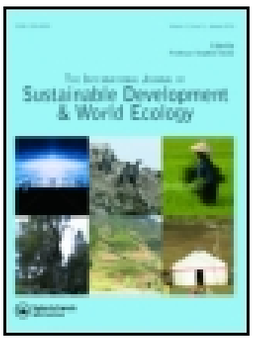

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'Mértola, a lab for the future' as a transformational plan for the mediterranean semi-arid region: A learning case based on landsenses ecology

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ABSTRACT

Leaning cases as Transformational Plans are a tool that is still little explored and that have great potential in the framework of Landsenses Ecology as an emerging discipline. This work presents the project 'Mértola, a Lab for the Future' as a learning case of a Transformational Plan in the Mediterranean semi-arid region based on Landsenses Ecology. It is a project of agroecological transition, adaptation to climate change and desertification combat that places the local community leadership in the planning of a more sustainable and resilient future. The paper proposes Transformational Plans as a tool to promote networks for the sharing of technical-scientific, political and practical/lay knowledge enhancing a people-centred and place-based change. The learning case methodology follows an analysis showing a set of good governance practices for sustainability, through six transformation domains: access to natural ecosystems, knowledge and culture, systems of exchange, networks, equity, and discourse. Results show a strong articulation between the learning case and the UN 2030 Agenda, highlighting SDGs location and territorialization practices. This kind of projects, which strongly connects with governance and its multilevel and territorial translation, have a great potential for the Landsenses Ecology, contributing to innovate in governance approaches. The same place-based approach could be used and replicated by other territories in the Mediterranean semi-arid region to develop their Transformational Plans for accelerating transformation towards more sustainable territories.

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Introduction

The Sustainable Development Goals (SDGs) (United Nations 2015) are of transversal concern for public policies at all levels. The biggest challenge of this agenda is to be constituted as a truly collective project, which implies an effective global-local translation (United Nations General Assembly 2018). Each territory has its own identity resulting from socio-environmental, political and economic challenges as determined by its population. Thus, this global-local translation should be 'place-based' and 'people-centred', following a proximity approach for the territories and citizens so that these objectives are adapted to different realities (Seixas et al. 2017; Ferreira 2020).

Transformational plans may pave the way for the territorialisation of UN 2030 Agenda establishing references and developing strategies to align the agenda with territorial specificities and population needs. Strengthening local actors' participation and capacities for SDGs' integration, and promoting knowledge management for sharing and replicating good practices are relevant steps for enhancing a 'lobby of the people' and transformational communities (Seixas and Lobner 2018). 'Mértola, a Lab for the Future' highlights these practices thus illustrating that it is a good strategy for a Transformational Plan.

Transformational Plans are locally led sustainable governance tools to foresee the future. The use of these tools is essential, especially in territories where the challenges of desertification, food security, and climate change are more evident, such as the semi-arid region with a Mediterranean climate (Vizinho et al. 2015). The development of these plans comprises building a network of local actors to combine techno-scientific, political and practical/lay knowledge to produce new and more resilient sustainable territories. Such 'ecology of knowledges' (Santos 2010) has already been proposed to highlight the need for modern science to recognise the plurality and heterogeneity of perspectives and actions.

This paper proposes Transformational Plans as an important active methodology for the emerging discipline of so-called Landsenses Ecology (LE). The purpose of LE research and the landsense creation approach 'is to maintain, improve, and increase ecosystem services in a general sense, and at the same

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time, and more significantly, to pay special attention and emphasis on increasing an ecosystem's services associated with sustainable development consciousness' (Zhao et al. 2020, p. 197). This approach to sustainable development requires a lens of science as well as a lens from culture and ethics, combining both hard and soft knowledge and skills. We still need to highlight and to discuss good practices that could be a beacon to this path.

We present 'Mértola, a Lab for the Future' as a flag case study to elaborate these policies. This paper discusses the project as a learning case of a Transformational Plan for the sustainability governance in the Mediterranean semi-arid region based on an LE approach. This strategy of agroecological transition, adaptation to climate change and combating desertification places the local community leadership at the core of the planning for a more sustainable and resilient future.

This project enables a platform for sharing knowledge and achieving the localisation and territorialisation of SDGs. The sharing of this learning case is, therefore, in itself a contribution to sustainability governance, configuring a set of good practices that can be used and, eventually, replicated by other semi-arid territories with a Mediterranean climate in order to prepare their Transformational Plans.

Foreseeing the future in the semi-arid region: transformational plans as a tool for sustainability governance

The implementation of the UN 2030 Agenda (United Nations 2015) opened up a discussion about its territorial translation. In 2018, the United Cities and Local Governments (UCLG) Regions Forum promoted the conference 'Territorialising the development agenda'. This event brought together more than 200 representatives from municipalities and regions from various countries to debate and exchange experiences on the territorialisation of global agendas of development, and specifically the UN 2030 Agenda. Later, the same entity published a report 'Towards the Localisation of the SDGs' (UCLG 2019), portraying the SDGs' 'localisation' strategies in more than a hundred countries during the first four years of the agenda. In this report, the 'location of the SDGs' is described as: '[. . .] the process of defining, implementing and monitoring strategies at the local level to achieve global, national, and subnational SD goals and objectives [. . .]' which '[. . .] includes the process of taking into account subnational contexts in achieving the 2030 Agenda, starting from the set goals and objectives to determine the means of implementing and using indicators to measure and monitor progress' (UCLG 2019, p. 16).

Also in 2018, the European Union (EU) promoted the meeting 'Delivering Sustainable Development Goals at regional and local level' to discuss, with the main regions and cities, strategies to 'locate the SDGs'. In Portugal, six of the seventeen SDGs were adopted as national-level priorities, namely (Ministério dos Negócios Estrangeiros 2017): (SDG 4) 'Quality education'; (SDG 5) 'Gender equality'; (SDG 9) 'Industry, innovation and infrastructure'; (SDG 10) 'Reduction of inequalities'; (SDG 13) 'Climate action'; and (SDG 14) 'Protection of marine life'. However, this agenda has not been translated into the lower territorial levels (regional/NUTS II; sub-regional/NUTS III; and local/municipalities) in an effective way.

Besides this, some initiatives are now starting, such as 'The SDGslocal Platform' which aims at monitoring the evolution of the municipalities concerning the various goals of the SDGs through progress indicators built on information from national and municipal databases. This platform also intends to map and measure the impact of the innovative and sustainable practices that municipalities, civil society, and companies are implementing (CNADS/OBSERVA/MARE/2adapt 2020).

The territorialisation of sustainable development was first introduced with Agenda 21 (Local), translated in the slogan 'think globally, act locally' (Geddes 1915). This motto served for authorities, at different territorial levels, to develop strategies for a more integrated and localised SD. Agenda 21 presented itself as a dynamic programme, introducing the importance of building partnerships for the multilevel governance of the SD, taking into consideration the different actors according to the diverse situations, capacities and priorities of the countries and regions (United Nations 1992).

In general terms, 'territorialisation' refers to a place-based process of producing new territorialities, i.e. shared visions of a territory (Dias and Seixas 2020). In the framework of public policies, this process aims to (i) choose a specific territorial scale in its strategic intervention; (ii) cover the main stakeholders of territorial development; and (iii) effectively promote development and territorial cohesion (social, economic and environmental). Therefore, the territorialisation of the SDGs is directly related to the need to empower citizens who can actively participate in policies and initiatives to enhance the transformation of their communities.

Capacity building activates citizen territorial literacy necessary for an effective and successful SDG's translation into a global-and-local Transformational Plan (Seixas and Lobner 2018). The SDGs' Transformational Plans are themselves a learning agenda to create 'Transformational Plans' everywhere (Seixas et al. 2017). The two complementary political frameworks of the agenda are evidence of that purpose (Dias and Seixas 2020): (1) an extensive (top-down) guideline for institutional transformation, composed of seventeen objectives and 169 associated goals; and (2) minimalist (bottom-up) guideline for experimentation and local

adaptation, composed of a mnemonic of five thematic axes, the '5Ps': People; Planet; Prosperity; Peace; and Partnerships.

The concept of governance, applied to territorial sustainability, is opposed to the idea of a 'one-size-fits-all' formula. Instead, each sustainability governance model, territorially shaped, must result from a network of dialogue by several actors and their respective interests and knowledge (Dias and Seixas 2020). It is this 'ecology of knowledges' (Santos 2010) that makes possible to idealise a new identity for a particular territory (territoriality) and to mobilise collective action to pursue it. The next section discusses some concepts and approaches to achieve a sustainability governance model in the Mediterranean semi-arid region.

Landsenses ecology and agroecological transition: domains of transformation

The compromise between humans and nature is a global priority. Nature dynamics are not something new. Since time immemorial, humans have struggled to dominate Nature to meet their needs. However, historical evidence shows that this is a lost battle. As Catton and Dunlap (1978) showed, with the New Ecological Paradigm (NEP) proposal, human beings are part of Nature's dynamics. Ancestral civilisations transmitted to the next generations how to deal with Nature and to live sustainably. But currently, since the second half of the twentieth century, scientific advances neglected this knowledge and reaffirmed the goal of controlling Nature (Abegão 2019). This could be one of the main causes of the biggest challenge that humanity faces: to deal with the unpredictability of climate phenomena as a boomerang effect from anthropic actions.

LE is a recent approach, but its basis is robust, on that combines both techno-scientific and traditional local knowledge (TLK) as key elements to understand ecological changes in contemporaneity. The sense of land, in this discipline, is a powerful combination of natural elements, physical senses, psychological perceptions, socioeconomic perspectives, process-risk and other associated issues (Zhao et al. 2016). This approach can lead to a transformative process called 'landsense creation' (Zhao et al. 2020) where the main goal is to improve and increase ecosystem services linked with sustainable development awareness. The basic assumption is that, besides science and technology, local culture, a sense of place, lay knowledge and ethics are core to this creative process.

LE was developed to overcome the problem of dichotomies once its philosophy combines both modern and traditional disciplines to understand the complex interaction between social and ecological systems (Zhao et al. 2016; Shao and Wu 2020). In this sense, agroecological transition should be recognised as an LE approach. This concept was defined by Gliessman (2018, p. 599) as 'the application of ecological concepts and principles to the design and management of sustainable agroecosystems'. Recently, the same author elaborated on the concept as referred, 'the integration of research, education, action and change that brings sustainability to all parts of the food system: ecological, economic, and social. The definition includes the concepts of transdisciplinarity [. . .], participation [. . .] and it is also action-oriented [. . .]. The approach is grounded in ecological thinking where a holistic, systems-level understanding of food system sustainability is required'.

Agroecological transition is based on a systemic transformation that consists in 'ecologising' agriculture and food, towards a more sustainable agricultural and food system and involving multiple stakeholders with a political will to change (Magrini et al. 2019). Many of the agroecological transition processes are based on bottom-up grassroots movements, involving public entities, civil society and local entrepreneurs, with resilience heavily dependent on the chosen model of governance. These movements are based on 'transition networks' that look for short agri-food circuits to create more resilient communities (Hodgson and Hopkins 2010).

Recent studies have tried to analyse agroecology transition and the consequent transformation of the food system, to understand enabling and disabling conditions or factors that can scale up agroecology. Anderson et al. (2019, p. 6) developed the notion of ' . . . domains of transformation as the discrete (yet interrelated) arenas where niche and regime meet, engage in conflict and mutual contestation, and where agroecology – through transformations in governance – can gain strength over regime-driven approaches.' The same authors propose six domains that are essential to achieve sustainable and just food systems through agroecology: 1) access to natural ecosystems (safe access to the natural ecosystems are vital for smallholder livelihoods and investment in sustainable agriculture); 2) knowledge and culture (the way that knowledge is constructed, produced, shared, and mobilised); 3) systems of exchange (systems and processes by which agricultural products move from producers to the various users and consumers and also the ways that food producers acquire production inputs); 4) networks (pivotal in strengthening community self-organisation); 5) equity (dynamics of marginalisation and inequality are a major barrier to the development of sustainable food systems); and 6) discourse (can help or hinder processes of community-self organisation and is a critical domain for agroecology transformations).

These domains are determinant factors in the transition to agroecological production practices

and both influence and are influenced by governance processes, which will be the basis for the analysis of the project 'Mértola, a Lab for the Future'. Such transitions are considered long-term, multidimensional and fundamental transformations, through which the established socio-technical systems change to more sustainable modes of production and consumption. The focus of agroecological studies is on the dynamics, barriers and processes that move socio-technical systems towards sustainability, with learning cases being a methodology for accelerating transformation.

Methodological procedures

This paper presents the learning case 'Mértola, a Lab for the Future' as a tool for transforming the Mediterranean semi-arid region by mitigating climate change impacts, as well as responding to desertification and food security challenges. The use of learning cases is suggested by the UN (Williams et al. 2020) to improve the implementation of the UN 2030 Agenda, especially the involvement and participation of stakeholders. Therefore, learning cases are understood as a way of envisioning the future, building partnerships, and creating innovation contexts for transformational change (Silva et al. 2020).

The 'learning cases' have their origin in the areas of Law and Management, bringing to the academic discussion evidence from real cases of good and bad practices. Recently, this methodology has been used for innovating the policymaking process based on the problem-solving experience adopted in similar cases (Dotti 2018). In terms of decision-making, the pursuit of more fair, inclusive and sustainable solutions implies promotion of dialogue between three knowledges: political, techno-scientific and practical/lay knowledge.

Applied to an agroecological transition project, this paper explores the extent to which learning cases can be useful as a platform for dialogue amongst these knowledges. One of the great challenges to the creation of such platforms is to find dialogue tools that are user friendly for the actors in each of these spheres of knowledge. Therefore, learning cases are stories that are told and that can be heard/translated/converted by the actors in each of these spheres, creating a narrative in which each is called to participate. Storytellers were an ancient form of knowledge transmission and a tool for social relationships and the coexistence of difference (Barbara 2006), providing an 'ecology of knowledges' (Santos 2010). Learning cases are, therefore, a governance tool that puts people with different knowledge and degrees of decision-making in contact, to produce new territorialities, i.e., territorial identities or LE.

The importance of Mértola as a learning case for a Transformational Plan in the Mediterranean semi-arid region

Mértola is a municipality located in the south-east of Alentejo (Portugal), more specifically in the interior of Baixo Alentejo region. With a semi-arid climate, it is the most vulnerable municipality to desertification and climate change in the Alentejo region (Roxo et al. 1999; Vizinho et al. 2015). It is a municipality with severe limitations, both in terms of its biophysical characteristics and in terms of its socioeconomic context, classified by several indicators both negatively and unfavourably (García-Delgado et al. 2020).

Concerning edaphic conditions, a common characteristic of Mértola's soils is the low fertility, due to low content of organic matter, the small thickness of the horizons and the low capacity for water storage (Valente 2009). One of the causes for these adverse edaphic conditions could be the prolonged anthropic action, including overgrazing, and the continuous use of inadequate annual crops for these types of soils. Interestingly, however, this dilemma is not a recent phenomenon, or just a consequence of the intensive cereal campaigns launched in the first half of the twentieth century throughout the region. In technical information written in 1789, which examined the causes of decay and delay in agriculture and population, Pais de Almeida described the area as a region where the use of land, dedicated to livestock farming, did not respect the tree cover, resulting in increasingly arid and dry land (Sousa et al. 2016).

The other cause of soil problems and the low organic matter content has to do with climatic conditions: in the peak of the summer, water scarcity is accentuated, restraining chemical reactions that could favour decomposition (Valente 2009). These characteristics, combined with high slopes, and increasing soil erosion, explains the high level of soil degradation in the territory.

Mértola is part of a dry climate region, classified as an Arid Climate – Type B, Subtype BS (steppe climate), BSk variety (cold mid-latitude steppe climate). Recent climate scenarios predict the worsening of climatic conditions in Mértola, with a marked decrease in precipitation (from 483 mm in 2010 to 288 mm in 2100), an increase in temperature, and consequently, periods of drought (Vizinho et al. 2015). Under these conditions, Mértola is amongst the regions in Europe most susceptible to desertification. Desertification is defined as land degradation in dryland areas due to various factors, including climatic variations and/or human activity (Kannan 2012).

The vulnerability described above leads to severe limitations both in agricultural and other economic activities, such as tourism, which is affected by climate comfort (the average number of hotter days per year, could be three times higher under RCP 8.5). This leads

to severe economic weakness that accelerates migration and depopulation, a vicious cycle, which is difficult to reverse. Physical limitations (climate and soil) constrain the economy, but also the community's self-esteem and ability to change these extreme situations. Abandonment and ageing are rampant; population density is 4.8 inhabitants/Km^2 and the ageing rate is 395.1 (Pordata 2021) making Mértola one of the most critical Portuguese municipalities in terms of depopulation and reduction of capacity to innovate.

However, despite all these limitations or perhaps as a consequence, Mértola is also a territory of resilience, creativity, and social capital that can be capitalised, exponentially and monitored. A strategic vision including an agroecological transition process has been developed in recent years, with the mission to transform these weaknesses into strengths, electing this territory as a place of experience for solutions in the semiarid context. Mértola is, therefore, a learning case: a 'Lab for the Future' for an agroecological transition as a response to climate change in semi-arid regions.

Presentation of the learning case – 'mértola, a lab for the future'

When we look at a semi-arid case such as a 'Lab for the Future', we may try to perceive what is being done in terms of achieving more resilient socio-ecological systems. The greatest challenge seems to be to articulate a response to climate change, use of the soil, and economic activities. This implies development of consistent policies and planning to mitigate and adapt to the situation according to localisation and territorialisation of SDGs (Medeiros 2019).

Over the past decades, a continuous rise in global air temperatures resulted in significant changes in the global hydrological cycle, increasing desertification risk (Spinoni et al. 2015). Research made by the analysis of Koppen-Geiger Climate classification and Aridity Index (AI) proved that the arid areas globally increased between 1951–1980 and 1981–2010 (Spinoni et al. 2015).

The World Atlas of Desertification shows a trend in land productivity, with more than 20 % of world vegetated land in decline or stressed (Joint Research Centre 2019). SDG 15 gives deep attention to the desertification problem, amongst others such as restoring, protecting, and promoting sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification, and halting and reversing both land degradation and biodiversity loss. In particular, the target for SDG 15.3 is to restore degraded land and soil, including land affected by desertification, drought, and floods, and to strive for the achievement of a land degradation-neutral world by 2030. This link between land degradation and climate scenarios highlights the need to integrate climate change measures into policies and planning.

Regarding the target SDG 13.2, climate scenarios impact directly on the expansion of aridity, and global dryland expansions, and will increase the population affected by water scarcity and land degradations (Feng and Fu 2013). As a consequence, other global social problems will intensify such as: forced climate migrations and food insecurity. The complexity of these problems requires a transversal response which was the aim of 'Mértola, a Lab for the Future'.

Analysing 'Mértola, Lab for the Future' through the six domains of transformation

'Mértola, a Lab for the Future' is a local initiative that aims to foster agroecological transition, in a logic of partnership, amongst the local community and as a response that connects the food system and the local challenges of desertification, climate change, and depopulation. To develop this process, a new association was created, which includes a diversity of stakeholders with the following objectives (Associação Terra Sintrópica 2020):

> **Objective 1**: To encourage agroecological and regenerative practices that counteract soil degradation (desertification), and promote adaptation to climate change;
>
> **Objective 2**: To raise community awareness of the need to change patterns of production and consumption;
>
> **Objective 3**: To contribute to the acquisition of innovative professional skills appropriate to the extreme climate situation;
>
> **Objective 4**: To establish a pilot project, with potential for replication at the level of food challenges, in situations of scarce resources, to influence public policies;
>
> **Objective 5**: To test innovative strategies to support the settlement of young people through the regeneration of abandoned agricultural areas to provide a local agri-food system;
>
> **Objective 6**: To create a local food network based on direct collaborative relationships and short circuits.

The project will be presented and analysed through these six domains of transformation. This methodology presents a multilevel perspective to develop a framework for conceptualising agroecology transformations from a governance perspective (Anderson et al. 2019).

Domain 1: Access to natural ecosystems

This means enabling conditions for accessing natural ecosystems to include secure land tenure and access to

seeds, amongst others (Anderson et al. 2020; Wezel et al. 2018). The project includes different actions. In a region characterised by large scale property, but high desertification susceptibility, the sustainability of farms is highly dependent on European funds, rather than farm profitability. As a consequence, the transition is difficult for local farmers. Besides access to land for new farmers, it is also difficult due to the size of the land, a condition to access the 'funds pack', resulting in low availability of land to sell or lease.

To guarantee access to land for new farmers committed to the agroecological transition, the project launched a *Programme encouraging the settlement of skilled people to work the land*. The aim is to train and attract people to join an entrepreneurship project in agroecological production and the future supply of local collective catering canteens. The participants go through a process of theoretical and practical training (phase 1); a phase of autonomous practice with mentoring and support scholarship (phase 2); and a phase of final installation (phase 3), through a partnership with local owners which entitles participants to a scholarship for another six months. The condition to receive the grant is that the new farmers ensure the production of fair and clean food to the local consumers and simultaneously contribute to the production of ecosystem services.

The project also includes access to seeds as a critical issue. Extreme weather conditions, including droughts and temperature rises, demand adapted varieties, but the access to these plants is not guaranteed. A seed bank and a nursery have been implemented: *Horto of Forgotten Varieties of Al-Andaluz*.

The objective is to identify, to study, and to preserve horticultural varieties, perennial herbaceous plants, fruit trees, and medicinal herbs used in the territory of Al-Andalusia, including native species or species that have been introduced and spread since the Islamic period. The action had the collaboration of Mértola's Archaeological Research Centre, owner of the area. In addition to the interest in conserving seeds and promoting knowledge, this project aims at identifying the species and varieties most resistant to semi-arid/dry conditions, which can be grown in the Mediterranean region.

Domain 2: knowledge and culture

Constructivist teaching-learning processes are considered a key driver to scale-up agroecology (Mateo Mier Y Terán et al. 2018). The knowledge and culture domain articulates the importance of how knowledge is produced and shared (Anderson et al. 2019). In Mértola, the Entrepreneurs Association, in partnership with local authorities, started a peer-to-peer learning process, developing the embryo of a Community of Practices that encourages the sharing of knowledge between farmers with different backgrounds, experiences, and practices. Due to the difficulty of involving traditional farmers in these new models, a strategy of continuous involvement, observation, discussion, and peer learning was introduced, without prejudices regarding different practices.

First steps were made in 2018, with a three days' journey to the Alvelal Project, in Spain. This first visit was carefully chosen and prepared, to sensitise local farmers to the possibility of using different approaches in a similar area, although with worse climatic conditions. The visit included farmers, consultants and local decision-makers, sharing constraints and ideas in an informal and relaxed environment, and opening doors for new visits to other farms that apply agroecology. Several similar actions were repeated. This resulted, in 2020, in a joint project for the experimentation of regenerative agricultural techniques in five conventional farms and the involvement as observers of three farmers' associations, allowing the project to scale-up.

The change in farmers' practices is quite difficult. The costs and risks of the transition are a constraint to the farmers; doing things differently is hard even though they recognised it as relevant. It was necessary to ensure a place for experimentation of different techniques that could be adopted by farmers in a short-term. Mértola's Agroecological Centre (Horta da Malhadinha) is a 3 ha model farm, that has been converted into a demonstration, experimentation and training centre, specialising in syntropic farming, but using also other agroecological practices. The Centre includes a production component with vegetables and fruits commercialised by the Local Food Network, as well as a demonstration and training component for farmers and students; and a monitoring component, in partnership with research institutions.

Considering the importance of involving all the community and fostering a different future, children are an important part of the strategy. The project *School Forest Gardens* allows for the implementation of vegetable gardens in schools, under the principles of syntropic agriculture and to promote regenerative production practices and a greater connection between future consumers and agroecological production. The pedagogical gardens are conducted within the so-called 'Curriculum Enrichment Activities' developing in the five primary schools of the region, through a partnership with the Municipality of Mértola and the School of Mértola.

At the community level, several practical actions/workshops are developed regularly to involve participants in direct planting, seed harvesting, fruit harvesting and confection/degustation actions. At the team level, a programme of workshops was developed to ensure good governance of a process that recognises itself as ambitious, and where 'good governance' is

recognised as one of the decisive aspects for its success, resilience and sustainability. On the other hand, the local Vocational School is also initiating a movement of structural change, which includes an approach to this agroecological transition and development of education and training in courses from field to table, and from regenerative practices to regional and sustainable food processing and gastronomy. The project also foresees strategic actions with the Professional School.

To involve and scale-up the project, a *Volunteer, Internship and Exchange Programne in Agroecology* was developed. The activity aims to attract national and international young people to participate in this project, in order to train and share knowledge. The objective is also to have new residents, increase local entrepreneurship (a critical problem due to the migration of young people) around agroecology, and increase local self-esteem as well, due to the positive effect of the permanent involvement of qualified young people from other locations. A volunteer management programme was implemented, which includes the establishment of a set of activities: reception, support for accommodation, and mobility, as well as the acquisition of cultural skills aimed at the settlement of some of these young people in Mértola. This action also includes hosting master's and doctoral students who wish to develop their theses on topics in experimentation. More than sixty persons have passed through in two years of the project, and about twenty of them stay permanently or come regularly to Mértola.

Domain 3: systems of exchange

This domain explores the existence of robust, fair, and profitable systems and processes of exchange in the food system (Anderson et al. 2019). Instead of long supply chains, agroecological approaches tend to move toward a closer relationship between producers and consumers (short supply chains), even though not necessarily certified by official or formal standards (Wezel et al. 2018). In this project, a *Local Food Network* was developed including farmers, associations, and different institutions responsible for collective catering canteens and consumers. A logistic area was equipped for the *Network*, where fresh products are stored and prepared, before being sold in boxes at local markets. Efforts are being made to include local and organic products in public canteens. The Local Food Networks include different projects, such as the 'Fresh on Wheel' project, that allowed the municipality to buy an electric vehicle for the vegetable baskets distribution, and the development of a website to facilitate the direct marketing of local products. New spots on local markets were carried out as well as the organisation of farmers' markets for local production. However, changes in the exchange systems require an in-depth understanding of the desired transition and also a community with sensitivity (Appadurai 2001) about the on-going process. In this sense, the *Local Food Network* promotes several actions on awareness and education for the community and consumers, such as: 'Night at the Market', which encourages the sharing of food and ideas around the local, seasonal, and fair foods; and 'Grandma's Kitchen', developed by a private institution for social solidarity, which promotes the development of organic and regenerative gardens, and the collection of recipes and traditional knowledge around food, amongst many other specific initiatives, such as field trips, fairs, courses, and workshops. The outcomes can be measured by the emergence of new independent proposals around the theme. In fact, since the implementation of this process, two local restaurants have adopted vegetarian recipes for their menu; a new restaurant was established, totally dedicated to local, seasonal and sustainable food; and at least two new food entrepreneurial initiatives have been developed by young local women.

Domain 4: networks

Anderson et al. (2019) identify multi-actor networks as pivotal in strengthening community self-organisation for agroecology. 'Mértola, a Lab for the Future' (Sintrópica 2020), is defined as the response by a resilient community that believes in a sustainable future. It was initiated, nurtured and developed by a wide and heterogeneous network of people in private public institutions, which are moved by a feeling of unease, and the need to act in the context of isolation, depopulation and a serious climatic situation. This includes innovation brokers, farmers, several local associations, schools and local governments.

The project is also helping to create new coalitions, to act as a regional network focusing on regenerative agriculture that can be a future powerful alliance to scale-up the transitional movement. The project is involved in other national networks as well, such as the '*Agroecological Caravan*', a national initiative that responds to the need to raise awareness of agroecology in Portugal.

In Domain 3 (Systems of Exchange) the strategy to guarantee new exchange systems was identified through the constitution of a *Local Food Network*. The creation of the network is one of the fundamental tactics of this process that started with an important ally: the *Food Networks* in Switzerland, that develops partnerships with local food chains in Nepal, Kosovo and Mértola. This alliance has played an important role in the project since its inception.

Domain 5: equity

The domain of equity highlights the need to ensure equal, fair treatment and access to the food system, in all its dimensions. Gender inequalities are particularly relevant at this level and are considered as a critical aspect in agroecology (Anderson et al. 2019). In the region, gender issues are somewhat hidden, by the almost consensual acceptance that there are no problems of gender inequality, while simultaneously, a fundamentally male and patriarchal system of power and organisation is reproduced.

It is not surprising, therefore, that this initiative, launched by women, regularly faces discomfort reactions and attempts at diminishing the ongoing strategy. These reactions only slightly focus on discussing the process and focus mostly on discrediting female stakeholders.

Facing this challenge, the project maintains a balanced relationship of gender representation, and acts to attract strategic male opinion leaders to the process. These partners help to create respectability and credibility, as well as to demystify the arguments of some male members of the community. On the other hand, the project promotes an inclusive approach, involving members of all age groups: from primary school children to senior citizens of the senior university; attracting both PhD students and less qualified people, as well as the unemployed, to their volunteer programmes, including people of different nationalities and backgrounds and different sexual orientations.

Domain 6: discourse

The last domain analysed is discourse. Discourse can be a powerful tool both to support or block agroecology (Anderson et al. 2019). The strategy used was an innovative debate around this theme. Agroecology and agroecological transition were in constant debate and included two annual seminars related to local development. Specific events, as well as several projects, adopted the agroecological transition in its formal name. This concept was repeatedly used and explained in the various actions carried out with the community, farmers, and schools. One of the emblematic local projects, the establishment of a *Knowledge Transfer Centre* (Estação Biológica de Mértola), initially focused on biodiversity and wild resources, and included agroecology as a strategic area. Cooperation agreements on agroecology were developed with different research institutions and international associations, aiming at citizen science knowledge production.

A holistic perspective is another core aspect of the discourse: transition processes cross-cut different areas of knowledge and different sectors, involving farmers, restaurants, education, the social economy sector, art and culture, health and research. This approach was crucial to the involvement of the community, contributing to the acceptance, dissemination and participation.

However, there is also a barrier discourse to the project. It is essentially based on disbelief in agroecology techniques and practices, difficulties in its application on a large scale, and the incompatibility or inadequacy between some practices and the Common Agriculture Policy (CAP) financing regulations. Several lobbying and advocacy activities were developed as a reaction to the project, at regional, national, and international levels. Meanwhile, successful outcomes can only be expected by applied research, monitoring the results, and evaluation in the long-term.

The systematisation of the analysis through objectives and domains initiatives allows a full picture of the project (Table 1). This analysis is a reflection on the project as well as a monitoring moment. It enhances the awareness of the objectives and domains that are fully represented by the initiatives and the ones in which there is still space to improve.

Final remarks and future directions

This paper presented 'Mértola, a Lab for the Future' as a learning case for a Transformational Plan for the Mediterranean semi-arid region. The learning case methodology followed an analysis, through transformation domains, showing a set of good governance practices for sustainability. Many of these practices have shown a close articulation with the goals of UN 2030 Agenda, illustrating how SDGs' location and territorialisation projects can be developed. The same place-

Table 1. Distribution of initiatives by 'mértola, a lab for the future' objectives and domains of transformation.

	Domains					
Objectives	1	2	3	4	5	6
1	A	D	E	E		
2		C; D	E	E; F		
3	A	D				H
4	B	D	E	E		H
5		D			G	H
6			E	E		

Notes: (A) *Programme for fixation of skilled people to work the land;* (B) *Horto of Forgotten Varieties of Al-Andaluz;* (C) *School Forest Gardens; (D) Volunteer, Internship and Exchange Program in Agroecology; (E) Local Food Network; (F) Agroecological Caravan; (G) Equality promotion; (H) Knowledge Transfer Center*

Objective 1: To encourage agroecological and regenerative practices that counteract soil degradation (desertification) and promote adaptation to climate change;

Objective 2: To raise community awareness of the need to change patterns of production and consumption;

Objective 3: To contribute to the acquisition of innovative professional skills and appropriate to the extreme climate situation;

Objective 4: To establish a pilot project, with potential for replication, at the level of food challenges, in situations of the scarcity of resources, which can influence public policies;

Objective 5: To test innovative strategies to support the settlement of young people through the regeneration of abandoned agricultural areas to provide a local agri-food system;

Objective 6: To create a local food network based on direct collaborative relationships and short circuits.

based approach could be used and replicated by other territories in the Mediterranean semi-arid region to develop their Transformational Plans. Therefore, the main contribution of this paper is to promote the use of learning cases as a methodology for accelerating transformation towards more sustainable territories.

Learning cases as Transformational Plans are a tool that is still little explored, and has great potential in the framework of LE as an emerging discipline. There is a persistent claim on sustainability governance literature: the need to contextualise the sharing of good practices within networks/platforms to facilitate the dialogue amongst knowledges (techno-scientific, political and practical/lay). It seems clear, currently, that the conceptual universe on sustainability (such as the case of agroecology transition) always ends up strongly connecting with governance and its multilevel and territorial translation. Hence, there is great potential here for the LE discipline to contribute to innovation in governance approaches.

A 'landsense co-creation' is proposed focusing on the relationship between the dimensions of actors, knowledges, and practices, as a way to give meaning to places and territories. It is in these relationships that governance networks become effective and that the increase in ecosystem services becomes possible associated with sustainable development awareness. This approach raises several questions that LE should try to answer: how to put in dialogue actors with different views, knowledges, and different degrees of access to making decisions? What is the role of politics, science and civil society in the creation of channels of dialogue that allow for the understanding of, and agreement on, the best path that a community or territory should follow to achieve sustainability? How do the dynamics and processes established between the actors in each of these spheres of knowledge block or facilitate the transformation processes? How should emerging governance practices be streamlined to prepare for the future and to produce new, more resilient and sustainable territories?

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