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Irrigation for family farmers in the context of climate change in Portugal: perceptions, options and needs

Luís Moreno

Resumo

Ilustra-se o problema do uso da água na agricultura familiar em Portugal continental, com foco em: escolhas de irrigação feitas pelos agricultores; relação entre essas escolhas e as perceções da influência das alterações climáticas; condições e fatores que explicam maior ou menor propensão para manter práticas e para prever mudanças. Contando essencialmente com resultados do projeto AFAVEL (Agricultura Familiar e Valorização Territorial Sustentável, no contexto das Alterações Climáticas), mostra-se alguma incompatibilidade entre as perceções dos agricultores familiares sobre as alterações climáticas e o seu efetivo uso da água, bem como certas necessidades de soluções sociotécnicas e medidas de política pública.

Palavras-chave: Agricultura Familiar; Uso da Água; Alterações climáticas; Sustentabilidade.

Abstract

The problem of water use in family farming in mainland Portugal is outlined, focusing on: irrigation choices made by farmers; the relationship between these choices and perceptions of the influence of climate change; conditions and factors that explain greater or lesser propensity to maintain practices and to envisage changes. Based mainly on the results of the AFAVEL project (Family Farming and Sustainable Territorial Development in the context of Climate Change), some incompatibility is shown between family farmers' perceptions of climate change and their actual use of water, as well as certain needs for socio-technical solutions and public policy measures.

Keywords: Family Farming; Water Use; Climate Change; Sustainability.

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Introduction

Family Farming (FF) is a conceptual reality with multiple definitions, depending on the contexts and symbolic appropriations of individuals and groups, from academics to policymakers and civil society actors, depending on the interests involved and the objectives (Bosc et al., 2019). For our purposes, in Europe and Portugal, FF accounts for more than 90 per cent of the total (Eurostat, 2024a) and represents the highest water consumption, particularly in the southern European regions (Rossi, 2019; Eurostat, 2024b).

In this paper, we try to illustrate the problem of water use in FF in mainland Portugal by referring to the irrigation choices made by family farm managers and the relationship between these choices and perceptions of the influence of climate change. We also look at the conditions and factors that will explain a greater or lesser propensity to maintain practices and to foresee changes on farms, taking into consideration the challenges of FF addressed in numerous studies (we highlight Costa et al., 2018; Migliorini et al., 2018; Ebel, 2020; Wuepper, Wimmer & Sauer, 2020). The work essentially includes results of the research carried out as part of the AFAVEL project (Family Farming and Sustainable Territorial Enhancement, in the context of Climate Change; see ahead for details), involving the use of fieldwork in 2020 and 2021. However, the aim of this short paper is simply to illustrate a certain degree of mismatch between family farmers' perceptions (mental representations) of climate change and their agricultural water use practices, as well as the need for socio-technical solutions and public policy measures in the face of the water shortage challenges experienced.

Materials, methods, study scope and sources of family farmers' irrigation water

This work was mainly based on structured in-depth interviews

with producers recognised as Family Farmers (FF), conducted by AFAVEL project partners, and involved visits to 130 farms in 15 municipalities in three Portuguese regions: Douro Litoral, Dão-Lafões and Alentejo. In the latter case, these are mainly municipalities in 'Alentejo Central', but also in 'Alto Alentejo' (Figure 1).

The results of the interviews were obtained from a 'convenience sample', which is not representative or even of the territories in which the sites observed are located, and which does not allow descriptive inferences to be made. In other words, the elements presented only have an illustrative value in terms of the expression of certain characterisation variables, and can only inspire relationship analyses. Thus, by showing illustrative elements of the situations studied (potentially indicative case studies), we were able above all to explore the relationships between certain attributes of the people interviewed and their opinions and behaviours, as well as to analyse the answers contextually.

In a basic characterisation, we found that all FF irrigated in some way. In the territories studied in the North and Centre, producers' use of water from groundwater wells and springs (or even watercourses) and combined sources dominates. In the part of the Alentejo that was analysed, the importance of wells and boreholes stands out, as well as dam irrigation perimeters and combinations of resources.

The combined forms / resources are, for example, on the same farm, borehole and well, or well and spring, and this diversity of origin of water resources was the main characteristic of the farms in Dão-Lafões (a region particularly favoured by natural conditions) that were the focus of attention.

These different sources of water for irrigation involve higher or lower access costs, with expenses that also vary depending on farm production (type and volume), the technical conditions for

the purpose, the type and origin of machinery and equipment (by purchase, inheritance, loan, hire, etc.) and other agricultural production factors. In the cases of the three study areas, the vast majority of these resources are entirely obtained by purchase, and are differentiating factors for the sustainability or prospects for continuity of the farms, despite considerable differences in each case.

Results and discussion: water uses and the perception of climate change

According to the study on which we rely, the vast majority of people interviewed recognised the existence of so-called 'climate change', with very similar weights among younger and older people (92% and 90% respectively), but it was slightly more significant among people with a higher level of education (94%, compared to 89% of those with no more than primary education). Other people, even though they've heard of it, say they haven't noticed any significant changes yet. The same goes for the feeling of consequences on their farm.

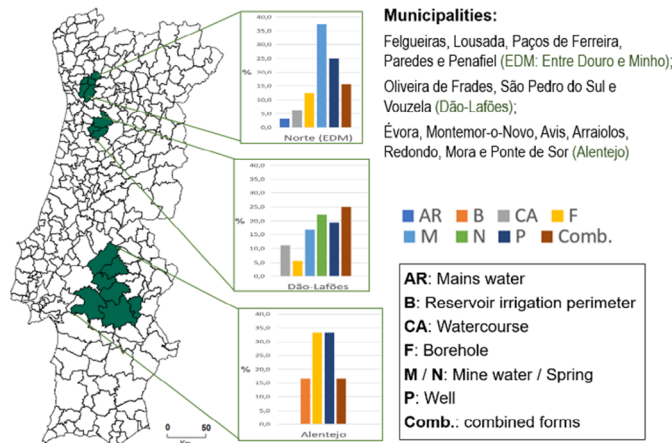
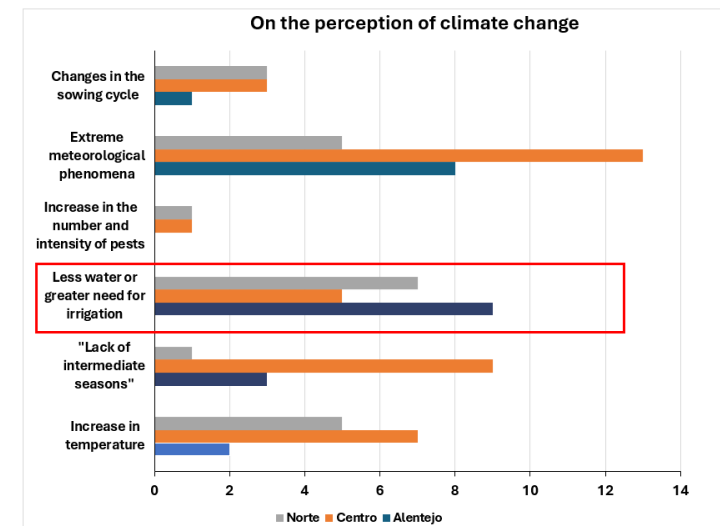


Figure 1. Municipalities where the interview surveys were carried out of the AFAVEL project and origins of the water used for irrigation (%)

Among the aspects that have been recognised as being associated with climate change (CC) extreme weather events and the absence of intermediate seasons were emphasised. Both show unequal representation, both in geographical terms (more in the Alentejo and the North) and in consequences throughout the year (especially less water available or greater need for irrigation), as well as being associated with other changes. The scarcity of water and the increased need for irrigation do indeed appear as consequences of the CC; only in the Centre / Dão-Lafões region the destruction and diminished quality of crops (due to fires and certain pests...) prevailed over the weight of adversities directly related to water shortage (Figure 2).



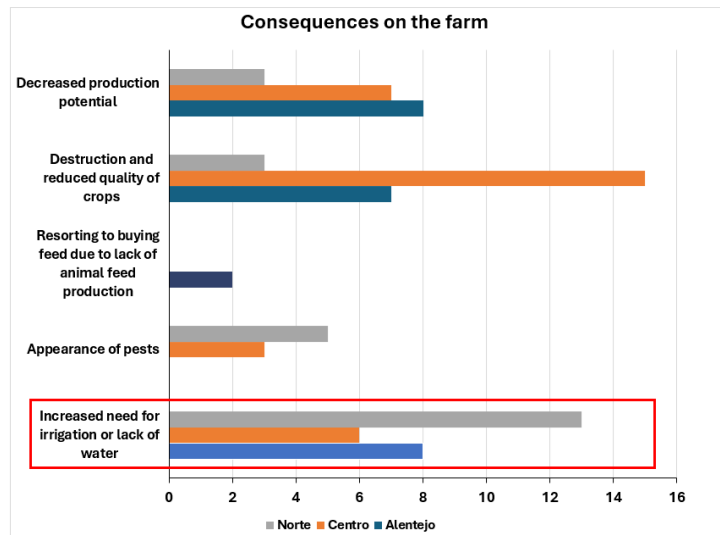


Figure 2. Perception among the producers interviewed of the existence of climate change and its influence on the farm

In any case, we can find in all the (considered) ‘consequences of the CC’ dimensions that we cannot easily dissociate from the availability of water, which translates into increases in the (complex, not just economic) costs involved for those who produce. A significant majority of the people interviewed considered that new needs and changes in cultivation techniques had arisen as a result of the CC above all greater / better regulation of irrigation or its increase, followed by changes in the calendar and type of crops – more so among those with more years on the farm and higher levels of education.

Most people also said they were concerned about preserving the properties of water and soil (with the exception of cases of very small farms, thus assuming limited impact, and more attention to quantity than quality), acting to control and manage water consumption in irrigation (with drip irrigation, filters, etc.), as well as controlling or reducing the use of phytopharmaceuticals and

fertilisers and ‘sustainability techniques’ such as crop rotation, reusing organic matter, etc.

For these reasons - concerns about the quantity and quality of key resources - a majority of respondents (over 82%) said they feared significant implications of climate change in the more or less near future, with the main concern (over half of the cases) being water scarcity. As a result, there were declarations of intent to make changes in the coming years, mainly (more than half of the cases) investment in technical operating conditions, with the emphasis on reinforcing water supply or irrigation systems, greenhouses, agro-processing, etc.

Conclusion

According to the study, the issue of water use in Family Farming (FF) is largely a matter of concerns associated with perceptions or recognitions (mental representations) of climate change (CC) and its consequences for farms and territories. However, the relationship between mentions of a greater or lesser water shortage and climate change was not straightforward. On the one hand, a reduction in rainfall seems to have been less noticeable than an increase in its concentration, resulting in meteorological irregularity and extreme weather situations (temperature, rainfall and wind). On the other hand, the farmers who have focused most on intensification using conventional / traditional methods (sometimes drilling more boreholes) are the ones who have complained the most about water scarcity, adding their concerns to those of other people (farmers and actors relevant to FF) who have been more or less apprehensive about CC and its systemic consequences on farms and territories.

In the encounter between the recognised problems and the challenges to be faced, the study inherent to the AFAVEL project pointed to the need for investment in water retention structures and systems for their efficient use, thinking about solutions for individual and collective use which is associated with changes

in water use patterns, consistent with various studies but also in suitable cultivation options (more resistant to water shortages, such as traditional varieties and native species), as well as more diversified and better informed options in the relationship with markets and actors in the socio-territorial fabric. To this end, a whole dynamic of governance and innovation (technical, social, organisational...) will be important, in a logic of subsidiarity, around education, training, research, experimentation and extension.

Several of these aspects, diagnosed in 2020-21, are still valid, given the slow changes in the practices of a 'losing' FF (shrinking in Europe in general, and also in Portugal, in association with some rural depopulation) and insufficient support to ensure its resilience in the context of climate change. This support for the necessary investments would involve systemic improvements for the efficient use of water and would be part of the instruments for mitigating the effects of a system that has rewarded short-term technical and economic efficiency to the detriment of responding to the challenges of territorial sustainability. These challenges correspond to the need for cohesion, spatial planning and meaningful occupation, as well as diversification of options and opportunities for the most threatened areas of the territories, with an additional positive impact on urban areas.

Among the recipients of the results of the AFAVEL project, including those on the issue of irrigation and the resulting quality of farms and their territories, were various players in the agri-food system – some of them taking part in project activities – such as researchers, academics and others, but also political decision-makers and heads of farmers' and local development organisations concerned about qualified rural-urban links, as well as about sustainability in general and the role of water management in that process.

One of the instruments that emerged to boost the multiple innovation required was the policy measure embodied in the

creation, at the end of 2021, of a protocol to set up the Centre of Competence for Family Farming and Agroecology (CeCAFA), "made up of farmers' organisations, local development organisations, entities from the national scientific system and public administration, and civil society organisations working in the area of Family Farming and Agroecology" (Moreno & Magalhães, 2021, p. 60). This initiative has given meaning to the work carried out and suggests that CeCAFA can favour a process of increasing efficiency in water management and irrigation, given the dimensions of the skills being mobilised.

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