This project has received funding from the European Union's HOrizon 2020 research and innovation programme under grant agreenment Nº. 727872

Herdade dos Lagos: Biodiversity and sustainability

Source: Joana Amaral Paulo, Raquel Portanova de Almeida, Ana Tomás (Instituto Superior de Agronomia; Centro de Estudos Florestais), Helena Manuel (Herdade dos Lagos)

"Herdade dos Lagos, HDL" is a biodiverse, organic farm in Mértola, Beja, in the Alentejo region of Portugal, with a total area of 1000 ha. The climate in Mértola is a dry Mediterranean (Csa, according to Köppen-Geiger) with an average annual temperature of 17,1 °C (18 °C in 2017) and average annual precipitation of 505 mm occurring to a great extent during the winter months (pt.climate-data.org). Data gathered in situ (from the farm's own weather station) shows that the average annual precipitation from 2000 to 2018 was 446,84, with only 281 mm in 2017! The soils are mostly lithosols, with low water holding capacity.

The farm was acquired 35 years ago, by the Zeppenfeld family, and it was a semi desertic land due to this combination of harsh weather, poor soils and decades of intensive agriculture. The new owners had a different, climate-smart vision, and invested in the planning and implementation of measures that maximize water retention. Some of these measures were planting trees, building three new water dams and repairing the existing deteriorated ones. As a result the farm currently has more than 60% of area where trees are included.

Photo 1 – Landscape view from two of the farm´s dams. June 2018. Credits: Ana Tomás

Since the moment of the farm acquisition the new owners were keen on achieving and maintaining sustainability on their land, diversifying their crops and going forward with a silvopastoral approach for the entire property. The results of such a strategy and investment are now, 35 years passed, visible to other farmers and to the community. The farm produces a broad range of organic products: wine, olive oil, lamb meat, fruit, carob and honey. The 80 ha olive grove produced its first organic olive oil in 2015, and at this time recorded an annual average production of 1500 kg/ha which is currently increasing.

For the last 35 years, 300 ha of a new crop has been planted every year, including forest, pasture, carob orchard, almond trees, olive orchard and vineyard. The almond tree orchard was watered at plantation and was not a success, mostly because well-adapted varieties were not used. This was an expensive, but useful lesson! When increasing the carob orchard area they chose locally adapted varieties. The first carob orchard was planted in 1997, on a 55 ha area, as dry farming. In 2002 it was grafted and converted to a watered crop (it's the only watered carob on the farm). It is currently under full production.

This project has received funding from the European Union's HOrizon 2020 research and innovation programme under grant agreenment Nº. 727872

In 1999, 85 ha of carob were installed over contour lines and as dry farming. This area was grafted in 2002 and it's currently on its 6th year of production. The third carob area was planted in 2002, and it's the result of switching the 122 ha of previous almond tree orchard to carob. The grafting was done in 2004, and it has been producing for two years.

Photo 2 - Sheep grazing the carob orchard. June 2018. Credits: Ana Tomás Blow', (Briggs, S)

In 2007, 18 ha of carob were also installed over contour lines. This area is now beginning its production.

Orchard density is 238 plants per hectare (6 x 7 m) and in 2017 the total carob production was 700 kg/ha, with an annual precipitation of 281 mm(!), which clearly shows how a careful planning and management can work wonders!

Harvested carob fruits are sent to a local mill (another social responsibility effort) to be shredded, and around 75% are exported to the USA and the Netherlands, mostly for animal fodder.

In order to test which woody plants are better adapted to the farm conditions, and therefore possibly suitable to use as hedgerows or borders, to promote biodiversity increase and maybe provide additional fodder source, the farm is conducting an experiment to test the survival of the following species: *Rosa canina, Arbutus unedo, Olea europaea, Budleia davii, Viburnus tinus, Myrtus communis, Myopurum sp., Nerium oleander, Punica granatum, Pistacia lentiscus, Spartium junceum.*

The farm water needs are completely filled without outside interference, despite the semi-desertic location – due to 35 years of water retention maximization strategy. In addition to the water dams, water is saved by a careful irrigation plan that is continuously monitored by the farm manager, adding to the use of well-adapted crops and the implementation of a key line system for increasing water uptake. To prevent water loss and soil erosion protective barriers have been built and tree hedgerows planted as well as pounds expanded to naturally keep water inside the system.

Photo 3 – Detail of the carob tree fruit. Credits: Ana Tomás

This project has received funding from the European Union's HOrizon 2020 research and innovation programme under grant agreenment Nº. 727872

This farm currently has a flock of 1000 sheep, who are kept on rotational holistic grazing following Allan Savory's theories. In addition to being one of the farm productions, the animals have an important role in the soil fertilization, control the understorey biomass on the carob orchard and vineyard, and control of the carob and olive trees typical side shoots growth. The maximum time sheep are kept on each enclosure is 3 to 7 days. There they frequently also feed on carob fruits left on the ground on low production years when the harvest is unprofitable and finally not carried out.

Social responsibility is also a big concern of the owners. They are aware that Alentejo is one of the poorest European rural areas. Besides offering work and training, most workers can live on the farm. The majority of the work force are women (60%) and seasonal labour is locally sourced. Farm production is also shared with workers.

Photo 4 – Visit of ISA and EDIA teams to Herdade dos Lagos. May 2018. Credits: Ana Tomás