

Article

Unveiling Contrasting Preferred Trajectories of Local Development in Southeast Portugal

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Abstract: Mediterranean land systems are amongst the most susceptible to global change, in part due to the region's vulnerability to climate change and misfit within a high production demanding political and societal setting. The impact of global drivers at a local scale (i.e., the possible trajectories of change of a territory) are context-dependent, and to some extent dependent on how local actors perceive them and act upon them. In this study, we focused on southeast Portugal and conducted 22 interviews and 1 collective workshop to understand how different actors across the territory anticipate the development of the region and its land systems. From our results, we get a picture of a depopulated territory, constrained by ill-adjusted policies to its harsh conditions, including little water availability and continuous depopulation. We found contrasting preferred trajectories of development for the territory. On one hand, there is a preference for prioritizing traditional land systems, usually rainfed and multifunctional. Contrasting, a need for water reservoirs that would increase water availability and allow for profitable agricultural activities and thus fixate population is recognized. The different perspectives fit with a wider debate on the role of agriculture, intensification and ecosystem services under an increasingly arid Mediterranean. The next challenge is to integrate technical expertise and knowledge with local needs and initiatives, to fit in a broader scale strategic plan. We identify a lack of technical support regarding soil health. Poor soil, from the perspective of several stakeholders, is a characteristic of the region. Knowledge dissemination is urgent so that farmers can proactively improve soil health and benefit from its capacity to increase production and retain water. We urge a higher effort from the scientific community focusing on marginal areas, supporting knowledge dissemination and analysis of the impacts of different trajectories of development.

Keywords: land systems; marginal areas; Mediterranean; local dynamics; participatory approach

1. Introduction

Most land systems have been influenced, directly or indirectly by human use. On a global scale, land systems dynamics are often linked with population, affluence and technology variables [1,2]. Yet, these relationships tend to fade when descending to the local scale [2]. How local actors and institutions interact with global trends, through their perceptions and decisions, can influence local dynamics [3,4]. Hence, when aiming to understand possible pathways of development at a local scale it is important to consider how dynamics are being perceived and how actors are willing to deal with them. Understanding the relationship between global drivers and local effects can improve the capacity to push for desired pathways of development [5,6], by highlighting at what level of governance actions need to be taken.

In the Mediterranean basin, humans have been managing their surroundings for centuries, creating the diversity of land systems and landscapes that still today characterize the basin [7,8]. Technological advances and policy support that favor market-driven agriculture are adding pressure

to the systems that have evolved and been managed as multifunction and low input systems [9]. When viable, the tendency is to intensify production and increase productivity [1]. In peripheral areas, either geographic, economic and/or productive, systems are being pushed towards states of lesser human management through extensification, abandonment or afforestation [10]. Although contrasting, and varying in its degree of repercussion, all of these trends influence how land systems are being managed, potentially threatening natural and cultural values associated with certain land systems [11].

How local actors and institutions interact with these global forces can influence the trajectory of development [12], and in turn, influence global dynamics [13,14]. Thus, strategies for the sustainable development of the territory are in part dependent on actors of differing positions involved in decision-making and public sector action [15]. Studies that attempt to characterize land systems dynamics at a finer scale are important to fully grasp this region's particularities and design adequate policy instruments [16] at different governance scales. This paper contributes to such effort by providing a characterization of Mediterranean land systems using a case study located in southeast Portugal, including three municipalities: Serpa, Mértola and Alcoutim.

The goal of this paper is two-fold: (1) Gain a better understanding of the local dynamics in a marginal Mediterranean area, and (2) contribute to the unveiling of desired and sustainable pathways of development for the territory.

2. Case Study

The case study comprised three municipalities in south Portugal: Serpa and Mértola in the region of Alentejo, and Alcoutim in the region of Algarve (Figure 1, Table 1). The Guadiana River crosses the three municipalities, and borders with Spain from Alcoutim to its mouth, in the Gulf of Cádiz. The Alqueva dam (the largest artificial lake in the Iberian Peninsula) follows the Guadiana River along 83 km of its main course and extends to 30 km above Serpa, irrigating 23 927 ha of the municipality [17]. Alcoutim has four micro dams, ranging between 24 ha and 35 ha in potential irrigated area, all below its capacity, totaling 8.5 irrigated hectares amongst all [18]. The Guadiana Valley Natural Park (PNVG) has 69 773 ha and is part of the Natura network under the Birds Directive. The vegetation is dominated by holm oak woods, with extensive cistus areas and rainfed plantations [19]. The Castro Verde Special Protection Area, relevant for the protection of steppe birds in Portugal, extends through 7 695 ha in the eastern part of Mértola [20].

Southeast Portugal is highly susceptible to desertification [21]. The climate is Mediterranean, and the region characterized by rainfall irregularity both monthly and annually [22]. The territory has low ecological value and low aptitude for irrigation agriculture, except in the northern part of Serpa [23,24]. These, together with its peripheral location, make this territory marginal in terms of agricultural production. Notwithstanding, agriculture is of relative economic relevance, employing 15.3% of the working population in Mértola, 18.7% in Serpa and 9.8% in Alcoutim (being the 2nd, 1st and 5th economic sector employing the most people at the municipal level, respectively [25]).

Table 1. Summary information on the characteristics of the three municipalities of the case study. Data retrieved from: **a** - [26]; **b** - [27]; **c** - For the year 2015 [28]. UAA – Utilized Agricultural Area

	Serpa	Mértola	Alcoutim
Area (ha)	110,563	129,287	57,536
Population density ^a (n°/km ²)	14.1	5.6	5.1
UAA ^b (ha)	86,546	90,018	12,448
3-year average irrigated area ^c (ha)	8,244	649	52
Annual rainfall ^a (mm)	314.4	366.2	347.1

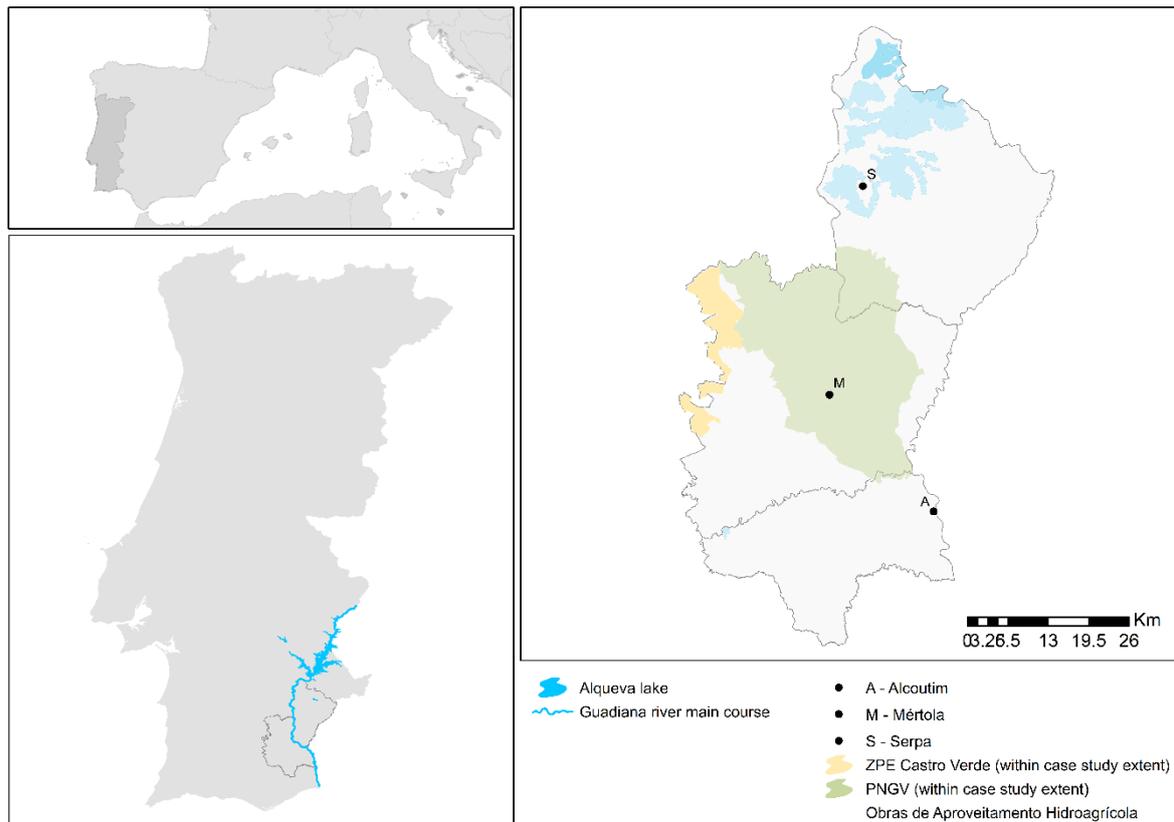


Figure 1. Location of the case study.

The landscape is a mix of agricultural, forest and agroforestry systems and scrublands. Most of the land is privately owned, with larger average property size in Mértola, and smaller in Serpa and Alcouthim.

3. Methods

This study followed a two-step process. First, we conducted semi-directed interviews to collect local perceptions of the land systems in the 3 municipalities. Second, we used the participatory approach named territory-game [15,29], to promote the construction of a collaborative vision of the future of the land systems in the case study. Through a game-based approach, it is possible to provide actors with a simplified model of reality, to discuss desired outcomes and possible actions [30,31], gaining a better understanding of desired and possible development pathways adapted to the territory in focus.

Territorial actors (i.e., actors with an explicit role in territorial development) were identified through the revision and listing of active associations, cooperatives and organizations operating within the territory. A similar process was used to identify relevant institutions acting at the local and regional levels. During contact and data collection, other territorial actors were identified through snowballing sampling [32]. In total, more than 40 individuals from 26 different institutions were involved (Table 2).

Table 2. Involved territorial actors. The numbers in brackets refer to the number of interviews/participants per sector.

	Number of Territorial Actors	Sectors That Territorial Actors Represent
Interviews	22	Local public administration (municipality level, 4), local farmers and farmer’s organizations (6), local associations and NGOs (7), regional public administration (4), irrigation enterprise (1)
Territory Game	23	Local public administration (municipality level, 3), local farmers and farmer’s organizations (4), local associations and NGOs (10), regional public administration (3), senior researcher on agricultural science (1), Guadiana Valley Natural Park (PNVG) management (2)

Data collection took place between October 2018 and April 2019. The interviews were done in person; in some cases with two respondents from the same institution together (considered as one interview). The interviews followed a script divided into 4 sections: I—Characterization of the land systems, II—Recent changes to the land systems; III—Visions for the future; and IV—Commercialization and local food chains. Interviewees were provided with a map of the territory to draw information if wanted. A map of land systems as classified for the whole Mediterranean basin was also provided (see [33,34] for the land system classification methodology).

The participatory workshop took place on the 17th of April, with 23 players divided into 5 groups with 4 to 5 players each. The territory game follows a board game format to engage actors in discussing the actual state, future development and possible actions in the territory. This approach uses a map of the territory as a board and thematic cards to guide the discussion. The thematic cards were informed by data collected in the first step of this study, grey and scientific literature. The game is played in 3 steps: (1) Diagnosing the present state and the main dynamics affecting the territory using the thematic cards; (2) imagining a scenario of future development for the territory; and (3) agreeing on possible actions to meet the desired future. Each group presented its work in plenary (Figure 2). The workshop had a duration of 3 hours; however, due to time constraints, the game had to be shortened through the combination of the first 2 steps. The thematic cards were used to inform a future scenario and not only a diagnosis of the present state [15,29].

The question that guided the game emerged from a preliminary analysis of the interviews and was defined as: “Which agricultural practices should be favored to prevent desertification and strengthen local commercialization of agriculture products?” The distributed thematic cards were: (1) land systems, (2) soil ecological value, (3) protected areas and Natura network, (4) energy potential, (5) edaphic morphologic aptitude, (6) edaphic morphologic aptitude for tree species, (7) local production, (8) social drivers, (9) commerce and transformation, (10) hydrographic region, (11) climate scenarios and (12) agricultural hydro-infrastructure. There was a skilled facilitator for the whole session and each table had an animator to guide the discussion within the groups.

The interviews and the plenary discussion of the participatory approach were recorded with the consent of the participants and transcribed. All collected data were analyzed using content analysis. The results were presented and discussed with a specialist in agricultural sciences, focused on research in soil science, agricultural plant science and agronomy. In the next section, we present dissonances between the expert’s knowledge and the collected data. We include quotes from the actors to better illustrate some of the discussed topics.

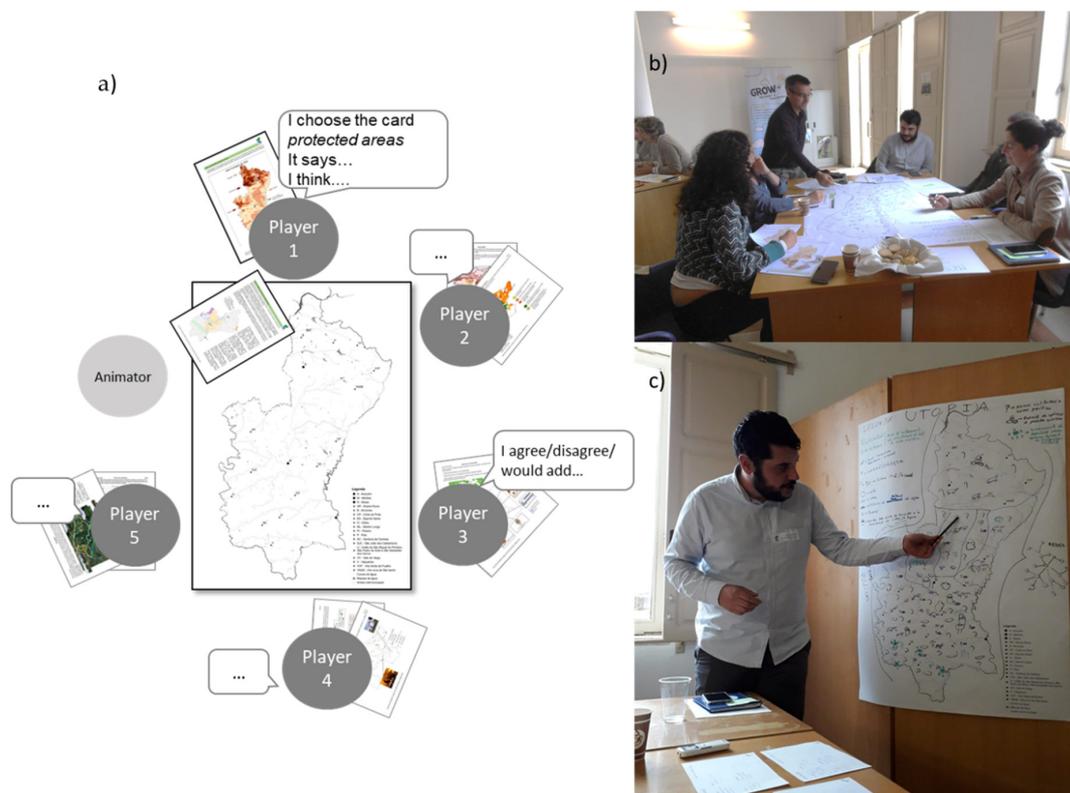


Figure 2. (a) Schematic representation of the game. The game is played over a paper map of the territory. (b) In each round, each player must choose amongst its cards a theme to discuss. At the end of the round, the selected information must be drawn on the map. (c) The results and maps are shared and discussed with all the groups.

4. Results

4.1. Establishing a Reference Point

Perceptions of the present state of the territory did not differ from data used to characterize the case study. In most interviews, it was acknowledged that the North of Serpa has higher agricultural productivity and water availability than the rest of the territory. Based on the analysis of the interviews and actors' descriptions of the land systems, it was possible to distinguish the territory between (a) livestock production under different tree densities associated or not with fodder production; (b) afforested area; and (c) irrigated agriculture. This description is in accordance with the characterization developed by Fusco et al. in [33,34] (Figure 3).

4.2. Past and Present Dynamics

Interviewees described two main dynamics affecting the territory: afforestation and the introduction of irrigation. The growth of the forested area, mainly of *pinus*, was described mainly in Alcoutim and Mértola. This trend was related to the measure "2080" (EEC regulation 2080/92, established by the decree 199/94). We found two different interpretations of this phenomenon. On one hand, afforestation was described as an opportunity to generate revenue from land with low profitability. This reasoning was mostly associated with the afforestation trend in Alcoutim. In Mértola the absentee landowners were described as being the ones who opted for afforestation. The financial support for pine plantations has come to an end, and several interviewees expressed reservations on the future of afforested areas, as these are not meeting expected productivity levels. The lack of productivity was attributed to the installation of the pine plantations in the shallowest soils of

the territory. The interviewed soil expert pointed out that soils can be worked on and improved. Even degraded soils can be corrected and worked to increase nutrient and water retention, securing productivity, even if lower than in other places.

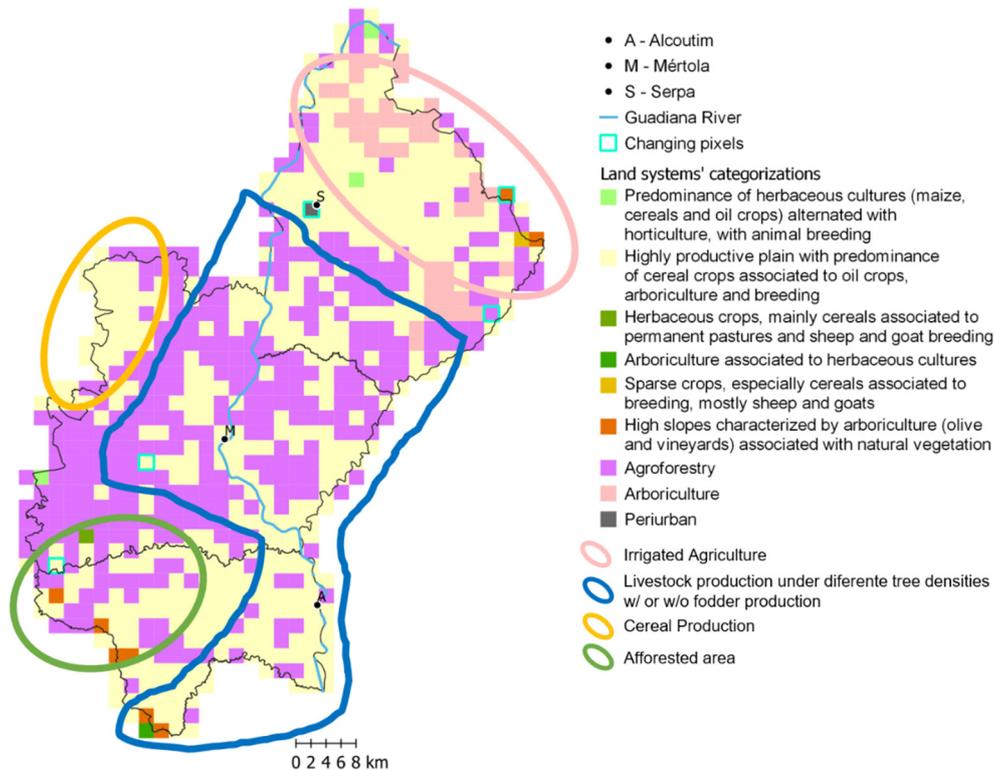


Figure 3. Land systems as characterized in the spatial analysis by Fusco et al. [30,31] at 2×2 km pixels and as described by the territorial actors (drawn shapes over the map).

We also found fear of abandonment and fear of an increased fire hazard if additional support and measures targeting these afforested areas are not taken. In general, this afforestation trend was seen as an example of the disconnection between policies and this territory, as (i) many well-adapted species to the territory, such as carob, were not supported; and (ii) the required densities to be eligible for support were high for the soil capacity.

“People did not want to abandon the land, because it was family property, even if unproductive. Entering the European Union and agrarian policy made possible the forestation of the properties instead of them just being abandoned.” - Technician in forest association

The expansion of irrigated agriculture started in 2011 with the Alqueva dam. From the analysis of the interviews, a range of opinions regarding this expansion was found, from being against it to the belief that the dam is vital to maintain agricultural productivity in the territory. Despite these opposing viewpoints, a consensus was found about the opportunity for agricultural diversification that was not being explored. Market pressures, together with favorable policies, were considered to be driving agriculture towards the dominance of (intensive) olive yards. Such perception is supported by crop cover data that shows that olive yards cover 75% of the irrigation perimeter in Serpa, namely intensive and super-intensive productions [17].

“I am in favor of Alqueva but believe there should be limits to intensification. I was in favor of the Alqueva project, and of the possibility of agricultural diversification that did not exist.” – President Local Action Group operating in the study area

Respondents positive towards the dam highlighted the economic development and dynamics irrigation brought, stressing that there is room for other crops than olive yards, and other production styles other than super-intensive, including organic production. In interviews from both positions, we found the reference to the “social model of Alqueva”, as it was labeled by one of the respondents. This model was described as driven by large company interests, and not promoting the right dynamics to fixate population and revitalize the territory. Harmful practices (i.e., use of pesticides and herbicides) were mentioned and little social and economic impacts in the territory were highlighted. Independently of the interviewee’s perceptions, it was broadly agreed that drought has been aggravating in the last years with consequences for production, and that increasing access to water must be a priority. Yet, it was also noted that water alone is not the answer. Expert knowledge highlighted it should be expected that in marginal areas there is an investment in water infrastructures and reduced water and (pumping) energy costs from a development perspective. Nonetheless, prices should not be reduced to the point that it is still economically viable to irrigate unimproved soils, leading to sub-optimal results and non-efficient uses of water in areas where water is scarce.

“Rainfed will not work in the future because of water scarcity. And if it will be scarce, we need to invest in water.” –Farmer in Alcoutim

Although “stable” was frequently used to describe livestock production in the territory, often respondents referred to changes to livestock production in the last 10 years. Cattle is mainly replacing small ruminants due to the low profitability of the latter, and incentives from the common agricultural policy (CAP). Reportedly, livestock owners in the territory had to be granted “urgent access to water” to sustain the animals in 2017 during the drought, whereas other types of production did not enjoy the same benefits.

The data shows that stakeholders agree that there is insufficient cooperation in the territory, and the case of lamb producers, a historically and economically important production in the territory, was used to illustrate the problem. The inorganization of lamb producers was described to hinder the development of the sector and make producers more vulnerable to unfair deals. Further, most lamb producers do not have the means to sustain production till slaughter, thus selling their products (usually to intermediaries that sell them to fatteners) early in the production stage with smaller market value. This was considered aggravated by the isolation of the territory and its distance to slaughterhouses, increasing commercialization difficulties. There was also the perception of missed opportunities to sell products with a regional and traditional differentiation (niche markets; e.g., protected geographic indication). Issues of isolation and commercialization were echoed concerning other products.

4.3. (Un)Desired Future

We found binary perspectives on the future development of the territory, the optimists and the pessimists. In the positive future scenario, montado (valued silvopastoral system, considered within the identified land system “livestock production under different tree densities associated or not with fodder production” in Figure 3) was thought to persist. In the future, the montado would include diversified crops, techniques for water seeding, such as ponds and mulch tillage, would be widespread and drought-resistant species introduced. In contrast, we found another scenario that expects continuous desertification, land abandonment, and the progressive intensification of agriculture, where it is viable and further marginalization of areas where it is not. Such a trend would lead to the increasing degradation of traditional systems, including the montado.

Despite different predictions, the desired future was consistent across participants and methodologies: a developed territory, where agriculture would play an important role, including traditional systems yet favoring crop diversity; ease of access to water and distribution and commercialization of local products; and with conditions conducive to attract and retain people. The main points of agreement concerning the future development of the territory are presented in

Table 3. We found key differences in how to achieve such vision, namely the role of water in an agricultural production system:

“Agriculture must be irrigated. What is done in rainfed systems can only be valued by its services, like biodiversity.” –Technician at water management institution

“Rainfed production is not pretending agriculture. [...] Irrigated agriculture cannot eliminate rainfed production.” – Extensive producer

Table 3. Desired future and possible actions.

Issue	Desirable Future	Suggested Actions
Maintenance, protection and improvement of land systems	Improved soil Policies and measures fitted to extensive, multifunctional systems (of Montado in particular) Increased tree cover The predominance of multifunctional systems Silvopastoral practices compatible with values and rules of PNVG Natural park	Change common agricultural policy (CAP) schemes and values not to favor ill-adjusted or unsustainable practices Integration of “forest” and “agricultural” policy measures considering the existence of agroforestry systems Empowerment of farmers, landowners and policymakers on good practices, adaptive management, water and soil conservation techniques through field trips and knowledge transference
Increase water availability	Water seeding—agricultural practices concerned with water conservation such as swales and ponds. Use of irrigation as a complement to rainfed systems Accessible irrigation infrastructures to a wider population	Empowerment of farmers, landowners and policymakers on good practices, adaptive management, water collection and conservation techniques through field trips and knowledge transference
Cooperation between actors	More dialogue amongst different entities Find and converge on common points of concern	Creation of lobby group to represent the interest of the territory near decision-makers
Population	Maintain and increase the rural population	Incentives for business opportunities and job creation in the territory
Local market	Ease of access to local products in the local market and increase awareness of buyers for local consumption	Relax public procurement regulations to facilitate placement of local products in the local market (including public canteens and restaurants) Increase awareness of local buyers for local consumption
Transformation and commercialization strategies	Organized producers to gain commercialization strength Multifunctional processing center in the territory Access to niche markets The Guadiana River as a “road” to reach a wider market	Collective transformation facilities, including a collective kitchen and multipurpose factory Creation of a platform of commercialization of the products from the territory
Energetic production	Investment in small projects across the territory	

The idea of the introduction or increased access to irrigation infrastructure was described both as a necessity and an unwanted scenario. For some participants, irrigated agriculture was considered a

means to diversify agriculture, fight increasing aridity, and even a necessity for agriculture to continue to be viable under a changing climate. This feeling was particularly strong in Alcoutim, where most participants mentioned the construction of a dam in the municipality as a necessity. The participants positive towards dams and irrigated agriculture did not frame rainfed systems as not of value. Instead, the persistence of the traditional systems, due to low productivity and revenue, was deemed as bound to their value beyond production, and often supported through agro-environmental policies. Some participants feared that investment in irrigated agriculture would diminish the existence of extensive systems. Hence, participants referred to water seeding techniques such as swales and ponds, which can be implemented at a farm level, to increase water availability. The introduction and farming of drought-resistant species was also supported.

Many of the discussed desired developments for the future imply an action or a change (i.e., not maintaining the status quo). There is a high concordance between the actions defined by the participants and the desired future. The defined actions are summarized in Table 3. Concrete actions were agreed by all and most of these actions depend on higher levels of decision-making, often relating to development or agrarian policies. However, there is also a will of organization and cooperation of actors from different levels, including producers, associations and public institutions. Although not explicit in the suggested actions, across interviews and methodologies we also found keenness for mechanisms that would value cultural and regulating services. On this matter, the consulted expert expressed reservations. Payment to maintain certain land systems, afforested areas, in particular, arguing for their ecosystem services is likely to maintain the status quo of the direct payments and perpetuate a detrimental dependence on subsidies in the territory in focus, whilst failing to provide incentives for people to remain in a marginal territory. Instead, marginal areas ought to benefit from assistance schemes that would counteract their lower productivity allowing for economic sustainability, and be capable of attracting people, in a result-based logic.

5. Discussion

5.1. Dealing with Change

Within the territory in the study, we found the often-cited contrasting trends of intensification and abandonment. It is worth noting that the irrigation plan covers land that has the highest ecological value in the territory in the study [23]. The areas being pushed towards intensification are those that have a higher productivity potential. Contrasting, agricultural abandonment was predominating in Alcoutim, the most marginalized area for its lower accessibility, shallow soil and hilly topography. This is in agreement with trends described in the literature in marginal Mediterranean areas [10,12,35–37].

Intensification in the case study was mainly associated with the advancement of wide-scale irrigation structures in territory that was traditionally rainfed. Agriculture within the irrigation perimeter has been developed to obtain higher yields and meet the increasing national and international demand for Mediterranean products [38,39]. There was a fast-growth of olive yards to meet the high demand for olive oil [40]. This trend has been raising environmental as well as socio-ecological concerns. These include fears over the overexploitation and contamination of water [41,42], homogenization of the landscapes and social disparity, and prevalence of foreign economic interests over the wellbeing of local inhabitants [43]. Further, several authors note that current governmental subsidies for water prices mask production cost [43,44], and are expected to increase [45]. Therefore, in the long run, one should question whether current investments in water demanding crops will be sustainable in the long run.

The expansion of forests is expected to continue due to a probability of further land abandonment and forestation incentives [12]. In our case study, the afforestation phenomenon was seen as a prime example of ill-adjusted CAP to the local context more than a symptom of land abandonment, even if effective in preventing further shrub encroachment [46]. Pine plantations added little economic value to the territory and contributed little to reverse depopulation. Nonetheless, it is also important to

reflect on the responsibility of national and territorial actors in the application of European measures. On one hand, the zonation made for afforestation priorities did not predict species well adapted to the territory (as acknowledged in later measures; see [47]) and demanded a tree density inadequate to the territory soil. Farmers jumped in, complying with demands they most likely knew their lands would not be able to sustain in the long run. Perhaps a stronger link between farmers, policymakers and regulators and experts' advice would have prevented the current challenge the region is facing.

Increasing water access holds a diversification and development potential for semi-arid marginal areas [48]. However, it also increases susceptibility to perverse interests that push for unwanted developments and land systems [49,50]. Thus, when weighing on pushing towards investment in water infrastructures in marginal Mediterranean areas it is relevant to investigate not only the feasibility of an increased yield factoring true water costs but also who will be the beneficiaries; how the natural and cultural values of existing land systems will be affected; and if there are mechanisms to prevent that outside and/or economic interests topple local will of a sustained territory.

To a lesser extent, intensification was also noted through the change of species and increased number in livestock. Policy incentives and changes in dietary preferences have been favoring cattle over the traditional small ruminants, leading to an increase of grazing pressure [51,52]. Simultaneously, erratic rain patterns and low precipitation were reported to have affected the number of heads of livestock in the territory. At the policy level, our case study provides empirical evidence of the impact that direct payment in CAP's pillar I have on the traditional production systems of the Mediterranean, potentially causing a locked-in state and hindering the adaptive capacity of the system to external pressures [53]. Therefore, our study supports the argument by [54] for the need to stop direct payments in the next CAP. Concerns over these dynamics were reported to act as a driver for a movement for diversification of cultures and production methods in Mértola. Projects such as the recovery of peri-urban food gardens and the implementation of water seeding practices within rainfed production systems are being promoted by both the municipality and non-governmental organizations. Out of the three municipalities in the study, Mértola is the one with the higher civic engagement [55]. This locally promoted "resistance" to global trends further re-enforces the idea that local actors can influence development outcomes [6,13], and the relevance of fostering bottom-up initiatives for achieving sustainable development.

We also found a general acknowledgment of the importance of the ecosystem services beyond production, which ought not to be a burden on farmers but rewarded by society. More and more it becomes evident that there is the need for change in how agricultural production is framed and it is critical the implementation of mechanisms that allow for services and functions to be recognized and increasingly appreciated [56–58]. The challenge is to find incentives that go beyond benefiting farmers with a history of production that fits within the ecosystem services narrative, but that incentives farmers to improve their production system through favoring a functional agro-system [59].

5.2. A Divergent Shared Vision

Despite a clear common desire for a developed territory, sustained by agriculture and preservation of traditional land systems, we found disagreement on the best path to achieve these, namely on the role of water. This captured division is evocative of the debate happening at a wider scale. For some, it is necessary to increase the irrigation perimeter and area of irrigated agriculture. Beyond a means of increasing productivity, irrigation would act as a safeguard production under climate change. Water requirements are expected to increase, whilst water resources become scarcer [60], and the adoption of efficient irrigation has a high-water saving potential [61], which could allow the maintenance or increase of production levels even under increased aridity. Nonetheless, the deviation of water resources towards agriculture raises concerns for possible conflicts with non-agricultural uses [50,62,63] and even more in areas arguably less fit for intensive agriculture. Hence, there is the contrary position that argues rainfed systems ought to be kept and privileged. Also, rainfed agriculture is bound to be affected by water stress and decreased yields [64]. Water management and conservation practices

ought to be encouraged, namely practices such as no-tillage [65,66] that are contrary to common management strategies [67].

Finally, the study shows that coordination and cooperation amongst actors are highly desired and considered as a means to steer the development of the territory into the desired path. Thus, demonstrated interest by actors is not enough, and mechanisms should be put in place to promote higher engagement and support bottom-up initiatives. The lack of integration of scientific and specialized knowledge into the decision making of territorial actors is shown to have negatively affected the current land system dynamics characterized in this study. The literature review developed for this study broadly supports our perception that this marginalized territory also lacks the attention of the scientific community. Therefore, it is urgent to redress this situation and make well-adapted expert advice available for local decision-making processes, alongside the recognition and support for local and traditional knowledge in ways that can advance the achievement of the desired vision.

6. Conclusions

Local dynamics in our case study appear to be dominated by global drivers, namely agrarian/rural development policies and market value, that privilege efficiency and production over natural and cultural value. Local governance, in the form of associations and municipalities, alone and in partnerships, has been seeking to promote diversification of production, strengthen local markets and increase water availability. Despite a common vision for a developed and diversified territory with agriculture at a relevant position, disparities amongst stakeholders arise concerning the role of water and irrigation in such a semi-arid region. Although there is an expressed desire to preserve traditional and extensive production systems, areas with lower aptitude will most likely still undergo intensification. These findings reinforce the notion that although local initiatives are needed and important, the development of marginal Mediterranean areas is dependent on action at a wider scale (both national and European), and on common strategies defined to achieve the desired goals especially the accommodation of territorial specifications. Further, there is a lack of research in the more marginalized areas and a lack of integration of technical knowledge into decision-making. Therefore, we argue for greater accessibility of information that would allow for local actors to access the impacts of investments, considering the specificities of their territory, so that they may themselves be able to push for the desired trajectory of development.

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