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THE MONTADO LANDSCAPES OF ALENTEJO:
IDENTIFICATION OF THREATENED MEDITERRANEAN
LANDSCAPES IN SOUTHERN PORTUGAL

by
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STATEMENT BY AUTHOR

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ABSTRACT

Montado landscapes are agro-silvo-pastoral systems where pastures and crops occur under the canopy of trees. They are specific to the southwest of the Iberian Peninsula.

In Alentejo, two types of montado with different origins, geographic distribution, and economy can be distinguished: the Holm Oak Montado and the Cork Oak Montado.

Changes in Alentejo’s socioeconomic situation have led to montados, until recently the most profitable land use for the poor soils of the region, being currently in danger of extinction either by abandonment or substitution.

This thesis seeks to identify the structure, dynamic evolution, and possible future of montados. It demonstrates, within an historical perspective, that these landscapes can assume different forms, corresponding to varying degrees of intensity and uses. Therefore, the preservation of their productive, ecological, and cultural values necessitates redefinition of their form in relation to the evolving socioeconomic context.
I - INTRODUCTION

The extinction of the unique, whether it is a treasured work of art, a species, or ...a landscape is irrevocable

Adapted from R. L. Smith

I.1 - THESIS OBJECTIVES

The montado landscapes are agro-silvo-pastoral systems where pastures and crops occur under the canopy of fruit or forest trees. They have been identified by Meeus et al. (1990) as one of the 13 types of agricultural landscapes in Europe. Although similar landscapes can be found in other parts of the world, most authors consider the montado to be specific to the southwest of the Iberian Peninsula where it appears associated with two native evergreen oaks: the cork oak (Cork oak montado), and the holm oak (Holm oak montado).

Like the majority of landscapes occurring in the Mediterranean Basin, the montados have co-evolved with man, and their continued existence is dependent on human intervention. As the new socio-economic context in Mediterranean Europe has been gradually leading to the disappearance of the combined agricultural, forest, and

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grazing land uses which have shaped montados since time immemorial, these landscapes are now in danger of extinction either by abandonment or substitution by other land uses. Their loss would not only imply an important decrease in the productivity of the already disadvantaged southwestern Iberian Peninsula areas, but also the disruption of the invaluable protection and regulatory ecological functions performed by these systems, as well as the loss of their inherent aesthetic, cultural and historical values.

In consideration of the need to preserve the montado landscapes, the goal of this thesis is to bring together knowledge about the structure, dynamics, historic evolution, current situation, and future perspectives of these landscapes in the southern Portuguese region of Alentejo (map I), where they still occupy one third of the total area. In order to set up a global context for this study these landscapes are first located in the Sclerophyll Forest Zone, and identified according to the criteria developed by Rossi and Vos (1993) as endangered Mediterranean landscapes, thus, making them eligible for a Green Book on Mediterranean Threatened Landscapes (chapter I). The modern Holm Oak Montado and Cork Oak Montado are identified and described in the study region - Alentejo - (chapter II), and their history is traced as far back as possible within the context of the evolution of the Alentejo landscape (chapter III). Both chapters review the available literature about the subject. Having described the landscape and revealed its history, the conclusions are then laid out in chapter IV. After summarizing the evolution of both montado landscapes, chapter IV evaluates their present situation, projects their future,
and makes the point, using landscape ecology and sustainable development concepts, for the urgent need to defend these systems. Additionally, a few hints of possible solutions to maintain "and care for what cannot be quantified"\textsuperscript{2} are given.

\textsuperscript{2} "(...) between indulgence in the present and consideration of the future obliges people to strike a balance between counting what can be quantified and caring for what cannot be quantified". (Ashby, 1978).
Map 1 - Portugal and Alentejo in Western Europe
The Sclerophyll Forest Zone (SFZ) of the Mediterranean Basin is probably, after the tropical rain forests, the most threatened ecosystem in the world. (Naveh and Lieberman, 1994). The SFZ, which comprises about 1% of the world's terrestrial vegetation, covers all the regions that exhibit a Mediterranean climate\(^3\), i.e., a climate characterized by a division into periods of maximum temperature (warm to hot dry summers) and maximum precipitation (mild to cold wet winters) (Perez, 1993; Naveh and Lieberman, 1994). A classification by UNESCO (1963) subdivides the SFZ into: i) a drier "xerothermic" region merging into the subdesert, the *Oleo-Ceratonia* alliance (W. Medit.) and the *Ceratonio-Pistacion* alliance (E. Medit), according to the Braun Blanquet terminology, and ii) a wetter "accentuated thermomediterranean" part, the *Quercion ilicis* alliance (W. Medit.) and the *Quercion calliprini* alliance (E. Medit).

The geomorphic (abundance of steep slopes) and edaphic (predominance of barely developed soils) characteristics of Mediterranean landscapes make them very vulnerable to sheet and gully erosion when their protective natural vegetation canopy is denuded and their shallow soil mantle is exposed to desiccation in the dry summer and to torrential rains in the winter. This vegetation, adapted to suboptimal growing conditions, is mostly broad-leaved evergreen trees and shrubs, and annuals, (Perez, 1993; Naveh and Lieberman, 1994).

---

\(^3\)Approximately half of the SFZ is concentrated in the Mediterranean Basin, but it occurs also in California, central Chile, southern Australia, and in the Cape Region of South Africa. (Naveh and Lieberman, 1994).
The final shaping of Mediterranean landscapes took place during the Quaternary, but the evolutionary process of speciation and ecotypic variation was continued and gradually intensified during the long period of human occupation initiated in the Middle Pleistocene (Naveh and Lieberman, 1994). The addition since then of anthropogenic pressures (hunting, gathering, prescribed burning, cultivation, woodcutting and coppicing) to natural selection forces (drought, fire, and grazing) has brought most of these landscapes clearly into the realm of cultural landscapes.

The biodiversity of the SFZ has been multiplied since the Neolithic Revolution, as the anthropogenic factors have exploded in intensity by the introduction of domestic ungulates, and by the periodic opening of the Sclerophyll Forest (SF) not reclaimed to farm land by prescribed burning, woodcutting and coppicing (Naveh and Lieberman, 1994). The proximity of cultivated areas created conditions for spontaneous hybridization of wild and cultivated plants (Zohary, 1960), many of which, especially grasses and legumes, have become the most valuable pastures plants in Mediterranean and temperate climates (Naveh and Lieberman, 1994).

During Biblical and Classical times, the densely wooded SF was transformed into a more open and "humanized" landscape. The natural vegetation was retained only on the least accessible rocky and mountain sites, while on the remaining area, man-modified semi-natural mixed woody and herbaceous plant communities appeared closely interwoven with well-managed field crops, vineyards, olive groves and orchards. The population decline and agriculture regression occurring during the Middle Ages led to the establishment of a new man-maintained equilibrium of the SF that was neither overgrazed, heavily coppiced, too frequently burned, nor completely protected (Naveh and Dan, 1973). This man-maintained equilibrium shaped the Mediterranean plant communities into a "mosaic of innumerable variants of different degradation and
regeneration stages" (Walter, 1968). Thus, from the combination of ecological heterogeneity, biotic richness, and human modification, very attractive and diverse seminatural landscapes evolved (Naveh and Lieberman, 1994).

Today, the dynamic equilibrium that has contributed to the biodiversity, productivity, and stability of these agro-silvo-pastoral landscapes is threatened either by excessive use, or by abandonment. In the Southern Mediterranean the degradation arises from excessive grazing pressures and removal of fuelwood by a fast-growing population (Naveh and Lieberman, 1994), while in the North (Mediterranean Europe) the tendency is to abandon and neglect the SF not reclaimed to agriculture, intensive forestry or urban sprawl.
1.3 - GREEN BOOKS FOR MEDITERRANEAN THREATENED LANDSCAPES

In an effort to protect these endangered landscapes, Naveh and Lieberman proposed in 1984 the preparation of "Red Books for Mediterranean Threatened Landscapes". These Red Books, renamed in the meantime Green Books, were conceived as analogous to the IUCN Data Books for endangered species. But, because most decisions affecting the fate of biodiversity as well as other landscape values and functions, are made on the landscape level, their foci are concrete endangered landscape units (which can range from a small ecotope to a regional landscape) instead of the taxonomic species level (Naveh, 1993).

As threats to such tangible entities as landscapes are likely to have more impact on the public than threats to species or vaguely defined ecosystems, it was recommended that the Green Books include relevant information, not only on endangered natural assets, but also on all other crucial historical, cultural and aesthetic values. Green Books should also provide practical solutions as to how to prevent further deterioration and misuse, and should recommend alternative and more sustainable land use practices. (Naveh, 1993).

The goal is not to produce another scientific or technical report to be filed away, but a document usable by political and professional decision makers, by those dealing directly or indirectly with these landscapes, and by the public in general. Green Books "should ideally be a database, a dynamic model, an impact evaluation, a forecasting tool and a background document for planning, policy, and management guidelines. They should tell us what the landscape is composed of, its static as well as dynamic aspects, i.e., the forces that are changing it, and what should be preserved and how to do it" (J. Glass, quoted by Naveh, 1993).
Rossi and Vos (1993) identified for Mediterranean Europe three types of landscapes to be the object of Green Books, and included in a Red List of endangered landscapes:

i) Metastable relict landscapes - landscapes originated under natural conditions much different from today's, which for several reasons have survived as "relicts".

ii) Unstable vanishing landscapes - cultural landscapes developed under a different social and economic context, which have lose part or all of their originating functions.

iii) Metastable strained landscapes - cultural landscapes determined by still evolving anthropic functions, whose uncontrolled progress may overwhelm and unbalance the overall characteristics of the landscape.
I.4- THE ALENTEJO MONTADOS AS ENDANGERED MEDITERRANEAN LANDSCAPES

The open oak forests (cork oak *montado*, and holm oak *montado*) that have been the *ex-libris* of the Alentejo landscape, praised in all the travel diaries, travel books, or magazine articles about the region, have all the characteristics necessary to be considered unstable vanishing landscapes, especially the holm oak montado.

With their natural origins lost in history, these agro-silvo-pastoral landscapes evolved to the form they maintained until a couple of decades ago between the 18th and 19th centuries. This form was the result of an intensification of all its productive components in order to obtain the highest possible output while maintaining the equilibrium of the whole system. Such intensification was only possible within a certain socio-economic context, which is no longer the same.

The gradual (and recently European Union subsidized) disappearance of the anthropogenic pressures creating the equilibrium and inherent beauty of these landscapes has been leading their evolution to an increasing degradation by abandonment. The extinction of these systems which had represented (and still represent) the best land use for the poor soils of the Western Iberian Peninsula (Alentejo included) constitutes not only an economic loss, but also a fundamental disruption of the ecological, aesthetic and cultural equilibrium of a whole region. Their disappearance further jeopardizes the region’s historical inheritance and future sustainability. This makes these landscapes obviously a case to be included in a Red List of Mediterranean landscapes.

The elaboration of a Green Book for the *montado* landscape is clearly outside the scope of this thesis. Ideally a very extensive inventory of the landscape and its diverse components as well as an instrument to evaluate impacts and propose alternatives, Green
Books must obviously result from the work of an interdisciplinary team. The objective of this thesis, as was already stated, is less ambitious.
II - THE MONTADO SYSTEMS OF ALENTEJO

"The Alentejo is this: fields of wheat, montado, and a solemn solitude."¹

Orlando Ribeiro

II.I - THE ALENTEJO AND ITS LANDSCAPE

From a geographic perspective², Alentejo is the southern Portuguese region located between the Tejo river³ and the Serra Algarvia (a chain of mountains separating it from the Algarve, the southernmost Portuguese region). This region corresponds to approximately one third of the Portuguese territory. (Ribeiro, 1955).

The administrative region called Alentejo, however, is smaller than its geographic counterpart (map 2). It corresponds to a territory of 26,932 km², i.e., 29.3 % of the country area (91,831 km²)⁴, and encompasses the districts of Portalegre, Évora, and Beja, which consist of 46 counties or 289 freguesias (the smallest administrative units). Recently, it has been subdivided into 4 subregions: Alto Alentejo (Northern Alentejo); Alentejo Central (Central Alentejo); Baixo Alentejo (Southern Alentejo); and Alentejo Litoral (Littoral Alentejo) (map 3). (INE, 1993).

¹"O Alentejo é isto: seara, montado e uma solidão solene".
²From the perspective of a territorial unit exhibiting homogeneous geographic characteristics.
³The word Alentejo actually means beyond (Alem) the Tejo.
⁴This area includes the Azores and Madeira Islands.
Map 2 - Alentejo: Geographic Boundaries

Map 3 - Alentejo: Administrative Boundaries
As will be explained in the next chapter, the political limits of this region have changed throughout history. In Ancient times, its territory was part of the Roman Lusitania, and of the Muslim Garb-al-Andaluz (maps 10 and 12). Being part of Portuguese territory since 1238, its first name was Antre Tejo e Odiana when the country was first subdivided into administrative units in the first half of the 14th century (map 15). Its current limits were set up only in the 19th century, when the 3 districts actually composing the region were established by the Decree of 18th of July of 1835 (Caldas, 1991).

Besides the large basins of the Tejo and Sado rivers, the Alentejo constitutes a fairly homogeneous geographic and visual unit (map 4). As mentioned by Ribeiro (1955), the idea of uniformity comes to mind, sustained by an unending expanse of smooth rolling hills only occasionally interrupted by the rise of a higher mountain. Except for the Serra de S. Mamede (1,205 m), and Serra da Ossa (649 m), all the Alentejo is at an altitude of less than 400 meters (map 5) (Lautensach, 1932; Ribeiro, 1955).

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5Antre Tejo e Odiana means between the rivers Tejo and Odiana, this latter now called Guadiana.
6Only 3% of the Southern Portugal (area located south of the Tejo river) has an altitude above 400 m. 63% of this region is located bellow 200m, and 37% between 200 and 400m. (Ribeiro, 1945)
Map 4 - Landscape Units
Source: adapted from "Geografia de Portugal" (S. Daveau eds., 1991)
Map 5 - Topography (South of Tejo River)
Source: adapted from "Geografia de Portugal" (S. Daveau, eds., 1991)
The absence of relief which would otherwise promote the condensation of humidity coming from the Atlantic, together with the southern position of the region, have caused the Mediterranean climate to be substituted for the Atlantic climate typical of other Portuguese regions (Ribeiro, 1955). The Alentejo, as any other Mediterranean climate zone, is characterized by a division into periods of maximum temperature (warm to hot dry summers) and maximum precipitation (mild to cold wet winters). The climate is not homogeneous, though, throughout the region. As one goes towards the interior, the temperature increases in the summer (map 6), and decreases in the winter (map 7), thus increasing the annual thermic amplitude (12° in littoral Alentejo as opposed to 17° in the most continental areas). Rainfall and relative humidity decrease as well (except for the higher mountain areas mentioned above) as one gets away from the ocean (map 8).

This non-coincidence in time of maximum temperature and maximum precipitation, together with the summer water deficit, causes chemical weathering to be slow, and therefore soils to be poorly developed (Perez, 1990). Apart from scarce areas of rich soils such as those occurring in Beja, Elvas, Évora and Estremoz, the soils of Alentejo are generally thin with low water storage capacity, poorly aggregated and very prone to erosion, and poor in organic matter.
Map 6 - Average Temperature in the Month of January

Map 7 - Average Temperature in the Month of July

Source: Adapted from "Atlas de Portugal" (Amorim Girão, 1941).
Map 8 - Average Annual Precipitation (South of Tejo River)
Source: adapted from "Geografia de Portugal" (S. Daveau, eds., 1991)
These edapho-climatic characteristics led to the development in the region of evergreen sclerophyll vegetation dominated by the *Quercium ilicis* alliance of forests and *maquis* shrubland associations in the interior areas, and by the *Quercium suberi* alliance in the littoral. (map 9). The arboreal strata of these floristic alliances is dominated in the west by the cork oak (*Quercus suber*) and maritime pine (*Pinus pinea*), substituted in the interior by the holm oak (*Quercus rotundifolia*)\(^7\), which is more adapted to drought and to higher summer temperatures. The wild olive tree (*Ollea europea var. sylvestris*), thriving in a wide range of climate and soil conditions, appears as a companion species in both alliances.

Constituting the shrubland of these areas, the *maquis*\(^8\), one can find *Quercus coccifera*, strawberry trees (*Arbutus unedo*), mastic trees (*Pistacea lenticus* and *Phillyrea angustifolia*), oleanders (*Nerium oleander*), laurel trees (*Laurus nobilis*), spurge-laurels (*Daphne gnidiun*), rhododendron (*Rhododendron ponticum var. baetica*), furze (*Ulex sp.*), white heather (*Erica arborea*), rosemary (*Rosmarinus officinalis*), lavender (*Lavandula sp.*), and several brooms (*Cytisus sp.; Genista sp.; Retama sp.; Ruscus aculeatus*) and rock roses (*Cistus sp.*), among many other species. (Lautensach, 1932; Ribeiro, 1955). The herbaceous level of these associations is constituted primarily by annuals (Perez, 1990).

\(^7\)Until recently the holm oak existing in southern Portugal was called *Quercus ilex*.

\(^8\)The shrubland floristic associations developing in the sclerophyll forest zone have several designations depending on the part of the world where they appear. In France they are called *maquis*, in Italy *macchia*, in Spain and Chile *matorral*, in Greece *xerovoni*, in Israel *choresh*, in California *chaparral*, in South Africa *fynbos*, in Australia *mallee, heath,* and *scrub* (Naveh and Lieberman, 1994), and in Portugal *chanieca*. As the most widely used name in scientific publications is *maquis* (probably because this vegetation has been widely studied by the French botanist Braun Blanquet), I've decided to use this word whenever I want to refer in this thesis to the shrubland dominated vegetation native from the South of Portugal.
Map 9 - Distribution of the Native Quercus
Source: adapted from (J. Carvalho e Vasconcellos, and J. Amaral Franco, 1958).
The geographic characteristics of Alentejo, together with its historic evolution have determined in this region a pattern of concentrated human habitat, and a low population density, at least since the Christian Reconquest. According to Ribeiro (1945) this settlement pattern is typical of Mediterranean climates, where the lack of humidity and low soil fertility do not promote the dispersion of population. In Alentejo, these natural conditions have been helped by the concentration of land in the hands of a few owners.

Until the 19th century, the large and compact cities and villages of Alentejo, with their agricultural belt of rich crops (kitchen gardens, orchards, and vineyards) and cereal fields, appeared surrounded by the more or less managed *maquis* covering the large majority of the region. In the 1950's the *maquis* had completely disappeared, substituted by an immensity of fields of wheat, interrupted only by the dark green of *montados* and by the geometric layout of olive groves. (Ribeiro, 1955).

Being the most productive land use for soils requiring long fallow periods, the intensive modern *montados* emerged from the native sclerophyll forest between the 18th and 19th centuries. In the 1920's they already covered 24% of the region (Lautensach, 1932), and in the 1950's more than 50% (Balabanian, 1980). Since the 1960's their importance has been decreasing, but their imprint on the landscape of the southwestern Iberian Peninsula is still big enough for them to be distinguished by Meeus et al (1990) as one of the 13 types of agricultural landscapes existing in Europe.

Although there isn't precise information about the population of Alentejo in Roman and Muslim times, descriptions of the age do not convey the idea of a low populated region. This higher population density in Ancient times might have been made possible by the Roman and Arab elaborate irrigation systems, which allowed an intensive agriculture in a region characterized by an irregular rainfall pattern and long drought periods. Even if there aren't explicit references to the subject, it is likely that these irrigation systems had been destroyed during the Reconquest wars, as there are no subsequent references to them. This destruction, reducing the carrying capacity of the region, would necessarily lead to a decrease of the population density, as occurred in many other Mediterranean areas (see Naveh and Lieberman, 1994, pp 262-263).

4/5 of this province is composed of large farms (Ribeiro, 1955).
As a land use, the montado can be defined as an agro-silvo-pastoral system, i.e., a system where there is spatial and temporal coexistence of agricultural, forestry and pastoral land uses. More than sufficient, this coexistence is necessary to classify an area as a montado, as Portuguese nomenclature does not include in this category a tree covered area where forestry is the single goal. Also in Estremadura, the main area of occurrence of this land use in Spain, the word dehesa (Castillian word for montado) means a farm where agriculture, pastures and forestry coexist. Moreover, the real dehesas imply the existence of "two levels of pastures": the grasslands (at the soil level) and the acorns (at the tree level). (Balabanian, 1980).

According to Portuguese land use classification, a montado is any agricultural or pastoral area under the canopy of forest or fruit trees, the tree species being of no importance in defining the montado. It can occur in areas where the tree canopy consists of several kinds of oaks (Quercus rotundifolia, Quercus suber, Quercus pyrenaica, Quercus faginea, etc.), chestnuts (Castanea sativa), olive trees (Olea europaea), or other fruit trees. This wide range of tree possibilities expands considerably the geographic area where one can find the montado. However, many authors consider it to be specific to the Southwest of the Iberian Peninsula, more precisely to the Portuguese province of Alentejo and the Spanish province of Estremadura, where it appears associated mainly with the holm oak (Q. rotundifolia) and the cork oak (Quercus suber). In these regions, where it has come to occupy more than 80% of some counties, the montado displays its more singular characteristics (Balabanian, 1980).
II.2.1 - The Holm Oak Montado

The holm oak (*Quercus rotundifolia*) is the dominant tree in the holm oak *montado*, where it can exist alone or together with other tree species, the most common being the cork oak (*Quercus suber*). When the *montado* is composed of more than one tree species it can also be called mixed *montado*.

The main use of the holm oak *montado* is for the raising of livestock, traditionally the raising of the Iberian pig, an indigenous breed well adapted to extensive grazing and the animal that takes better advantage of the two food sources offered by the *montado*: acorns and grass (Balabanian, 1980; Correia, 1993). Both forestry and crop production are secondary activities in this system, a system that many authors consider to be the purest and most elaborate form of the *montado*.

The pastoral element

Until the 1960's, the pig was the most common animal in the *montado*. With it, one could also find some cattle, goats, and sheep. Being well adapted to the pastures offered by the *montado* and to a transhumance system, sheep were always present, this not the case with cattle and goats. Goats were most usually found in steep areas where one could take advantage of their climbing capabilities. As for the presence of cattle, it depended on the will and taste of the *montado* owner, since these animals are not very well suited to this system.

As a consequence of African Swine Fever, which appeared for the first time in the Iberian Peninsula in the spring of 1957, the pig was almost wiped out from the *montado*. It has been replaced since by cattle, goats and sheep. As measures have been found
recently to deal with the disease, the pig has been gradually regaining its place in the montado, especially in Spain. (Balabanian, 1980; Correia, 1993).

The fattening of pigs through what is called "the montanheira system" (montanera in Spanish) is what characterizes the traditional holm oak montado economy. The pigs are put to graze in the montado in the beginning of the fall to feed on acorns and grass during three months (the montanheira period). After this period they are sold to make high quality delicatessen products, such as smoked ham and smoked sausages. The acorns and the fact that the pig must walk to obtain food, are the factors giving the montanheira products their particular and appreciated characteristics. (Balabanian, 1980).

In the montanheira system, the breeding of pigs is considered a secondary activity, required only to colonize the montado. Many farms avoid breeding by buying the pigs in one of the region's many livestock fairs which occur at the end of summer. Farms without breeding and capital to buy the pigs in the market usually establish an agreement with a pig breeder who has no montado. In this case, a sum of money\(^\text{11}\) is paid to the montado owner at the end of the grazing period, according to the weight gained per pig. (Balabanian, 1980).

In all cases the number of pigs fattened depends almost entirely on the quantity of grass and acorns offered by the system. Since the acorns are poor in protein, they cannot provide for all the nutritional needs of the pig. Grass is the traditional and indispensable food complement. In years of poor pastures, even with abundant acorns, pigs do not gain enough weight. Good years for the montanheira system are those with plenty of acorns and grass.

\(^{11}\)Usually the bigger the final weight of the pig, the bigger the price per weight.
When food is abundant, a pig of 100 Kg eats approximately 9 Kg of acorns per day, and on average increases its weight from 0.6 to 1 Kg daily. Traditionally, growers tried to avoid giving the pigs any food other than acorns or grass. When a supplement was necessary, farm resources like cereals, legumes, and several sub-products were used. Today, however, it is common to supply the pig with food supplements, especially vitamin and protein concentrates. (Balabanian, 1980).

Since pig fattening is the montado's main source of income, and as it depends on a good production of both grass and acorns, trees and pastures are managed to maximize their combined production. One of the first consequences of this management is tree density. It cannot be very high, as it would reduce the grass production. And, it cannot be too low, as the necessary quantity of acorns will not be produced. 40 to 50 trees per hectare seems to constitute the optimal equilibrium. (Balabanian, 1980).

A holm oak starts to bear fruit between its 15th and 20th year, and thereafter the production of acorns will depend on the age of the tree. A large holm oak produces from 60 to 75 kg of acorns, a medium from 22.5 to 37.5 kg, and a small from 3.75 to 7.5 kg per year (Pinto, 1957). This production is also dependent on soils and climate. The holm oak doesn't like clay soils, or soils with a pH lower than 6 or with a high alkalinity. It produces best in well drained soils with a pH between 6.5 and 7.5 (Cuéllar, 1957). This tree is also very well adapted to slopes, even those with thin soils.

As regards climate, the holm oak requires a mild winter and a certain amount of rain for good fructification. Usually, one year favours the production of acorns and the next doesn't. However, fluctuations of production are mitigated in most montados by the

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12Climatic conditions for maximum fructification are: i) less than 20 frost days per year; ii) more than 400 hours of insolation and at least 150 mm of rainfall in the winter trimester; and iii) more than 600 hours of insolation and 200 mm of rainfall in the spring. (Cuéllar, 1957).
existence of a variety of aspects and microclimates. A year without acorns in the whole montado is a very rare phenomenon. (Balabanian, 1980).

In the montado system pastures occur under the tree canopy. These pastures are primarily natural grasslands, selected from the original maquis through the elimination of shrub-type vegetation. (Balabanian, 1980; Correia, 1993) Traditionally, the maintenance of these grasslands consisted only in keeping the shrubland under control. This was usually achieved through animal grazing, and through the necessary ploughing to put the soil under cultivation every 6 to 8 years. More recently, to improve the natural pastures, other maintenance operations were introduced such as the addition of phosphates to the soil and the sowing of Trifolium subterraneum. (Balabanian, 1980).

The forestry element

To stimulate the production of acorns, the holm oak is pruned. In order to obtain a regular fruit production, this tree should be treated as any other fruit tree, i.e., with low, annual and intensive pruning. This kind of pruning, however, never happened. As there was, for a long time, an interest in the wood produced by the montado, the pruning was always spaced in time and not so intensive, allowing the wood to grow. (Balabanian, 1980).

The wood produced by the montado derives only from the maintenance of the trees, nevertheless annual production approaches 300 kg per hectare. Traditionally this wood was transformed into charcoal, and generated enough income alone to support the maintenance of the whole montado. Today, due to a decrease in demand for charcoal, the sale of wood doesn't cover anymore the maintenance of the montado, nor its production costs. This has led montado owners to stretch the interval for the expensive
pruning operation to every 10 to 15 years instead of every 5 to 6 years, which has caused a diminution of acorn production. (Balabanian, 1980).

**The agricultural element**

Despite being almost always present, cultivation is a secondary activity within the holm oak *montado* economy, and usually involves only a small percentage of the whole area. (Balabanian, 1980; Correia, 1993). Although one can find *montados* where the area under cultivation is always the same (corresponding usually to superior soils if there are any), the most common procedure is to rotate the crops, in space and time, across the entire *montado*. Each area, depending on soil quality, is cultivated for a year or two every 6 to 8 years.

According to the reviewed literature, there seems to be no rule regarding which crops are grown. Correia (1993) refers to wheat as the most usual crop in the first year, and oats, rye or barley in the second. To these crops Balabanian (1980) adds many others, especially fodder crops. Besides its small, but never negligible, contribution to farm income, cultivation plays an invaluable role in controlling the *maquis* and in ameliorating the pastures (Balabanian, 1980; Correia, 1993).
II.2.2 - The Cork Oak *Montado*

The cork oak *montado* only visually resembles the holm oak *montado*. Its origins, geographic distribution, and economy are different. (Balabanian, 1980; Daveau, 1987).

Prior to the 18th century, the cork oak was infinitely less appreciated than the holm oak. This disregard was due to its irregular and smaller production of acorns which make it unsuitable to support regular animal production. The cork oak produces acorns only once or twice every 10 to 12 years, and this production is less than half the yield of the holm oak. Also the bitterness and abundance of tannins in the cork oak acorn make it less appreciated by livestock and humans than the sweet holm oak acorn. (Balabanian, 1980)

It was only with the boom of the cork industry, around the turn of the 18th to the 19th century, that the first modern cork oak *montados* were established. Demanding a large capital investment to select the trees from the native *maquis* or even plant them, this system appeared essentially in the context of large capitalist farms. Its main goal is obviously the production of cork. (Balabanian, 1980; Daveau, 1987).

The forestry element

The cork oak thrives in a wide variety of soils, but the best cork\(^\text{13}\) comes from poor\(^\text{14}\), usually acid, but deep\(^\text{15}\) soils. Such an opportunity to derive income from the poor Mediterranean soils plays a very important role in the respect given the cork oak. It

\(^{13}\)The high quality cork is white, flexible, and its volume increases considerably when plunged in hot water. This product is mainly used in the manufacture of cork stoppers. (Balabanian, 1980).

\(^{14}\)Fertile soils produce a porous cork with small flexibility (Balabanian, 1980).

\(^{15}\)Thin soils produce thin cork with small flexibility (Balabanian, 1980).
cannot play its cherished role everywhere, however, as it has very precise climatic requirements. (Balabanian, 1980).

The cork oak is very sensitive to extremes of temperature, and has a very clear preference for low thermic amplitudes\(^{16}\). Its climatic optimum corresponds to a Mediterranean climate with an ocean flavor. This explains why the cork oak is located essentially in the Western Alentejo, where Atlantic breezes moderate the aridity of Mediterranean climate. Here is located the largest cork forest of the world, producing more than half of the world's cork.

The first cork is harvested when the trees are 25 to 30 years old, but is of low quality. It is necessary to wait another 9 years to obtain a good product. After this initial period, production continues to increase with harvests every nine years, until the montado reaches its age of decline, usually 150 to 200 years. In order to preserve and stimulate such a reliable and invaluable production, legislation has been enacted in Portugal and Spain to control the exploitation and maintenance of the cork oaks. This legislation is extremely precise about when and how one should harvest cork and prune the trees\(^{17}\). (Balabanian, 1980; Daveau, 1987).

\(^{16}\)In winter the cork oak does not tolerate temperatures below \(-5^\circ\text{C}\), and preferably not below \(5^\circ\text{C}\). Its optimum for the coldest month is \(9\) to \(12^\circ\text{C}\). Its growing period starts when the temperature reaches \(12\) or \(13^\circ\text{C}\), and flowering when it reaches \(14\) to \(16^\circ\text{C}\). Its optimum for the hottest month is \(21\) to \(24^\circ\text{C}\). Temperatures above \(28^\circ\text{C}\) are detrimental for the tree, especially after the cork harvest. Sirocco like winds are also harmful. (Balabanian, 1980).

The cork oak is well adapted to rainfall values ranging from 400 to 2500 mm, with an optimum between 600 and 800 mm. It does not tolerate, however, prolonged humidity, especially after cork harvest. (Balabanian, 1980).

\(^{17}\)"The pruning operation can only be done between the months of December and March" (Decree n° 13 658, article 4) "and only in the year of the cork harvest, or in the 3 following years" (Decree n° 27 776, article 3, §1).
Management of the cork oak *montados* is done primarily to maximize the production of cork. This has immediate consequences on tree density, which is higher here (70 to 100 trees per hectare) than on the holm oak *montados*. Also the pruning assumes a different form. It favours the trunk and leading branches, which are the main sources of cork. These facts gave the cork oak *montado* the shape of a mature forest, as opposed to the orchard image of the holm oak *montado*. (Balabanian, 1980).

As for the holm oak *montado*, until the 1960's the production costs of the cork oak *montado* were low, with the subproducts of the system (charcoal, animal production, and crops) being enough to pay for its maintenance and even to generate some income. This is no longer the case, and many producers are forced to minimize maintenance operations in order to reduce costs. Fortunately for this system, the smaller the human interference, the better the cork. (Balabanian, 1980).

**The agro-pastoral element:**

As cork is the most valuable output of the system, the agricultural and pastoral elements play a secondary role in the economy of the cork oak *montado*.

The location of the cork oak *montado*, mainly in acid sandy soils, and the weak insolation at the ground level caused by the high tree density of this landscape allow only poor pastures and crops. (Balabanian, 1980; Daveau, 1987). There is a maximum of 2 years of crops in each 10 to 12 year period. The poverty of grasses, together with the irregularity and lower quality of cork oak acorns, lead to low grazing carrying capacity of the system. (Balabanian, 1980).

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18 The higher the location of the cork in the tree, the lower its porosity, thus, the better its quality. (Balabanian, 1980).
19 10 to 15 ha per cattle unit; 4 to 5 ha per sheep; 3 ha per goat. (Balabanian, 1980)
To keep the shrubland under control, and, therefore, to improve the vigor of the tree and the production of cork, is the main reason to grow crops and graze animals in this system.
III - THE MONTADO LANDSCAPES OF ALENTEJO: AN HISTORICAL PERSPECTIVE

"History teaches us to see things as relative"

Fernand Braudel

III.1 - THE ALENTEJO BEFORE THE CHRISTIAN RECONQUEST (BEFORE PORTUGAL).

III.1.1 - Pre-Roman times

The social history of Alentejo in pre-Roman times is difficult to track due to the lack of written records and long lasting construction materials (Ribeiro, 1955). Remains of several large walled settlements, identified in the hinterland of present Alentejo, show us, however, that a tradition of concentrated settlements existed in the region by the Final Bronze Age. The economy of these communities seems to have been based on the exploitation of the large copper resources of the region, and on agro-pastoral activities. (Fabião, 1993)

Probably dependent upon these inner settlements, several small non-walled settlements were located along the Atlantic shore. Established in flat areas without natural defensive characteristics, these littoral populations had an economy based largely on the exploitation of marine resources, complemented by an incipient agriculture and some pastoral activity. (Fabião, 1993).
In the First Iron Age\(^1\), a new culture emerged in the South of Portugal. This culture, which is usually called the First Iron Age of South of Portugal, was born in the context of the "Orientalizing Period" - a period marked by the propagation of cultural influences and products originated in the Phoenician colonies established in the Iberian Peninsula\(^2\). It seems to have maintained strong connections with the kingdom of Tartessos\(^3\). (Alarcão, 1988; Fabião, 1993). In its socio-cultural dimension, this culture is characterized by the appearance of the first written communications, and by the emergence of a new religion and the local concept of city. Economically, this period introduced iron metallurgy, the potter's wheel, and new forms of exploiting marine resources - the production of salted fish and fish condiments, and use of the mollusk *murex* in dye-works. The introduction of wine and olive oil technologies, and the expansion of cereal crops had also centered agriculture in the triple base of the Mediterranean diet - wheat, olive oil and wine\(^4\). (Fabião, 1993).

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\(^1\)The Iron Age in the Iberian Peninsula starts with settlement of the first Phoenician colonies (8th century BC) and ends with the Roman conquest in the 2nd century BC.

\(^2\)The Phoenician colonies have only been traced in Andaluzia. However, the social, technological, and religious innovations induced by their presence surpassed largely their location territory.

\(^3\)The Tartessos kingdom, whose origins date back from sometime between the beginnings of the first millennium BC and the 8th century BC, is the first Iberian political entity mentioned in the written historical sources. Located somewhere in the banks of the Guadalquivir, its precise location is not yet known, which has contributed to much of the myth built around it. It is known however that it was an entity of strong Mediterranean characteristics.

\(^4\)The extension of wine and olive oil production was frequently mentioned by the classical authors as the border line between barbarism and civilization.
The Second Iron Age corresponds with the settlement in the Iberian Peninsula of warrior and pastoral Indo-European tribes (5th to 3rd centuries BC)\(^5\). The Alentejo, already occupied by the Conii\(^6\), was then colonized by the Celts, who later settled in independent walled communities which were always located in places with a commanding view over the surrounding landscape. The economy of these communities was not much different from that of the Late Bronze Age communities occupying the same region. It was based on cattle and pig grazing, combined with the production of cereal and vegetable crops. As this occupation didn't seem to develop the typical Celtic social institutions well known in other areas of the Iberian Peninsula\(^7\), many authors believe that the pre-existent "Mediterraneanized" populations might have worked as a powerful acculturation element inhibiting the implantation of such structures. This corroborates the hypothesis that Conii and Celts might have lived side by side. (Alarcão, 1988; Fabião, 1993).

Urban centers maintaining commercial relations with the Eastern Mediterranean seemed to have subsisted during this period all along the Southern and Western Atlantic shores. (Fabião, 1993).

\(^5\)In the Southern regions this period corresponded to the fall of the Tartessos kingdom, and to the rise of Carthago to first Western Mediterranean potentate.

\(^6\)The Conii must have lived in the area since the Late Bronze Age. Their contacts with the Phoenician colonies in the Peninsula, which should have begun by the end of the 7th century BC, mark the beginning of the Iron Age for these people. (Alarcão, 1988).

\(^7\)The agro-pastoral Celtic communities were organized into a social hierarchy evolving from the families to the *gentilitates* (clan). The clans were organized in tribes, and each tribe occupied a walled settlement located in the mountains (the *castros* or *citâncias*). (Caldas, 1991).
III.1.2 - The Romanization

When the first Roman legions landed on the Iberian Peninsula in 218 BC, their intention was not to conquer territory, but to attack the Carthagineans with whom they were fighting the Second Punic War. Defeated Carthage in 201 BC, three years later (204 BC) started the Roman occupation of the Peninsula. This first occupation, however, was essentially military, its objectives being to maintain order, and to promote exploitation of the territory. (Fabião, 1993).

Only in 197 BC, when the first Hispanic provinces - *Hispania Citerior* and *Hispania Ulterior* - were created, was the real Roman administration of the region initiated. Soon after, in 194 BC, the first confrontations between Romans and Lusitans\(^8\) started, which culminated in the Lusitan War (155 BC - 138BC). There is strong evidence that by the end of this war the South of Portugal (Alentejo and Algarve) was already under Roman domain. (Fabião, 1993).

It was not until the leadership of Julius Caesar (by the middle of the 1st century BC) that the municipalization process in Hispania began. The *Hispania Ulterior* was divided in two provinces - *Baetica* and *Lusitania*. In the first phase all of Portugal was included in *Lusitania* province.\(^9\) Later, in 13 BC, the Northern *Lusitania* border was moved to the Douro river. This province was subdivided into three *conventus*\(^{10}\)

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\(^8\)The Lusitans were one of the people occupying the Iberian Peninsula at the time of the Romans. Although the exact location of their territory is still object of discussion, they are usually mentioned as occupying the region between the Tejo and Douro rivers.

\(^9\)The whole Hispania territory was subdivided into 3 provinces - *Baetica, Lusitania* and *Tarraconensis*. Later, between 248 AD and 288 AD, the territory was reorganized and another 2 provinces were created - *Carthaginensis* and *Gallaecia*. The *Baetica* and *Lusitania* provinces, however, didn't seem to have suffered any modification in their area.

\(^{10}\)The *conventus* were subdivisions of the provinces. There were 14 *conventus* in all of Hispania. Each *conventus* had a capital.
(Emeritense, Escalabitano, Pacense), each one comprising several civitates\textsuperscript{11} - territory often modelled after the boundaries of the pre-Roman tribal areas. (map 10) (Alarcão, 1988; Fabião, 1993). Among the 34 civitates of the Lusitania province, 28 constituted tributary municipalities (oppidi stipendiarii, where the magistrates were not Roman citizens and where the old Celtiberian laws were maintained, and 6 were either Latin colonies (coloniae Latinae), Roman municipalities (municipii civium Romanorum), or Latin municipalities (municipii Latinii), where the magistrates and most of free citizens were Roman and where Roman law was applied. All the latter were located in the South, four on the territory of today's Alentejo: Pax (Beja), Ebora (Évora), Myrtills (Mértola), and Salacia (Alcácer do Sal)\textsuperscript{12}. (Mata and Valério, 1993).

From an administrative perspective, the Romanization consisted in the establishment of a net of urban centers, superimposed on the old political geography. This net worked as a powerful attraction to all the native communities, that gradually abandoned the old settlements and established themselves in the new cities. This long municipalization process must have been completed by the end of 1st century AD. In 74 AD all the civitates received the status of Latin municipality, and in 212 AD the Edict of Caracala conferred Roman citizenship on all free men of the Roman Empire. (Fabião, 1993; Mata and Valério, 1993).

\textsuperscript{11}Every civitas had its own administrative capital, often an ancient settlement rebuilt after the Roman model (Alarcão, 1993).

\textsuperscript{12}The other two civitates included in this category were Olisipo (Lisboa) and Scallabis (Santarém).
Map 10 - Administrative Divisions on Roman Hispania
Source: "História de Portugal" (J. Mattoso eds., 1993)
In order to assure a food supply to its inhabitants, the Roman cities induced the development of several agricultural areas in their vicinity. When an urban center was created, its surrounding area was divided into parcels and distributed among its inhabitants, a process called centuriation. This division, however, was not equitable. The size of the parcels was proportional to the importance of the settler. (Fabião, 1993).

Apart from these agricultural belts, Roman agriculture was based upon the *villa rustici*, large autonomous agricultural estates existing between the cities. These *villa* included the manor house, baths, lodges for the workers, wine and olive presses, potteries, weaver's looms, forges, barns, etc., and in some cases even cemeteries and temples. The ideal of self-sufficiency, which led to the concentration in the *villa* of a variety of agricultural and artisan activities, was not compatible with monocultures, and led to the construction of complex systems of water capture and distribution. (Alarcão, 1988; Fabião, 1993). Although not supported by archeological studies in Portugal, it is most likely that the Alentejo *villa* were organized upon the classical zonation of the Roman agronomists. Located more or less concentrically around the "urbanized" area were respectively the *hortus* (area of irrigated horticulture), the *ager* (dry cereal crop fields); the *saltus* (vineyards and olive groves), and the *silva* (extensive grazing areas on scrub and woodland), in a spatial arrangement that represented a decreasing land use intensity as one moved out from the *villa* headquarters. (Antrop, 1993).

The self-sufficiency of the *villa* contributed to their permanence throughout the centuries. When the Roman administrative structure was dissolved, by the turn of the 3rd to the 4th centuries AD, leading to consequent urban decadence, the *villa* not
only endured but got stronger. From thereon, they stopped being the rustic extension of urban life, and became centers of a more decentralized and ruralized economic and political system. The subsequent construction of Christian cult buildings lead some to believe that the *villae* had become regional centers (parishes), their self-sufficiency affording the best survival conditions in a time of social instability and reduced trade. (Fabião, 1993).

Other agricultural units, besides the *villae*, existed in the Roman rural world. In Alentejo are known some small communities occupied only by one or two large families working owned or rented land. (Fabião, 1993).

As regards the crops, the Roman presence certainly contributed to increase the production of wine, olive oil, and cereals - wheat, barley, rye, and millet. The livestock component of Roman agriculture is not well known. References to the wool of *Salacia* (Alcácer do Sal) lead some to believe in the historic existence of goats and sheep in today's Alentejo. (Fabião, 1993).

**III.1.3 - Between Romans and Arabs (Swabian and Visigoths)**

Between 262 and 266 AD, the Iberian Peninsula was for the first time invaded by German tribes. Even if Roman control was rapidly reestablished, the fortification of many cities and *villae* by the turn of 3rd to the 4th centuries AD suggests an unstable situation. (Alarcão, 1988; Mata and Valério, 1993). But if, during the 4th century AD, these invasions were only a remote fear, they became a reality in the 5th century AD, with the massive invasion in 409 of German tribes (Alarcão, 1988; Mattoso, 1993). In
411, Rome established a pact with the invaders and gave them the provinces of Lusitania, Callaecia, and Carthaginensis. This fact ended Roman domain over the present Portuguese territory. (Mattoso, 1993).

The installation of Barbarian kingdoms in the Iberian Peninsula, doesn't seem to have caused a sudden rupture in the former culture. (Fabião, 1993). The changes were imperceptible and happened more by a slow atrophy of the old structures than by the introduction of new customs. In fact, the complex Roman organization was not substituted by anything. The division of the Iberian Peninsula into 5 provinces was maintained\(^{16}\) as well as the net of *civitates*, many of which evolved in the meanwhile into episcopal centers (map 11). (Mattoso, 1993).

The ruralization of the society, which began in the 3rd century AD with the decline of the Roman Empire, was strengthened by the Indo-German belief that all essential goods were produced by the land, and by the German trifunctionality\(^{17}\) which put productive activities at the same level as religious and military functions. The warrior chiefs and monks installed themselves in the countryside, and organized the agricultural production. Only bishops remained in the cities. Power became less centralized and the economy more oriented toward self-consumption. (Mattoso, 1993).

Slavery disappeared, substituted by serfdom. The hordes of slaves that had constituted an important labor force in the Roman villa were then installed in small farm units, which they could manage with a certain autonomy, apart from being obliged to give part of the production to the seignior. In face of the unstable situation, the small

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\(^{16}\)This division, profoundly changed by the Arab occupancy, is going to constitute the base to the metropolitan and diocesan division during all the Middle Age.

\(^{17}\)The tripartite German society model - clergy, nobility and people - established in the Iberian Peninsula during the Visigoth domain, is going to constitute the structure of the Portuguese medieval society. (Saraiva, 1993).
farm owners were compelled to exchange their lands for the protection of a powerful religious or secular seignior. This led gradually to the disappearance of the small estate. (Mattoso, 1993).

The warrior lifestyle of the great seigniors led to their minimal intervention in agricultural activities. The seigniorial farm was greatly reduced, substituted by a multitude of small farms operated directly by the serfs. The Roman *villae* was transformed into the village. (Mattoso, 1993).

Another form of rural organization, more common in the North than in the South, was the "village community", an autonomous communal organization independent upon a master's protection. In these communities, each family worked its own lands, and was entitled to the common use of pastures and woods. Other collective practices such as shared use of the mill, press, oven, bull, the common herd or the common cereal field might also have existed. (Mattoso, 1993).
Map 11 - Visigoth Provinces (in Iberian Peninsula)
Source: "História de Portugal" (J. Mattoso eds., 1993)
III.1.4 - The Arab Occupation (The Garb-al-Andaluz)

The barbarian hegemony in the Iberian Peninsula was brief. In 711, the Arabs landed in the South of Spain and defeated the armies of the Visigoth King Rodrigo. Seven years later (718) almost all Iberia was under Muslim domain. (Macias, 1993, Mata and Valério, 1993).

The Al-Andaluz, the name given to the area of the Iberian Peninsula under Islamic occupation, was divided in two: the Eastern Andaluz and Western Andaluz. The Western Andaluz (Garb-al-Andaluz) corresponded to the region where the rivers ran to the Atlantic, and where rains were ruled by western winds. In this region, almost matching the Roman Lusitania, was included the Arab Portugal (Map 12). (Torres, 1993).

The Arab occupation corresponded to a reappearance of urban life. Of the 500,000 inhabitants of the Garb-al-Andaluz, more than half lived in urban areas: 100,000 in the urban perimeter, and 200,000 in a densely populated surrounding area. This latter area, though not directly dependent on the city, was completely integrated in its commercial activity. (Torres, 1993).

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18 Garbe means West.
Garb-al-Andaluz cities:

- located in today's Alentejo
- located in other regions of Portugal
- located in Spain

Map 12 - The Garb-al-Andaluz
Each city was ruled by an alcaide (qaid)\textsuperscript{19}, and had under its control (more economically than juridically) a territory\textsuperscript{20}. This territory included the city surrounding fields and gardens, which daily supplied the city markets, and a number of rural settlements (alcarias) ruled by assemblies of venerable (aljamas). Each alcaria could be constituted by a single settlement, walled or not, or by a group of settlements possessing a common fortified area providing shelter to population and cattle in case of danger. While the first pattern seems to have been utilized more in Northern Alentejo, the second was common in the mountain areas of Southern Alentejo and Algarve. (Torres, 1993).

Outside the economic and political circles of the city were located vast territories covered by forest, pastures, and scrub. In these interurban areas, where ancient rural communities were settled, roamed small transhumant tribes. (Torres, 1993).

To this territorial organization were connected three major agrarian systems: urban gardens, large farms, and communal lands of the interior. The urban gardens, of small and medium dimension, were located in the most fertile lands surrounding the cities, and outlined in a way their perimeter. Worked in the great majority by their owners, who were inhabitants of the city, these gardens were irrigated by a complex net of channels, and submitted to an intensive production. (Torres, 1993).

\textsuperscript{19}The Alcaide was the governor of a city, castle or tower.

\textsuperscript{20}The territorial organization of the Andaluz has pretty much followed the structure left by the Romans and Visigoths. This geography suffered such minor alterations through the centuries, that there is an almost absolute correspondence between the Roman civitates (the Muslim kastil) and present counties. (Macias, 1993; Torres, 1993).
The large farm estates were donated to the urban aristocracy, the donee almost always being the *Alcaide*. These farms were located mainly in good non-irrigated cereal lands, and were worked by journeymen hired in the *Alcarias*, and surrounding villages²¹. (Torres, 1993).

The agro-pastoral communities of the interior controlled large territories, located mainly in the mountain areas and sometimes in interior valleys. These communal societies were also ruled by an assembly of venerable. Not completely outside military and political control or excluded from urban trade, these communities were allowed to maintain a certain autonomy. (Torres, 1993).

The Arab agriculture not only continued, but improved the Roman tradition of mixed farming. In fact, the Muslim occupation brought to the Peninsula many new species of fruits and vegetables that have since constituted an important part of the diet of the Mediterranean populations. (map 13). To support this mixed farming, the Arabs also introduced a number of new irrigation techniques. (Torres, 1993).

²¹Although not assumed clearly by the reviewed literature, the *alcarias* seem to correspond to the urban center of the Roman *villae rusticae*. As for the surrounding villages they might have evolved from the small communities existing besides the *villae*. 
Map 13 - Main Crops in the Garb-al-Andaluz
Source: "História de Portugal" (J. Mattoso eds., 1993)
More than imposing a radical change, the establishment of agreements with local populations was a central strategy of the Muslim occupation of Iberia. This fact, together with the division of the Andaluz territory among different Arab tribes, contributed to maintain the Garbe in a state of latent revolt. In fact, the many attempts to centralize power, lead successively by the Omiads, Abassids, Almoravids, and Almoads, always clashed with a local will for autonomy, the cause of many revolts. (Macias, 1993).

Weakened by internal conflicts, the Muslim domination started to yield in the face of Christian assaults from the North. By the end of the first Taifa Period\textsuperscript{22} (late 11th century) the irreversible decline of Islam on Iberian soil had begun. In 1147 the common frontier was moved to the Tejo river, and in 1166 the reconquest of Alentejo began. Between 1232 and 1238 Southern Alentejo was conquered, and the next decade saw all of Portugal under Christian domain. (Macias, 1993).

\textsuperscript{22}Many years of internal fights led to the fragmentation in 1012 of the Omiad califate into several small kingdoms, politically independent - the Taifa kingdoms. The first Taifa Period (1012-1094) was followed by a second one between 1044-1057. (Macias, 1993; Mata et al, 1993).
III.1.5 - The Montado before the Christian Reconquest

The large forests of evergreen oaks which covered the rolling hills of Alentejo had been altered by human communities at least since the Late Bronze Age. However, it was the intensive use of landscape resources promoted by the Romans that has been pointed to by most authors as the main cause of deforestation before the 15th and 16th centuries, when intensive naval construction induced by the Great Navigations reduced dramatically the forests of the country. (Birot, 1950). In the Muslim South, Devy-Vareta (1986) imputes this deforestation to the Arabs, to whom she also credits the creation of the first montados.

Although the literature reviewed does not provide explicit references to refute this thesis, it seems strange that a system traditionally based on exploitation of the pig could have been developed by the Arabs, who are prohibited by the Koran to eat pork meat. In fact, while many authors state that pig production didn't decrease during the Muslim occupation of the Iberian Peninsula, the monk João de Gorze, ambassador in Cordoba of Otan the Great, astonishingly realized in the 10th century that the Christians of the Al Andaluz didn't eat pork (Dufourcq, 1979).

Against the Devy-Vareta thesis are also the Roman origin of the word montado (Caldas, 1991), allusions by Roman and Greek chroniclers to pig fattening in the Iberian Peninsula, and the substantial development by Visigoths of pig production in Alentejo mentioned by Silbert. As will be developed later in this chapter, this latter author, who studied the agrarian structures of Alentejo at the end of the Ancient Regime, defends the thesis that before the 18th century the montado didn't exist as the individualized system known today, but as a very extensive land use integrated in the "fallow land economy" that dominated the great majority of the region's territory until the late 19th century.
If, however, the precise origins of the *montado* systems cannot be historically located, the origins of the agrarian structure within which they would emerge are precisely known. All the authors agree that the tripartite Roman agrarian structure of *centurias* (city agricultural belts), *villae rustici* (large farms) and surrounding matrix of very extensively utilized *maquis*, was maintained with various degrees of intensity until the great agricultural transformations of the late 18th and 19th centuries. While in Northern Portugal the Roman *villae* was subdivided into small farm units, which ensemble gave rise to the *freguesia* (the smallest unit of territorial administration), in Alentejo it was maintained, corresponding almost entirely to the modern *herdade* (large farm). Until recently, the Alentejo *herdade* continued to be characterized by the same luxurious manor house and wide variety of constructions (*monte*), the same quantity and diversity of workers, and in some more traditional cases even the same classical zonation (Ribeiro, 1955).

Although its uninterrupted persistence throughout history is a matter of discussion (Daveau, 1983; Saraiva, 1993), agrarian collectivism had its origins in the communal agro-pastoral societies existing since pre-Roman times (Saraiva, 1993). Protected by the "colonizer kings" (Caldas, 1991), communal structures would persist in Alentejo and become one of the main supports of its agriculture and peasant society until the 19th century, when their legitimacy was questioned by the Liberal theorists. While many of the ancient extensive *montados* were objects of communal use and management, the emergence of modern *montados* would result largely from the substitution of agrarian individualism for the old communal practices.
III.2 - THE PORTUGUESE ALENTEJO FROM CHRISTIAN RECONQUEST TO LIBERAL REVOLUTION

III.2.1 - The political and socio-economic context

The emergence of Portugal as a Nation

While Portugal emerged as an independent kingdom in 114323, its approximate final shape wasn’t established until a century later. The reunion under one country of extremely diverse cultural and geographical elements was only possible due to the cohesion of the ruling and political class of the time. The first Portuguese were the aristocracy centered on the King, and by extension his dependents. In fact, it was the military, political, and fiscal control over resources and populations that created the unity of the country. Migrations from the overpopulated Northwest to the underpopulated Center and South contributed greatly to this homogenization (Mattoso, 1993).

The colonization

In order to attract population to the newly reconquered areas the Portuguese kings, followed by the religious and secular seigniors, made wide use of the emphyteusis contract. This contract, which can be individual or collective, is an agreement between a landowner and a concessionaire (the emphyteuta) by which the former transfers to the latter the property rights for the use of a piece of land, against payment of a tribute. (Mattoso, 1993; Silbert, 1966).

23After the Ourique Battle, the first Portuguese king, D. Afonso Henriques, proclaimed the independence of Portugal from the Kingdom of Lion. (Mattoso, 1993).
The collective form of the emphyteusis were the charters (\textit{cartas de foral}). In the early years of the monarchy a large number of charters were granted to new and old settlements - the counties$^{24}$ - in order to attract and establish populations to defend the border and assure productive activities$^{25}$. The charter, which contained the juridical and tributary terms by which the relationships between inhabitants and seignior of the settlement (the King or the religious and secular donees) should be ruled, constituted a unilateral offer to any individual willing to accept its conditions. Depending upon the military (closeness to the border or to war areas), political (rural or urban), social, and economic situation of the counties, the conditions of the charters were diverse. While the rural counties were usually founded on a group of individual emphyteusis contracts, the urban settlements followed the organization of reference counties. Because of the unstable political situation of Alentejo, most of its counties were organized upon the Évora charter, which assumed a strong military character in order to assure some stability to the development of economic activities. (Soares, 1964).

The colonization of Alentejo

Much of today's Alentejo territory was donated by the King to the religious Military Orders and nobles involved in the Reconquest$^{26}$ (Map 14).

$^{24}$Although the great majority of historians acknowledge the "counties" only after their royal confirmation, recent investigations have shown the pre-existence of self-organized communities, independent from any kind of superior authority (Mattoso, 1993). Ruled by an assembly of neighbors (inhabitants of the settlement), these communities corresponded probably to old \textit{villae}, whose masters had disappeared in the war, and where no one had more authority than the others to solve the problems concerning everybody (Saraiva, 1993).

$^{25}$Someone abandoning the seigniorial lands to go clear a land or offer its labor in another place, would stop being a serf (understood as part of the seignior domain) to became a free man (Saraiva, 1993).

$^{26}$Part of the Alentejo was not reconquered directly by the King, but by the Military Orders - especially the order of Santiago. (Saraiva, 1993).
Map 14 - Land ownership in Post Christian Reconquest (South of Tejo River)
The land structure created by these donations was dominated by the *latifundia*, still characterizing the area (Ribeiro, 1955). In a time of scarce technical and human resources, the need to clear and exploit these large areas led most landowners[^27] to adopt the individual emphyteusis contract. Through this contract the emphyтеутa, in exchange for the transmissible right to use the land for a certain period of time, was obliged to exploit it and pay a tribute to the seignior: a percentage of the production (*foro*)[^28], and, in some cases, small quantities of other goods (*direituras, foragens, miuças*) and personal services (labor due to the seignior). To these tributes was added the tithe to the church (*dizimo*), a tax of one tenth over all the economic activities (Mata and Valério, 1993).

Since the socio-economic situation of the first years of the monarchy was not favorable to short term contracts, the emphyteusis remained perpetual (transmissible between generations) until the 13th century, when the "contracts in lives"[^29] first appeared. The emphyteusis contract could also be transferred to a third party, and be the object of a sub-emphyteusis or leasing contract, usually through the payment of a transmission right (*laudemio*). (Silbert, 1966; Costa, 1964).

The duplication of property rights created by the emphyteusis allowed the remuneration of both land and labor, and afforded an opportunity for the redevelopment of agriculture in Alentejo. As happened in the past, this development occurred within the limits imposed by the available technology and by the edapho-climatic and demographic characteristics of the region; i.e., crops were

[^27]: The landownership here mentioned does not necessarily correspond to the actual meaning of the word. In fact, before the Liberal Revolution of the 19th century, many landowners didn't have total property rights but only fiscal rights - the right to receive tribute - granted by the King.

[^28]: In order to encourage the development of the farm, payment advantages were often offered: i) a tribute waiver until a certain production was reached; ii) the establishment of different percentages to different soil productivities; iii) an increasing tribute.

[^29]: The most frequent "contract in lives" was the contract for "three lives", i.e., for three generations.

[^30]: At the same date the most populated region of the country - Entre Douro e Lima - had a density of 40 inhabitants per square kilometer, i.e., 17 times larger. (Mattoso, 1993).
restricted to a few areas usually in the neighborhood of settlements, while the bulk of the country remained the domain of an extensive "fallow land economy". (Mattoso, 1993).

**Power centralization**

The end of Reconquest wars allowed a centralization of power in the person of the King, with a consequent decrease of the autonomy of seigniors and counties. To make Royal control easier, the country was divided into 6 provinces during the first half of the 14th century: Antre Douro e Minho, Trás-os-Montes, Beira, Estremadura, Antre Tejo e Odiana (future Alentejo), and Algarve (Map 15). To each province was nominated a corregidor charged with local administration and control of the local courts. (Mata and Valério, 1993)

At the same time, judges elected by the county were replaced in some counties (usually the more important ones) by judges nominated by the King (*juizes de fora*). The county assembly (constituted by all the free men of the county) was replaced by smaller councils chaired by town councilors (*vereadores*). This led to a loss of the old juridical and administrative autonomy which had allowed counties (and seigniors) to live by their own laws (*costume*). (Marques, 1964; Mata and Valério, 1993; Mattoso, 1993; Monteiro, 1993).
Map 15 - 14th Century Provinces

Source: adapted from "História de Portugal" (J. Mattoso eds., 1993)
A period of prosperity: 11th - 14th centuries

Between the 11th and 14th centuries, the integrated development of agriculture and trade (domestic and international) provided for a prosperous economic situation, which was reflected in population growth. (Mata and Valério, 1993; Saraiva, 1993). This prosperity was accompanied by an increase in the production of exportable goods (wine, olive oil, and Mediterranean fruits), to the detriment of non-exportable ones. Vineyards and olive groves were the two main uses of the newly cleared lands. This, together with the population growth, led to an increasing cereal deficit. (Saraiva, 1993).

The Great Plague

The surge of the Great Plague in 1348 put an end to this prosperity. The second half of the 14th century was a period marked by several epidemics, wars and bad harvests. And although the 1400's had brought some improvement, it would take almost all of the 15th century to overcome the effects of the Plague. (Mata and Valério, 1993).

The severe decline in population caused by the Plague (more than a third of the population died); the migration to cities of many peasants enriched by inheritances or trying to escape the famine ravaging the countryside; and the high wages asked by the remaining rural population, caused a severe drop in agricultural production. In an effort to control the situation, several laws were made to retain the necessary labor force in the countryside (interdiction of the emigration of rural population to the urban centers; compulsory work; and fixed salaries) and to compel the landowners to cultivate their lands (Sesmarias Law of 1375). (Mata and Valério, 1993; Saraiva, 1993; Sousa, 1993).

The results of such measures were almost nil. Wages didn't decrease, the population didn't remain in the countryside, and agricultural production continued to fall.
In spite of the Sesmarias law, many areas, especially in the South, returned to pastoral uses. (Mata and Valério, 1993; Saraiva, 1993)

The Modern Age

Although the conquest of Constantinople by the Turks in 1453 seems to be the adopted official date for marking the end of the Middle Ages and the beginning of the Modern Age (Saraiva, 1993), the real transition varied from country to country. For Portugal, the literature offers no consensus date, but many authors seem to agree that the new situation emerging from the Great Plague is what marks the beginning of the Modern Age in the country. In an effort to overcome the crisis, Portugal turned its eyes to the sea, and the littoral became the center of economic life. (Mata and Valério, 1993; Saraiva, 1993).

The Age of Discoveries (15th and 16th centuries)

The Age of Discoveries brought Portugal the control of several territories overseas and the role of intermediary in the trade of exotic goods between these possessions and Europe. Gold, ivory, slaves, pepper and other spices were added to the traditional Portuguese exports of salt, wine, olive oil, and Mediterranean fruits.

Alternatively, wheat, in which Portugal was no longer self-sufficient began to be imported. The regular importation of cereals led to the introduction of certain rules that persisted until 1760 when the domestic wheat trade was liberalized. Only the deficit areas (Lisboa, Algarve and Madeira) were allowed to import. In the rest of the country, exporting cereals from origin counties was prohibited, except to pay rents and tributes or
to supply the deficit areas. Counties were allowed to retain in their granaries a third of their production for self-consumption. (Mata and Valério, 1993).

The prosperity brought by the discoveries didn't reach the countryside, which was affected by pests and famine through all 16th century (Rodrigues, 1993). Attracted by the dream of wealth in the city (and overseas) or just trying to escape a life of poverty, rural populations continued to migrate to urban areas. The utilization, after the second quarter of the 15th century, of slave labor\(^{31}\) in agriculture had contributed greatly to this exodus in Alentejo, as it reduced the demand for paid labor, and thus rendered impossible the fight for a better salary. (Magalhães, 1993; Saraiva, 1993).

The Modern State and the first General Legislations

Under the Modern State, the Kingdom became a whole entity, and the King the representative of a public authority exercised over all citizens no matter their social position or privileges (Mattoso, 1993). This concept of power, already underlying the centralization initiated in the 13th century, gave origin in 1454 to the first Portuguese General legislation - the *Ordenações Afonsinas* - which revoked all previous laws based on the old Visigoth *Liber Iudicum* (Mata and Valério, 1993).

It was in the *Ordenações Afonsinas* that a distinction was first made between the emphyteusis and two other leasing-type contracts - sharecropping and leasing -, that would play an important role in the Alentejo agricultural structure. As opposed to the long term emphyteusis, these latter, however renewable, were short term contracts (usually less than 9 years). While sharecropping had a variable rent (a percentage of the

\(^{31}\)The importation of slaves to Portugal began in the second quarter of the 15th century, and continued at a variable rate until its interdiction in 1761. However, and since their acquisition implied a high initial investment, the use of slave work has only became common in the richer areas of the country - Lisboa, Madeira and Açores Islands, and the South. (Magalhães, 1993; Sousa, 1993).
harvest) and would be terminated in case of death of one of the contractors, the leasing called for a fixed rent in cash or goods, and was not dependent on the life of the initial contractors. (Costa, 1964; Serrão, 1993).

Since the new legislation systematized a collection of laws applicable to the whole kingdom, with the county being the smallest political and juridical spatial unit (Hespanha and Silva, 1993), it became necessary to withdraw a number of county specific rights contained in the charters. This gave origin to the Charter Reform of 1497-1520 (Magalhães, 1993). The new charters, which would persist until the 19th century, were no longer the county political statutes but rather simple registers of tributes owed to the Crown and seigniors (Magalhães, 1993; Saraiva, 1993).

In 1521 another general legislation, the *Ordenações Manuelinas*, was issued (Magalhães, 1993), and between 1527 and 1532 the first general census of the population (the *numeramento* of 1527) was conducted. This census revealed a general increase of the population, and the existence of very diverse population densities throughout the country (Table 1 & Chart 1). The awareness of such reality led to subdivision of the former 6 administrative provinces into 27 smaller units, the districts (*comarcas*), with a corregidor nominated to each one (Map 16). (Hespanha and Silva, 1993; Rodrigues, 1993).

Of the 27 new districts, only 5 were located in Alentejo (Hespanha and Silva, 1993; Magalhães, 1993). This fact was obviously justified by the low density (7.7 inhabitants per Km²), and concentrated distribution pattern of the population in the province. In fact, the census of 1527 revealed that more than half of the Alentejo population lived in settlements with over 100 households. In this province were located half of the 22 settlements with 500 to 1000 households, and 6 of the 13 with over a thousand households. (Rodrigues, 1993).
<table>
<thead>
<tr>
<th>Province</th>
<th>Total Population (inh)*</th>
<th>Population Density (inh/sq. km.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antre Douro e Minho</td>
<td>275050</td>
<td>35</td>
</tr>
<tr>
<td>Tralos Montes</td>
<td>177935</td>
<td>14</td>
</tr>
<tr>
<td>Beira</td>
<td>334020</td>
<td>12.2</td>
</tr>
<tr>
<td>Estremadura</td>
<td>327105</td>
<td>15.3</td>
</tr>
<tr>
<td>Antre Tejo e Odiana</td>
<td>243980</td>
<td>7.7</td>
</tr>
<tr>
<td>Algarve</td>
<td>43985</td>
<td>?</td>
</tr>
</tbody>
</table>

*estimated value (obtained by multiplying by 5 the number of counted households)

Table 1 - Population and Population Density per Province (according with the 1527 Census)

Chart 1 - Population Density per Province (1527-1532 Census)
Map 16 - 16th Century Districts
Source: adapted from "História de Portugal" (J. Mattoso eds., 1993)
The Iberian Unification

In 1580, a problem in the succession to the throne of Portugal put the country under the rule of Philip II of Castilla - Philip I of Portugal. This Iberian unification, which lasted until 1640, didn't mean, however, the loss of Portuguese autonomy. In spite of the promulgation in 1603 of new general legislation (the Ordenações Filipinas), Portugal maintained independent legal and administrative systems. (Mata and Valério, 1993; Saraiva, 1993).

Two periods can be distinguished during the Iberian unification. The first, from 1580 to 1620, was characterized by political stability and economic prosperity. Brazilian sugar became the main object of Portuguese trade, helped substantially by the possibility offered to Portuguese traders to establish themselves in the Castillian possessions of the New World. (Mata and Valério, 1993).

This prosperity was interrupted in the second quarter of the 17th century, when economic recession in Europe caused a decrease in demand for Portuguese and colonial goods, and when some of the overseas possessions were lost. Similar difficulties in the Hapsburg Empire gave rise to hostilities against the Portuguese presence in the Castillian colonies and to a tax increase. This, together with the attempts of Philip III to diminish Portuguese autonomy, gave origin to a period of constant revolts which culminated with Portuguese independence in 1640. (Mata and Valério, 1993; Saraiva, 1993).

The loss of the oriental colonies was final, but Portugal was able to regain control over several possessions in Africa and Brazil. However, difficulties in the exportation of colonial goods, and a high level of imports kept the country in economic crisis until the end of the 17th century, when gold was found in Brazil. At this time, the first efforts towards industrialization were made, and the first progress in the wool industry was achieved. (Mata and Valério, 1993; Saraiva, 1993).
The Ancient Regime

The Ancient Regime is usually associated with the Absolutism\(^{32}\). Although there was no true Absolutism in Portugal, except for the government of Marquês de Pombal under D. José I (1750-1777), one can consider that the Ancient Regime began in 1698, when the Courts were convened for the last time. The Courts would not be convened again until after the Liberal Revolution, but then with a totally different meaning. The Courts dissolution didn't imply, however, a sharp decrease of the Nobility and Church powers limiting the authority of the King. Only the People was no longer represented. (Mata and Valério, 1993; Saraiva, 1993).

During the first period of the Ancient Regime (1698-1793) the country enjoyed a prosperity similar to that of the 16th century. The colonial pact, which prohibited the colonies of a country to trade directly with foreign countries, granted Portugal exclusivity of trade - now centered in the Atlantic - between its colonies and the rest of the world. Portuguese exports (salt, wine, olive oil and Mediterranean fruits) increased, supported by an agriculture more oriented towards the production of tradable goods (wine, maize, olive oil, fruits, and vegetables) and industry related goods (mulberry tree, flax, and livestock production). The 1703 Methuen Treaty, giving Portuguese wine a priority in the English market in return for a waiver of restrictions to the import of English textiles, made wine first among Portuguese exports. (Mata and Valério, 1993; Serrão, 1993).

An increase in population from 2 million in 1700 to 3 million in 1800 caused an higher demand for cereal crops, which favored an increase of foreign supply, able to respond faster and with lower prices. As a consequence, there was a relative decrease in domestic wheat production (which supplied only 1/3 of the total demand) in favor of

\(^{32}\)Political system in which an unlimited power is held by one ruler, usually the King.
maize\textsuperscript{33} in the North, and livestock production in the South. (Mata and Valério, 1993; Serrão, 1993).

The general increase in wealth didn't correspond, however, to a long term improvement of the economic situation of the country, since trade revenues were not utilized to generate new wealth. While the State share in the gold of Brazil (1/5) was wasted by the King and his luxurious Court, private merchants invested everything in the acquisition of land, at the time the only way to ascend in the social hierarchy. This investment of trade revenue in the land caused inflation in the farm land rental market, which in Alentejo was responsible for the expulsion of many farmers. (Mata and Valério, 1993; Saraiva, 1993; Serrão, 1993).

\textbf{The Peninsular Wars}

The wars against revolutionary France gave rise in 1793 to another period of political instability and economic depression. In this context, Portugal was to suffer the only alteration of its boundary since 1297, as the territory of Olivença in Alentejo was given to Spain as a consequence of the Oranges War (\textit{Guerra das Laranjas}). In 1807 the country was invaded by Napoleon's army, and the King's Court sought refuge in Brazil. (Mata and Valério, 1993).

The Peninsular Wars (1807-1814) had serious consequences for the Portuguese economy. To the short term effects of pillaging and destruction by the French and Spanish armies, were added war expenses and the effects of free trade access to Portuguese domestic and colonial markets granted England in return for its help in the

\textsuperscript{33}Maize was introduced in Portugal in the 16th century, and has caused dramatic changes in the agricultural landscapes of the North of the country.
war (Trade Treaty of 1810). The independence of Brazil in 1822 dealt the final blow to the economic situation. (Mata and Valério, 1993).

**Absolutism and Power centralization**

Despite the non-existence of real absolutism at the top, it is possible to detect in the Ancient Regime several indicators of increased control by the central government over local power. One of these indicators was the sharp reduction of lands owned by secular seigniors (38.3% of the counties in 1640 against 18.1% in 1811) in favor of the Crown and the Royal Houses\(^3\) (30.3% of the counties in 1640 against 58.3% in 1811), which also accumulated the lands belonging to the Military Orders\(^5\) (11.5% of the counties) (map 14 & map 17). It must be noted, however, that this reduction in territory didn't correspond to an equivalent reduction of income, because if only one jurisdictional donee was allowed per county, as regards fiscal rights several could exist. While the Crown owned juridically 53% of the counties in 1819-1820, it only received exclusive tributes from 7% of those. (Monteiro, 1993).

Other indicators were: i) the increasing number of counties with *juizes de fora* (judges nominated by the Crown) - less than 10% in 1640 against 22% in 1811; ii) the withdrawal of authority from illiterate judges, i.e., the judges nominated by the county (*juizes ordinários*); iii) the increasing participation of the counties in implementation of central taxes, iv) the abolishment in 1790-1792 of the juridical and administrative powers (*ouvidorias*) of the secular and religious donees; and v) the increasing central control over the county budgets and communal lands. (Monteiro, 1993).

\(^3\)Bragança, Infantado, and Rainha.

\(^5\)The *Ordem de Malta* was exempted from this land confiscation.
Map 17 - Landownership in 1811 (South of Tejo River)
Attempts by the Crown to control the management of communal lands and their privatization process had their culmination in the Law of the 23rd of July of 1766, which addressed the abusive leasing of communal lands for ridiculously small amounts to parents and friends of county government officials, by imposing the requirement of central approval for privatization of all communal land. The practical results of this measure were small. This was not strange given the hostility of the new Physiocratic School of Thought to any kind of agrarian collectivism which was considered an obstacle to the progress of agriculture. (Monteiro, 1993).

The privatization of the commons, in counties where donees had the right (granted by Charter) to lease collective lands, was also one of the main causes behind the anti-seigniorial movements marking the late Ancient Regime. This extended the conflict from regions where the movement was more intense, i.e., the regions paying higher tributes (Littoral Beira, and some regions of Estremadura and Interior Beira), to other parts of the country. (Monteiro, 1993).
III.2.2 - The Alentejo agriculture before the Liberal Revolution

III.2.2.1 - The agricultural landscape

At the end of the Ancient Regime, as in the period following the Reconquest wars, the Alentejo landscape was organized according to an infield - outfield system. The infields (sesmos, coutos or fortificados) were located in proximity to settlements, and consisted of an area of rich crops - kitchen gardens, vineyards, olive groves, and orchards, and intensive (without fallow period) cereal production (ferregiais). This intensive agricultural zone occurred especially in the neighborhood of towns, where the existence of a wealthier class led to more complex consumption habits. It is likely that it played an important role in their economy. Despite the nonexistence of references to coutos in information about the villages, this does not mean the nonexistence of intensive areas in their surroundings. Rich crops must have existed there also, though in smaller variety and in a less organized fashion. (Ribeiro, 1955; Serrão, 1993; Silbert, 1966).

In between the intensive agricultural areas and the outfield (fallow land) were located the areas of extensive (as opposed to the ferregiais) but regular cereal crops (as opposed to the temporary or shifting cultivation practised in the outfield). In fact, apart from the existence of preparatory ploughing, the boundary between this area and the outfield is not easy to determine, given the wide variety of rotation cycles. Silbert has assumed, based on the studies of Silva Picão (1903), a six-year rotation as the lower limit of the so called temporary cultivation. These longer rotations corresponded in many places to the development of tree-covered fields, where the goal was more the maintenance of the montado than the production of cereals. In the regular cereal
cultivation area, the rotations varied from 2 years (in the exceptionally rich soils of Beja) to 5 years (which was even rarer), the most common being the three-year and the four-year rotations\textsuperscript{36}. In the northeast rye was the main crop, complemented sometimes by millet (a secondary Spring crop), substituted in the cereal regions of the South by wheat complemented by barley. (Ribeiro, 1955; Serrão, 1993; Silbert, 1966).

While many authors defend a clear-cut distinction between the above described nucleus of regularly cultivated land surrounding the settlements, and the "impenetrable and totally non-utilized" maquis, Silbert (1966) considers the picture oversimplified, and convincingly defends the existence of a "fallow land economy" based on extensive utilization of the maquis resources\textsuperscript{37}. The economy of the outfields was based on extensive livestock production (sheep, goat and pig) and temporary cultivation, complemented by the utilization of many other resources such as honey, wood, cork, tanning bark and acorns. In many sparsely populated areas of the Southern and Western Alentejo this economy was important enough to be the origin of a self-sufficient and individualized way of life - the fallow land way of life. (Serrão, 1993; Silbert, 1966).

The landscape emerging from the Reconquest Wars was an extensification of the one existing under Roman and Muslim domain, with the fairly intensive and commercially oriented agriculture supported by the Roman villae giving way to a more self-consumption oriented activity. Regular cultivation persisted only around the perimeter of settlements, where it could be better protected, while the remaining territory

\textsuperscript{36}Subjacent to the rotation system was the need to restore the soil fertility. Stable manure was scarce and reserved for the intensive crops. The dung left by the livestock grazing in the fallow fields was one of the ways to restore the soil fertility. Other alternatives were prescribed burning, the burying of dead leaves and grasses, and the cultivation of Leguminosae. (Sousa, 1993).

\textsuperscript{37}It was the wide range of rotations mentioned in the literature (from 2 to 20 years) that led Silbert (1966) to conclude that a gradual transition, and not a clear cut limit, must have existed between land cultivated regularly and untilled land.
became the domain of extensive cultivation and livestock production. Also the individualism characterizing Roman agriculture was largely replaced (except for the rich crops) by collective forms of land use. Ruiz and Ruiz (1986), in their paper about transhumance in Spain, attribute this generalization of the agrarian collectivism to the Arab concept of property. As opposed to the Romans, the Arabs associated the notion of property not with land ownership but with usufruct of the land, i.e., with the right to exploit an area, which allows the reversion of unexploited (or fallow) lands to public use (Ruiz and Ruiz, 1986).

III.2.2.2 - Agrarian collectivism

Three different regions of agrarian collectivism could be distinguished in the early 18th century Alentejo: i) the northeastern openfield region; ii) the region of common grazing, which included areas in the Central-Eastern Alentejo (Cabeço de Vide and Mourão), the eastern fringe south of Elvas (Terena, Mourão, Moura and Serpa), and in the Ourique district; and iii) the region under weak collective constraints, the remaining area. (Silbert, 1966).

This tripartite situation was not true in post-Reconquest times, when the system of common grazing (kitchen gardens, orchards and some enclosed farms excepted) was imposed all over the country (Magalhães, 1993; Silbert, 1966). Despite being the domain of agrarian individualism, the area of more intensive crops was not exempted from this common grazing regime. Pastures under the canopy of olive trees, and the stubble of
*ferregiais* were often confiscated by the county to be sold in auction or granted to the meat supplier\(^{38}\) of the county.

Due to the necessity to reduce the fallow period in face of an increase of the population, and to the demands of a prosperous livestock industry, the openfield emerged during the Middle Ages north of the line Gavião-Crato-Arronches (NE Alentejo). To the common grazing practiced then on fallow fields that could not be fenced, this system added a compulsive rotation, and the division of the cultivation fields into small farm units (*courelas*) distributed among the small farmers. It must be noted that this distribution of the cultivation fields didn't happen only on the common lands. In some private enclosed *herdades* (the great majority owned by the Military Orders), whose owners were only interested in livestock production, the cultivation field was also periodically divided among *seareiros* (precarious sharecroppers) for a part of the harvest. This system has granted these *herdades* the name of partial openfield. (map 18) (Silbert, 1966).

Both on the openfield and common grazing regions, common grazing was generally allowed only from March to September. In face of the great demand from the transhumant flocks coming from Spain and Serra da Estrela (Ribeiro, 1955), the winter pastures were usually confiscated and sold in auction by the county\(^{39}\). (map 18) This didn't happen without great opposition from the large local landless\(^{40}\) livestock producers who often saw the "precious" winter pastures allocated to foreigners.

\(^{38}\)It was common in many counties of Alentejo to grant grazing facilities to the meat supplier, in exchange for a lower meat price (Silbert, 1966).

\(^{39}\)It must be noted that the great majority of the "communal lands" didn't belong to the population but to the county. This means that the income generated by the sale of the winter pastures went to the county (except for one third reverting for the Royal Treasury). This might explain the county interest, and the superior approval, in the pastures sale.

\(^{40}\)In face of the abundance of common pastures, the holding of land was not necessary at the time to be a large livestock producer.
• Openfield

• Common grazing

• Common grazing w/ sale

• Common grazing in Coutos

• Periodical distribution of common lands

• Periodical distribution of private lands

Map 18 - Agrarian Collectivism before 1739 (South of Tejo River)
Source: adapted from (A. Silbert, 1966)
In many places these producers\(^{41}\) were able to lobby the county and obtain a preference (pre-emption) right. (Silbert, 1966).

Despite the pasture sale, "ox reserves" were set up during the winter in the fallow fields to provide food for the work animals of the small farmers. These "ox reserves", which could also be used by horses and mules, were complemented by other areas established in common grazing lands during the whole year. The latter were fundamental to the survival of seareiros, because they can be found even in counties without a generalized common grazing system. In these lands the seareiros, and even the journeymen, were also allowed to practice small livestock production - a few pigs and sheep. (Silbert, 1966).

The third region, which included both rich and very poor counties, also slowly emerged from the second one. In the most fertile counties (Beja, Elvas, Évora, and Estremoz), the large farms evolved not to the precarious distribution of courelas, but to the establishment of long leasings. The high wheat production fostered by soil fertility, and the comparative weakness of landless livestock producers who lacked the support of the small farmers, allowed an earlier development of agrarian individualism, revealed first (13th and 14th centuries) by the right to establish a private "ox reserve" close to the cultivated field, and later by complete enclosure of the herdade. (Silbert, 1966).

In the poor Western and Northwestern regions this evolution was motivated by different reasons. A low population density and the absence of transhumant flocks rendered less necessary the existence of common grazing. These regions were the domain of a very extensive livestock production and shifting cultivation occurring mainly

\(^{41}\)The classes of landless livestock producers and livestock farmers (livestock producers owning or renting farms) could be partially superimposed, i.e., one could have enclosed pastures and still buy common pastures.
in the *herdades de mato* - scrub covered farms. In these latter, the farmers usually transfer to *seareiros* the necessary cultivation to maintain the tree covered fields (*montados*) and pastures. (Silbert, 1966).

The weakness of the communal organization was compensated in this third region by the greater extension of county properties. In county lands, poor peasants were allowed to cultivate some cereal, and to practice small livestock production. (map 18) (Silbert, 1966).

The decline of transhumance\(^2\), together with the growing importance of local capitalist (with land) livestock production (due especially to the progress of the wool industry and trade, but also to the exportation of live cattle to Lisbon) caused, between 1739 and 1826, the extinction of the common pastures in many regions previously under a common grazing system. This regression of the agrarian collectivism had the support of the Physiocratic School of Thought, great defender of individual rights, and mentor of the Liberal Revolution of 1820. (map 19) (Silbert, 1966).

Able to escape this individualistic wave was the openfield region where the convergent interests of large landless livestock growers and small farmers allowed a longer survival (until the second half of the 19th century) of collective rights. (Silbert, 1966).

\(^2\)The decline of the transhumance in Alentejo is connected with the decline of transhumance in Spain, whose golden years were in the 16th century. In the 18th century there was no need anymore to take sheep to graze in Portugal.
Abolishment of common grazing

Farm enclosure

Privatization of common lands

Map 19 - Agrarian Collectivism Regression after 1739 (South of Tejo River)
Source: adapted from (A. Silbert, 1966)
III.2.2.3 - The agricultural social structure

The above described agricultural landscape was driven by a complex social hierarchy, characterized by a remarkable system of rights and rents, and by an abundance and diversity of intermediaries, separating those who owned the land from those who worked it. In average this hierarchy had five elements, though it could be much more complex: (i) the landowner, (ii) the financier, (iii) the emphyteuta, (iv) the farmer (lavrador), and (v) the journeyman.

Landowners and intermediaries

Apart from the territory granted to the counties, the large majority of the Alentejo territory was owned by the Crown, the royal houses (Bragança, Rainha, Infantado), the nobles, the Military Orders, and the Church (Serrão, 1993; Silbert, 1966). (Table III.1). As in many other regions dominated by the latifundia, the Alentejo landowners were largely absentees. Most lived in Lisboa "where they wasted their wealth in a life of luxury". As this glamorous life required cash, the ancient custom of paying the rent in goods didn’t appeal to them. Thus, they preferred to renounce a portion of their income, and transfer substantial rights to intermediaries who advanced them the value of the rent. (Silbert, 1966).

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43 José Joaquim de Costa e Simão in a manuscript sent to Academia de Ciências in 1808.
44 Although there were exceptions, it was only at the end of the 19th century that the payment in cash of the rent became usual. Before, the rent was payed in goods: bushels of grain plus a small quantity of other products (pitâncas).
45 While landowners had the reputation of waiving partially or totally the rent in cases of bad harvests, less tolerance was found among the intermediaries, engaged in a strictly commercial operation, and obliged by contract to make their payments whatever the circumstances. The avoidance of any direct contact with their tenant farmers seemed to be another advantage sought by the landowners when trusting their lands to financiers.
These business men, often incorrectly called "first tenants", constituted a true capitalist group receiving a large share of the land revenues of Alentejo. They were authorized by contract to exercise all the rights and powers of the landowners\textsuperscript{46}, including the power to increase the rent and force out those who didn't comply with the contract\textsuperscript{47}. Their misuse of these powers has often been blamed of not providing incentives to farmers, and, thus, retarding the progress of agriculture in the region. (Silbert, 1966).

**Emphyteutas**

The emphyteusis was very common in Alentejo. But unlike in the North of the country, or in the burgo areas it didn't promote the development of a class of small landowner-farmers. For the great majority of the Alentejo large farms (<em>herdades</em>), the emphyteusis was not a regular leasing contract between a landowner and a farmer meant to promote the use of the land, but a way of creating a duplication of property rights. The large emphyteutic herdades of Alentejo were often the object a sub-emphyteusis or leasing contract. In fact, in Ancient Alentejo it was often not possible to distinguish landowners from emphyteutas, since it was common to have persons being both, i.e., paying foros for some herdades and receiving foros for others\textsuperscript{48}. Thus, the right to lease land was the essential fact determining the upper level of the social hierarchy. (Costa, 1964; Silbert, 1966).

\textsuperscript{46}José Joaquim de Costa e Simão in a manuscript sent to Academia de Ciências in 1808.
\textsuperscript{47}Most of the contract clauses concerned the good maintenance of soil and farm buildings.
\textsuperscript{48} This situation does not apply to the religious institutions, who were landowners but never emphyteutas.
Lavradores

Lavrador was the word utilized in Alentejo to designate a farmer, this designation being independent from landownership. In fact, at least until the Liberal Revolution, the number of lavradores-landowners was very low, the lavrador-tenant farmer being the typical Alentejo farmer. Curiously, in spite of this dominant situation, they were never called rendeiros (tenant-farmers). The word colonos (settlers) was used instead. This detail of vocabulary had its importance. The underpopulation of Alentejo caused landlords to avoid by all means the departure of their tenant farmers (or emphyteutas), which led to substitution, for a word suggesting an unstable situation, of another hinting at the idea of established roots. (Silbert, 1966).

Despite the tenant farmer status of the majority, the lavradores were far from being an homogeneous class. Together with the small farmer exploiting only one farm, there were many large farmers exploiting several. Their common characteristic was the possession of a cultivation apparatus (plough and oxteam), and the possession of at least a flock of sheep and a flock of pigs. It was this last feature that distinguished them, according to many authors, from the class of seareiros.

Seareiros

The word seareiro in Alentejo can have two meanings. It can be used to designate a small farmer occupying a courela (small farm), the difference between seareiro and lavrador in this case being only the size of the farm. But more traditionally it is applied to a small peasant practising a precarious agriculture in a regime of share-
cropping. In fact, the Philippian Code differentiates *lavrador* and *seareiro* by something more than just the size of the farm. While the first term is utilized for individuals producing large harvests, growing several kinds of livestock, and not having any kind of industrial job (Philippian Code, Book 2, article 57, §24), the second means an individual cultivating only a small amount of land (Philippian Code, Book 2, article 33, §30). For many authors the main difference between a *lavrador* and a *seareiro* was the possession or not of a flock of sheep or pigs. Apart from his oxteam the *seareiro* possessed no other kind of livestock, because he didn't have the right to use the pastures or stubble of the lands where he was allowed to crop for a part the harvest (usually 1/4 in good soils, and 1/5 to 1/6 in less fertile ones). Another feature distinguishing the *seareiro* was his usual connection to second rate lands: lands in process of clearance, temporary or shifting cultivation lands, and lands where livestock production was the prime goal - for example the *montados*.

The *seareiro* allowed the great farmers interested mainly in livestock production to transfer to him the necessary cultivation to improve the pastures. More often, the great *lavrador* entrusted a part of his lands to *seareiros* in order to get it cleaned or even cleared. In fact, the great land clearances that would happen in Alentejo between the late 19th century and the early 20th century were their work. Prescribed burning, the same technique used in their precarious agriculture, was utilized to destroy the shrubland. (Silbert, 1966).

When the working capital unit was the plough and the oxteam, its possession allowed the *seareiro* to offer his skills to the *lavrador*, to apply for the cultivation of communal lands, or even to perform cargo jobs. It was often possible for him to

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51 Silva Picão (1903) attributes to the seareiros the maintenance of the *montado*.
52 It is possible that the transportation revolution, by reducing this income alternative, also contributed to the extinction of the *seareiro* figure.
accumulate some capital and ascend in the social hierarchy of the region. Mechanization and the introduction of chemical fertilizers have technically rendered this transition impossible. (Silbert, 1966).

Journeymen

The great majority of the Alentejo population (~75%) were journeymen, employed permanent or temporarily by the lavradores. While the temporary employees were usually associated with seasonal tasks like weeding, harvesting, and the shearing of sheep, the permanent workers performed jobs mostly related to livestock keeping, and tilling. These latter could be paid yearly, monthly, or daily, the food being always supplied by the boss. Some permanent employees had the right to grow a few ares of vegetables, and the chiefs (abegões) were entitled to an extra hectare of wheat or rye, and sometimes some livestock privileges. (Silbert, 1966).

The low population density (the depopulation of Alentejo continued through all the 18th century (Serrão, 1993) ), together with the abolishment of slavery in 1761 (Caldas, 1991; Mata and Valério, 1993) led to a deficiency of agricultural workers in Alentejo at the end of the Ancient Regime (Caldas, 1991; Silbert, 1966). This situation, leading to an inflation of wages (the wages in Alentejo were much higher than in any other part of the country), was considered at the time as one of the causes, if not the main cause, of the agricultural decadence of the region - promoting livestock production (less labor-intensive) at the expense of cereal crops.

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53The abegões were well above the average employee, and even above many seareiros.
54Slavery had existed in Alentejo since the 15th century.
55Animal production protected the farmer against the labor problem, especially the one concerning the harvest. In Alentejo during the cereal harvest season, a journeyman wage could reach 50 reis, while in other regions of the country, like Beira, it was 10 reis.
This labor force deficit was also responsible for the frequent temporary migrations occurring to the region. In the face of this situation, Henriques da Silveira in "Racional Discurso" (1762) proposed the settlement in the Alentejo of small farmers, who could help the lavradores.

III.2.2.4 - The farming problem of Alentejo

Until recently, the Alentejo conveyed, in spite of its scarcity of water, an idea of great suitability for cereal crops, whereby it was considered the imaginary "barn" of the country. An 18th century author refers to it as the most fertile province of Portugal - the one that would supply wheat, rye and barley for everybody if all its fields were cultivated (Castro, 1762). This idea, which had been a determining factor in the evolution of Alentejo agrarian landscape until the present century, would condition all the discussion about the agricultural situation of the region at the end of the Ancient Regime.

The lack of cereal crops and the excess of livestock production were long (perhaps always) the cause of complaints concerning the agricultural situation of Alentejo. This concern about the small wheat production of "such a suitable region" probably increased when Portugal started to be a wheat importer. In fact, among the causes justifying the Sesmarias Law of 1375, Fernão Lopes (1380) mentioned the development of livestock production at the expense of cultivation, with articles 18 and 19.

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56 The neighbor region of Beira was the main source of these migrants. The route connecting Covilhã to Ourique, a fundamental axis in the Portuguese economic life at the time, apart from being the transhumance and wool route was also the route of the temporary migrations. However, many migrants came also from the Algarve.

57 In fact, many of the migrants settled in Alentejo for good. This had certainly happened in the South of the region with people coming from the Algarve, and it was people from Beira that at the end of the 19th century colonized the NW of Alentejo, where they introduced their crops and their techniques.
of the law even prohibiting the possession of animals apart from those strictly necessary to cultivate the *herdades*.

This situation seems to have reached a climax, at least considering the number of complaints reaching the Courts and reports written about the subject, in the 18th century. High labour costs, resulting from the chronic low population density of the province and from the abolishment of slavery in 1761, and the serious competition from the international market faced by the wheat producers (the prices of the imported cereal were usually lower than the domestic prices), combined with the progress of the wool trade and industry, were probable causes leading to the extensive development of a capitalist livestock production in the region (Caldas, 1966; Serrão, 1993; Silbert, 1966).

The comparatively high income generated by livestock production caused an inflation in the leasing market, leading to termination of the tenancy contract of many *herdades* occupied by the same family generation after generation. Since leasing played a major role in Alentejo farming, this instability of tenancy contracts started to be seen as a new cause preventing the progress of agriculture in the region. A short-term lease was perceived, because of its uncertainty, as a disincentive to investment, and an invitation to overexploit the land. This awareness gave rise to legislation seeking stability of leasing contracts, and through this the maintenance of the cultivation area.

The first law concerning this subject was the Decree of the 21st of May 1764, applicable only to farmers working in the lands of the House of Bragança. Through this decree the King declared that any *lavrador* installed in the *herdades* of the House of Bragança who worked the land properly, could not be forced out, or have his rent increased, without a special order signed by the King. Exceptions were allowed for

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58 As was already mentioned in this chapter, the leasing was a short term contract, with a duration of less than 10 years.
Lavradores not paying their lease, letting the house go to ruins, not maintaining the trees properly, or not cultivating the land "seriously". (Silbert, 1966).

Six years later this protection was extended to the lavradores working the lands of the Military Orders by the Royal Resolution of the 6th of November of 1770. And in 1774, the Law of the 20th of June extended equal rights to all tenant farmers of the region. (Silbert, 1966). The 1774 law reinforced and extended the former two laws: (i) a special order resulting from a local investigation, and approved by one of the authorities in the affair, was necessary for a farmer to be expelled; (ii) the expelled farmer might be reinstalled if the herdade was left untilled, with the annulment of any leasing contract established in the meanwhile. And unless a new value was established by experts, the rent would be the old one; (iii) in case the expelled farmer didn't want or couldn't rent the herdade again, it would be rented to someone offering the price established by the experts; (iv) any destroyed or damaged buildings and equipment were to be repaired within six months, at the expense of the livestock producer or, in his absence, the landowner. Failure to comply with the reconstruction article would cause the farm to be seized (when the violator was the livestock producer) or to be given during six months to any farmer wishing to rebuild it (when the violator was the landowner).

The 1774 law was never truly enforced. Threats causing the lavrador to leave on his own initiative, lawsuits based on noncompliance of the contract clauses, expulsion following the lavrador's death (Pereira da Fonseca, 1782), and the installation of caseiros (bailiffs who were not real farmers) in order to keep the place and prevent its occupation by lavradores (Anónimo de Campo Maior, 1880), were some of the strategies used to subvert the law. Also the farmers aiming to occupy the not-well cultivated lands gave up in face of the risks and costs of making a legal claim or demanding an evaluation of fair rent (Gervásio Almeida Pais, 1788).
Thirty years after the 1774 law, it became a custom to authorize the expulsion of the tenant farmer when the landowner pretended to assume the exploitation of the land himself, despite the law's omission on such matters. The *Alvará* of the 27th of November of 1804 legalized this resumption right: "(...). preference should be given to any landowner who wishes to cultivate its lands, as long as he inhabits the *herdade* himself or has it cultivated by employees or managers with the resources there installed. (...) The expelled farmer can retake the farm if it is not inhabited or if the pastures are sold, even when there's a bailiff inhabiting it. On the contrary, if the *herdade* is cultivated properly, the landowner could rent it again after 4 years."

The resumption right, which no tenant farmer ever dared to contest, was not the only clause favoring landowners established by the 1804 law. To the three cases of expulsion foreseen in the 1774 law, the 1804 law added a fourth: A farmer could be forced out of a *herdade* if the potential improvements had not been done. If they had been done - and the expulsion didn't happen - the law authorized the landowner to increase the rent every 9 years after an evaluation and permission of the Supreme Court.

The 1804 law, the Napoleonic Invasions of 1807-1814, and the general price collapse of 1819-1821 led the "agricultural crisis" to a climax. Albert Carlos de Menezes visiting the province on the eve of the Liberal Revolution, reported many untitled and uninhabited *herdades* being utilized solely for pig (tree covered fields) and sheep grazing (Menezes, 1819). The new class of tenant livestock farmers now included many financiers (enriched by their intermediary role), artisans and merchants, to whom the investment in the land was still the only way to ascend in the social hierarchy. In an

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59 Although some authors - like Silbert (1966) - consider that a war situation affects more adversely the livestock than the crops, the opposite is usually accepted. Due to the livestock mobility, what usually happens is a production shift from crops to animal growing.
effort to put an end to this situation, i.e., to put back in place the "real farmers" the Agriculture Commission of the Courts proposed in 1822 the reactivation and reenforcement of the 1774 law.
III.2.3 - The Montado at the end of the Ancient Regime

The *montado* landscape as we know it today - as was described in chapter II - is the result of a fairly recent evolution. Although one can find earlier references to individualized and "well-kept" *montados* used to graze large pig flocks\(^6\), it seems that the first "modern" *montados* were only created between the 18th and the 19th centuries. The holm oak *montado* associated with the generalized progress of a capitalist livestock industry, and the cork oak *montado* due to the incentives of a booming cork industry (Balabanian, 1980; Silbert, 1966).

According to Silbert (1966) it was not possible to be so demanding in the context of the ancient economy. Before the capitalization of agriculture, the *montado* should have been a tract of maquis where trees were favored in order to obtain acorns to graze pigs, and where patches were occasionally burned both to allow a cereal harvest and the regeneration of pastures\(^5\). These *montado* patches occurred mainly outside the area of regular cultivation (outfield) and were part of the so-called "fallow land economy" or "fallow land way of life". (Ribeiro, 1955; Silbert, 1966).

As mentioned above, "fallow land economy", which could be practiced both in private (*herdades de mato*) or on communal lands, was typical of the less fertile soils and assumed its larger importance in the region's less populated areas. Sheep, goats (in the

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\(^6\)At the end of the 15th century the *sesmeiro* (distributor of uncultivated lands) of Estremoz blamed the creation of cork oak *montados* - used to produce cork and raise pigs - on the abandonment of cultivation. (Silbert, 1966).

\(^5\)Prescribed burning was a technique utilized both in shifting cultivation and to create pastures. In face of the fire danger implied, this operation was object of many county regulations, namely the specification of the date after which the vegetation could be burnt, and the establishment of punishments to the violators. Despite all precautions imposed, prescribed burning was accused of causing many fires leading to the destruction of the trees.
most sloping or scrubby areas\textsuperscript{62}, pigs (in oak covered areas) and cereal crops were its main outputs, but the landscape supplied the local populations with other minor but not insignificant products (including the sweet holm oak acorns which were until the 19th century a common diet constituent among the poor people in bad years (Lautensach, 1932; Ribeiro, 1955). Honey and bees wax were very important products in some counties (curiously apiculture was regarded, if one considers its production system and the utilized nomenclature\textsuperscript{63}, as just another form of livestock production) but in general, forest products were the most important secondary output of the system. (Mattoso, 1993; Silbert, 1966)

As in the modern montados, charcoal was the most important forestry product of the fallow lands. In the vicinity of the main routes it even generated substantial large industry and trade, sometimes illegal, which led many authors of the 18th and 19th century to blame this production for a large part of the deforestation occurring at the time in the province. Due to the scarcity of forest trees, the maquis was also utilized by the local populations as a source of construction and fire wood. (Silbert, 1966).

\textsuperscript{62}Except for the most suitable areas for goat production, the number of sheep must have been in average three times bigger than the number of goats. However, these later played a very important role in self-consumption, and even in local trade. As in all the Mediterranean countries, goat milk, cheese, and meat were widely used in the diet of the poor people.

\textsuperscript{63}Bees were called "aerial livestock" (gado aereo), and their food "flower pasture" (pasto de flores). The bee swarms not belonging to the owner of the land were called peguilhöes - name given to livestock in the same conditions. Also malhada, the name given to the bee feeding sections, is a commonly used to designate the livestock feeding parcels.
III. 2.3.1 - Holm oak montado

The oak tree (holm oak or holm oak + cork oak) covered fields used to graze pigs must have been abundant in the district of Portalegre (especially in the South), and in all the eastern areas under a common grazing system. They were rare in the region of the rich crops (around Évora, Estremoz, Elvas and Beja) and in the west of the province where the holm oak is replaced by the cork oak and the maritime pine.

As for the pastures, the acorns of common or private montados could be confiscated by the county during the montanheira period (November, December and January) to be sold in auction to the local or transhumant pig producers (old documents mention the transhumance of large flocks of pigs coming from Coimbra to graze in the Alentejo montados) (Magalhães, 1993), or distributed by the local population (as was the case of Moura and Mourão). The sale price was usually established, following an ancient tradition, during the São Miguel fair, based on numerous offers stuck on the walls of the churches near the fair ground (Silva Picão, 1903). There were other cases, like Póvoa and Castelo de Vide, where the seignior of the county reserved the three months of montado to himself (Silbert, 1966).

The sale in auction, reflecting the existence of a fairly important commercially oriented production, didn't happen without the protest of local populations, who were prevented from practicing their small pig fattening. To overcome this situation and to prevent pig production in the interior of the villages, some municipalities (like Nisa, Arronches, Moura, and Monforte) maintained (some until the 20th century) the old tradition of the common pig herd (adua). This herd, composed only of pigs belonging to the small producers (usually 2 or 3 pigs per producer), grazed on the public lands under

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64 There are cases of private lands where the trees, the fruits or even the use of the trees belonged to the county.
the vigilance of a guard (*adueiro*) and an assistant. (Silva Picão, 1903). It must be noted that this small pig production was not meant solely for self-consumption. To sell a pig, a small investment with a high revenue, was for many resourceless peasants the sole opportunity to gain some money. (Silbert, 1966).

However, the modern *montado* would emerge in the context of large livestock production. With the gradual capitalization of agriculture, the *montado* evolved from its ancient extensive forms to a most intensive one - an enclosed oak forest with evenly spaced trees, regular cereal cultivation and regular maintenance. As one might imagine, this was a continuous and gradual process, not a creation for bare ground. The first modern *montados* emerged from gradual improvement of the native maquis by: i) gradual elimination of the shrubby vegetation while keeping the trees; ii) gradual elimination of the worst trees in order to achieve the optimal tree density (an average of 45 trees per hectare); iii) shape pruning of the selected trees to improve the fructification; and iv) maintenance pruning to keep the maximum fructification tree shape (Balabanian, 1980). The large amount of labor necessary to create and maintain a modern *montado* was, together with the lack of necessary capital, one of the main reasons why this landscape was not possible in the ancient Alentejo economy. It also explains why the great majority of today's *montados* were created during the process of the great land clearances of the late 19th-early 20th centuries, when the labor force deficit of Alentejo had been largely overcome.
III.2.3.2 - Cork oak _montado_

Within the context of the "fallow land economy" the cork oak was, despite being less appreciated than the holm oak, the source of two cherished resources: cork and tanning bark. According to documents of the time, the manufacture of beehives was one of the most popular uses of the cork, which was also utilized in the facing of houses and corrals and on the handicraft of common utensils (Fragoso de Siqueira, 1790). As regards tanning bark, Almeida e Vasconcellos (1950) suggests, more than just popular utilization, an intensive commercial exploitation of this product.

Although largely increased by the 19th century boom of the cork industry (Silbert, 1966), a fairly important cork trade must have already existed in the late Middle Age, as this activity was often blamed for the decline of cultivated areas (Gama Barros, 1886; Rau 1946). This early trade was of large pieces of cork bark, and according to the statistics it was not of great relevance among Portuguese exports of the time.

The diffusion of the cork stopper in the 18th century gave cork its present importance (Balabanian, 1980; Daveau, 1983; Silbert, 1966). Initiated in France and in Catalunia (in connection specially with the champagne industry), the new technology soon arrived in Portugal (1822-1826) where it gave rise to a prosperous industry®^ (Deschamps, 1935).

This sudden importance of cork was immediately seen as a great opportunity for the poor soils of the sparsely populated western Alentejo, where the cork oak finds its

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65This wide diffusion of the cork stopper industry caused by the introduction of a new technology doesn't mean that the cork stopper was not already used and manufactured in the past. Cork stopper factories are known since the time of Pombal (second half of the 18th century) in Porto and Lisboa (Bernardo, 1948), and Portugal exports cork stoppers (at the time only 12.5% of the total cork exports) since the late 18th century (Silbert, 1966).
optimal conditions and grows spontaneously almost everywhere. Large cork oak
*montados* were selected or even planted in the large *latifundia* covering almost all the
region, which has since become the largest cork forest of the world, only interrupted
occasionally by the alluvial valleys, water courses, and by rare patches of pine trees.
Cork became the first production of Alentejo, and Portugal the first world cork producer,
producing more than half of the world's cork. (Balabanian, 1980).
III.3 - THE LIBERAL REVOLUTION

The political situation in the years following the Peninsular Wars was characterized by increasing tension culminating in the Liberal Revolution of 1820. Besides the substitution of a constitutional regime for absolutism, this revolution aimed to put an end to British interference in Portuguese affairs and to return Brazil to colonial status (not achieved since Brazil gained its independence in 1822).

This first Liberal Revolution was followed by a period of political instability marked by i) resumption of power by the absolutists (1823-1826); ii) a civil war between absolutists and liberals (1828-1834) ending in liberal victory; and iii) several confrontations between conservative liberals and progressive liberals ending in 1851 when a moderate government gave rise to a period of political stability.

The liberal triumph brought on several legal, juridical, fiscal, and administrative reforms, which caused considerable changes to the agrarian society and agricultural structure, with obvious impacts on the landscapes of the country. The construction of public works, another main issue of the liberal agenda, also contributed to this landscape metamorphosis. Between 1853 and 1890, more than 2,000 km of railroads and 10,000 km of macadam roads were built, reducing to 13% the area of the country without easy access. This contributed to the economic integration of the several regions of the country.
III.3.1 - The reforms

In 1821, only a year after the Liberal Revolution, were abolished: i) the personal services (labor due to the seignior); ii) the banalidades (compulsory paid use of seigniorial property such as olive and wine presses, the mill or the oven); iii) the tributes paid to live on seigniorial land, to marry, to use water from the public fountains, to have or graze livestock, or to light fire; iv) the privileges preventing free navigation of the rivers; v) the relego (exclusivity of wine sale granted to the Crown or Seigniors in certain months of the year); vi) the trade preferences granted to some towns and villages; and vii) the hunting enclosures. (Caldas, 1991; Vaquinhas and Neto, 1993).

In the same year, the Decree of the 5th of May of 1821 nationalized all the Crown properties, which therefrom became National properties (Caldas, 1991; Silva, 1993).

In 1822, the Charter Law (Lei dos Forais), which would subsequently be revoked in 1824, reduced the foro (percentage of production owed to the seignior) to half, and the laudemio (transmission right) to 1/40. Applicable only on lands regulated by a charter, this law had no effect on tributes resulting from an individual emphyteusis contract. (Caldas, 1991; Vaquinhas and Neto, 1993).

Since these "timid" measures didn't come up to the expectations of farmers who wished a larger and more generalized reduction of the tribute charge, they revitalized the anti-seigniorial movement giving rise to a generalized boycott of tributes. (Caldas, 1991; Vaquinhas and Neto, 1993).

The deepest reforms to the Ancient Regime system were brought about by the second, and more definitive, liberal assault on power. In 1832, still under civil war, the
morgados generating a small income were abolished by the Decree of the 4th of April of 1832, as was the tithe, substituted by an amount paid by the State - Decree of the 30th of July of 1832.

The Decree of the 13th of August of the 1832, referred to by some historians as the Agrarian Revolution Law, was the final blow to the seigniorial system, revoking all donations of Crown properties and charters granted by the King or donees to the counties, as well as any kind of tribute paid on these lands. (Caldas, 1991; Vaquinhas and Neto, 1993). This decree ordered that any land under such conditions should became private property in possession of the individual who paid tribute for it (lands under an emphyteusis contract), or of the donee (lands exploited directly by the donee or by his tenant farmers or sharecroppers). Lands under the direct administration of the Crown (untilled, or cultivated by tenant farmers) became alienable National lands. (Caldas, 1991).

Since the Decree of the 13 of August of 1832 was applicable only to donated lands and not to properties acquired by any other means (nobody really understood which ones), its enforcement gave rise to several disputes in Court, which was responsible for deciding whether or not to abolish the tribute. In the end, and despite good intentions, the desired revitalization of agriculture, through the distribution of land free from tributes to individuals wishing to cultivate it directly or indirectly, was not achieved. (Caldas, 1991).

In 1834, all male Religious Orders were extinguished and their properties confiscated by the State. With this measure the new regime meant to neutralize the political and economic influence of the strongest nucleus within the Church, the main

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66 The morgados were lands under a regime establishing the indivisibility of the inheritance and by which patrimony was transmitted to the oldest son. The large morgados would not be extinguished until 1863.
support of the Ancient Regime. The female Religious Orders, and a secular Clergy kept under the immediate control of political power were maintained as they were not considered a relevant menace to the new order. However, as a way to guarantee their political obedience, in 1861 the properties of these institutions were also confiscated, and they were thereon maintained as direct financial dependents of the State. (Caldas, 1991; Silva, 1993).

In 1835 the sale in auction of National lands (former Crown lands and Church lands) was decided on, justified by both economic reasons (to balance the public debt and promote the development of agriculture) and socio-political reasons (to multiply the number of landowners, and thus increase the public support to the new regime) (Caldas, 1991; Silva, 1993). None of these objectives was truly achieved. The sale revenue was well below the public debt, and the selling process, not favoring broad access, did not correct the existing asymmetries in land distribution. In fact, though all social groups participated in the auction, the share obtained by each of them was much different, with one tenth of 1876 buyers getting more than half of the 7267 parcels sold. The nobles bought the better parcels, and the bourgeoisie, to whom the possession of land was necessary to ascend in the social hierarchy, bought the largest share. (Caldas, 1991; Silva, 1993).

Agrarian collectivism, though accused from the beginning by Liberal theorists of preventing the progress of agriculture, was able to survive the first phase of the Liberal

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67 The sale of National land has been considered by many historians as one of the most scandalous processes in the implementation of the liberal regime. Many references lead some to believe that some auctions were set up to sell the lands to a predetermined buyer, i.e., when groups of peasants, facing enormous financial difficulties, arranged to get the money necessary to buy parcels that were deliberately large, the auction was announced in one place, and suddenly carried out in another, in order to get the exclusive presence of the pre-chosen buyer who ended up buying the land at a moderate price. (Caldas, 1991).
Period, and to persist almost intact into the second half of the 19th century when it finally became the object of severe reforms. In 1867 the first Civil Code\(^{68}\) declared common grazing illegal for being incompatible with the new notion of land ownership as an absolute, individual, and exclusive right over the land (Caldas, 1991; Vaquinhas and Neto, 1993).

Aiming to achieve an increase of cultivated land, the Civil Code also promoted the privatization of any form of common property inherited from the Ancient Regime, with the exception of land necessary for the common use of counties and parishes\(^{69}\) whose privatization was up to the local authorities. Despite this exception, the commons only persisted in some interior villages of the North of Portugal, where a communal way of life was maintained in support of agriculture. In regions dominated by strong agrarian individualism, like Alentejo, the county or parish common lands soon were sold in auction or divided in equal shares for all inhabitants. (Caldas, 1991, Vaquinhas and Neto, 1993)

If the sale at auction again favored groups with greater financial resources, the division in shares ended up not giving better results. While the ancient system allowed peasants an independent way of life based on use of common lands and common grazing, the individual small parcels resulting from the division of common lands were usually too small to provide the necessary income. As many soon became unproductive or eroded after use beyond their capability, their owners had no alternative but to sell them

\(^{68}\)The Civil Code of 1867 replaced the former general legislation - the Ordensões Filipinas. (Mata and Valério, 1993).

\(^{69}\)In 1840, civil administration was instituted at the parish level. (Mata and Valério, 1993). This administrative reform divided the country into 17 districts, each district into several counties, and each county into one or more parishes (freguesia). (Caldas, 1991). With this reform, which established a minimum size for the counties, 498 old counties were extinguished and 21 new ones created. (Caldas, 1991).
"for almost nothing" to large landowners of the region, and to resign themselves to the status of journeyman or emigrant. (Baptista, 1978; Caldas, 1991).

While the Liberal reforms managed to destroy the foundations of the Ancient Regime in such way as to render its reconstruction impossible, the second objective of correcting the asymmetries in land distribution was not accomplished at all. To promote the distribution and consequent cultivation of the vast areas of untilled lands existing in Portugal at the end of the Ancient Regime, the Liberal Government abolished the indivisibility and inalienability of the land, a regime set up to perpetuate the privileges granted to the Nobility and the Church\textsuperscript{70} (Caldas, 1991). However, the sale at auction of the National lands, and the privatization of the commons, only substituted a new privileged group (the bourgeoisie) for the old (the nobility and the Church). This situation was especially evident in Alentejo, where this process consolidated the large farm land structure of the region, making it no more available to common farmers than it was before.

III.3.2 - The \textit{montado} within the progress of agriculture

Gerardo Pery (1875) determined that no more than 10\% of the country's territory was cultivated at the end of the Liberal Civil War (1834). Forty years later, this area had tripled (map 20) (Pery, 1875) and from thereon it never stopped growing (Vaquinhas and Neto, 1993). This trend is attributed to the utilization of new technologies (mechanization, and new cultivation techniques), a demographic increase (2,931,930

\textsuperscript{70}The Crown lands, and the lands donated to nobles and Church could not be subdivided or alienated. The only way to receive revenue from these lands were the contracts of emphyteusis and leasing.
Map 20 - Land Use in 1868 (South of Tejo River)
Source: adapted from (A. Silbert, 1966)
inhabitants in 1801, against 4,660,095 inhabitants in 1890), and the market expansion induced by the construction of roads and railways71. (Vaquinhas and Neto, 1993).

Until the 1870's the increase of the cultivated area reflected mainly growth in the area of cereal crops (maize and wheat). However, the decline of the domestic wheat price, due to American competition caused a substitution of pasture for this crop. Conversion of the cereal area was particularly intense in Alentejo, where along with the pastures, the areas of cork oak *montado* (stimulated by the increase of the cork exports), and holm oak *montado* (stimulated by an increase in meat consumption) also increased. (Caldas, 1991; Vaquinhas and Neto, 1993).

Despite this important increase of the cultivated area, untilled lands continued to dominate the Portuguese landscape on the eve of the 20th century. It would be the productivity boost allowed by generalized use of chemical fertilizers and by the protectionist regimes of the late 19th century that would alter definitively this situation. (Vaquinhas and Neto, 1993).

In response to the repeated demand by farmers for measures protecting them against the difficulties assaulting agriculture, in 1899 a law was finally promulgated establishing protection for wheat. Through the provision of a fixed price for this grain (representing a 25 to 30% increase over the former price) (Daveau, 1987), this law sought to promote an increase in domestic production, and even to achieve national self-sufficiency. It's success was exceptional, especially in Alentejo where the combined use of machinery and chemical fertilizers72 allowed a substantial increase of the land in wheat production. However, if this measure satisfied the producers, it was not

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71 Market integration of the different regions of the country was helped by adoption of the metric system in 1853, since the former diversity of measuring systems always constituted a barrier to trade. (Mata and Valério, 1993).

72 The high price of chemical fertilizers and machinery, and the large size of the first agriculture machines restricted the use of these two innovations, in the first phase, to large capitalist farms - as was the case for most Alentejo farms. (Vaquinhas and Neto, 1993).
appreciated by the consumers forced to buy flour and bread at higher prices, a fact that
gave it its popular name of Lei da Fome (Hunger Law). (Caldas, 1991; Pereira, 1971;
Vaquinhas and Neto, 1993).
III.4 - THE TWENTIETH CENTURY

III.4.1 - Land clearances and colonization

The great land clearances induced by the Hunger Law caused the expansion of the area of intensive *montados* in Alentejo. In soils capable of supporting a short rotation, the tendency was to eliminate trees since they are an obstacle to cultivation. But on the thin, poor or rocky soils, and on the steep slopes where there is need for a long fallow period, the trees were maintained to complement the meager income generated by cereal crops. In many of these regions the *montado*, more than a complementary system, came to have a preeminent role in the economy. (Ribeiro, 1955).

The labor force available in the region, although increased by the 19th century demographic boom and by privatization of the commons, was not enough for the needs imposed by land clearances and intensification of crops. To overcome this deficit, the large Alentejo farmers traditionally resorted to the use of temporary workers from other regions of the country. In order to assure a more regular and reliable supply, some of these farmers promoted colonization initiatives. (Caldas, 1991; Ribeiro, 1955).

Through the subdivision of *herdades* into small farms (*courelas*), subsequently rented for minimal amounts to settlers coming from other regions, the large *lavradores* were able to assure the labor necessary for their farms and to promote land clearances. This supply was guaranteed by the size of the *courela*. Small enough to allow only for the house and for a small kitchen garden and orchard, these farms left much working time available to be hired by large farms during peak periods. (Caldas, 1991).
III.4.2 - The Republic

In October of 1910, a coup d'état abolished the Monarchy and instituted the Republic. Despite its political importance - establishment of a new constitution implementing a parliamentary regime, and separation of Church and State - the first period of this new era failed to bring revolutionary changes to the agricultural landscapes of the country. (Mata and Valério, 1993).

In 1926, a military coup installed a dictatorial regime that would last until 1974. This second period of the Republic was characterized by a revivification of the cereal protectionist policy, attenuated in the meanwhile by the need to decrease the price of bread (Caldas, 1991).

III.4.3 - The Wheat Campaign

In 1929 the Wheat Campaign was initiated, with the goal of increasing wheat production to meet national consumption needs. Reestablishing a fixed price for wheat, this campaign was assisted by intense technical support73 and a monetary incentive for land clearances. (Caldas, 1991; Mata and Valério, 1993; Vaquinhas and Neto, 1993).

The subsidy of 200 escudos per hectare of untilled land or vineyard cleared led to the destruction of the last tracts of maquis. Apart from rock outcrops, all the land was cultivated, even the steepest slopes and thinnest soils which erosion rapidly carried away. (Caldas, 1991; Feio, 1949). And if this "wheat rush" caused the destruction of some montados, it was soon necessary to resume the montado land use in many soils eroded in

73 Selected seeds, chemical fertilizers, machinery, and technical advice to farmers (Caldas, 1991).
the meanwhile by the wheat culture. In 1939, the area of (intensive) montado in the country totalled 1,050,000 hectares, more than triple that of 50 years earlier. Approximately two thirds of this area was holm oak montado. (Ribeiro, 1955).

III.4.4 - The evolution of the montado

Resulting largely from the land clearance induced by the wheat campaigns, the modern montados emerged in the 20th century as the best system for the poor soils of Alentejo. With productivity substantially improved by intensive management, achieving an optimum balance among agro-silvo-pastoral components, these agricultural landscapes were also the ones involving the lowest costs. This advantage was only possible in the context of cheap labor, made possible in Alentejo by privatization of the commons, and by the demographic increase of the 19th and 20th centuries (Table 2 & Table 3). The reversal of this situation by the late 1950's and early 1960's affected the fate of the montado, especially the fate of the holm oak montado.
<table>
<thead>
<tr>
<th>Time Period</th>
<th>Districts</th>
<th>Setubal</th>
<th>Portalegre</th>
<th>Evora</th>
<th>Beja</th>
</tr>
</thead>
<tbody>
<tr>
<td>1527-32</td>
<td>n.a.</td>
<td>8-12</td>
<td>8-12</td>
<td>n.a.</td>
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<tr>
<td>1864</td>
<td>12-25</td>
<td>12-25</td>
<td>12-25</td>
<td>12-25</td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>25-40</td>
<td>12-25</td>
<td>12-25</td>
<td>12-25</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>95-140</td>
<td>12-25</td>
<td>12-25</td>
<td>12-25</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 - Population Density per Time Period and District (inh./km²)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Setubal</td>
<td>272 / 619</td>
<td>100 / 150</td>
<td></td>
</tr>
<tr>
<td>Portalegre</td>
<td>35 / 55</td>
<td>-20 / -30</td>
<td></td>
</tr>
<tr>
<td>Evora</td>
<td>65 / 85</td>
<td>-10 / -20</td>
<td></td>
</tr>
<tr>
<td>Beja</td>
<td>35 / 55</td>
<td>-20 / -30</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 - Population Relative Variation per Time Period and District (%)
The main goal of the cork oak *montado* being the production of cork, this landscape has had, since its outburst in the late 18th century, a fairly stable evolution. Even though the increase of its area may have responded somewhat to fluctuations in the world cork price, there is no evidence that this *montado* has been an object of destruction, as would be the case for the holm oak *montado*. This relative stability can be explained by the lack of substitutes for cork\(^7^4\), and by the lack of more advantageous land uses for the soils where this *montado* is installed. Given the poor characteristics of such soils, the sole alternative would be the plantation of pine or eucalyptus forests. This alternative is only feasible, however, for soils not yet covered with *montado*, and when the landowner is interested in short term revenue. If the *montado* is already established, the revenue generated is well above the revenue of any fast growing forest\(^7^5\). (Balabanian, 1980). The following remarks about the evolution of the *montado* landscape during the 20th century are applicable primarily to the holm oak *montado*.

Until the 1960's the *montado* maintenance was not only a self-paid operation, it also generated income to pay for all the labor costs of the system. Charcoal men did all the pruning for half of the charcoal produced, leaving the other half to pay for the use of the *montado* (Balabanian, 1980)\(^7^6\). To the *seareiros* was left the necessary cereal cultivation to maintain control of the shrubland and to regenerate the pastures. As the number of *seareiros* increased with the population, *montado* owners could afford to

\(^7^4\) Even if after the 1950's there a was tendency to substitute plastic stoppers for cork stoppers, this substitution was never considered for high quality liquors. In the meanwhile, the particular characteristics of cork granted this material several new uses. (Balabanian, 1980).

\(^7^5\) Given the fact that the cork oak needs 25 years to produce the first cork harvest, and another 9 years to produce the first quality cork, the fast growing pines and eucalyptus species offer obvious advantages if one is interested in or requires a short-term profit. However in the following 150 to 200 years (the estimated lifetime of a cork oak) the cork oak generates a yearly income approximately double that of the eucalyptus. (Balabanian, 1980).

\(^7^6\) The pruning of an average tree produces 316 Kg of wood (average value). (Balabanian, 1980, pp 122).
impose on these sharecroppers worse and worse conditions. In many cases the part of the harvest due to the landowner increased from 1/6 to 1/4, and even to 1/3 of the cereal production (Balabanian, 1980).

As pruning and cereal cultivation were usually left to contractors, there was always a tendency to intensify these activities beyond the level optimal for montado equilibrium. This situation was especially exacerbated whenever wheat and charcoal prices boomed in the market. On such occasions, many montados were sold by their absentee owners to people who rushed in to uproot the trees in order to sell the largest amount of charcoal for the highest price. The bare land was subsequently sold to cereal farmers, who in turn depleted the organic matter accumulated through years of montado as quickly as possible. (Balabanian, 1980).

This situation led to legislation protecting the montado. In 1927 the montado was put under the jurisdiction of the Portuguese Forest Service, whose main goal was to maintain the scarce forest resources in all the Mediterranean areas of the country. Decree number 13 658 "prohibits the destruction of forests" (article 1) "unless their transformation to agricultural land proves to be more advantageous" (article 9). An authorization is necessary, however, to fell the trees. It also "prohibits the damage of trees by mutilation, barking or any other means" (article 6). Especially regarding the montado, the same decree compels "all montado owners to treat it properly and to

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77To prevent such situations, it was stipulated in many leasing or sharecropping contacts that the contractor must respect the trees, which means to maintain them properly and not cut the leading branches. In some cases, the contract demanded the pruning to be done only in the presence of a representative of the landlord. If any of these conditions were violated, the contractor could be legally prosecuted. (Balabanian, 1980).

78Curiously, while in Alentejo this situation led to the destruction of many holm oak montados, in the Spanish Estremadura it was the maquis that was turned into charcoal, and the montado that took its place. (Balabanian, 1980).
maintain a normal tree density, cereal crops being forbidden in the montados located on steep slopes" (article 5)79.

Despite all the protective measures, the holm oak montado was always subject to destruction whenever the situation was less favorable to some or all of its components. The 1960's were the lowest point in the history of this landscape, when several adverse factors appeared in combination: i) the complete mechanization of cereal production; ii) the increase of labor costs; iii) the appearance of substitutes for charcoal, iv) a change in diet habits which favoured the York type ham against the montanheira ham; and v) the outbreak of African Swine Fever (Balabanian, 1980).

The complete mechanization of cereal production, given the importance of this crop to the local labor market and the nonexistence of job alternatives in the region, led to a generalized rural exodus. The wage increase resulting from this situation rendered the maintenance of the montado more expensive. From a time, when the costs of maintaining this system were not only nil, but negative, the Alentejo entered an era where the montado owners had to pay in order to obtain pastures or acorns. (Balabanian, 1980).

This situation grew worse when the charcoal men, at that time already doing the pruning for all the produced charcoal, saw their product substituted in the market by bottled gas. The demand for fuel wood fell abruptly, which caused the montado owners to have to personally bear the burden of the expensive pruning operation. This had immediate consequence in the frequency of pruning. Instead of being pruned every 5 to

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79 Given the higher forestry interest of the cork oak montado, the legislation is even more strict and precise for this system. "The pruning of cork oaks with less than 9 years can only be done after a special authorization of the Forest Services." (Decree nº 15 020, article 4). "The pruning operation can only be done between the months of December and March" (Decree nº 13 658, article 4), "and only in the year of the cork harvest, or in the 3 following years (Decree nº 27 776, article 3, §1)."
6 years, the holm oaks started to be pruned only every 10 or 15 years, which caused a significant decrease in acorn production\(^{80}\). (Balabanian, 1980).

African Swine Fever, which broke out in the Iberian Peninsula in the Spring of 1957 and immediately affected seven Portuguese districts, caused the irreversible decline of the holm oak \textit{montado}. The disease, which is hypercontagious, evolves very fast and leads to the death of the pigs. Between 1958 and 1960, a remission of the epidemic occurred, but it subsequently returned with even greater virulence. In May of 1962, a vaccination campaign was begun which seemed to have no positive effect. The epidemic maintained all its virulence, and continued to cause massive devastation. (Balabanian, 1980; Correia, 1993).

In face of the ineffectiveness of vaccination, the only remaining solution was to create a pig void. In addition to massive slaughtering, any pig grazing, pig fair, or pork meat export was forbidden in the affected areas. With all the restrictions favoring indoor pig production, the traditional \textit{montanheira} system, the holm oak \textit{montado}'s main reason for existence, suffered a mortal blow.

Although the \textit{montanheira} system has made a reappearance in Spain in recent years, which has lead to the recuperation of the holm oak \textit{montado} in that country, in Portugal this landscape has been continually degraded and diminished since the outbreak of African Swine Fever in the late 1950's. A discussion of the present situation of the \textit{montado} landscapes, and of their future prospects is the subject of the next chapter.

\(^{80}\)In the 1920's it required 2 hectares of \textit{montado} to feed 1 pig, while in the 1950's this value increased to 3.5 hectares. (Balabanian, 1980, pp 110).
IV - CONCLUSIONS: THE ALENTEJO MONTADOS AS CULTURAL LANDSCAPES IN TRANSITION

"The need to maintain the social fabric in rural regions, to conserve the natural environment, and to preserve the landscape created during 2000 years of agriculture, are determinant reasons why society has chosen a Green Europe, which protects the practice of agriculture and at the same time serves the long-term interest of European citizens".

Commission of the European Communities

IV.1 - THE EVOLUTION OF THE MONTADO LANDSCAPE

IV.1.1 - The ancient extensive montados

The cork oak and holm oak montado landscapes that we know today, or at least that we knew a few years ago - oak tree covered fields with evenly spaced trees, regular crops, and a regular and fairly intensive maintenance - are rather recent phenomena. This is of particular importance as one remembers that agriculture has been practiced in the space that is today called Alentejo for more than two thousand years. As mentioned by Silbert (1966), it was not possible to be so demanding within the context of the ancient economy.
Before all the conditions necessary for the emergence of the first "modern montados" came together in the 18th and 19th centuries, the montado seemed to have been nothing more than a tract of maquis where the oak trees (holm oaks specially) were favored so as to obtain acorns to graze pigs, and where patches were occasionally burned to allow both a cereal crop and the regeneration of pastures. These extensive montados occurred usually outside the area of regular cultivation surrounding the settlements, where the need to practice longer rotations (six years and above) led to the development of tree covered fields as a way to complement the weak income generated by cereal crops. Usually the longer the fallow period, the greater the landscape convergence to a pure maquis form.

In the less fertile areas, usually areas of low population density, very extensive forms of these "ancient montados" were embodied in a so called "fallow land economy" or "fallow land way of life", a subsistence economy based on a very extensive use (shifting cultivation, animal grazing, and recollection) of the available natural resources (grasses, acorns, honey, wood, tanning bark, and cork).

Given the structure of land tenure prior to the Liberal Revolution, montados could be found either on communal lands, or on private lands, the latter being the so called herdades de mato (scrub farms). As regards the common lands, the montado could be available all year long for the free use of populations, or submitted to some restrictions. When the communal lands (lands granted by the King for the common use of a county population) had been granted to the county administration (county lands) and not directly to the people (People lands), the montado was often "sold" by auction to local or transhumant pig raisers during the montanheira period (a three month period during the fall and winter, coinciding with the higher production of acorns). When this sale, which
never happened without the protest of local populations, was extended to all the available common montados, the populations were prevented from practicing small pig fattening, which for many resourceless peasants, more than a self-consumption need, was the only opportunity to gain some money.

In face of the general common grazing rule, the montados existing in private herdades were available, as was any other pasture, to be used by anyone willing to use it for grazing their animals. If, on the contrary, the herdade had been given the right of enclosure, both acorns and pastures were property of either the landowner, emphyteuta, or tenant farmer, who could use them for their own livestock or sell them to pig producers. In the latter case, the farmer, usually only interested in livestock production, often delegated to seareiros (sharecroppers without any right over the stubble or pastures) the cereal cultivation needed for the maintenance of the montado.

In a region where the edapho-climatic conditions (Mediterranean climate, and poorly developed soils) led to the development of a scherophyll forest, and the combination of historical and ecological reasons dictated a low population density and an economy largely based on extensive (transhumant or not) livestock production, the ancient extensive montados were the "human landscape" emerging from the best possible use of the widest range of available natural resources, given the technical, demographic, and socio-economic constraints of the time.
IV.1.2 - The modern intensive *montados*

When progress in other sectors of the economy (industry, trade and financing) started to generate capital to be invested in the land (considered the safest investment for income generated in activities of higher-risk, and a necessity to a bourgeoisie aiming to ascend in the social hierarchy), agriculture became more market-oriented, and the *montado* system started to be intensified.

The cork oak *montados* were the first *montados* emerging within this new context, as a booming cork-stopper industry conferred, in the late 18th early 19th centuries, sudden advantages to the cork oak, which had been until then infinitely less cherished than the holm oak. But if the cork oak thrives in a wide variety of soils, the best cork comes from acid sandy soils, like those covering the Western region of Alentejo, an area that has since then evolved to be largest cork forest of the world.

The holm oak *montado*, for which the major goal was pig production, has suffered a slower and less straight evolution, as its advantages are directly connected with the livestock market, and with the comparative advantages of livestock production over cereal crops. Though Alentejo is a region with a natural suitability for animal raising, this activity was seldom encouraged as there was a tendency, at least since the Great Plague, to promote cereal production at the expense of livestock production. Thus, one can consider that the gradual intensification of the holm oak *montado* only started between the 18th and 19th centuries, when 3 factors were brought together favoring livestock production over cereal crops: i) the abolishment of slavery in 1761 which largely increased the labor costs of cereal production; ii) the decrease of domestic wheat
prices in the 18th and 19th centuries; and the pillaging and destruction resulting from the Peninsular Wars (1807-1814).

The Liberal Period initiated in 1820 brought new incentives to the progress of agriculture. From renter of herdades, the new class of market oriented large farmers became owner of individual, absolute, and exclusive rights over the land, as it became a divisible and alienable good, and the regime of common grazing was abolished in 1867. Also the constraints posed by a scarce and expensive labor force were lessened, as the abolishment of common grazing and the privatization of the commons condemned those without land of their own either to emigrate, or to look for employment in the large herdades.

In the sequence of these changes a first phase of land clearances occurred in Alentejo between 1835 and 1850-1870 (Pereira, 1971). But, ironically, it was the protectionist regime instituted for wheat in 1899 that gave rise to the large scale creation of modern holm oak montados. Through the establishment of a fixed price for national wheat, and given the low price of chemical fertilizers in the meanwhile available, the Alentejo was finally transformed into the dreamed of "barn of Portugal", with the soils less suitable for cereals not being completely cleared, i.e., being covered with montados. Generating an important income in the lands under long fallow periods, the oak trees were maintained in all the poor, rocky, and thin soils, as well as in the steeper slopes. Here the holm oak montado has come to play a dominant role in the local economy.

With the Wheat Campaign of the 1930's, which besides the fixed wheat price also offered a subsidy of 200 escudos per hectare of cleared land, were eradicated the last tracts of maquis. Except for the rock outcrops, all the land was cultivated, with the "wheat rush" leading in some cases even to the destruction of montados. The ecological
consequences of this campaign were tremendous, as erosion took away a large part of the scarce topsoil of Alentejo poor and steep lands. Soon it was necessary to increase the fallow period, and to obtain from the montado the income denied by growing wheat in soils without capability for such a crop.

In 1939 the montado covered more than a million of hectares, an area which was triple that existing a half century before. The holm oak montado area was approximately double that of the cork oak montado. (map 21) (Ribeiro, 1955)

Meanwhile, the chronic demographic deficit of Alentejo had been largely overcome, leading to an excess of labor supply. This put the large farmers in an advantageous position, affording them the possibility of obtaining cheaper labor and imposing on the sharecroppers increasingly worse conditions. In many cases the share of the crop due to the landowner increased from 1/6 to 1/4, and even to 1/3 of the harvest.

Within this new socio-economic context of landownership, and availability of capital and labor, the montado, now in its intensive form, remained the best system for the poor soils of Alentejo. From an ecological perspective; it offers effective protection against erosion and other forms of environmental disturbance; it contributes to water conservation by promoting infiltration and decreasing evapotranspiration; and it increases biodiversity. Given the intensification (higher production per hectare) of its wide range of outputs, and the low maintenance costs allowed by the sudden excess of labor supply, this agro-silvo-pastoral system was also, at least until the 1950's, economically the most profitable. (map 22).
Map 21 - Land Use in the 1930's (South of Tejo River)
Source: adapted from "Geografia de Portugal" (S. Daveau eds., 1991)
Map 22 - Land Use in the 1950's (South of Tejo River)
Source: adapted from "Geografia de Portugal" (S. Daveau eds., 1991)
IV.1.3 - The decline of the montado

The 1960's constituted a turning point in the evolution of these landscapes. As mentioned in the previous chapter, the decline of the montado has started due to an alteration in the social structure of the region caused by economic changes. The rural exodus induced by the complete mechanization of wheat culture, and the extinction of charcoal men caused by the substitution of bottled gas for charcoal, rendered the maintenance of the montado an expensive operation.

But if the cork oak montado generates income enough to support this sudden increase of production costs, the same was not true for the holm oak montado, as this land use has been impacted by other constraints. The African Swine Fever, breaking out for the first time in the Iberian Peninsula in the Spring of 1957 and reappearing again with increased virulence in 1960, severely affected the montanheira system. On one hand, traditional pig fattening in the montado cannot be done anymore without incurring enormous risks, and on the other all the measures found to fight the disease favored indoor pig production against extensive grazing.

As the montanheira system continued to present extraordinary advantages (lower production costs) over industrial pig production, and because there was a shift in consumer preferences towards the montanheira products (which price is more than double that of industrial pig products), the Spanish Government has since 1967

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1The cost of raising a pig in extensive grazing is 50% to 30% smaller than the cost to raise a pig in a stable. While in industrial pig production the costs derive from the pay off of infrastructures and acquisition of feed ration, in the montanheira system they arrive from labor (200 pigs per worker in the montanheira system against 700 to 1000 pig per worker in industrial production) and from the acquisition of nutrient supplements. (Balabanian, 1980).
established measures to relieve pig producers from the risks of African Swine Fever, and thus revitalize the *montanheira* system\(^2\). (Balabanian, 1980).

Unfortunately this initiative was not followed by the Portuguese government. Determined instead to promote industrial (indoor) pig production, the Portuguese authorities established for the *montanheira* pig a compensation (per dead pig) one third of that for the white pig grown indoors. Having to support on their own almost all of the losses caused by the epidemic, the large majority of Alentejo pig producers simply gave up the *montanheira* system, or tried to find alternative livestock species to put in the *montado*.

In 1987 the area of holm oak *montado* had been surpassed by the area of cork oak *montado*. Of the 36\(^%\) of the Alentejo area covered with *montado*, approximately 60\(^%\) was cork oak *montado*. (Daveau, 1987).

\(^2\)To promote extensive pig production in the *montado*, the Spanish Government has established a fixed price (production price) for *montanheira* pork meat, and after 1967 a compensation per dead pig based on that price. After 1973 these measures became more precise. To the compensation per slaughtered pig set up periodically by the Ministry of Agriculture, was added a prize according with the sanitary conditions of the pig herd. (Balabanian, 1980).

\(^3\)21\(^%\) of cork oak *montado*; 15\(^%\) of holm oak *montado*. (Daveau, 1987).
IV.2 - THE PRESENT SITUATION OF THE MONTADO LANDSCAPES

In 1974, a military coup (known as Revolução dos Cravos\(^4\)) put an end to 48 years of dictatorial regime, and installed a democracy.

During the previous dictatorial period, several attempts at agrarian reform (included in Planos de Fomento) were made in Alentejo. These reforms, which tried to promote small irrigated farming in the region (analogous to what was being done in the Spanish region of Andaluzia), were always hindered by the large landowners of the region, at the time a powerful lobby in the Câmara Corporativa\(^5\).

The desired agrarian reform of Alentejo was only achieved in 1975. Many lands were then occupied by cooperatives of agricultural workers, and subsequently nationalized and rented to those cooperatives. The large landowners soon were able to get the support of small landowners, tenant-farmers, and sharecroppers and reverse the process. During the 1980's, part of the nationalized lands were taken from the cooperatives, and rented by the Government to these small farmers. These lands were later given back to the previous landowners, with the condition of honoring the established rental agreements.

The new European Union (EU) agricultural subsidies caused the large landowners to have no interest in the renewal of rental contracts. On the eve of Portuguese accession to the EU, the agricultural landscape of Alentejo was not much different from that before 1974. However, the social tension was greatly increased, which has contributed to the dramatic rural exodus and population aging affecting the region.

\(^4\)The Carnation Revolution
\(^5\)A non-elected parliament
Portugal has been a member of the EU, former European Economic Community (EEC), since 1986. As any other member state, its agriculture is now ruled by the Common Agriculture Policy (CAP), and its agricultural prices are the prices determined on the Common Market.

In the first years, the CAP subsidy established for sheep and goat producers of the EU less favoured areas caused an extraordinary increase of these productions in Alentejo (Costa et al, 1992). For example in Ferreira do Alentejo county, the number of sheep rose from 26,943 in 1979 to 42,348 in 1989, which represents an increase of 57% (INE, 1979; INE, 1989). The increase in the number of goats was smaller, only 32% (1,240 in 1979 against 1,634 in 1989) (INE, 1979; INE, 1989), as the subsidy to goat production was only 80% of the sheep subsidy (Costa et al, 1992). This increase in the number of goats and sheep induced necessarily an increase in the area of permanent pastures, namely of pastures occurring under the canopy of trees. Again in Ferreira do Alentejo county, the area of permanent pastures under the canopy of trees increased from 730 ha in 1979 to 4,049 ha in 1989, i.e., increased 555% (INE, 1979; INE 1989).

While this new interest in pastures induced by the subsidy to sheep and goat production seemed to have brought some revitalization to the holm oak montado, the CAP reform of 1992 reversed again the course of this landscape evolution.

When the CAP was created in 1957, its main goal was to raise the agricultural productivity of the EEC so as to achieve a self-sufficiency in food products. Such was the success of this policy, that from a deficit situation in the majority of food products, the Community rapidly achieved a surplus status. The main objective of the CAP reform issued in 1992 was precisely the reduction of those surpluses and consequent high costs resulting from their management. At the same time, the new CAP aims at reducing the
environmental damages caused by the former policy\textsuperscript{6}, and reversing the current rural exodus trend affecting the disadvantaged areas\textsuperscript{7} of the EU.

If the new price and market policies of the CAP might have some success in reducing the surpluses, and even alleviating the negative environmental impacts in areas of intensive agriculture, they have been severely criticized for worsening even more the already precarious situation of the disadvantaged areas. In fact, the loss of income that will arrive from the gradual approximation of the EU prices to the world prices (negotiated on the GATT\textsuperscript{8}), combined with the new extensification and set-aside measures are foreseen as increasing even more the trend of land abandonment (and consequent rural exodus) actually affecting those areas.

To make up the loss of income caused by the approach of EU cereal (oil and protein plants)\textsuperscript{9} prices to the world prices, a lump sum subsidy to farmers has been established. However, in order to receive it, the producer must set-aside 15\% of the area currently under cereal (oil and protein plant) crops or already in set-aside. The set-aside areas, which are to be included in the rotation (they rotate from year to year), can either be left fallow or cultivated with non-food crops (like flax). In alternative to this "rotative set-aside" the farmer might decide to put an area (usually a low productive area) under

\textsuperscript{6}The modernization of agriculture (within an approach of best technical means) promoted by CAP led to severe pollution problems in the areas where agriculture has reached higher levels of intensification and industrialization. As monocultures were largely introduced as a result of farm specialization, and most landscape structural elements (hedgerows, stone walls, trees) were removed in the extensively used reallocation process (Meeus et al, 1990), the landscape simplification resulting from this modernization has also impacted all the natural processes influenced by landscape structure.

\textsuperscript{7}Disadvantaged areas are areas characterized by important natural and structural disadvantages for agriculture, and by insufficient or nonexistent income or job alternatives. Almost all the Mediterranean areas of the EU are considered disadvantaged areas. (CEC, 1988).

\textsuperscript{8}General Agreement on Tariffs and Trade

\textsuperscript{9}Recently there has been a large scale introduction of oil and protein plant crops (like sunflower or soy) in Alentejo, which have come to occupy much of the former wheat area.
permanent set-aside, being in this case the area (%) increased so that the loss of income equals that resulting from rotative set-aside. (Costa et al, 1992). Applied to Alentejo, the permanent set-aside is obviously going to affect first the cereal areas (or oil and protein plant areas) installed in the poorer soils, namely the cereal areas still included in the *montado* system. Also the fact that the lump sum subsidies are lower for the least productive areas, and that they tend gradually to disappear as the farms adapt to the new market situation (world prices) the prospects for Alentejo (as for other regions with a low productivity) are of increasing abandonment of these agricultural activities if in the meanwhile no other solutions are found.

As for the subsidy to sheep and goat production it was not only maintained by the new CAP, but as opposed to cereal (oil and protein plants) subsidy, it started to favor the disadvantaged areas (Costa et al, 1992). However the approach to the lower world prices, and the fact that there is an established maximum number of animals eligible to receive the subsidy (a constraint to expansion) are going to lead the Alentejo agricultural systems based on sheep and goat production to be non-competitive in few years (Costa, 1993). This lack of agricultural and pastoral perspectives, together with the incentives to set-aside and the new economic prospects of transforming the *montado*

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10 It must be noted that the large farm structure of Alentejo favours the "permanent set-aside", as there is likely a coexistence on the same farm of soils with different fertility levels.

11 The subsidy is calculated based on the productivity of each region. The higher the productivity, the higher the subsidy. This differential is justified by the higher income loss resulting from price decrease loss in regions of higher productivity. But if the farms located on the most intensive areas have the possibility to easily adapt their structures to face the world market, such adaptation is nearly impossible in the disadvantaged areas. Thus this differential subsidy has been accused of increasing even more the already sharp differences existing between advantaged and disadvantaged areas of the EU. (Costa et al, 1992).

12 Wheat presents an average yield of 6170 kg/ha in Atlantic Europe but only 2700 kg/ha in Mediterranean Europe. (Perez, 1990).

13 100% of subsidy value is attributed to the first 1,000 heads per producer in disadvantaged areas, and to the first 500 per producer in the other areas. The remaining animals are entitled only to 50% of the subsidy.

14 The maximum number of animals eligible to receive the subsidy is the number of animals existing in the region in 1991.

15 A subsidy is attributed to the farmer by each hectare of land put on set-aside.
into a hunting enclosure have been leading to the gradual abandonment of all the agro-
pastoral activities supported by this landscape, and consequently to its regression to a
dense maquis form.
IV.3 - FUTURE PERSPECTIVES FOR THE MONTADO LANDSCAPES

IV.3.1 - Holm oak *montado*

The complete abandonment of the holm oak *montado*, through the cessation of its agricultural, pastoral, and forestry functions is going to lead to the elimination of the diversity of patches composing this landscape. In an early stage, recovery in height and density of the herbaceous and wood plant cover occurs, but soon thereafter a dense, and species poor sclerophyll shrubland, suppresses, almost totally, the herbaceous understory and entangles the trees (Naveh and Lieberman, 1994). The poorer floral composition of this "potential natural vegetation" results in an almost immediate decrease of the faunistic diversity, a fact that ironically doesn't seem to meet the present hunting expectations for Alentejo.

A diversity of patches is necessary to increase the biodiversity and consequently the hunting resources of a region. Being long adapted to the existence of agricultural patches, the game species of Alentejo will immediately decrease if this activity disappears. For example the partridge, one of the most important game species of the region, needs a certain amount of natural or sown legumes, arbutus berries, long grain Gramineae, and cereals to thrive. And its nests increase with the area of vetch. The *montado* with its wide diversity of patches and food resources (it offers grasses and legumes to small game, acorns to large game, and shelter to a large number of birds and

16Based on the present state of knowledge Naveh and Lieberman (1994) concluded that the existence of a natural *maquis* climax (theory defended by many phytosociologists from the Braun Blanquet school) is highly doubtful, since people had already modified the sclerophyll forest (SF) ecosystems before the present Mediterranean climate patterns were established. As the SF ecosystems can only be perpetuated and rejuvenated by fire, cutting or thinning, a complete stop of interference would not lead to a more diverse, productive or stable situation. On the contrary, increasing diversity can be found in correspondence with a longer duration of the agro-pastoral functions. (Naveh and Lieberman, 1994).
other species) is an ideal landscape to support hunting sports. (Balabanian, 1980) However, for its potential to be maintained, a certain level of intervention is necessary to assure a diversity of patches.

The jeopardy of hunting prospects is not the sole problem deriving from the homogenization of the Alentejo landscape. After an initial dynamic phase, the shrub thicket becomes stagnant and senescent, and very fire prone (Naveh and Lieberman, 1994). The accumulation of dry and dead branches, and undecomposed litter (Naveh and Lieberman, 1994), together with the pyrophite nature of many species composing the maquis (Ales et al, 1992), leads to an exponential increase of wild fire risks, and consequent damage and extinction costs. As the poorly aggregated Mediterranean soils are left bare after the fire (thus exposed to the torrential rains characterizing the Mediterranean climate), an increase of fire risks in this disturbance susceptible ecosystems means also an increase of erosion risks. (Ales et al, 1992). Given the already poor soil resources of Alentejo (a fact that results from natural circumstances, but also from erosion brought about by the wheat campaigns), such situation would jeopardize even more the low productive potential of the region.

Prone to fire and erosion are also the forests of fast growing species, like pine and eucalyptus, whose installation and maintenance is subsidized by the CAP. In order to diminish agricultural surpluses and at the same time increase the production of forestry products, in which EU is deficient, the new CAP has established incentives to the forestation of agricultural areas. (Costa et al, 1992). As the holm oak wood is very difficult to utilize\(^\text{17}\) and the charcoal has lost its commercial interest, the forestation of

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\(^{17}\)The hard and difficult to peel holm oak wood is difficult to work. However it has very interesting properties that could improve its economic value: it doesn't rot when immersed in water, and it has a great shock and bending resistance. It can also be treated with an urea solution (80%) to became softer. (Balabanian, 1980).
the agricultural areas of Alentejo is reduced to the cork oak, pine or eucalyptus. Given that the cork oak needs a period of 30 to 35 years to start producing a high quality cork, and that this product can only be obtained under specific and limited edapho-climatic conditions, the largest chances are that this forestation measure is going to increase the areas of pine and eucalyptus in the region. And if no alternatives are found in the meanwhile to give economic viability to the holm oak montado, there are also chances that this landscape will be substituted by forests of these fast growing species.

A substitution of the holm oak montado by pine and eucalyptus forests would result in environmental catastrophe (Balabanian, 1980; Perez, 1990). The biomass produced by the holm oak montado (vegetal litter + animal manure) is very important to replenish the soil with nutrients, protect it from erosion, and promote pedogenesis (Balabanian, 1980) and water conservation (as it promotes infiltration). Conversely, the low soil protection provided by forests of pine and eucalyptus will result in increased erosion risks, soil and nutrient loss, and diminished aquifer recharge. A loss of biodiversity (many endangered species included) would also occur as a consequence of the landscape simplification promoted by this substitution.

In an effort to stop the abandonment and destruction of the holm oak montado the Portuguese Ministry of Agriculture has recently created a lump sum subsidy18 to farmers willing to maintain this system. This subsidy is included in the Agro-Environmental Measures set up by the new CAP in order to reward farmers who adopt environmental-friendly agricultural practices. In concert with the subsidy to sheep and goat production

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18To be eligible for this subsidy the montado must have at least 1 hectare, and a minimum tree density of 40 trees per hectare. The subsidy rewards a maximum of 300 ha, and its amount varies with the area: 80 to 100 ECU up to 10 ha; 45 to 56.3 ECU from 10 to 50 ha; and 20 to 25 ECU from 50 to 300 ha. Within each area group the lowest value corresponds to the absence of grazing, and the highest to systems reintroducing the Iberian pig. An in between value exists for montados using ruminants as the grazing animal. (IEADR, 1994).
this measure has good chances of promoting the revitalization of the holm oak *montado*. It is less likely that it will achieve by itself the reintroduction of the Iberian pig, as the increase of subsidy for systems using this animal (2 to 8 ECU over the subsidy for systems using ruminants) is not enough to annul the risks of the African Swine Fever.

The problem with the agro-environmental measures is that they imply a co-payment of 25% by the member-state. As they are of optional application\(^{19}\), any constraint in the Portuguese budget might cause them to be diminished (thus to be less effective) or even discontinued. While for the moment the subsidy offered to the maintenance of holm oak *montado* might be a solution to prevent its further abandonment or destruction, it will be necessary to find long run alternatives to support this landscape. The reintroduction of the Iberian pig might be a solution, as the products derived from this animal are considered regional quality brands, and thus sold at much higher prices than the regular industrial pork products. This reintroduction implies, however, more effective ways to deal with African Swine Fever, and that the Portuguese Government assumes a large part of the risks brought by the disease, as was done in Spain. Hunting, honey and bee wax production, sheep and goat production, and rural tourism might be other alternatives. To ensure better protection of this landscape, the new uses must be as much as possible diverse and complimentary, as it was this diversity and complementarity that has always assured the success of the holm oak *montado* in the past.

\(^{19}\)The Agro-Environmental Measures, as any other of the Assisting Measures of the CAP (forestation of agricultural lands, and early retirement scheme) have an advisory character, i.e., each member state must determine what measures to apply in its territory, as well as the intensity and context of their application. All these measures are applied on the basis of voluntary management agreements.
IV.3.2 - Cork oak *montado*

As mentioned before, the cork oak *montado*, because it produces a valuable and unique product whose production is naturally restricted largely to Portugal\(^{20}\), does not incur the same risks menacing the holm oak *montado*, specially as new consumer preferences for natural products have been granting cork many new uses, namely in insulation and decoration.

Despite these advantages, a problem concerning the long term conservation of these landscapes has started to emerge. Most of the present cork oak *montados* are of first generation, i.e., most of them were created between the late 18th and the early 19th centuries. As the average life of a cork forest varies from 150 to 200 years, many of them are reaching a senescent state and will soon need to be renewed. As mentioned by Balabanian (1980), the only alternative land uses for the cork oak *montado* (pine and eucalyptus forests) do not constitute any menace while this landscape is in its most productive stage. However the competition is serious in soils not yet occupied by *montado*, and, I must add, in soils where the *montado* needs to be renewed. Considering that the *montado* requires a much larger initial investment than the pine or eucalyptus forests, and that one must wait 30 to 35 years to obtain the first quality cork, a serious problem can be foreseen in the future of the cork oak *montado*.

If Portugal wants to maintain a production in which the country has great natural advantages, serious measures should be taken to promote the renewal of the cork oak *montados*. Otherwise, this valuable landscape will soon be in serious danger of being substituted by pine and eucalyptus forests, land uses generating a short-term income.

\(^{20}\)If the production of cork is restricted to a small area around the Mediterranean basin, the production of high quality cork is restricted to SW of the Iberian Peninsula. All the other regions produce essentially low quality cork, the so called "male-cork". (Balabanian, 1980).
IV.3.3 - Final remarks

The gradual abandonment of the traditional agricultural, pastoral, and forestry activities which have shaped montado landscapes since time immemorial, or the replacement of these landscapes by fast growing forests of pine and eucalyptus, has had and will continue to have an increasingly negative impact on the productivity of Alentejo. This negative impact arises both from direct and indirect consequences of abandonment or substitution, and results both in short and long term effects on the productivity of the region.

In the short run, the abandonment of the economic activities (animal grazing, cereal crops, cork, wood and charcoal production) supported by the holm oak montado and cork oak montado will result, or has already resulted, in a decrease of the productivity of these landscapes, and consequently in a decline in the region’s productivity. As abandonment implies a significant decline in the biodiversity supported by montados and a reduction in their aesthetic value, it also prevents uses, such as rural tourism or hunting reserves, that could contribute to their revitalization and thus increase their economic value.

In the long run, the abandonment of montados or their replacement by pine and eucalyptus forests will result in an increased risk of fire and erosion. The resultant soil loss and aquifer recharge diminution arising from these ecological disturbances will reflect very negatively (as happened in the past with the Wheat Campaigns) on the productivity and sustainability of Alentejo, a region characterized by poor soil and water
resources. Furthermore, the diminution of the floristic diversity supported by *montados* will result in the irreversible loss of a "drought-resistant" genetic pool, which would be of increasing importance given the current trend of global warming and expanding aridity.

The extinction of *montado* landscapes, however, cannot and should not be evaluated solely in traditional economic terms. Besides the above mentioned short and long term decreases in Alentejo productivity, the disappearance of *montados* represents also the irreplaceable loss of their cultural, historic, aesthetic and spiritual values.

For all the reasons mentioned above (and throughout this thesis), a serious effort should be made to preserve the holm oak *montado* and cork oak *montado* of Alentejo. It should be noted, however, that preservation of these landscapes does not necessarily mean maintaining their present form. It may entail a continuous redefinition of the shape, and consequently of the degree of intensity, of *montados* in relation to the socioeconomic context. Preservation efforts should be directed towards finding new uses (such as rural tourism or hunting reserves) for these landscapes, or revitalizing old ones (namely through the reintroduction of the Iberian pig, and apiculture, or through subsidies to the renewal of the cork oak *montado*), so as to assure them self-sustainability and independence from subsidies of unpredictable duration. If possibilities are not found in the present socio-economic context to maintain the economic viability of *montados*, at
least an attempt should be made to preserve their biodiversity, regulation and protection ecological functions, cultural, historic and aesthetic values, and potential productivity. Since this is not possible without some intervention, means should be found, namely through the use of controlled goat grazing\textsuperscript{22} and prescribed burning\textsuperscript{23}, to prevent these landscapes from regressing to an irreversible point, thus, ensuring their enjoyment by future generations.

\textsuperscript{21}Without internalizing the externalities.

\textsuperscript{22}Goats are the most important domestic grazers in shrub dominated areas. As mentioned by Naveh and Lieberman (1994), systematic controlled goat grazing can be used to prevent the regeneration of shrubs from suckers and lower branches after cutting, thinning and pruning of dense maquis shrub tickets. This grazing is also proved to have increased the species richness of formerly impenetrable and fire-prone maquis, namely the number of perennial pasture grasses and ornamental geophytes.

\textsuperscript{23}Prescribed burning is an important tool not only for reducing fire hazards, but also to attain highest diversity and productivity on the ecosystems of the SFZ. The short-term post-fire nutrient flush, resulting from the mobilization of nutrients tied up in the highly lignified wood and slowly decomposing litter, is utilized by herbaceous fire followers for prolific forage and seed production. (Naveh and Lieberman, 1994).
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