm management strategies in place and to identify typologies of transition pathways and the factors, internal and external to the farm, that support the innovation required for the multifunctional transition. The analysis also aims to find evidence of the coexistence of different strategies at local level, and to identify and characterize the spatial distribution pattern of areas concerned with these different farming strategies. The survey to a representative sample of land managers applied in the municipality of Castelo de Vide municipality in the Alentejo region comprises issues as management options, but also attitudes and expectations regarding the multiple functions of the rural landscape.

## Research Area-The municipality of Castelo de Vide



**Figure 2.** Location of Castelo de Vide municipality in Portugal and Alentejo region.

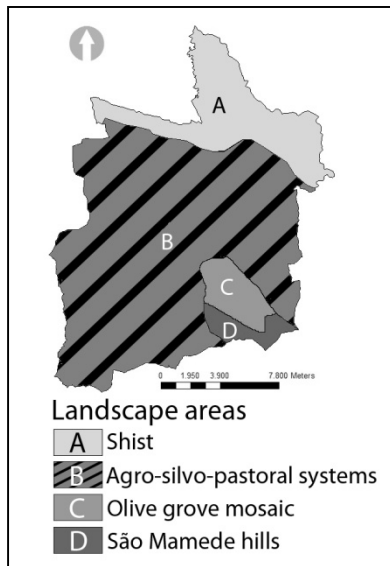
The municipality of Castelo de Vide is located in the Northeast of the Alentejo region, close to the Spanish border (Fig. 2). It is integrated in São Mamede Natural Park, also a Natura 2000 site. The municipality of Castelo de Vide covers a territory of 264 km<sup>2</sup>, with a total of 4144 inhabitants in 2000, and a very low density of population (15,64 hab/km<sup>2</sup>). This municipality has been classified as an area of *extensive agriculture with environmental quality, in diversified territory*, according to the typology established for the whole country concerning the dynamics and changes of rural areas in Portugal (Pinto-Correia et al. 2006; Pinto-Correia and Breman 2008). This means that it has a diversified landscape with conservation and environmental values, with potential for a multifunctional use, maintained through extensive farming systems, threatened now by the globalization processes going on.

It is also a municipality where land cover has been rather dynamic during the last years, resulting mainly from the extensification processes of the silvopastoral systems, but also from the forestation of agricultural areas. On the other side, it is a diversified area, with wild and poor areas close to the Sever River to the North, silvo-pastoral systems in large properties in the centre, small scale mosaic around the town of Castelo de Vide, and the mountain hills of São Mamede (Pinto-Correia and Primdahl 2009). The combination of the biophysical 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, a particular climate, more mild than in the surroundings due to the proximity of the São Mamede mountain, and also its cultural heritage, the municipality has been attracting since some years ago diverse types of users, both for recreation as for week-end stays and even settlement of neorural inhabitants, both Portuguese and foreigners.

### Landscape character areas

Four landscape areas have been identified (Fig.3): a) Schists, b) Agro-Silvo-Pastoral, c) Olive grove mosaic; d) São Mamede Hills.



**Figure 3.** Landscape areas identified for Castelo de Vide municipality.

The **landscape area of Schist (A)** has a very open and harsh character, which can be explained by its very poor soils developed from schist rock, and the consequent vast extension of shrub areas, areas of dispersed tree cover of cork and holm oak *montado* (the silvo-pastoral system characteristic of the whole region of Alentejo) and fast growing forest areas (Eucalyptus). The properties here are very large (>100ha) comparatively with the others landscape areas. There is a high potential for nature conservation and hunting.

The **Agro-Silvo-Pastoral landscape area (B)** represents the biggest landscape area in the municipality. Pastures are combined with high and low shrubs, broad leaf and evergreen oaks, annual cultures and rock outcrops. Livestock production is the main activity. These elements can be found all over this area, however the densities in which they occur can change very much, providing

more open or more closed areas, though maintaining the same landscape character.

The **landscape area of Olive Grove Mosaic (C)** represents the area where the municipality town, Castelo de Vide, is located. Surrounding the village, 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 neorural inhabitants, searching for a better life quality, but not connected to farming. Prices of land here are high, as the pressure for building or restoring houses is high.

The **landscape area S. Mamede Hills (D)** corresponds to a small part of the Mountain 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 monospecific forest plantations, of pine trees mainly. Some have been affected by fires in the last years.

### Methodology

The processes of transition and the conditions required for the transition pathways are so complex, that a clear overview of all factors has been difficult to achieve so far. Methodological innovation is needed, if the different areas of knowledge that are relevant to be integrated. The assumption that existent land management options reflect the capacity of innovation or adaptation of landowners, and that the conditions that support those are not fully known, has motivated the team to study these typologies at the farm level.

Knowledge on these processes and the factors at play is highly needed in particular in peripheral rural areas of Europe, as within the region of Alentejo, where many are the land managers struggling to find new strategies for their future, if possible linked to the emerging demand of public goods and services. Although with some biophysical limitations and declining role of the economic and social role of the farming, the value of the rural landscape in these areas is highly acknowledged already today as provider of goods and services. As evidence from other studies, related to landscape preferences, show, there is already a variation, within the same and different contexts, concerning land management. This may reflect different levels of adaptation concerning these demands. In order to collect precise information about the management typologies existent, a methodological approach is proposed as follows.

### **Characterization of the municipality of Castelo de Vide**

The identification and characterization of landscape areas applied the landscape character assessment approach based on the crossing of biophysical and socio-economic data and maps, combined with a revision of literature on the area and in-depth fieldwork (D' Abreu *et al.*, 2004) and also stakeholder's integration (Swanwick *et al.*, 2002). Information on land use systems and on the most relevant non-commodity functions that reflect the social demand already in place, were based on interviews to local key informants.

### **Enquiry**

The present proposal is built upon some key ideas, which are integrated and linked by an effective strategy, in order to accomplish its goals and fully execute the analysis. Applying this analysis in a case study area where public demand for rural landscape is already relevant and where, consequently, some land managers have started to react, by developing innovative management strategies. The approach for access land management typologies was based on surveys done in order to collect data that can characterize the land manager and farm profile, focusing on different dimensions: personal characterization; expectation and motivation (ideology); agricultural production; agricultural policies; etc. A representative number of surveys (n=72) were applied in the case study area, permitting a confident generalization to the population represented. The enquiries were done by direct contact.

### **Data analysis**

The enquiries were analyzed through expert analysis. The contribution of this analysis was to show evidence of the spatial temporal and structural coexistence and interplay of productivist and non-productivist strategies, in land management. The aim of this approach is to classify the different land management typologies on a multifunctional spectrum, from productivist to non-productivist oriented. It aims also at demonstrating the spatial expression of the differentiation taking place, linking ecological, social and economic factors. All those involved, from farmers, to neo-rurals or other land managers, need a deeper understanding on the transitions processes going on, so that they better can define and adapt their strategies. Farm strategies also depend from the landscape character they integrate. Further, relating the profile of more or less multifunctional land managers to a spatial distribution, has not been done before, and can lead to a possible linkage to the patterns of demand of public goods and services.

## **Results**

### **Landscape management: what are the different management strategies?**

A analysis in order to determine land management typologies has been undertaken, aiming to identify and spatialize land management typologies, reflecting the several management adaptations

by landowners which are progressively taking place to supply the new demand by society and the new role of agriculture. According to an expert analysis to the data collected at the farm level, it is possible to identify general types of land management trends.

*Types of Land management trends:*

**1:** Large properties (>100ha; 500-2000ha) in the northern part of the municipality, where 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. The size of the properties combined with a general high knowledge and experience from landowners, as a result from being part of rich and important families running a farm business for some generations, allows them to easy access to subsidies as they struggle to follow a production management as part of the family tradition. Although some areas are covered with fast growing forest species as eucalyptus, 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 and are two of the more appealing functions for these landowners to invest in, since the vast properties are rich in big game species (deer, wild boar), providing, at the same time, stunning views over a wide lonely deserted landscape stretching all the way to Spain, where nature inspires who longs for a break from the city. 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.

**2:** Medium properties (20-100ha) with strong productivist oriented management, located in the central part of the municipality. These have also meat production (cattle, sheep and goats) as the main goal and although 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 rock outcrops and dry stonewalls, as a result from an effort, throughout time, to clear as much soil as possible for production. 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.

**3:** Medium (20-100 ha) and small properties (5-20 ha) in the central and southern part of the municipality where innovative and multifunctional strategies for management have been appearing, mostly conducted by outsiders, Portuguese and foreigners, generally young and with academic education. Motivation for these landowner's bases on the search for balance and sustainable living, providing a break from an urban background and close connection with the land and nature rhythm. 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.

**4:** Small (5-20 ha) and very small properties (0-5 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 strategy is very peasant like as the products from these small properties represent important resources in the familiar 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.

**Table 2.** Land managers and farm profile; types of land management trends and land management types examples. The examples shown here were chosen to represent more or less the typical type of land management trend. In some cases the type of land management trend have two examples because in that group there are two sub types.

Land managers/farm profile	Types of Land Management trends	Land management types examples
<ul style="list-style-type: none"> <li>- Large properties;</li> <li>- Traditional family business farms;</li> <li>- Meat production;</li> <li>- Touristic hunting reserves and rural tourism.</li> </ul>	<p><b>I.</b> Production oriented management with some diversification</p>	<p><b>2120ha.</b> 45 years old. Inherited the property recently. In this area, there is a high potential for nature conservation and hunting. Due to the property area, the landowner is able to diversify in order to have more sources of income. So besides the cattle production, which is the main source of income, there is also a touristic hunting area, apiculture, and also some eco-tourism but in the last activity the owner doesn't obtain any advantage of it. Part of the area is under organic farming production but the main reason is not for ecological reasons but mainly to gain access to subsidies.</p>
<ul style="list-style-type: none"> <li>- Large and medium properties;</li> <li>- Traditional and organic meat production.</li> </ul>	<p><b>II.</b> Production oriented management with integration of environmental concerns</p>	<p><b>A. 59ha.</b> 75 years old. Low education level. Farming is the main activity, and the only source of income, which came predominantly from livestock production. Due to his age, the landowner just want to keep the current production, and doesn't want to make any changes or take any advantage of new function or activities.</p> <p><b>B. 186ha.</b> 43 years old. Medium education level with professional agricultural formation. Farming is the main activity. As the example above livestock production is the main source of income. However this landowner due to his young age and agricultural training, beyond the traditional farming and also as a result of its ecological concerns is doing some extensification and changing to organic production.</p>
<ul style="list-style-type: none"> <li>- Medium and small properties;</li> <li>- Strong ideological motivation;</li> <li>- Neo-rurals with urban background;</li> <li>- Nature, sustainability, aesthetics as strong values.</li> </ul>	<p><b>III.</b> Post-productivist oriented management based on Innovation and multifunctionality</p>	<p><b>90ha.</b> 42 years old. High education level. Neo-rural with strong urban background and ecological motivations. Never worked in agricultural business. Hobby farming activity. A lot of areas without production and with shrubs and bushes as a refugee for wild species, however since they don't like hunting there's a conflict with the hunters. This landowner have in mind a series of ideas and activities for the future, such as horseback riding or donkey, campsite areas, ecotourism activities, training farm for children, organic farming production, etc..</p>
<ul style="list-style-type: none"> <li>- Small properties around the main town;</li> <li>- Coexistence of old local farmers and urban outsiders;</li> <li>- Symbiotic functions of production and recreation;</li> <li>- Economical survival vs aesthetic pleasure.</li> <li>- Peasant like management for subsistence of insiders and recreation of outsiders</li> </ul>	<p><b>IV.</b> Gardened oriented management for subsistence and recreation</p>	<p><b>A. 2,1 ha.</b> 85 years old. Low education level. Very diverse farming with olive groves, vegetable gardens, fruit trees and vineyards. There is a decrease in production and mainly in the vegetable gardens and sheep production since he no longer can take care of all the production his age. In the pass he sells the production in the local market but now is just for own consumption. He is trying to sell his farm to move to Castelo de Vide town.</p> <p><b>B. 18,5 ha.</b> 45 years old. High education level. Neo-rural. Bought the farm to an old local farmer. Farming as a hobby activity. A local farmer often provides their service to manage the land (vegetable garden, grazing with sheep for shrubs control, olive tree management, etc.). In the future, recreation activities as donkey riding, rural tourism and organic farming. Conflict with hunters.</p>

## Discussion

The recognition of different management typologies leads to the identification, not just of land management types but also to the understanding of the spatial distribution, and the types associated with specific functions. Some results like the spatial distribution are not yet finished, but we expect in a near future to finish that analysis; however from the results already concluded is possible to figure out how some of the different types distribute in the municipality and landscape areas. For example the Group I type - *Production oriented management with some diversification* clearly appear more in landscape area A, where the farms are much bigger and allows some diversification together with cattle production and hunting areas. The types existent in the Group II - *Production oriented management with integration of environmental concerns*, emerge more in landscape area B in central and northern part of this landscape area. Here subsist two types (II-A and II-B), one connected with the older farmers with low level of education where the purpose is mainly the production. On the other hand in this group there's also another type related with the younger farmers with some education level and with professional agricultural training. These farmers also have as a main goal the production but they already included some diversification and most of the times they shift the production to organic farming.

Group III type - *Post-productivist oriented management based on Innovation and multifunctionality*, are associated mostly to the central and southern part of the municipality; some of these farms are located in the landscape area B some others in the limits of the landscape area C and D. These farms are close to the main town but far enough to have a bigger area allowing a bigger diversification. This typology is related with innovative and multifunctional strategies, mostly conducted by outsiders, Portuguese and foreigners, generally young and with academic education. Finally in the Group IV- *Gardened oriented management for subsistence and recreation* take place two types mainly located closed to the main town of the municipality in landscape area C and D. The properties are small and very small. One type (IV-A) is linked with the neo-rurals and outsiders, with a urban background, looking for second housing for weekends and holidays but formerly belonging to old local farmers. This landowners most of the times never had a link with farming or do it just as a hobby. However, and because of the motivation and higher education, these owners tend to diversify with donkey riding, aromatic plants production, trekking, etc.. These landowners also are closely linked with some old farmers still existent as they usually contract them to manage their land for grazing with their sheep, are take care of the vegetable garden. The second type IV-B is of course related with the old farmers still existent, which the main goal is a subsistence farming.

The types defined proved to be consistent, not only because they showed differentiated management strategies, but also because they also show different motivation as shown. As the management strategies have showed to be differentiated, the information to deliver as support to decision making for new management orientations can be in this way more accurate. Farm strategies depend on the landscape character they integrate and the farm area. Further, relating the profile of more or less multifunctional land managers to a spatial distribution, has not been done before, and can lead to a possible linkage to the patterns of demand of public goods and services. The linkage between land management typologies, spread upon a multifunctional spectrum, with the landscape users preference according to different functions (commodity and non-commodity functions) can also be done as shown in another paper from this workshop (Menezes et al. 2010).

The result presented here can provide us useful information for other areas still struggling under productivist orientations, not taking advantage of complementary non-commodity functions with potential for income support and social rehabilitation. In relation to the methodological approach developed in the surveys presented, several points deserve discussion. Respondents were with one or two single exceptions, highly open to the enquiry situation, and positively involved in the questionnaire. Results of types of management can be related with landscape patterns and with particular areas or farm units. And in the same way, the relation between the preferred pattern and the exact management options that result in this pattern is also difficult to establish but possible. However, the fact that the analysis of different types has been made by expert knowledge not allowed us to directly reproduce the methodology in another area. Developing methodologies and indicators expressing land management typologies bounded within a productivist and non-productivist action and thought (multifunctional spectrum) (Wilson, 2009) is the next step to reach the land management typologies in a more accessible and replicable way. So a better understanding of the indicators and also to adjust the inquiry to these indicators is the next area to develop for further studies.

## Concluding remarks

In the study area, traditional farming has created diversified landscapes with great environmental, cultural and scenic values. But farming in this area is facing many difficulties, struggling between market liberalization and the consequent urge for unrealistic competitiveness, and the more realistic extensification and progressive disappearance of the land use systems in place. As production loses its relevance in relation to emerging amenity functions that gain weight, new goals for management may be defined by each owner, demanding on one side, new income sources, but also new knowledge basis. Therefore, being able to assess how the above-mentioned changes influence the motivation and the management by different landowners is a fundamental contribution for the future management of these systems. The knowledge produced so far in this paper, is still under development, as not all possible exploitation of the data have been achieved. The relation of the land management typologies with multifunctional spectrum indicators and the consequent spatialization of the processes going on, is still under development. This will be the area to further develop in future studies, as well as progressing in the sense of obtaining more data on land management typologies, so that results can be generalised.



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