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# "Montados" Systems Sustainability: Landowners, Activities and Practices in Alentejo, Portugal

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**Abstract**. We present the results of a study on the sustainability of "montados" (dehesas in Spain), which basically depends on the type of management adopted by landowners, in a North Alentejo region of Portugal of around 156 000 ha. The prevailing exploitation systems are identified and characterized based on inquiries to landowners. The different types of productive activities are studied, as well as the practices more commonly associated with them. With the knowledge of both the exploitation systems and the agroforestry activities and practices, it became possible to create a typology we called "sustainabilities", which lays on the fact that it is by the activities and practices choice that landowners simultaneously interfere in economic, social and environmental sustainabilities.
**Key words**: agrosilvopastoral systems, attitude, "montados" management, exploitation systems, property, south of Portugal

**A sustentabilidade dos sistemas de montado: proprietários, atividades e práticas no Alentejo, Portugal**
**Sumário**. Apresentam-se os resultados de um estudo efetuado no norte alentejano numa região com cerca de 156 000 ha, sobre a sustentabilidade dos montados, que basicamente

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depende do tipo de gestão adotada pelos proprietários. Os sistemas de exploração prevalecentes foram identificados e caraterizados com base em inquéritos aos proprietários. São estudados os diferentes tipos de atividades produtivas, assim como as práticas culturais mais comuns nesses sistemas. Foi possível criar uma tipologia do que chamamos "sustentabilidades" com base no conhecimento dos sistemas de exploração e das atividades e práticas agroflorestais, assente no fato de que é pelas escolhas das atividades e das práticas culturais que os proprietários interferem simultaneamente na sustentabilidade económica, social e ambiental.
**Palavras-cheve**: sistemas agrosilvopastoris, atitudes dos proprietários e gestores, gestão dos montados, sistemas de exploração, propriedade, sul de Portugal

**La durabilité des systèmes de "montados": propriétaires, activités et pratiques à l'Alentejo.**

**Résumé**. Dans ce travail sont présentés les résultats d'une étude sur la durabilité des "montados", qui dépend du type de gestion adopté par les propriétaires, élaboré au nord de l'Alentejo dans une région d'environ 156.000 ha. Les systèmes d'exploitation dominants ont été identifiés et caractérisés à partir des enquêtes menées auprès des propriétaires. Les différents types d'activités productives, aussi bien que les pratiques culturelles ont été étudiés. Une typologie appelée de «durabilités» a été crée à partir de la connaissance des systèmes d'exploitation et des activités et pratiques agroforestières. Cette typologie est fondée sur le fait que c'est par les choix des activités et des pratiques culturelles que les propriétaires interagissent, en simultané, sur la durabilité économique, sociale et environnemental.
**Mots clés:** systèmes agrosilvopastoraux, attitude des propriétaires et entrepreneurs, gestion des "montados", systèmes d'exploitation, propriété, sud du Portugal

**Introduction**

"Montado" is a production system originated by man intervention in Mediterranean forestlands**,** where oaks were the dominant trees of the primitive vegetation, aiming to exploit, for his own benefit, natural resources that produced/produce goods and/or services with increasing demand on market.

A set of diversified production systems with extensive cultural tendency has resulted from that intervention. Its outstanding feature is the presence of cork oak (*Quercus suber*) and/or holm oak (*Quercus ilex*) in pure stands or associated with other species, mainly the maritime pine (*Pinus pinaster*) and the stone pine (*Pinus pinea*). The pluriproductive guidance has changed over the history of these systems. Thus, the consociation with cereal crop and grazing activity has dominated in some phases, mainly on holm oak "montados", whereas in other phases, as in the present, there is a retraction movement from crop to extensive animal husbandry and game. In any case, land multiple use is the distinctive characteristic of these systems.

The "montado", as we have defined it, while a productive system, is essentially the result of man interference in precise historical moments.

What are then the conditions that make man launch the intervention process in the natural environment?

The basic conditions for that are three:

- Existence of a land property regime in which large and very large private farms are broadly dominant.
- The availability of abundant and cheap labour resources.
- The appearance, on the national and/or international market, of an increasing demand for one or more specific products originated from "montado" natural resources.

After being created in a concrete period, the next question is to know the conditions of sustainability or decline of the "montados".

Obviously, the conditions leading to the decline are usually opposite to those allowing sustainability.

The concept of sustainability, long term permanence, has distinct meaning among the different scientific areas.

Ecological, environmental or biological sustainability refers to a certain environment or ecosystem biological productivity potential maintenance; on the opposite sense, in the biological productivity lasting decline, we move towards desertification (HARE *et al.*, 1992).

When we think about sustainable forest we should distinguish (FABIÃO, 1996, *cit*. RADICH & ALVES, 2000) between resource sustainability, that is of one or several kinds of production, and ecological sustainability "with long term permanence, meaning not only of production but also of the ecosystem structure and patterns".

In market economies, there are fundamentally two economic sustainability conditions. One is the possibility of continuously achieving long term exploitation positive net results. The other condition is the absence of alternative activities that would provide better economic results, in a way to produce capital from investment, thus leading landowners to interest in replacing "montados" exploitation by these new activities.

Intrinsically, the essential is on landowners economic rationality and attitudes in landed patrimony management (REIS, 1994).

The rise in prices of the industrial goods beyond certain landings, makes the search of cheaper alternative products profitable. This happened with the cork stoppers: the prices went up so much that made to seek and obtain an artificial substitute. Although being of inferior quality, its widespread utilization as stoppers in current and lower quality wines can seriously threat the economic sustainability of those "montados" where cork quality and/or the production costs are more unfavourable.

Social sustainability refers to the possibility of work income being attractive enough to avoid labour departure for other activities, either local, regional or external.

Evidently, social sustainability is much dependent on social progress conditions of "montado" regions, that is, on the accessibility to the minimal conditions of health care, education, leisure, and others that have become vital in modern society.

Economic sustainability is often seen in opposition to ecological sustainability. In the specific case of "montados", we believe that the system maintenance would be very difficult without economic and social sustainability together. It would not be possible, in a medium term, to keep the economic and social sustainability without safeguarding the biological sustainability.

Historical facts prove this, mainly related to the holm oak "montado" decline after the "montanheira" (pasture for black autochton race pigs) collapse, and the cork oak "montado" increment related to the stoppers demand increase, with the consequent rise in cork prices (COELHO, 2000a,b).

To corroborate what we have said we can invoke the damage caused to cork oak "montado" during the stripping period, to obtain stem tissue tannins for

"curtimenta" (tanning of hides) or the injuries inflicted to both cork and holm oaks "montados" when in course of the two World Wars the lack of fossil fuel shot up the demand and prices of the firewood and coal in the national market.

"Montados" are, therefore, land multiple use production systems, which man created by acting in the natural environment, and whose sustainability depends on the correct interaction of the ecological, economic and social spheres. Landowners are the key factor for the future of "montados". It is by the management options, at the agroforestry activities and practices choice level, that their action is determinative for "montados" sustainability. Thus, the agroforestry activities, practices and operations are the mechanisms that simultaneously interfere in ecological, economic and social sustainabilities.

In this work we analyse the above mentioned options, that is, the agroforestry activities and practices adopted by cork and holm oaks "montados" landowners in a region that comprises Avis, Mora and Arraiolos councils. The effect of these options at the environmental sustainability level is the study subject of other research team.

The text includes a small methodological note, the analysis of the region land tenure structure, the identification of the "montados" exploitation systems, and the identification and characterization of landowners groups according to the agroforestry activities and practices. The connection between systems and practices leads us to a typology of "sustainabilities".

## Methodology

The analysis was carried out in the Avis, Mora and Arraiolos region with 156 000 ha of total surface area. We identified 597 farms (owned by 444 landowners) larger than 20 ha (INSTITUTO GEOGRÁFICO PORTUGUÊS, 1999), and whose cork oak and holm oak stands amounted to, at least, 1 ha.

Aiming at the characterization of the exploitation system carried out by each landowner, a questionnaire form was produced, and it was delivered to the landowners and collected in hand in the year of 1999. A total of one hundred nine answers were obtained (24,5%).

Among economic[1] and structural indicators[2], twenty four variables were selected, which were then submitted to a principal components analysis (PCA), with previous variable weighing (COELHO *et al*., 2000). Subsequently, the taxonomic organization units were grouped by the respective K-means (COELHO *et al*., 2000), allowing us to identify five exploitation systems that occur in the study areas.

The twenty four variables were arranged so as to make it possible to select a sub-group of seven variables with main influence in the variability observed. The selected variables were: Cork Oak Stands Area/Total Area (CO/TS), Holm Oak Stands Area/Total Area (HO/TS), Improved Grasslands Area/Total Area (IG/TS), Irrigated Clean Land Area/Total Area (ICL/TS), Cattle Number/Total Area (CN/TS), Sheep Number/Total Area (SN/TS), and Total Labour/100 ha Total Area (UTA-Agrarian Labour Unit/100 ha).

The first four axes explained approximately 75% of the total variability, thus allowing a relative rigor in the analysis of the results.

The first axis essentially expressed an opposition between CO/TS and HO/TS variables, distinguishing the farms with cork oak predominance from those with holm oaks. The second axis indicated the presence-absence of ICL/TS and CN/TS variables, thus being related to irrigation intensification in the farm. The third axis opposed HO/TS variable to SN/TS and UTA/100ha ones, differentiating, therefore, the farms with labour intensification and sheep predominance from those with dominant holm oak, were catle and black pigs predominates. Finally, the fourth axis separated the farm by improved grassland intensification (IG/TS).

Subsequently, the automatic classification method was applied aiming to establish groups of farms with similar exploitation systems. This procedure allowed us to determine five groups.

To identify the main types of cultural interventions with incidence on "montados" conservation, ninety three enquiries were carried out.

An analysis methodology was applied to the results of these inquiries, in which we started by the codification of those variables that were considered in the forms, according to semiquantitative ordinal and nominal scales. After that, the TWINSPAN classification method was employed (COELHO *et al*., 2000).

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[1] Gross product, final product, crop output, woodland output, cork output, total labour, rented machinery traction, rented machinery traction (in cork oak activities).

[2] Total area, stands area, cork oak stands area, holm oak stands area, arable land area, improved grassland area, irrigated potential area, irrigated area, number of cattle, number of sheep, number of goats, number of pigs, sheep livestock units, tractor main power, machinery traction.

TWINSPAN is a program for arranging multivariate data in an ordered twoway table by classification of the individuals and the attributes that in our case are activities and practices managed in montados systems.

**Land property structure**

As already mentioned, landowners play an essential role in "montados" evolution, since when they decide about the type of agroforestry practices and activities that consubstantiate the land multiple use, distinguishing characteristic of those systems, they will interfere in the environmental, social and economic sustainability.

It is well known that "montados" have expanded in large and very large farms. In the Spanish Extremadura the *dehesas* law only considers as such, a farm with a surface area of, at least, 100 ha. In Portugal there are not established area limits for "montados"; however, the "Instituto Nacional de Estatística", with the agreement of the "Direcção Geral das Florestas" and the "Direcção Regional de Agricultura do Alentejo", only considers for forestry statistics, those farms with an area of 20 ha or more, and which contain a minimum of 1 ha of cork oak and/or holm oak stands. These were the criteria we followed in the analysis of the structure of the land property with "montados" in Avis, Mora and Arraiolos counties.

Table 1 clearly denotes the matrix of the basic territorial units that constitute our universe of study.

As we can see, the dominant territorial units (farms), when we refer to the surface area, are those with areas between 100 and 1000 ha. If we consider the number of farms, the predominant territorial units are now those with a surface area between 20 and 500 ha. However, the landowner is the nucleus of our universe of study. There are farms belonging to one landowner or more, and there are landowners owing one farm or more. Table 1 reflects these situations since the matrix of the predial structure by landowner is different from that indicated in Table 2. As already mentioned, landowners play an essential role in "montados" evolution, the dominant landowners, considering the surface area, are those having estates with areas bigger than 200 ha, although those owning estates with areas smaller than 500 ha predominate in number.

***Table 1*** *- Predial Structure per Area Class in North Alentejo region of Portugal*

| Classes (ha) | Farms | | Total Area | |
|---|---|---|---|---|
| | nº | % | ha | % |
| 20-50 | 128 | 21.4 | 4 106.9 | 3.0 |
| 50-100 | 101 | 16.9 | 7 497.5 | 5.6 |
| 100-200 | 128 | 21.4 | 18 402.0 | 13.6 |
| 200-500 | 183 | 30.7 | 56 456.0 | 41.9 |
| 500-1000 | 47 | 7.9 | 29 280.0 | 21.7 |
| 1000-2000 | 7 | 1.2 | 9 587.0 | 7.1 |
| >=2000 | 3 | 0.5 | 9 547.7 | 7.1 |
| Total | 597 | 100 | 134 877.1 | 100 |

Source: Instituto Geográfico Português, 1999.

***Table 2 -*** *Landowners Structure per Area Class in North Alentejo region of Portugal*

| Classes ha | Landowners | | Farms | | Farms/ Land-Owners | Total Area | | Area/ Land-Owners |
|---|---|---|---|---|---|---|---|---|
| | nº | % | nº | % | nº | ha | % | ha |
| 20-50 | 87 | 19.6 | 90 | 15.1 | 1.0 | 2899.7 | 2.1 | 33.3 |
| 50-100 | 64 | 14.4 | 72 | 12.1 | 1.1 | 4744.7 | 3.5 | 74.1 |
| 100-200 | 91 | 20.5 | 104 | 17.4 | 1.1 | 12704.3 | 9.4 | 139.6 |
| 200-500 | 134 | 30.2 | 167 | 28.0 | 1.0 | 42928.7 | 31.9 | 320.4 |
| 500-1000 | 49 | 11.0 | 98 | 16.4 | 2.0 | 31350.3 | 23.3 | 639.8 |
| 1000-2000 | 13 | 2.9 | 42 | 7.0 | 3.1 | 18527.3 | 13.7 | 1425.2 |
| >=2000 | 6 | 1.4 | 24 | 4.0 | 4.0 | 21722.1 | 16.1 | 3620.4 |
| Total | 444 | 100 | 597 | 100 | 1.3 | 134877.1 | 100 | 303.8 |

Source: Instituto Geográfico Português, 1999.

**Exploitation systems**

Five exploitation systems were identified, which are briefly characterized in the following:

*1. Traditional cork oak "montado". With extensive understory pasture exploitation.* The average total surface area is 272 ha, from which more than a half is covered with cork oak stands. In these "montados" there is, preferentially, sheep husbandry, but also some cattle husbandry. Labour use intensity is 1,4 UTA/100ha.

*2. Cork oak "montado" with improved grasslands*. The estate average total surface area is 173 ha, from which around ¾ are occupied with cork oak stands, and 80% are utilized with improved grasslands. Animal husbandry is composed of sheep, with a load twice the one of the traditional system. Labour use intensity is 1,1 UTA/100ha.

*3. Traditional holm oak "montado". With extensive understory exploitation*. The average total surface area of this system units is 282 ha, from which about a half is covered with holm oak stands. Animal husbandry is mainly formed by sheep, with some cattle. Labour use intensity is 1,2 UTA/100ha.

*4. Holm oak "montado" with improved grasslands*. The estates average total surface area is 209 ha, from which around ¾ are occupied with holm oak stands, and 80% are utilized with improved grasslands. Animal husbandry is composed of cattle, with a load that is much lower than the one of the previous system. Labour use intensity is 1,5 UTA/100ha.

*5. "Montado" on farms including irrigation*. The average total surface area of this system units is 182 ha, from which 1/5 is covered with cork oak stands, and 1/10 with holm oak. Around 40% of that area is utilized by irrigated cultures (maiz, rice, tomato, melon). Load husbandry is very low in this system, and the effective total is constituted of sheep and cattle without dominance of any species. Labour use intensity is 1,6 UTA/100ha, the highest of all the systems.

The economic results (Table 3), measured in gross production/ha of total area or in final production/ha of total area (TA), were higher in the system of "M*ontado" on Farms Including Irrigation* and lower in the *holm oak* systems. In the latter, the values obtained were approximately half of those found in the cork oak "montado" systems.

***Table 3*** *- Economic results (euros/ha)*

| **Classes** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| GP/TA | 205 | 260 | 105 | 140 | 340 |
| FP/TA | 100 | 145 | 25 | 85 | 40 |

Source: Autors elaboration

**Management groups according to agroforestry activities and practices**

Nine management practices groups were identified, which are characterized by the common presence (or absence) of a certain set of agroforestry activities and practices (Table 4).

***Table 4*** *- Frequency of the activities and practices per management practice group-SE*

| Class \ Group (%) | SE1 | SE2 | SE3 | SE4 | SE5 | SE6 | SE7 | SE8 | SE9 |
|---|---|---|---|---|---|---|---|---|---|
| Formation Pruning | 0 | 40 | 90 | 0 | 0 | 20 | 0 | 0 | 0 |
| Maintenance Pruning | 20 | 92 | 100 | 75 | 0 | 90 | 100 | 0 | 10 |
| Soil Mobilization | 0 | 0 | 0 | 87 | 90 | 100 | 25 | 0 | 0 |
| Culture (crops) | 7 | 0 | 30 | 87 | 90 | 100 | 75 | 0 | 20 |
| Fertilization | 7 | 0 | 20 | 75 | 78 | 67 | 88 | 0 | 10 |
| Improved Grasslands | 0 | 0 | 10 | 100 | 0 | 0 | 50 | 0 | 0 |
| Installed Pastures | 0 | 0 | 20 | 0 | 67 | 100 | 38 | 0 | 0 |
| Natural Regeneration Protection | 0 | 0 | 20 | 0 | 10 | 44 | 0 | 30 | 0 |
| Animal Husbandry Load Control | 7 | 15 | 0 | 63 | 0 | 0 | 0 | 0 | 0 |
| Big Game | 0 | 0 | 0 | 25 | 40 | 10 | 6 | 60 | 10 |
| Unrestricted Hunting | 40 | 27 | 0 | 0 | 0 | 20 | 25 | 30 | 10 |
| Number of cork Strippings | 67 | 60 | 88 | 100 | 78 | 88 | 0 | 100 | 78 |
| Integral cork Strippings | 30 | 67 | 10 | 100 | 67 | 78 | 0 | 60 | 30 |
| Fractionated cork Strippings | 7 | 0 | 78 | 50 | 40 | 10 | 0 | 60 | 0 |
| Wire Fences | 0 | 0 | 67 | 63 | 40 | 78 | 75 | 0 | 0 |
| "Montanheira" | 0 | 15 | 10 | 0 | 0 | 10 | 6 | 0 | 0 |
| Caprine husbandry | 0 | 6 | 10 | 0 | 10 | 0 | 6 | 0 | 20 |
| Bovine husbandry | 7 | 40 | 10 | 75 | 30 | 10 | 80 | 0 | 80 |

Source: Autors elaboration

The activities and practices' included in the inquiry forms but not displayed in the Table 4 are those which, by TWINSPAN methodology, had no meaning in the separation of the groups. These variables would be either present in all groups (*e.g.* sheep, small game, shrub clearings, grasslands, dead trees cut, pastures utilization during all the year, and bigger or lower livestock charge) or generally absent with rare exceptions (*e.g.* mushrooms harvesting, thinnings, tree plantations, associative game, and coal production).

The great division axes were: 1st - Pruning and "Montanheira"; 2nd - Cultures (crops), Soil Mobilizations, Improved Grasslands, Installed Pastures, and Protection of Natural Regeneration; 3rd - Integral Cork Stripping, Number of Cork Strippings, and cattle (Figure 1).

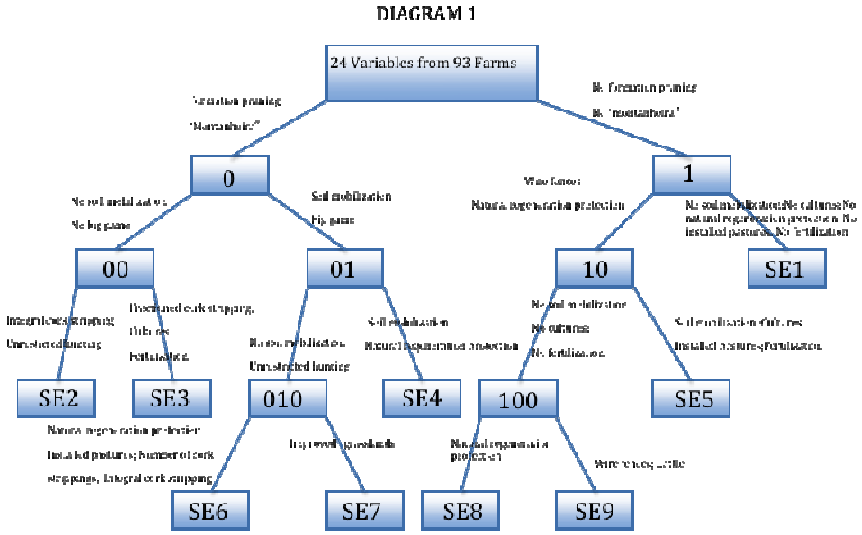


***Figure 1*** *– 24 Variables from 93 Farms*

Regarding the soil mobilization practice, carried out for shrub control and/or seeding, it is usually performed by tractors and disc harrows, and sometimes by scarifiers, that is, by light machinery which operates at low depths.

Related to pastures, we distinguished the natural pastures improved by the application of fertilizers (improved grasslands) from the installed pastures, in which seeding practice occurred besides fertilization, generally with the use of mixed seeds but sometimes using seed of just one species.

A brief description of the nine groups found is presented in the following.

SE1 – The distinguishing mark of this group is the total or almost total absence of silvicultural practices and activities such as cultures, animal husbandry, pastures and cynegetic. Since this is a cork oak "montado" group, the number and type of cork strippings, with the dominance of the integral cork stripping, and the unrestricted hunting, are the practices and activities present, which do not demand any kind of effort by the "montado" manager.

SE2 - The distinguishing mark of this group is the absolute importance of the pruning practice and the relative importance of the "montanheira". There are no cultures, no pastures, no soil mobilization and no fertilizers. The cork stripping is integral and the bovine husbandry assumes significance (it is important to point out that the present production system is a mixed cork oak and holm oak system).

SE3 - The distinguishing mark of this group is the absolute importance of the pruning practice and the relative importance of the "montanheira". One third of the group performs cultures, another third carries out pastures, but nobody mobilizes the soil. A greater part has wire fences. The cork stripping is essentially fractionated and the bovine husbandry is not relevant.

SE4 - The distinguishing mark of this group is the absolute importance of the maintenance pruning practice. Everybody has improved grasslands and the majority performs cultures, fertilization and soil mobilization. A greater part of the group has wire fences and controls the animal husbandry. The cork stripping is mostly integral and the bovine husbandry is very important.

SE5 - The distinguishing mark of this group is the total absence of the pruning practice. The cultures, installed pastures, soil mobilization and fertilization assume particular importance. A great part of the group has big game and there is bovine and caprine husbandry within wire fences. Cork stripping is either integral or fractionated.

SE6 - The distinguishing mark of this group is the absolute importance of the maintenance pruning practice and the relative importance of the "montanheira". Everybody has installed pastures and cultivates the land with soil mobilization. The most part of the group applies fertilizers. Special attention is given to the protection of the natural regeneration and the wire fences are mostly utilized. The cork stripping is basically integral and the bovine husbandry has low meaning.

SE7 - The distinguishing mark of this group is the absolute importance of the maintenance pruning practice (it is important to point out that the present production system is a "montado"of holm oak). Some "montanheira" is carried out but the preference goes toward the bovine husbandry. The cultures, pastures and fertilization assume relevance, however, soil mobilization is not much utilized. Wire fences are broadly utilized.

SE8 - The distinguishing mark of this group is total absence of activities and practices such as pruning, animal husbandry, cultures, pastures, fertilization

and soil mobilization. The big game assumes importance and one third of the group protects the natural regeneration. The cork stripping is either integral or fractionated.

SE9 - The distinguishing mark of this group is the absolute importance of the bovine husbandry and the relative importance of the caprine husbandry. All the remaining variables of Table 4 are either absent or present with a low degree of importance.

**Sustainability types**

The conjunction of the management practices groups and the exploitation systems to which they are associated allowed us to synthetize a typology of "sustainabilities" that we succinctly present below. Since landowners are the principal agents of the mentioned "sustainabilities", we have chosen those terms which are inspired by the kind of attitudes regarding natural resources.

*I. Conservationist*
I 1 Exploitation system – traditional cork oak "montado"
Management practices group – SE2
I 2 Exploitation system – traditional holm oak "montado"
Management practices group – SE2
I 3 Exploitation system – "montado" on estates including irrigation
Management practices group – SE2

*II. Productive*
Exploitation system – cork oak "montado" with improved grasslands
Management practices group – SE5

*III. Do (basically) nothing*
Exploitation system – traditional cork oak "montado"
Management practices group – SE1

*IV. Do (basically) nothing / Conservationist*
Exploitation system – traditional cork oak "montado"
Management practices group – SE8

*V. Conservationist / Productive*
Exploitation system – cork oak "montado" with improved grasslands
Management practices group – SE5

*VI. Productive / Conservationist*
VI 1 - Exploitation system – traditional holm oak "montado"
Management practices group – SE7
VI 2 - Exploitation system – holm oak "montado" with improved grasslands
Management practices group – SE7
VI 3 Exploitation system – "montado" on estates including irrigation
Management practices group – SE3

*VII. Do (basically) nothing / Conservationist / Productive*
Exploitation system – traditional holm oak "montado"
Management practices group – SE9

**Conclusions**

We started from the following basic assumptions: "Montado" is a production system originated by man intervention in Mediterranean forestlands, where oaks were the dominant trees of the primitive vegetation, and whose sustainability depends on the correct interaction of the ecological, economic and social spheres. Landowners are the key factor for the future of "montados". It is by the management options, at the agroforestry activities and practices choice level, that their action is determinative for "montados" sustainability. Thus, the agroforestry activities, practices and operations are the mechanisms that simultaneously interfere in ecological, economic and social sustainabilities.

Intrinsically, the essential is on landowners economic rationality and attitudes in landed patrimony management.

When we apply a Principal Component Analysis to the variables of our study we can identify and characterize five principal systems of "montados" exploitation. The TWINSPAN methodology allowed us to recognize nine homogeneous groups of "montado" landowners, according to the class of agroforestry activities and practices they utilize on their estates.

The crossing between the exploitation systems and the homogeneous groups that were defined according to the activities and practices led us to the

identification of different types of "sustainabilities" of "montados". This means similar groups of landowners, which follow the same resources exploitation system and apply a specific set of agroforestry practices in the management of those resources.

The positive or negative consequences of these types of "sustainabilities" on "montados" should be analysed using additional approaches, under the scope of other sciences.

Once these studies are performed, we will then deepen our research with a different kind of approach, in which we will try to find out the disposition of landowners to change from agroforestry practices and activities harmful to the systems, to others with a more conservationist tendency.

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