

## Silvo-pastoral systems in southern Portugal: management challenges from the owner's perspective



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### Keywords

forest nuts

cork oak

*Quercus suber*

agroforestry

wild harvested

### NWFP

Cork

Wild Nuts & Berries

### Scale

Local

### Context

Abegoaria is a 500 ha property, located in the center of Portugal. It is placed over a sandy soil (regosol) characterized by low nutrient and organic matter content. The climate is typically Mediterranean, characterized by a strong seasonal precipitation irregularity, with an annual average of 600 mm, hot summers (maximum temperatures above 35 °C are very frequent) and very cold temperatures in winter. It is a family landowner management oriented to the long term production, with an economic and profitability focus but with a special care in improving the resilience of the system. The main productions are cattle, pine cones (from *Pinus pinea*) and cork (from *Quercus suber*).

### Objective

Silvo-pastoral systems are quite common in the Alentejo region of south Portugal. Bringing together economic profitability and ecological sustainability is challenging and requires a conscientious management. We present the example of a young forest owner who manages a farm in south Portugal composed of a mixture of cork oak and stone pine grazed by cattle.

The recognition of severe soil degradation problems and the effort in its recovery has been the priority of this owner. The management options carried out in the last 15 years are now positively reflected in soil quality, biodiversity and in the survival of tree seedlings. Overcoming annual precipitation reduction is one of the main challenges.



## Results

The bovine herd consists of 120 livestock units for the production of meat, managed on a rotational basis. This rotation system allows to control shrubs accumulation and reduce the fire risk. The natural herbaceous growth occurs in two very short periods: in autumn and spring, with April rainfall being particularly important.

The cork oaks are quite old and with a high percentage of diseased trees. The oldest stone pine trees comes from natural regeneration with a quite irregular interannual cone production.

When the present management started 20 years ago, the owner realized that the soil was a degraded ecosystem resource, unable to fulfil the most basic functions of water infiltration and storage and with a very low nutrient status. Soil recovery has been the priority.



## Recommendations

The most important decision was the exclusion of soil mobilizations, which allowed to reduce erosion, enabling a permanent soil cover and protection. The shrubs control is now done with minimally invasive machinery. To correct the soil nutrient content, phosphorous fertilizers were used in a first phase, followed by the use of organic-based products. The pH corrections are done with dolomitic limestone.

In the last decades, dead or diseased cork oaks and stone pine trees are systematically removed or pruned in order to avoid pests and disease spreading. Tree regeneration protection with metal mesh protectors is a priority due to the presence of cattle. In the past, pine were plantated for cones at 15x15 or 20x20m spacing grids, more recently at 10x10m and grafting at age 5. Periodic thinning are applied in young and adult pine trees to avoid excessive stocking.



## Impacts and weaknesses

The soil interventions carried out are now positively reflected in a higher tree regeneration survival rate, a clear improvement in soil carbon content and an increase in herbaceous species richness.

The investment in individual seedling protections, absolutely necessary in this silvo-pastoral system, is substantially high. The investment in new plantations is always necessary because in some areas, there is no natural cork oak regeneration.

The absence of rainfall in spring and the longer and hotter summers observed in the last years have had many negative impacts: decrease pine cone and cork production, increases cork oak tree mortality, need for irrigation and animal feed supplementation.



## Future developments

The introduction of another animal species (sheep) is being considered. It has less impact on the natural regeneration and has longer grazing periods. The introduction of perennial leguminous shrub species is also being considered which contributes to the system biodiversity and can be used as a food supplement during the dry period.

Tree species diversity can increase with the reintroduction of *Pinus pinaster* and *Quercus rotundifolia*, always promoting mixed stands. In the same way, genetic selected material for cork oak and stone pine from ecologically adequate areas can be used every year in new plantations. The progressive introduction of mechanical harvesting of pine cones is another goal.



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#### About INCREDIBLE Project

INCREDIBLE project aims to show how Non-Wood Forest Products (NWFP) can play an important role in supporting sustainable forest management and rural development, by creating networks to share and exchange knowledge and expertise. 'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) promotes cross-sectoral collaboration and innovation to highlight the value and potential of NWFPs in the region.



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