



## Integrated management of resources (water and soil) in nuts production

### Introduction

The initiative focused on soil and water management in four species that produce nuts: chestnut, almond, hazel and walnut. The OG aimed to evaluate the effect of different natural and sown plant covers on chestnut crops in order to select the type of cover best suited to each crop. Also, to evaluate different soil fertilization strategies, via foliar and/or fertirrigation in the four species studied with a view to knowing the response of these species to the main nutrients and recommend some corrections.

The objectives were assumed as differentiated, according to the specimen to be analysed, and aligned with the most evident problems that arise in the production practice. As a previous point, the OG stated the importance of knowing the characteristics of the place where the plantation will be located, and act accordingly:

- drainage: in soil with poor drainage it is not possible to establish an orchard- then, establish some practices to increase the draining capacity;
- pH: is probably the soil property that can impose the most constraints to the development of plants- then, to correct it is important;
- organic matter: it is important to contribute to the correction of its availability, for the plants;
- correction of phosphorus content, accordingly with the results of correction in the ph.

The OG worked several field stations, with extended experiences for the distinct specimens here considered. The results, by specimen, may be referentiated like this:

### Results by specimen

- Walnuts, even not being a particularly demanding crop in nutrients, need good soil structure and aggregation conditions provided by a good organic matter content, from deep soils with good storage capacity for water, and must also be ventilated and well drained;
- Chestnut tree must receive nitrogen annually and boron as fertilizers. Potassium also should be applied regularly. The phosphorus should be required in smaller quantities than nitrogen and potassium and is

less important the annual regularity of its application. The foliar analysis helps in the quantification of these applications;

- Hazelnut, due to the growing impact caused by climate change, ways are being studied to reduce the amount of water to be applied through irrigation, mainly through regulated deficit irrigation (RDI). The adoption of drip or micro-sprinkler irrigation, combined with irrigation strategies deficit, are the most viable solution to the current scenario of decreasing water reserves available for irrigation;
- Almonds, the use of indicators water and thermal stress of the plant is essential for adequate irrigation management deficit. It is essential to monitor the water status of the crop in the initial stages and evaluate the need to start watering earlier, considering the importance of satisfying water needs of the crop in the first phases of its cycle. The irregularity of Mediterranean climate reinforces the need of this control;

Other considerations and conclusions for the orchards: install biodiverse pastures; make legumes profitable for orchards, improve soil structure, use alternative fertilizers such as e.g. ex. algae, establish technically supported fertilization plans and install adapted irrigation systems, for each case.

## Lessons learned

It is a need to go deeper in practical experiences regarding nuts systems. Traditionally, they are produced in dry conditions, without special care in soil management, fertiliation, irrigation and varieties. The uncertainty in climate and the need to be more profitable appeals to more applied research, field experiments and farmers' engagement. Alternative nutrients sources, more frequent analysis (foliar and soil), technological advanced solutions for irrigation and biodiverse pastures are among the most suitable practices to improve nuts productions.

The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

## Further information

<https://egis.cncfs.pt/projeto>



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