



## Carob fruit production in silvopastoral systems: a viable production for dry climate

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Farming systems should be adapted to climate change such as the increase frequency of extreme weather events such as drought. In the south region of Portugal, carob (*Ceratonia siliqua*) orchards are sometimes used in agroforestry systems since they are a native, well adapted tree, resistant to the local drought, and their fruit is a very interesting food and feed source both for human and animal consumption.

In Herdade dos Lagos HDL (Alentejo, Portugal) 103 ha are managed as a carob orchard silvopastoral area. They are kept as a dryland crop and the understorey biomass is controlled by 1000 sheep grazing, which also graze the farm's vineyards (organic production). The sheep grazing activity also contribute for the control of the carob tree side shoots growth. On low production years, when the harvest is unprofitable, carob is left on the ground for animal consumption and soil fertilization, due to its high protein content and therefore organic nitrogen fertilizer potential.

The carob production is high for a low rainfall area. For example, in 2017 carob production was around 700 kg ha<sup>-1</sup> (annual precipitation 281 mm). The carob and grape harvests are carried out at the same time (from late August to late September), facilitating the management of the temporary labour by the farm. Due to the farm's social responsibility additional workforce is always locally sourced.

Harvested carob fruits are then sent to a local mill to be shredded, and is then 75% exported to the USA, mostly for animal fodder. Some of the innovative uses for carob meal are in children's snacks, as a nutritious alternative to animal protein, health supplements, cosmetics, or gluten free foods. We conclude that carob fruit is a good alternative for southern dry areas of Europe.

References and links:

<https://zenodo.org/record/1420406#.W-Qxl-KYTIU>  
<https://www.youtube.com/playlist?list=PL9WAF9lckk6Ytl0kYWegWmX300MvezdDH>  
<https://www.youtube.com/playlist?list=PL9WAF9lckk6agKPiukqBoW8PJ4CdXRSc>  
<https://www.youtube.com/playlist?list=PL9WAF9lckk6a8blxkMMhwVKvqP1GKi3Mv>



Figure 1. Silvopastoral system with carob tree and sheep at Herdade dos Lagos. Credits Ana Tomás

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