



Agroecology for Europe (AE4EU)

Towards the development of agroecology in Europe

Deliverable report D2.4 – Agroecology Territories as targets of agroecological transformation in Europe

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Executive summary

Climate change and the ecological crisis force us to find ways to address the challenge of developing sustainable agricultural and food systems in Europe. Among the different approaches proposed, agroecology consist of a transformative approach of food systems based on core principles and promoting place-based approaches. Current literature emphasizes the importance to facilitate and foster agroecology transition at territorial level. Place-based approaches at community scale can play a great role in achieving conditions for transition. Related to this, the concept of Agroecology-Territories (AET) has been proposed and is based on territorial action on three dimension (i) the adaptation of agricultural practices, (ii) the conservation of biodiversity and natural resources, and (iii) the development of embedded food systems. The main goal of this work is to analyse the current development of AET or equivalent concepts in Europe and question the relevance of this concept as an upscaling pathway for agroecology, considering economic, environmental and social aspects.

A literature review as well as semi-structured interviews with country informants and key informants regarding potential AET were achieved. In a first step, the literature review has allowed to understand the current use of AET as well as related concepts in the literature. Secondly, 17 interviews with country informants have been achieved, allowing a better understanding of the current development of the concept in different European countries. Building on those interviews, 9 interviews with key informants from Italy, France and Germany provided elements on potential AET and allowed an analysis of 8 case studies in those countries.

The analysis achieved highlights the gradual emergence of different territorial schemes over Europe that support transitions to sustainable food systems, with three main roots in rural development, territorial food systems, and agri-environment and biodiversity conservation. Pathways of those schemes reveal that their scope enlarges progressively to integrate new issues and topics. The current use of the concept of AET in the literature seems to be limited to a specific community whereas an important body of literature was found on comparable territorial schemes or promoting the relevance of a territorial approaches.

Three schemes have been identified as having a good potential toward AET: Bio-districts, Eco-model regions and Regional nature parks (PNR) in France. The comparison of those schemes through case studies provides interesting highlights regarding the conditions, levers and barriers for sustainable transition pathways at territorial level.

The AET concept appears throughout this work as a fertile and promising frame to design and extend current existing territorial schemes and their area of action to promote the development of agroecology. Further work on the potential to implement the concept through existing territorial schemes seems to be necessary as well as a further analysis of the numerous existing territorial schemes and their area of action in relation with the concept of AET. Recommendation and perspectives towards the development of agroecology territories are drawn from this work.

1. Introduction

In a context characterised by an acceleration of climate and ecological crises, the latest Intergovernmental Panel on Climate Change report highlighted the relevance to handle the challenge of developing sustainable agricultural and food systems in Europe (Pörtner et al., 2022). Rather than a technological or prescriptive approach on transition, agroecology relates to a transformative approach of food systems based on core principles (HLPE, 2019).

In order to foster its implementation, agroecology accords a great importance to place-based approaches:

- (1) to handle a systemic approach at landscape scale (Duru et al., 2015; Jeanneret et al., 2021)

Some papers - principally from agronomists or agroecologists - point out the need for a multiple scale approach from the field to the landscape level as agroecology relies on ecosystem functions at different scales. In their review of agroecological transition design, Duru et al. (2015) propose a methodological framework to support actors within the stakeholder arena to facilitate the transition to biodiversity-based agriculture (Duru et al., 2015). On the field and farm levels, agroecological practices often include biofertilizers, natural pesticides, crop rotation, intercropping, agroforestry, and the use of semi-natural landscape elements (Wezel et al., 2014). The landscape scale encapsulates farms and fields in its management of biodiversity and biological interactions (Jeanneret et al., 2021). At a similar scale, the concept of Agroecology Living Labs (ALL) has been proposed to characterised innovation processes that encompass transdisciplinary working, monitoring and co-creation of knowledge among the different stakeholders, thus considering the role of innovation at agroecosystems scales (Agroecosystems Living Laboratories (ALL) Executive Report 2019, www.macs-g20.org).

- (2) to take into account the specificity and embeddedness of learning processes in agroecology (Compagnone et al., 2018; Piraux et al., 2018)

Marking a shift in the modes of production and circulation of knowledge, agroecology emphasizes the importance of "local knowledge", embedded in social relations and the environment (Compagnone et al., 2018). Revaluing the bottom-up logics of agricultural development, coordination among local stakeholders thus supports learning processes and innovation (Piraux et al., 2018). Analysing French farm machinery cooperatives, Lucas et al. (2019) show the important role of local cooperation among farmers to foster agroecology transition.

- (3) to include an enlarged approach at the food system scale (Francis et al., 2003),

From the farm scale, agroecology has enlarged its approach to include the entire food system (Francis et al., 2003, Wezel et al., 2020). In transcending the farm scale through food systems approach, agroecology movements in sustainable agriculture, rural development, and fair food systems also include food production systems, processing and marketing, economics and politics, and consumer studies (Wezel et al., 2020). Gliessman (2016) describes five levels of food system

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change where the first three levels are incremental changes at the agroecosystem scale, and the last two levels supporting the transformation of food systems and their embeddedness. This is considered as the highest level of transition, strongly link with a territorial scale. Klassen and Wittman (2017) actually point out the role of place-based food systems to “foster ecological resilience, mitigate economic risk, facilitate sustainable use of local resources and create socially resilient connections to the landscape and within regional communities”.

(4) and to include a political dimension of transition including communities and citizens’ involvement (Anderson, 2019).

The importance of territories is also highlighted to consider a political dimension that relates to the involvement of citizens, social justice, food sovereignty as well as community involvement. “Agroecology thus emphasizes social and political aspects including autonomy, community-self organization, and bottom-up place-based organizing” (Anderson et al., 2019). The issue to handle agroecology at territorial level goes beyond scale issues – it also includes principles of governance; involvement of stakeholders and political issues related to community involvement.

Literature confirms the importance to facilitate and foster agroecology transition at territorial level. Place-based approaches at community scale can play a great role in achieving conditions for transition. Related to this, the concept of Agroecology-Territories (AET) has been proposed and defined as “places engaging in a transition process toward sustainable agricultural and food systems” where stakeholders in the territory are the central actors in the transition process (Wezel et al., 2016). The transition processes that define AET can be divided into three domains (see Wezel et al., 2016 and Figure 1):

- (i) the adaptation of agricultural practices,
- (ii) the conservation of biodiversity and natural resources, and
- (iii) the development of embedded food systems.

The first domain, ‘adaptation of agricultural practices’, requires a change in practices and methods that enables the integration of ecosystem services on the farm, or changes from conventional practices to agroecological practices. Reducing dependency on chemical inputs and using renewable resource at the farm level could be an example of this changes (Wezel et al., 2016; HLPE, 2019). The second domain, ‘conservation of biodiversity and conservation of natural resources’, must be performed at the field, farm, and landscape scale on both agricultural and non-agricultural land. As an increase in biodiversity leads to larger ecosystem services and more resilient ecosystems (Biggs et al., 2012) this domain has effects beyond the farm level. Therefore, management of biodiversity must be considered in public or common land in addition to farmland. Lastly the third domain, ‘the development of embedded food systems’, may include building food systems based on the identity of the territory, or re-establishing consumer and producer relationships (Wezel et al., 2016; HLPE, 2019). The embeddedness of food systems expands beyond the farm and landscape level to include at community level social and economic issues (culture, justice, health or poverty) as well as non-farming actors (citizens, local authorities etc.).

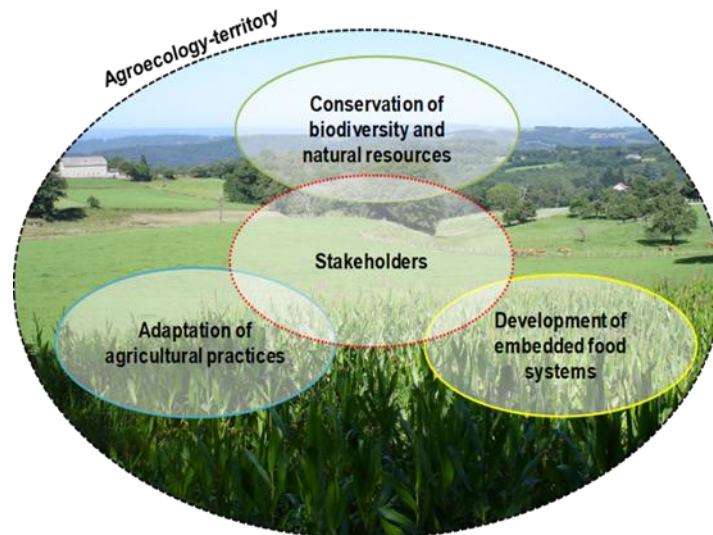


Figure 1: Schematic presentation of Agroecology Territory with stakeholders as central actors and the three essential domains for transition (Wezel et al., 2016).

As there is no peer reviewed literature highlighting the specificities and differences of an agroecology transition at the territory scale in Europe, new research is needed. In parallel, an increase of knowledge regarding territorial schemes that exist and could be seen as similar to Agroecology Ecology Territory seems to be a necessary step to foster the development of such initiatives at the territory level. The main goal of this work is to analyse the current development of AET or equivalent concepts in Europe and question the relevance of this concept as an upscaling pathway for agroecology, considering economic, environmental and social aspects. Thus, the general objectives of this work are:

- To develop an inventory and comparative analysis of AET throughout Europe.
- To gain a better understanding of the challenges, methods, and success factors that lead to transitions at the territory scale are analysed through case studies
- To discuss the relevance of different factors as enabler or barrier to foster the development of agroecology in Europe through a territorial approach.

2. Methods

In order to fulfil our goals, we organized our work through three main methodological steps described below (i) A literature review on the AET concept and equivalent concepts, (ii) a study of existing territorial schemes at European level and (iii) a more in-depth case study on some territorial schemes.

2.1. Literature review

A literature review was conducted to identify existing publications using the concept of AET. To achieve it, a search on Google scholar® for articles containing the phrase “agroecology* territory*” was conducted. In parallel, considering the article of Wezel et al. (2016) as a starting point that defines and formalizes the concept of AET, we have looked at articles that are citing it or are related to it. According to google scholar, the article of Wezel et al. (2016) is cited 120 times. We have screened all those articles. This, in association with a general screening of articles linked to “agroecology* territory*” leads us to 13 publications that not only cite the concept of AET but use it as an important part of their work. This was judged based on the use of the concept for developing an analytical tool, and/or application of the concept to a theoretical or place-based set of problems.

A review was also conducted to identify concepts related to AET. Three related concepts: Bio-districts, Living Labs and Agroecosystem Living Labs were examined. From the initial 5 articles written about or including Living Labs, only one document mobilised the specific concept of “Agroecosystem Living Laboratories” (McPhee et al., 2021).

2.2. Analysis and inventory of territorial scheme link to Agroecology Territories in Europe

In order to collect information regarding existing territorial schemes, it was decided to interview two types of informants: country informant on one side and key informant regarding AET (see the part 2.3). Country informants are here defined as those individuals that have knowledge about other territorial schemes or territories or regions that could potentially be considered or seen as similar to AETs. Informants were located through a snowball method (Parker et al., 2020) where the first informants were contacts from within the AE4EU network. All AE4EU informants are researchers familiar with agroecology in Europe. These informants in-turn recommended additional persons to be interviewed based on their familiarity with agroecology in Europe, or due to their work with agroecology at the landscape or territory scale in specific locations. Many informants were agriculture researchers or extension agents. Additional informants were interviewed because they are working with identified territorial schemes.

For country informants, online 30-minute interviews were held where the informant was asked six questions (see Annex 1 - Table 6) to gather data on agroecology in countries they are working in or are familiar with. On the whole, 17 interviews were conducted in total with 2 interviews in Italy, 2 in Spain, 4 in UK and 9 in Germany. These interviews have given insights into the comprehension

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of the Agroecology Territory concept in different European countries as well as an understanding of barriers, drivers, and key successes in transition processes.

Each interview was recorded in a non-verbatim transcription where the main topics and points of each question were entered into a spreadsheet to allow comparison between informants in the same countries. The main points of each interview were extracted to give an overview of the key points stated by each informant during their interview.

Thanks to country informant interviews and literature research, a final list of 10 territorial schemes was established but this one is not exhaustive over Europe. Data collection aimed to characterise the history, creation process, or current model of a territorial scheme.

The preliminary results from country informant interviews reveal that the concept of AET does not make sense at the first stage for most country informants. This seems to be due to different barriers: the reference and meaning of agroecology in the different countries; territorial and regional organization differ from one country to the other; the way to handle issues of adaptation of agricultural practices, of natural conservation of resources and embeddedness of food systems also vary between countries. Nevertheless, we could see in interviews with the general informant from Italy that the AET concept was easier to explain when compared to an already existing concept such as Bio-districts. In Germany, the concept of model Eco-regions (Öko-Modellregionen) was found to be relatively similar to AET because it combines multiple municipalities leading to a regional scale initiative that often includes elements from the three domains of AET. In France, the Regional Nature Parks ('Parc naturel régional') have been found to be a good example of potential AET.

Effort was taken in a second round of interviews with country informants to go further in the analysis of those schemes that contribute to develop potential AETs. Beyond those three schemes, in order to deepen our analysis, we tried to identify and document additional territorial schemes that contribute to territorial transitions of agriculture and food systems over Europe. Data collection to identify and characterised those schemes was achieved through:

- The interviews at country and territorial level of country informants (see below),
- Complementary literature review based on scientific documents as well as public policy documents, websites (using the Google, Web of Science search with the keyword being the name of the territorial scheme in English, and in the country language)
- A workshop activity at the AE4EU conference in May 2022, which helped in identifying further schemes based on AE4EU partners knowledge. During this activity international researchers from AE4EU were asked about existing territorial schemes in their countries, as well as the stakeholders involved, type of regions concerned, transition processes in the three AET domains, type of agriculture and food system, and the barriers and drivers for transition at territorial schemes.

2.3. Case study analysis

Following the semi-structured interviews with country informants, similar interviews were held with key informants regarding specific AET seen as potential case study. The interview questions were designed to provide a generalized overview of the scheme and/or potential territories to determine if they can be appropriately considered as AETs due to the presence of agroecology transitions. In order to qualify as an AET for this research, a territory must demonstrate initiatives or actions taking place in the three domains of AET (Wezel et al., 2016). At this first stage of data collection only attempts to detect agroecology transition processes will be carried out. If it is determined that agroecology transitions are occurring in two AET domains at least, the territory will be added to the AET inventory.

All case study interviews were held in the form of one-hour semi-structured online interviews where the informant was asked 14 questions (Annex 1 - Table 7) in the six categories of: agriculture in the territory, policies related to agroecology, stakeholder information, adaptation of agriculture practices, transversal information, barriers/drivers and key success factors. Answers to interview questions for the first five categories were recorded in a non-verbatim transcription where the main topics and points of each question were recorded. Answers to interview questions for the sixth category, barriers/drivers and key successes, were transcribed verbatim. To analyse interviews, the key points were extracted from the first five categories to provide an overview of the current forms of agriculture existing in each case study site, agroecology transitions existing in the territory, and which stakeholders are driving the transition.

All interview answers for questions in the barriers/drivers of transition category were analysed using ATLAS.ti (Version 22.1.0). This was used to analyse the data through a thematic template analysis (Brooks et al., 2015). First an initial coding template was created by applying codes to informant interviews. After the initial coding was completed, 60 codes had been applied through all interviews. These were then modified so that redundant codes were consolidated and new codes were created to capture more detail. These modified codes were then applied to the full data set. Following this the codes were consolidated into meaningful clusters. Each cluster is then referred to as a “theme” based on the codes used to create it. The codes are then referred to as “sub-themes” after they are consolidated into similar clusters.

In comparing case study sites, indicator scores were given to each case study based on the criteria in Table 2. These scores are a reduced version of the indicator grid to qualify agroecology transition at territory scale (Annex 2 -Table 8). This grid as well as the question asked during the interview were design based on the three domains of an AET (Wezel et al., 2016) and derived to correspond to most of the 13 principles of agroecology (HLPE,2019). Based on the interview and other materials on the case study, each case study area is given a score summarizing the strength of the agroecology transition in the three domains of AET, and in three transversal categories: governance, co-creation of knowledge and social and cultural issues. This indicator refers to the number of actions and programmes engaged in this direction.

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In total, case studies were chosen in three countries: Germany, France and Italy; and will thus question the role of the three Territorial schemes for transition: PNR, Bio-districts and Eco-model regions. Thanks to the interview with country informants, we were able to identify potential territories and/or relevant expert or provide information about them.

In Italy, two case study territories were identified through interviews with informants in the AE4EU partner network. For the Chianti region, one interview was conducted and for Valle d'Aosta, two interviews were conducted. In Germany, the Black Forest case study and Landscape laboratory in Lower Saxony were identified through contacts provided in the AE4EU partner network. The third territory, Paartal was included as a case study region because it was created through a territorial scheme. One interview was conducted in each of the three German case study areas. Informants chosen for interview are researchers working in the territories, or citizens from the territory. Table 1 shows the number of interviews and case study areas in each country.

Table 1: Number of case study sites and case study interviews per country

Country	Number of case study sites	Number of interviews per country
France	3	3
Italy	2	3
Germany	3	3

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Table 2: Indicators used in case study analysis.

Domain	Score	Description
Adaptation of Agriculture Practices	5	Agriculture practices have fully adapted to agroecology in the territory
	4	Territory has structured initiatives for adaptation of agriculture practices
	3	Collective initiatives exist to adapt agriculture practices to agroecology
	2	Low level/few initiatives to adapt agriculture practices to agroecology
	1	No initiatives to adapt agriculture practices to agroecology
Conservation of Natural Resources and Biodiversity	5	Conservation of natural resources and biodiversity in the territory are fully agroecological
	4	Territory has structured initiatives for conservation of natural resources and biodiversity
	3	Collective initiatives exist for transition to conserve natural resources and biodiversity
	2	Low level/few initiatives to conserve natural resources and biodiversity
	1	No initiatives to conserve natural resources and biodiversity
Embeddedness of the Food System	5	Territory has a fully embedded food system
	4	Territory has structured initiatives to create an embedded food system
	3	Collective initiatives exist to create an embedded food system in the territory
	2	Low level/few initiatives to create an embedded food system in the territory
	1	No initiatives to create an embedded food system in the territory
Responsible Governance	5	Territory administration fully supports agroecology
	4	Local forms of governance consider producers and consumers in decision-making and management of food production and food systems
	3	There are existing producer/consumer organizations or associations that consider human/environmental health or social equity issues
	2	Stakeholders from the territory organize to address environmental/human health or social equity issues
	1	Territory displays no attempt at providing responsible governance
Co-creation of knowledge	5	Cooperation for knowledge sharing between actors in the territory is fully developed. Agriculture sector in the territory and academics work together to develop the territory food system
	4	Territory has structured initiatives for co-creation of knowledge or knowledge sharing in a territory
	3	Collective initiatives exist for co-creation of knowledge or knowledge sharing in the territory
	2	Low level/few initiatives for co-creation of knowledge or knowledge sharing in the territory
	1	No initiatives for co-creation of knowledge or knowledge sharing exist in the territory
Social and cultural issues	5	Social and cultural issues (identity, tradition, gender equity, social equity, fair employment) are fully developed in the territory
	4	Territory has structured initiatives for promoting social and cultural issues
	3	Collective initiatives exist for promoting social and cultural issues in the territory
	2	Low level/few initiatives to promote social and cultural issues in the territory
	1	No initiatives to promote social and cultural issues in the territory

3. Agroecology Territories in the literature

In this part we will analyse how the concept of AET or comparable concepts already exist through literature and case study analysis. The 14 articles gathered through the literature review are summarized in Table 3. Three articles, published prior to the paper of Wezel et al. (2016), even if they do not cite or mobilize directly the term Agroecology Territories use and mention very similar concepts. All three articles (Duru et al., 2014; Gascuel and Magda, 2015; OECD, 2016) promote the idea of territorialised agroecological system.

As shown on Table 3, 8 out of 10 articles referring to the concept of AET involved case study analysis. All case study publications use or develop a conceptual grid to see the relevance and the reality of agroecology transition in specific territories (Vandenbroucke et al., 2017; Gruber, 2018; Owen et al., 2020; Van den Berg et al., 2021; Padró and Tello, 2022). Gruber (2018) developed a theoretical framework and analytical tool to assess existing territories and analyse their qualification as AET while other authors analyse the challenge of the multi-stakeholder approach (Vandenbroucke, 2017) or focus on the influence of territory and their governance on their transition dynamic (Vandenbroucke et al., 2020). Through a focus on two territories in Brazil, Van den Berg et al. (2021) tried to demonstrate how peasant involvement could empower them, while Padro and Tello (2022) conceptualized and tried to find enablers and barriers for agroecology transition in specific territories. Finally, Owen et al. (2020) studied how a specific scheme such as Geographical Indications could enable agri-food transition in a specific territory.

A similar proportion of articles, 7 out 10, are dealing with conceptual frameworks, and 4 of them include also case studies. For instance, Padro et al. (2020) develop a model to generate scenarios to describe viable pathways toward agroecology at the territory level (Padró et al., 2020). For the papers that only deal with conceptual studies – 4 out of 11 -, authors propose an analysis of the discourse and concept to foster the development of AET within the existing literature on agroecology (Gallardo-López et al., 2018) or discuss the relevance of territorial approaches to foster agrifood systems transitions (Lamine et al., 2019a). In their article, Wezel et al. (2018) describe different initiatives of territorial transition toward agroecology that exist in different territories. They discuss briefly territorial schemes such as Bio-District in Italy that could enable such transition.

The analysis of this existing literature on AET, show nevertheless a limited use of this conceptual approach mainly in Europe (9 out of 10 study). In about half of the cases it is used by the initial team that launched the concept (5 out of 10). In any case, a broader literature nevertheless exists and discusses the relevance of a territorial approach in transition to agroecology as this was pointed out in the introduction This literature provides insight on pathways to sustainable agriculture and food systems. Different studies question and highlight the potential effect of territory as a lever for different dynamics towards an agroecological transition.

Table 3: Summary of existing articles related to AET.

Citation (title to be erased at the end)	Year	Aim	Mobilizing the concept of AET	Type of articles		Journal	Country of main author
Duru et al., 2014 Un cadre conceptuel pour penser maintenant (et organiser demain) la transition agroécologique de l'agriculture dans les territoires	2014	Conception of a territorialised agroecological system	Partly	Scientific paper	Conceptual	Cahier agricultures	France
Gascuel et al., 2015 Gérer les paysages et les territoires pour la transition agroécologique	2015	Promoting territorial approaches to foster agroecological transition	No - indirectly	Paper – grey literature	Case study and conceptual	Innovations agronomiques	France
OECD/FAO/UNCDF, 2016, Adopting a Territorial Approach to Food Security and Nutrition Policy, OECD Publishing, Paris.	2016	Promoting a territorial approach to promote food security and nutrition	No - indirectly	Report	Case study	-	International
Wezel et al., 2016 Agroecology Territories: places for sustainable agricultural and food systems and biodiversity conservation	2016	Establishment and definition of the concept of AET	Yes	Scientific paper	Case study and conceptual	Agroecology and sustainable food systems	France
Gruber, 2018 Assessment of agroecological development: a case study of the Allgäu region	2018	Development of an indicator-based assessment tool for Agroecology Territory	Yes	Master thesis	Case study	-	Germany
Vandenbroucke et al., 2017 Toward Agroecology Territory : the challenge of enrolling multiple stakeholders in Participatory Action TERRAE project	2017	Analyse the challenge of enrolling multiple stakeholders in participatory action toward Agroecology Territory	Yes	Communication	Case study	-	France
Wezel et al., 2018 Agroecology in Europe: Research, education, collective action networks, and alternative food systems	2018	Mapping of agroecology development in some EU countries considering Agroecology Territories	Yes	Scientific paper	Description of initiative	Sustainability	Europe
Gallardo-Lopez et al., 2018 Development of the concept of agroecology in Europe: A review	2018	Analysing the development of the concept of agroecology in Europe – mentioning the concept of AET.	Partly	Scientific paper	Conceptual	Sustainability	Europe
Lamine et al., 2019b Crossing sociological, ecological, and nutritional perspectives on agrifood systems transitions: Towards a transdisciplinary territorial approach	2019	Analysing multistakeholder and transdisciplinary approaches through a territorial approach	No - indirectly	Scientific paper	Conceptual	Sustainability	France
Van den Berg et al., 2019 Agroecological peasant territories: resistance and existence in the struggle for emancipation in Brazil	2019	Analysis agroecological peasant territories as an enabler of transition	Yes	Scientific paper	Case study	The journal of peasant studies	Brazil
Padro et al., 2020 Modelling the scaling up of sustainable farming into Agroecology Territories: Potentials and bottlenecks at the landscape level in a Mediterranean case study	2020	Modelling the scaling up of sustainable farming into Agroecology Territories	Yes	Scientific paper	Case study and conceptual	Journal of cleaner production	Spain
Owen et al., 2020 Place-based pathways to sustainability: Exploring alignment between geographical indications and the concept of Agroecology Territories in Wales	2020	Analysis of Geographical Indicator as lever of transition to Agroecology Territory	Yes	Scientific paper	Case study paper	Sustainability	UK



Agroecology Territories in the literature

Vandenbroucke et al., 2020 Le territoire comme catalyseur de la transition agroécologique	2020	Investigate Agroecology Territory as learning space with integrated governance through case study analysis	Yes	Book (Chapter)	Case study	Presses Universitaires Blaise-Pascal	France
Padro and Tello, 2022 Exploring Agroecology Transition Scenarios: A Pfaundler's Spectrum Assessment on the Relocation of Agri-Food Flows	2022	Exploration of agroecology transition in different territories	Yes	Scientific paper	Conceptual and case study	Land	Spain

As an illustration, there is an abundant literature on “Alternative Food Networks” (AFN) and Local Agrifood systems (or SYAL with the French or Spanish acronym) that question and analyse the potential of ecologisation of those “Territorialized Food Systems” and how they can contribute to pathways to AET (Bowen 2010; Bowen and Mutersbaugh 2014; Klassen et Wittman 2017; Lamine et al., 2019a; Brives-Beaume et al. 2020). One key result of those studies is that considering sociotechnical objects, food chain governance, or territorial dynamics, there is **a transformative power in those Territorialized Food Systems**, that relies on their capacity to gradually integrate social and justice issues (Lamine et al., 2019a) or environmental issues as it was demonstrated in cases of geographical indications and local food systems (Brives-Beaume et al. 2020; Owen et al. 2020). Lamine et al. (2019b) consider the territorial approach in its ability to address the capacity of food systems to connect to social issues (including health) and ecological issues. Horlings et al. (2020) also point out the importance of place-based approaches “to foster resilient social-ecological systems and make their [humans] living more place-based and sustainable” (Horlings et al., 2020).

To reveal this transformative power, nevertheless, governance and learning processes among farmer organizations, territorial institutions, of food systems are questioned. Territories can be seen as “**Learning communities**” that provide resources to foster the transition to AET, once conditions related to place-based collective action, governance or decision-making process are gathered (Lucas et al., 2019; Vandenbroucke et al., 2020).

Stakeholder involvement is a critical element (Wezel et al. 2016). The different papers actually reveal grounded pathways that rely on consumer or citizen movements, farmer’s involvement or dynamics held by other stakeholders (restaurateurs, local firms, touristic stakeholders...). But literature shows that support from local authorities and territorial schemes contributes to foster dynamics, even if political and main stream regulations still keep lock-in effects (Piroux et al., 2018; Vandenbroucke et al., 2020). Focusing on the management of common resources such as soil and biodiversity, Gascuel and Magda (2015) reveal the importance of transition that brings together relevant actors.

Further, similar to AET, some related concepts in both sustainable food systems literature and policy making schemes aim to encourage innovation in natural resource governance and sustainable rural livelihoods. At second stage, we looked at three related concepts, Bio-districts, Living Labs and Agroecosystem Living Labs. These concepts play a role in our work given the objectives of AE4EU which seek to understand how structures such as Living Labs (LL) can enable processes related to agroecological transition (McPhee et al. 2021; Dias et al., 2021).

A Bio-district is “a geographical area where farmers, citizens, tourist operators, associations and public authorities enter into an agreement for the sustainable management of local resources, based on organic production and consumption” (Triantafyllidis, 2014). Like AET, the objectives of Bio-district are to preserve agro-biodiversity, cultural traditions and the natural environment (Dias et al., 2021). The two concepts of Bio-district and LL may be used in parallel to refer to the same territory. For example, the BioVallée in France, is also considered as a LL because it has strategic objectives

Agroecology Territories in the literature

such as decarbonated mobility, energy autonomy, transformation of agriculture, circular economy system, and an innovation pole for new professions (French Secretary General for Investments, 2019)

The European Network of Living Labs (ENoLL, 2021) defines LL as user-centred, open innovation ecosystems based on systematic co-creation, integrating research and innovation processes in real life communities and settings. In similar words, the Dictionary of Agroecology defines LL as a systemic and participatory approach which involves the targeted user of any innovations in order to solve complex and multidisciplinary problems on a territorial scale (Ferey et al., 2019). The main components that characterise LLs are: (1) an active involvement of users in innovation process (2) test and experimentation in real-life community and setting (3), participation of a multiplicity of stakeholders (4), use of a combination of multiple methods and tools and (5) co-creation, co-design and co-development processes. More specifically, Agroecosystem Living Laboratories (ALL) have been defined as “Transdisciplinary approaches which involve farmers, scientists and other interested partners in the co-design, monitoring and evaluation of new and existing agricultural practices and technologies on working landscapes to improve their effectiveness and early adoption” (Agroecosystems Living Laboratories (ALL) Executive Report 2019, www.macs-g20.org). The relation, link, complementarity and potential overlap between both concepts will be discussed later in this report. We will question whether AET could be considered or not as a specific type of LLs.

4. Territorial schemes over Europe

4.1. Identification of Territorial schemes for sustainable agriculture and food systems

From informant interviews and the AE4EU workshop, 10 territorial schemes for agriculture and food transitions were located. These schemes, shown in Table 4, differ in the way they support transitions in the three domains of AET through their funding, initial goals and administrative structure. In some instances, a territorial scheme supports transition in all three domains within a well-defined territory leading to an easily identifiable AET. In other instances, the scheme targets territories that may not necessarily have clearly defined territory boundaries, or strongly developed agroecology. This inventory is far from being exhaustive of all schemes that could be identified over Europe but it nevertheless provides a sample that can be analysed.

Table 4: Territorial schemes for agriculture and food transitions.

Name	Location	Starting year	Goal/project aim	Stakeholders involved in the scheme	Operation of scheme	Action link to AET domain and transversal domain			
						Adaptation of agriculture practices	Conservation of natural resources/biodiversity	Embeddedness of the food system	Transversal
Regional Nature Park (<i>Parc Naturel Régional</i>)	France	1968	Promote heritage (natural, landscape, cultural) and sustainable social and cultural development	Park board, local governments, citizens in the park	A park charter (lasting 12 years) defines long term strategy with stakeholders. The PNR mobilize different schemes to achieve chart objectives.	Adaptation of agriculture practices is encourage mainly through the park charter and other action link to it.	Nature conservation supported by the park.	Developing local food systems and circular economy.	Multi-stakeholder governance. Integrate cultural development.
LEADER programme	EU	1991	Development of rural communities	Administrators, farmers, members of the rural community	Partnerships are formed from public, private, and civil society to create Local Action Groups (LAG). CAP fundings	Adaptation of agriculture practices is encourage but dependent on site	20 Conservation of natural resources and biodiversity is observe but dependent on site	Rural development is one of the aim of the program.	Local Action Groups and place-based approach.
Regional Culinary Heritage	Denmark, Sweden (+ 8 countries)	1995	Developing culinary experiences, promote food quality and tourism, develop solutions for locally produced food	Farmers, firms, local authorities, Tourism stakeholders, restaurants	Local cooperation's Place-base food and tourism branding	-	Not the main focus but can be introduced further	Food quality and local food systems	Multi-stakeholders cooperations.
Eco-Model Regions (<i>Öko-Modellregionen</i>)	Germany	2014	Increase organic farming. Help consumers access organic food.	Federal state, farmers, processors, consumers, civil society, public administration	Supports of the federal state to enhance organic food supply and consumption.	Increase percentage of organic agriculture. Supporting farmer education.	Biodiversity in support of organic agriculture.	Increase local demand in organic products. Strengthen/establish local supply chains.	Local cooperation. Educational programmes
Bio-district (<i>Bio-distretto</i>)	Italy	2009	Practice sustainable land management and organic production. Economic and social development.	Farmers, citizens, public authorities, local actors	National/regional laws to coordinate the management	Increase organic agriculture	-	Enhancing/creating local markets. Improving youth land access.	Improving food sovereignty and cultural identity. Multi-stakeholders governance.
Organic Cities	Europe	2003	Provide seasonal and	Partnering	Member cities sign	-	-	Regional	-

Territorial schemes over Europe

Network	network – predominant in Italy and Germany (and marginally extended)		affordable organic food	companies, organizations, and institutions. Cities, municipalities, districts	agreement to support Organic City Network objectives			development. Shortening supply chains. Increasing organic food in the community	
Territorial Food Project (<i>Projet Alimentaire Territorial</i>)	France	2014	Support territory food system development	Farmers, rural communities, local public authority, agri-food companies, artisans	National programme. Supports local actions for embedded food systems.	Indirectly in some territory where they target specific farming system such as organic ones	-	Supporting local food systems. Promoting short supply chains. Local products in canteens and schools.	Multistakeholders governance. Programmes on education.
Agri-environment cooperatives	The Netherlands	2016	Facilitate agri-environmental payments to farmers. Encourage nature conservation on farms through a large scale approach	Farmer, farmer cooperatives	Contracts, government/cooperatives and cooperatives/farmers CAP funds	Farming for protection of natural resources	Management of natural resources and biodiversity.	-	-
Economic and ecological interest group (<i>Groupements d'intérêt économique et écologique - GIEE</i>)	France	2015	Encourage farmers in transitioning to sustainable practice	Farmers, farmer collectives, advisory actors, as well as territorial stakeholders	Advisory and equipment support to groups of farmers. National fundings/EU fundings	Adaptation of agriculture practices	Conservation of natural resources and biodiversity	Can be the topic in some specific cases.	-
National Park/AONB with Farming in protected landscapes	UK	2021	Improve environment and cultural heritage of the land. Economic development	Farmers and land managers in protected areas	Supports land managers through one-time payments to help carry out projects that may support the environment, support cultural heritage, or help in business development	-	Nature conservation	Economic development. Infrastructure development	-

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4.2. The gradual emergence of territorial schemes for sustainable food systems

To characterise those different schemes, their scope and context of emergence, we propose a chronological analysis that highlights the gradual emergence of different schemes at the crossroads from rural development policies, agri-environmental policies and food system policies.

4.2.1. The role of rural development issue as a starter for a place-based approach on agriculture and food system transition

The *Parc Naturel Régional* (PNR) created in 1968 in France includes in its objectives rural development while preserving natural landscapes and cultural heritage. This scheme has developed in territories that are unique in their history, culture, identity, and which may face biodiversity and patrimony degradation due to urban migration. Agriculture development and transitions, farmer livelihood, and sustainable food systems are considered as key elements to achieve park goals of social development and the protection and management of natural and cultural landscapes. In the case of the PNR of Pilat, the first programmes for sustainable agriculture were developed in the 1970s. As major institutions in the local economy and preservation of environment, holding transversality and cooperation between stakeholders, they gradually seized the different European programmes and opportunities on agri-environmental schemes since the 1990s, on territorialized food systems since 2000s, and from 2015 on territorial food strategies. PNR also developed a strong positioning on agroecology through Participatory Action Research programmes since 2012.

At the European level, the concept of agriculture development as a part of social and rural development began to gain more traction in the 1990s. In 1993 the European Council for Agriculture Law first used the term “multifunctional agriculture” in an attempt to provide a legal definition that can encompass sustainable agriculture. In 1996, with the Cork declaration on rural development, the European commission committed to multifunctionality and the environment with the role of farmers as land stewards (Marsden and Sonnino, 2008). In line with this paradigm shift, the LEADER programme was developed in 1991 with the first experimental phase occurring during the period of 1991-1993 in 217 rural locations. This place-based development model was created as a new method of rural development after policies using a traditional top-down method failed to relieve problems in rural communities. The LEADER programme includes in its objectives’ rural development through a place-based approach. This scheme was innovative at the time as it used Local Action Groups (LAG) composed of local private and public stakeholders to enact development projects and control decision making¹. LEADER generally support small projects for adding value to local food products, diversification, improving rural services, environmental improvements, small-scale infrastructure, village renewal and training, but not in a fully territorial approach but more single project-wise. In the analysis of case studies of AET, such as Bornholm Foodstuff Strategy in Denmark (Manniche et al., 2009), or regarding Bio-districts (Dara Guccione et al., 2021), the role of LEADER in pathways to sustainable territorial food

¹ https://enrd.ec.europa.eu/sites/default/files/leader_clld-explained_en.pdf

systems is highlighted as a first step toward territorial food systems (rather on differentiation to develop value-added for producers at the beginning), and above all in the raise of territorial governance through Local Action Groups, including community-type factors (Dara Guccione et al., 2021).

4.2.2. From agri-environmental schemes in the CAP to the establishment of collectives of farmers to change agricultural practices

Agri-environmental schemes have developed in the Common Agricultural Policy since the 1980s (article 19) and more significantly in 1992. According to the EU subsidiarity principle, those schemes integrated a territorial implementation, involving local environmental stakeholders and farmers to define issues, objectives and sets of specifications for agri-environmental schemes. As an illustration, the concept of High Nature Value Farming² (HNV) was identified within this work but not thoroughly analysed. The concept of HNV farming was developed since 1990 with the idea to preserve and develop low-intensity farming systems to promote habitat and biodiversity conservation. The development of HNV areas nowadays exist in different European countries thanks to its inclusion in different European policies among which are the Rural development programs as well as the bird directive or Natura 2000 areas. Put in comparison with the concept of AET, the concept of HNV, through its different existing examples, seems to allow territorial action on the conservation of biodiversity and natural resources as well as the adaptation of agricultural practices but do not act directly on the embeddedness of food systems in the current form of HNV. Lomba et al. (2020) however encourage multifunctionality and economic diversification as a future scenario for HNV farming systems to build long-term socioeconomic and socioecological sustainability through the development of farm shops, niche products, and on-farm processing facilities.

At the European level, while at first stage the main issue was to comply with individual and voluntary commitment of farmers for a set of specification, collective approaches emerged gradually from 2013 in order to enhance the impacts at landscape scale and to include co-creation of knowledge and innovation. In the Netherlands, result-based measures to preserve birds are for instance implemented at landscape scale through the involvement of cooperatives in agri-environmental support applications. The Dutch government decided in 2016 to implement the bird conservation scheme at cooperative scale, restricting farmers from applying to Agri-environmental schemes on an individual basis, but instead requiring applications to be carried out by cooperatives. This change was implemented to stop the decline of farmland biodiversity, involve multiple farms as well as associated partners, and have an impact at landscape scale. There are now 40 agri-environmental schemes which cover the entirety of the Netherlands.

In France, the **GIEE** (“Groupement d’Intérêt Economique et Environnemental”, or Economic and environmental interest groups; Table 4) were developed under the National Plan for Agroecology initiated in 2012 (Wezel and David, 2020). GIEEs are farmer collectives recognized by the state that implement multi-year agroecology projects to change their practices, systems or supply chains. It includes an important dimension of training and co-learning. While most of GIEEs are focused on

² <http://www.hnvlink.eu/>

changes in agricultural practices (reduce the use of chemicals, improve autonomy in breeding, improve soil management), some are oriented on the development of territorialized food systems (regional food chains, local and organic autonomy), and some other issues such as anaerobic digestion projects. This programme was not developed within the CAP agri-environmental schemes but GIEEs can apply for funding through the FEADER fund to implement actions, or to be involved in research and innovation schemes. While farmers are at the core of those projects, some other territorial stakeholders can also be involved such as: firms, local authorities (PNR, metropolitan areas...), advisory structures, and research institutions. Other collectives of farmers were developed in France to handle specific objectives, especially reduce chemicals such as Dephy or Ecophyto 30000. Those schemes are gathered under a common frame of collectives for agroecology³.

The third farmer-based scheme, the Farming in Protected Landscapes programme (Table 4), created in 2021 as part of the UK Department for Environment Food and Rural Affairs' Path to Sustainable Farming agriculture transition plan, aims to support the environment and cultural heritage and economic development through payments to land managers in National Parks and Areas of Outstanding Natural Beauty (AONB). The payments target projects occurring at the farm level to develop infrastructure on farmland. While social/economic development and environmental projects (including carbon capture) are mentioned, the programme does not directly refer to adaptation of agriculture practices.

4.2.3. From territorialized food systems to schemes which integrate food and sustainability issues

The **Regional Culinary Heritage** scheme and network (Table 4) illustrates the dynamic on regional food quality in the 1990s: place-branding of food, territorial-level cooperation among stakeholders from food and tourism. This network developed over different Northern Europe countries especially Sweden and Denmark, fostered by an INTERREG programme carried out from 2003 to 2005 that focused on developing culinary experiences, finding solutions for logistics and distribution of locally produced food and finding success criteria. The role of this scheme can be illustrated through the case of Bornholm where the Foodstuffs Strategy, which includes local gastronomy and food production through rural entrepreneurship are used to target changing consumer perspectives and place greater value on the territorial identity that is attached to food and agriculture (Arthur and Hracs, 2015). The pathway for this territory reveals an evolution from place-branding issues for differentiation and competitiveness to integrate gradually changes in agricultural practices (target of 20% of organic farmland) and the development of local food systems (Manniche et al., 2009). This case study illustrates a gradual shift in the object of territorial cooperation.

Italy is a good illustration of evolutions in the way to handle food system issues. Agri-food districts were recognized in Italian law in 2001, institutionalizing local cooperation on Geographical

³ <https://collectifs-agroecologie.fr/>

indication, regional development and agritourism. Within this frame, emerged in Cilento region the first “**Bio-district**” (Table 4), that further gradually developed in Italy and over Europe (Portugal, Spain and broadly speaking Germany, Swiss, Austria). While at the beginning, the issue was the development of organic production, Bio-districts integrated from 2017 issues on food consumption. They are characterised as places where local actors work for sustainable management of local resources based on the development of place-based organic production and consumption (short food chains, quality restoration, canteens). Stakeholders involved are farmers, citizens, tour operators, associations and public administrations. Promotion committees are used to establish Bio-district objectives and programmes based on regional needs. Unlike some other schemes, the Bio-district has to find its own funding which was stated as a barrier during informant interviews. Nevertheless, Bio-districts were institutionalized in Italian Law in 2022. Over Europe, the development of Bio-districts has been supported by organic organizations and lead in 2014 to the creation of a specific international network of ecoregions called IN.NER network – International Network of Eco-regions. Within this network and through European cooperation programmes, Bio-districts in Portugal, Spain, Slovakia and France have been developed. And some closed concepts developed as well in Germany, Switzerland and Austria.

In Germany, the *ÖkoModellregionen* (Eco-model region; Table 4), also called the organic flagship region programme, has been created to increase the amount of organic farming in the federal states to help achieve the overall German goal of having 30% organic farmland by 2030. This is done by creating organic value chains within the region, promoting local organic products, providing organic farming knowledge and raising awareness about organic agriculture and food within the region. The first Eco-model regions were created in 2013 in Bavaria. In a competition organized by the federal state, municipal associations projects were chosen from different regions. This scheme is supported by the federal state by funding measures for farmers, processors, suppliers, retailers, consumers and authorities to enhance supply and demand in organic food.

Those different pathways in Denmark, Italy and Germany reveal a shift at the beginning of the year 2010, characterised by the rise of territorialized food strategies with a stronger involvement of citizens and food consumers. This can be illustrated by movements of cities engaged in this process. The Milan Urban Food Policy Pact, signed by 102 cities over Europe, is an international agreement of Mayors for sustainable food policies. The objectives are to transform urban food systems involving City authorities, citizens, and NGOs. The Organic Cities network, strongly spread in Germany and Italy, aims to increase the amount of local organic products in member cities. Organic Cities started projects based on existing initiatives, or began new projects to increase consumption and access to organic food.

In France, the Territorial Food Project (Projet Alimentaire Territorial – PAT; Table 4) scheme was established in 2014 to encourage the establishment of territorial food strategies, that cover different domains of action: assisting new farmers to diversify local productions, promoting short supply chains, placing local products in canteens and integrating health and justice issues. Specific supports from the French “plan de relance” (programme for recovery) contributed to fund and foster this policy. In December 2022, 372 PAT are recognized by the French ministry of agriculture and food

sovereignty. A network (called RnPAT⁴) was created in 2015 at national and regional level to encourage and foster exchange of experiences and knowledge among them.

Another programme had been identified through the workshop with AE4EU partners: the Regional Food strategy in Sweden (Table 4). The objective of this scheme is to enhance food production in specific areas. It cannot be directly considered as a scheme that contributes to AET as the main goal is to restore food sovereignty in Sweden without any direct consideration regarding sustainable transitions of agriculture and food systems, so we did not keep it in our sample. Nevertheless a more integrated approach on resilience of food system including adaptation to climate change is emerging (Stenberg, 2021). Since Covid crisis and Ukraine war those issues on food sovereignty and resilience are developing at European and national scale but at territorial scale as well. We can assume this issue will increase in territorial schemes in the following decades.

This analysis thus highlights the gradual emergence over Europe of different territorial schemes that support transitions to sustainable food systems, with three main roots in rural development, territorial food systems, and agri-environment and biodiversity conservation. Pathways of those schemes reveal that their scope enlarges progressively to integrate new issues and topics. In the next section we will question those schemes through the frame of AET.

4.3. A typology of territorial schemes for sustainable food systems

The 10 identified territorial schemes (Table 4) can be divided into four categories considering the objectives and the type of actions integrated in the different programmes and schemes. We distinguish those that are (i) organized based on food strategies, (ii) schemes that are farmer-based, (iii) rural development schemes, and (iv) organic agriculture and food-driven schemes.

Three schemes were identified as being farmer-based programmes. Those are the Agri-environment Cooperatives found in the Netherlands, and the AONB in UK as well as the Economic and Ecological Interest Groups (GIEE) in France, even if latter can include actions for embeddedness of food systems. Those schemes are landscape and resource management oriented, and aim to change agricultural practices through training, agri-environmental schemes, and collective organization of farmers. Nevertheless, they do not include food system development which could be demonstrated as a limit to handle transition to sustainable food systems in France in the case of water quality management (Vincent and Fleury, 2015).

Two schemes are mainly built on territorial food strategies which is the case for PAT in France and the Regional Culinary Heritage in Denmark and Sweden. Those schemes handle the issue of the embeddedness of food systems, they can include actions on farming practices (diversification of local production, development of organic production), and on management of local resources but this is not the main scope of action. They nevertheless have a strong interest to connect to food, health and justice issues.

⁴ <https://rnp.at.fr/>

The Leader programme and the French Regional Nature Parks (PNRs) are focused on rural development issues. In Leader programme, actions can be held to embedded food systems and manage local resources. Transition to agroecology is not the core of those actions, nevertheless the bottom-up approach through the involvement of a network of stakeholders settled by LAG (Local Action Group) makes Leader program a potential valuable tool toward the implementation and development of AET. PNRs constitute an institution more than a scheme, its governance includes different type of stakeholders and enable them to hold territorialised schemes both related to resource conservation management, embeddedness of food systems, action oriented to communities, adaptation of agricultural practices and rural development. This integrative position proved to provide great opportunities to handle a holistic strategy towards sustainable food systems by creating favourable conditions for agroecology projects (Vandenbroucke et al., 2020).

The Organic cities network, Bio-districts and Eco-model regions constitute a fourth type of schemes characterized by a strong orientation on organic agriculture and food. Organic agriculture and food are considered as an operational way to handle sustainable resource management, food strategy (local food supply chains, quality food in canteens) and adaptation of farmer practices. Nevertheless, preservation and management of biodiversity or local natural resources is an issue but not an operational objective and scope for action.

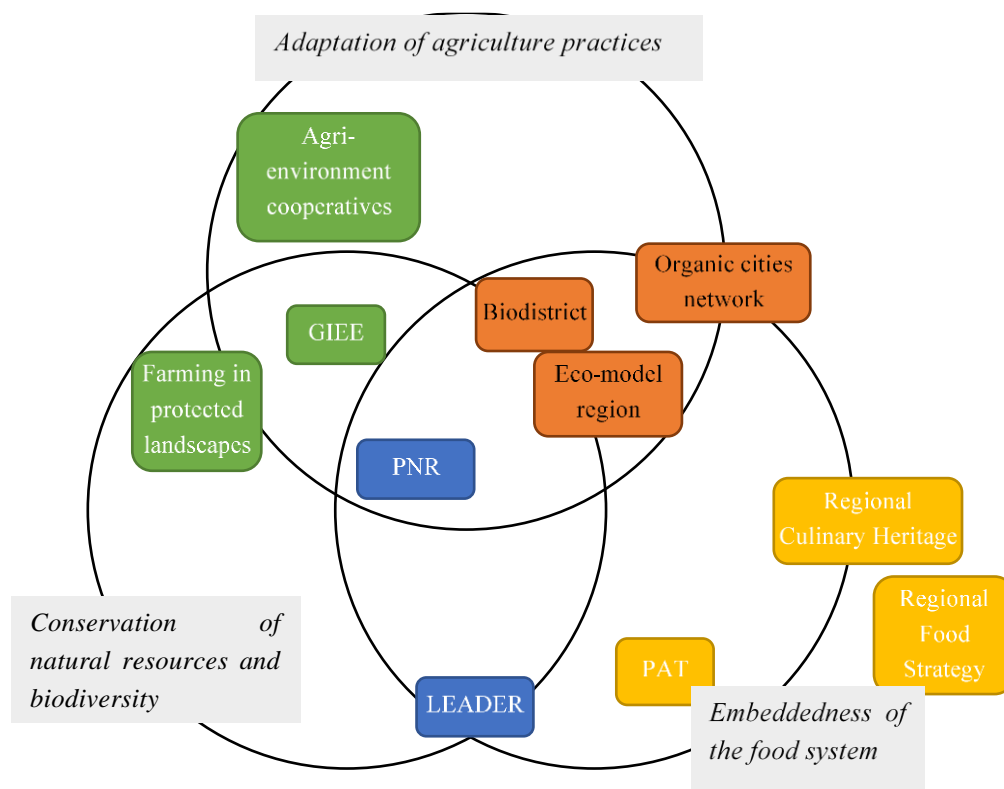


Figure 2: Territorial schemes and their dominant AET domain of influence. PAT = Territorial Food Project (FR), PNR= Regional Nature Park (FR)

Territorial schemes over Europe

The Italian Bio-district, the German Eco-model region, and the French PNR, have been identified as schemes that are the most relevant to handle transitions to AETs. Each of these schemes can facilitate transition towards agroecology in the three domains of AET where stakeholders from the territory are the main actors driving the transition. Created since 1967, the French PNR had initially broad goals on rural development and cultural and natural patrimony. Since then, they strongly affirm their role in adaptation of agricultural practices and food systems, including direct references to agroecology. The schemes in Italy and Germany were both created in the post 2000 paradigm shift where territorial schemes were designed to focus mainly on agriculture and food. Both schemes (Bio-district and Eco-model region) aim to foster transition to organic production and consumption. Nevertheless, while Bio-districts emerged through a bottom-up approach, Eco-model regions were initiated by regional and federal authorities to achieve a national objective on the share of organic farming. Cultural aspects are not absent from the German Eco-model region, nevertheless, it has been observed that they are not a central part of the scheme compared to the Italian Bio-district or the PNR. Instead, adaptation of agriculture practices can be found within the goal to meet the German national organic production goal, and the embedded food system is developed primarily through Eco-model region initiatives to increase local organic food in the territory. These three territorial schemes do have in common the direct or indirect promotion of agroecology transitions by fostering public and private stakeholders to create development projects in the territory.

The comparative analysis of case studies will provide key elements to compare and analyse the role of those 3 schemes.

5. Case study analysis

5.1. Description of case studies

The eight case study sites, described in Table 5, and shown with their location in Figure 3 give insights into the agroecological transitions of their respective countries, and how AET created through territorial schemes (in this case PNR, Eco-model region, and Bio-district) may differ from AETs that are not, yet, created through a scheme. Here each case study territory will be presented through a description of the site, with its current state of agroecology transition and the items used to score as a potential AET (Figure 4).

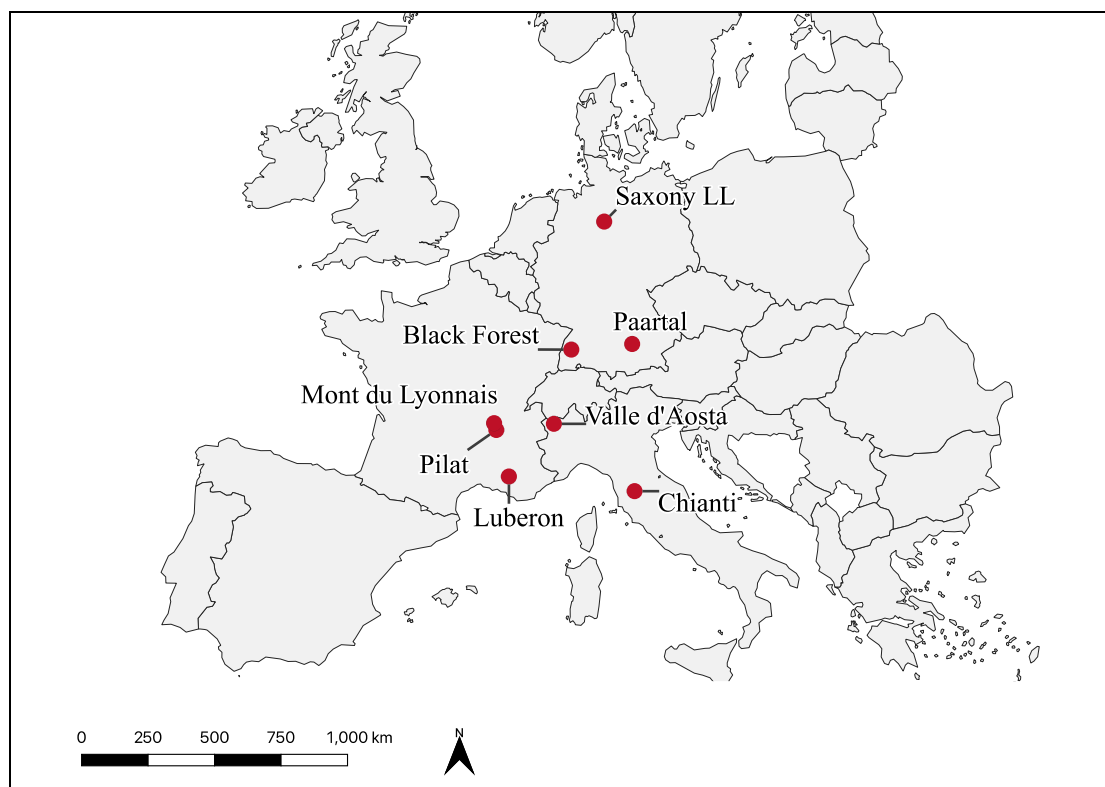


Figure 3: Map of case study sites.

Table 5: Territory case studies

Name	Territorial scheme	Country	Type of Agriculture	Stakeholders	Geography	Size in hectares (approximate)
Luberon	PNR	France	Crop and small livestock production, viticulture and fruit production	Farmer organization, environment organizations, citizens and public authorities	Forested mountains. Valleys. Scrubland. Climate: Csa	185,000
Pilat	PNR	France	Dominated by dairy production. Crop production, livestock production, orchard production and viticulture	Farmer organization, environment organizations, citizens and public authorities	Massif. Mountains. Forested land. Climate: Cfb	70,000
Mont de Lyonnais	n/a	France	Dairy production, small fruits and vegetables.	Farmer organizations, Leader program groups and water management institutions	Low elevation mountain. Climate: Cfb	37,477
Valle d'Aosta	n/a	Italy	Milk and cheese production. Small amount of viticulture or vegetable production	Regional council, 'Fontina' consortium organization, breeders associations, regional institute for agriculture, research institute as well as farmers union	Mountains. Climate: Dfb, Dfc	326,300
Chianti	Bio-district	Italy	Viticulture, olive production and arable crops	Chianti 'Classico' organization, farmers and tourism industry	Hilly. Climate: Csa	90,000
Paartal	Eco-model region	Germany	Arable crops and plants grown for biofuel	Farmer organizations and LEADER program group	Hilly landscape. Climate: Cfb	95,000
Black Forest	n/a	Germany	Crop production and viticulture	Agriculture associations and natural park	Forested mountain. Grassland. Climate: Cfb	600,900
Lower Saxony LL	n/a	Germany	Crop production and organic grassland	Farmer associations and chamber of agriculture	Plains. Climate: Cfb	900

Regional Nature Park of Luberon (later called Luberon; Figure 3 and Table 5), located in Southern France is an area which has been classified as a ‘Parc Naturel Régional’ (PNR) since 1977. It is additionally a UNESCO Man and Biosphere Reserve since 1997, and a UNESCO Global Geopark since 2004. Due to agroecological transitions action occurring in the three domains of AET, the territory meets the criteria to be seen as a potential AET. In this territory, the PNR works with other stakeholders to design and implement the park charter, programmes and actions. Municipalities that are part of the park must follow the rules and regulations set out by the park. Initiatives in adaptation of agriculture practices vary more at the farm scale. Actions include creating more mixed livestock systems, increasing self-production of lamb fodder, or increasing cover crops in vineyards for management. At a larger scale there are existing initiatives from municipalities to recycle nutrients and waste water. The embeddedness of food system relies on a PAT hold by the park with different stakeholders, and can support different actor groups such as farmer cooperatives who organize farmer markets.

The Pilat, located in France between Saint-Etienne and the Rhône Valley, has been classified as a Regional Nature Park since 1974 (Figure 3 and Table 5). The territory exhibits a large amount of biodiversity due to the presence of both Mediterranean and mountain climate zones. An all-encompassing strategy for agroecology transition was developed by the PNR since the 1970s and more significantly since 2000s where different initiatives and stakeholder network such as GIEE supported initiatives including revalorization of abandoned pastures to prevent afforestation and loss of pasture land (Vandenbroucke et al. 2020). There is strong involvement from the park to engage wine and fruit producers in agroecology transitions. Other actor groups such as farmers, farmer cooperatives, and local citizens drive transitions in the three domains of AET such as recycling manure for compost or bringing local organic produce into schools. Citizens and other actors in the food supply chain were said to be active in local social and cultural issues. In the case of Pilat, the study of Vandenbroucke et al. (2020) have shown the key role of the PNR in this dynamic, the importance of the governance among and with stakeholders as well as a contrasted reality of transition to agroecology when considering the different agricultural activity (from orchard to market garden and field crops) due to CAP and market regulations.

The third case study site located in France is the ‘Monts du Lyonnais’ (West of Lyon; Figure 3 and Table 5). Unlike the other French case study sites, this territory is not organized as a regional nature park. The territory is characterised by a large number of small and intensive dairy farms, as well as small fruits production such as strawberries or raspberries. Initiatives exist to manage water quality, especially in mitigating effects of dairy runoff and nitrate pollution. Local institutions connect farmers, private industries (milk industry but also water industry) and citizens on issues such as waste management. There is a certain regional identity, some individual or collective initiatives for territorialized food systems, but no territorial-based strategy for an embedded food system established so far. Transition towards agroecology seems to be less developed in this region when compared to the two other French case study sites. In this territory, a shift is observed since 2010 characterised by producers engaging in organic production, diversification of production at landscape level (development of market-gardening). However, this diversification occurred mainly at the landscape scale with less diversification being found at the farm scale. The proximity of the

Case study analysis

territory to the metropolitan areas of Lyon, and the desire to meet these markets has been a driver in diversification of production but the small farm size and the strategies of the dairy industry which promote a specialized production model have been barriers towards agroecological transitions in the territory.

Valle d'Aosta is an autonomous region located in the Alps of Northwest Italy (Figure 3 and Table 5). The main form of agriculture in the region is dairy production using local cattle breeds. Transhumance practices are used which determine grazing location throughout the year. Some viticulture and vegetable production can be found at lower altitudes. Due to the geographic limitations of the territory, there was never a large shift to industrial practices. Instead, much production has followed traditional transhumance practices with local breeds being used to produce dairy. At the environmental level, according to the key informant interview, the practices seem to favour little use of chemical inputs and most fertilization is done with cow manure. However, farmers are constantly trying to produce more in the face of an economic situation which is unsustainable due to the cost of milk production being higher than the price of milk. In the territory many barriers are centred around this economically unsustainable situation as younger generations are less willing to adopt the labour-intensive practices of production in the region, especially in the face of climate change. This may in turn lead to environmental problems as the economic conditions reduce the number of farmers leading to a smaller population to manage the environment.

The Chianti Bio-district (Figure 3 and Table 5), formed in 2016, is located in Tuscany, Italy. Agriculture production in the areas is dominated by wine and olive, with small amounts of arable crop production. Agriculture is largely organic, with 50% of vineyards being certified organic, and a large desire from territory residents to continue with organic agriculture. The region is trending towards diversification and shortening supply chains but there is still not a structure in place to support this. This may be made more difficult considering the fact that one of the main products of the region, the Chianti wine, is largely exported. Still, the diversification trend is often driven by young farmers producing products to sell at the local markets. However, the lack of knowledge in production outside of viticulture can be a barrier in transition. Although the Bio-district plays a role in knowledge dissemination within the region which has impacts at the farm level and how citizens view local products.

Paartal is an Eco-model region located in Bavaria, Germany (Figure 3 and Table 5). Production in this territory is mostly centred around arable crops including potatoes, wheat, and plants grown for biofuel. In this territory the transition to ecologically based forms of agriculture began in 2018 because ecological produce was worth more on the market than conventional produce. The Eco-model region includes different initiatives to expand and establish regional value chains, support organic catering at schools, retirement-homes, canteens, and educate the public about the importance of organic farming and organic products. The local government is responsible for many initiatives existing in conservation of natural resources and biodiversity such as maintaining meadow orchards and preserving habitats for local fauna.

The Black Forest, located in Southwest Germany (Figure 3 and Table 5), is made up of two nature parks. Originally these were not founded to be actors in agriculture but have adapted to support

meeting Germany's national organic agriculture goal (i.e. 30% of organic surface by 2030). Most farmers are selling dairy to one company which offers some of the highest prices in Germany to producers. The nature park strives to preserve the natural areas and biodiversity leading mainly to more extensive agriculture although there are not strong movements to develop agroecological farming practices or embedded food systems.

The Landscape Laboratory, located in Lower Saxony, Germany is part of the FInAL (Facilitating insects in agricultural landscapes) project⁵, (Figure 3 and Table 5). The area consists of a hilly landscape with wheat, maize and some rape-seed oil production. In the 1970s and 80s, the region included much higher amounts of cattle production, but due to low milk prices farmers began focusing production on arable land. This Landscape Laboratory is a sample landscape typical of northern Germany where conventional farming is the predominant form of production, which leads to low amounts of biodiversity at the farm scale. At the landscape scale there are co-design processes between researchers, farmers and other land users to promote biodiversity and natural resource conservation within the commercial farming systems. There is no presence of an embedded food system as farmers are dependent on global markets and agriculture traders in the region, although it was stated there is a wish in the region to create a more localized food system based on local supply chains. However, it was mentioned during interviews that farmers in the region are “stuck in a conventional way of thinking” which may lead to difficulties in adopting agroecology. Still, informants stated that farmers have a desire to improve biodiversity to promote a better image of farming in the region, or because they feel it's better for food production. Different in terms of size (acting on specific patches of 3km² within the territory) and organisation (link to a specific project), this last case study is not directly comparable to other case study but constitute an interesting example of stakeholder's collaboration towards biodiversity preservation.

5.2. Comparison of case studies

Using the grid established based on the 13 principles of agroecology, we compared the different case studies. During this comparison, **we observed that when territorial schemes are present, agroecology transitions in the three AET domains seems to be more developed.** This could be linked to the fact that schemes provide the condition for stakeholders' networks and organizations to develop and achieve common goals, and to coordinate funding for development projects. This is highlighted when comparing the two PNR case studies in France (Luberon and Pilat) with Monts du Lyonnais as shown in Figure 4. It is also visible when comparing transitions between the Eco-model region Paartal and the other German case study areas, and when comparing the Bio-district Chianti with Valle d'Aosta. Both the PNRs Pilat and Luberon are similar in the way they function and engage with stakeholders in agroecology transitions. The case studies display more development in

⁵ <https://www.final-projekt.de/en/>

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the transversal category as more responsible governance is created through a park charter (which is developed and validated every 10-12 years by different stakeholders of the territory). This encourages local initiatives development in the three domains as well as coordinating an overall strategy. In Germany, the Paartal Eco-model region engages local actors to develop embedded food systems by developing CSA or including local organic produce in canteens and schools. Local government programmes aim to preserve biodiversity by planting flowering areas and keeping local orchards alive. As shown in Figure 4 social and cultural issues are more developed in the Paartal region where local cultural events are supported by the Eco-model region. In Chianti, the Bio-district supports transitions through its partnership with farmers, citizens and government administrations such as partnering with municipalities for public procurement to include local organic food in schools and canteens or waste recycling. Valle d'Aosta continues in its main goal to maintain traditional forms of production which has become increasingly difficult due to climate change and younger generations being less willing to adopt transhumance life styles.

Food chain organization also impact transitions to sustainable food systems. In Italy, the Chianti region and Valle d'Aosta are both territories which depend on the identity provided by their food exports. In both territories there are strong links among stakeholders in the food production chain, with large Protected Designation of Origin (PDO) organizations holding lots of influence in the territory. In Valle d'Aosta, the Fontina consortium gathers milk from the valley and also communicates with farmers, cheese sellers, and consumers. Similarly, in the Chianti region, the Chianti Classico PDO wine is a very strong stakeholder in the territory. When food systems heavily depend on external stakeholders it is not favourable for agroecology. However, the Bio-district of Chianti supports higher amounts of transition in adaptation of agriculture practices and embeddedness of the food system as young farmers in the territory are attempting to diversify production and markets. In France, dairy production in the Pilat and the Monts du Lyonnais is partly driven by the same industry. In order to optimize logistic while developing the products range, this industry encouraged organic conversion in Pilat where systems were more extensive and where there was a PNR holding an overall strategy, while no specific shift in agricultural systems was targeted in the Monts du Lyonnais which was a strong dairy producer, did not receive any PDO for dairy and became part of dairy industrialization strategies which is a counter-movement to agroecology. Although, the Monts du Lyonnais was able to take advantage of its proximity to nearby cities to create a shorter food system for providing small and other fruits on an individual and collective level, displaying shorter food systems can create conditions for agroecology transition.

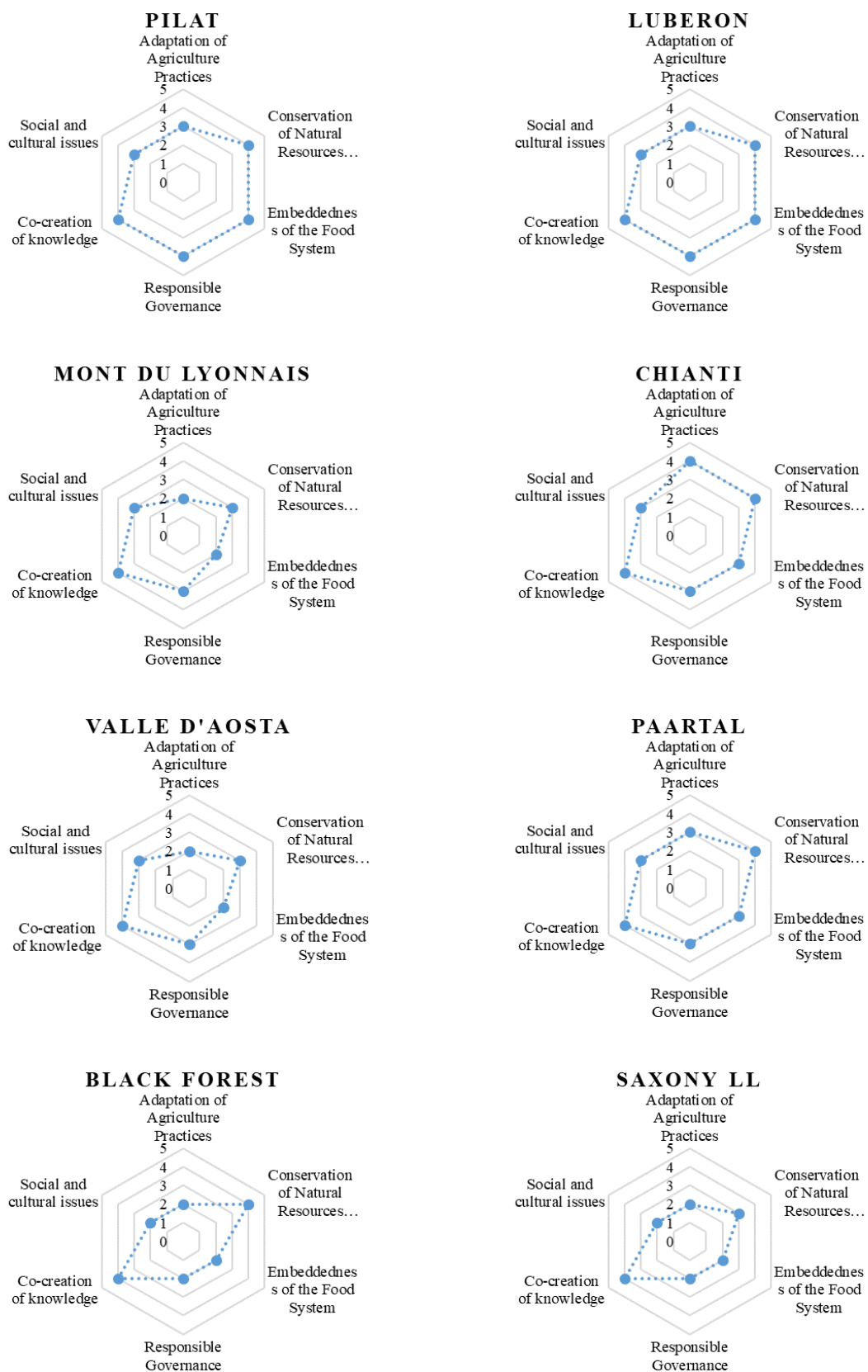


Figure 4: Comparison of case study sites based on agroecology transitions. Lower Saxony LL ⇔ Initiative of Landscape Laboratory (LL) linked to the FINNAL project in Lower Saxony.

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Similarities may be found between territories in their transitions to agroecology in AET domains (see Figure 4), although the transitions are quite dynamic and do not follow a set pattern. Adaptation of agriculture practices often includes diversification of crop production or switch to organic farming; however, this differs in territories and is driven by geography. Differences in agriculture production and changing agriculture practices are also due to outside forces such as research or agriculture extension organizations, funding schemes (mainly CAP) and supported within the territory through farmer networks either formal or informal.

Conservation of biodiversity and natural resources as well as co-creation of knowledge appeared to be the AET domains where large numbers of transitions initiatives are occurring. This observation regarding the conservation of biodiversity and natural resources can be link to the CAP or agri-environmental schemes and to the issue to manage local resources such as water and biodiversity in many territories. Different stakeholders are identified driving and being strongly involved in those dynamics: research institutes, local authorities as well as local environmental organizations. In the Monts du Lyonnais, where there are river and water management issues there were some programmes by the local government, NGOs or other local organizations to manage the environment. In the Landscape laboratory there are initiatives through research to maintain or increase biodiversity at the landscape scale.

Regarding transversal domains, a common trend found in all territories is the presence of some type of formalized farmer education through government organizations, farmers groups, or research extension, leading to a high score in co-creation of knowledge in Figure 4, although, farmer education does not necessarily include agroecology in all cases. Research through Landscape Laboratories or other Participatory Action Researches (PAR) were shown to introduce new methods for agriculture in the territories, innovative food systems or to have a reflexive approach on governance and learning processes. However, informal methods of knowledge exchange between farmers were also shown to be an important element in supporting agroecology transition.

Between territories large differences are found in the development of embedded food systems. Territories created through territorial schemes have more actions towards embedded food systems, an example being the Paartal which has organized initiatives to increase local organic food in diets, compared to other German case studies which do not display such initiatives. Similarly, movements in Valle d'Aosta often focus on maintaining current forms of agriculture instead of adapting new forms which differs from the Chianti region where younger farmers attempt to diversify production and local markets in the presence of large wine exports from the region. However, food systems remain mainly in all case studies dependant on and driven by external market regulations.

Aiming to distinguish some main barrier and drivers from the interview, a hierarchy of themes in barriers and drivers of transition to agroecology emerged from the informant interviews. Themes relating to different scales became apparent and are here distinguished as the barriers/drivers occurring at the farm scale (Annex 3), and the barriers/drivers occurring at the territory scale (Annex 3Annex). Specialization of farming was found to be the biggest barrier to transitioning to agroecology. At the farm scale much of farmer's reluctance to adopt agroecology is based on the financial uncertainties surrounding new methods of production. This is amplified when farmers

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already have large financial investments in specialized forms of agriculture. Farmer's may also be reluctant to adopt new practices due to lack of knowledge. The largest driver is the desire to increase income by targeting new markets, creating specialty products, or targeting subsidies such as through CAP. It can be observed that financial constraints or support at the farm scale may affect overall territory level transitions to agroecology. If conditions for enabling farm scale transition are not met it can affect territory level transition.

At the territory scale a number of factors contribute to the barriers surrounding transition to agroecology. Citizen's understanding of farming, the gap between citizen views and farmer views, as well as farmer's loyalty to traditional supply chains were found to be barriers. Environmental concerns such as lack of water and climate changes are also barriers. Lack of new marketing opportunities at the territory scale also reduces the possibility for agroecology transition to occur. Drivers for agroecology transition are based on the public's concern for environmental degradation, and the desire to protect the environment. Creation of new markets in territories was also found to be a driver.

A number of levers for change were identified in the research. In organizing territory level initiatives, the importance of establishing the collective vision for the territory was often observed. This leads stakeholders and transition actors to formulate action plans and coordinate resources. Other successful actions include movements led by local organizations for nature conservation in the territories. It was also found that farmers acting as leaders to drive transition was a strong driver and lever for change in agroecology at the territory scale.

6. Discussion

6.1. The potential for a place-based scheme for AET transition

The inventory of territorial schemes reveals that place-based policies in Europe have developed in Europe since the 1990s on different issues: quality of food, rural development, management of natural resources such as water and biodiversity and agri-environmental schemes. This has constituted a fertile ground for the emergence of different territorial schemes that contribute to transitions toward sustainable agriculture and food systems. Nevertheless, a barrier remains between food system-oriented schemes and agri-environmental schemes that focus on the management of natural resources such as water or biodiversity. The schemes identified rarely embrace all three dimensions of AET transitions, even if three schemes were identified as presenting a great potential to support agroecology transitions.

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6.2. Discussion on the existing schemes and their relevance according to agroecology transition

Three schemes have been identified as having a strong potential toward AETs: Bio-districts, Eco-model regions and PNR in France. An important development of Regions with organic focus can be identified in different countries with Bio-districts in Italy (but expanding to Portugal, France and Spain), Eco-model regions in Germany, but also some similar approaches in Switzerland and Austria that we did not study but were able to identify thanks to the literature review. Those programmes have in common to focus on a shift toward organic agriculture and food. We could point out some risks from this frame. There is a risk that certification could limit social and technical transformation, innovation and capacity of regions to adapt to new challenges (climate change, change of global markets). Moreover, organic certification remains linked to a global organic market that is for instance confronted to market difficulties in France in 2022. Finally, a single prism approach does not encompass issues of sustainable management of resources, fair and cultural issues. Nevertheless, several studies highlight the role of Bio-district in Italy to develop agroecology. Gargano et al. (2021) demonstrate its role to develop multifunctional farm systems, enhance community empowerment on agriculture and food systems and networking. Dias et al. (2021) highlighted that in Bio-districts, organic agriculture contributes to local development, environmental protection, co-learning processes and to develop a common set of values. The role of Eco-model regions in Germany is more nuanced. Mennig and Sauer (2022) reveal through statistical analysis that the Eco-model region programme failed in its objective to influence farmers' behavior and motivation to switch to organic farming even if they highlight a possible impact on consumers behaviour (Mennig and Sauer 2022). These differences can be explained by the embeddedness of Bio-districts in long term territorial pathways, bottom-up approach while Eco-model regions were set up with a top-down approach and thus highlight that the topic (organic agriculture and good) is a key point but as important as the implementation of a multi-stakeholder governance as well as co-learning processes among stakeholders to promote and foster agroecology transitions.

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The differences among case studies also reveal that those **transitions to agroecology territories rely on long-term pathways**. This has been demonstrated in Bio-districts (Dias et al. 2021) as well as identified in the case of Bornholm (DK), where a gradual shift from cooperation on place-based branding of food to integrate local food strategies and environment occurred (Manniche et al., 2009). In the case of the Pilat PNR, we were able to identify that the strategic territorial priorities have changed since the 1970s:

- To take into account internal changes: in the 1990s, the development of dairy coat breeding has been supported by the creation of a geographical indication for local cheese.
- To catch new opportunities: in 2000s, the local issues to develop sustainable food systems has been enhanced by the strategy of the food industry to develop organic dairy products.
- And more recently, to integrate external factors such as the forage autonomy for dairy farms to adapt to climate change which is a crucial topic currently, questioning the revalorization of abandoned pastures, or the development of irrigation infrastructure.

The PNR in France, which is an institution rather than a scheme, is thus interesting in its capacity to hold an overall long-term strategy, adapt this strategy to external factors and community changes, and mobilize the different schemes and measures to implement this strategy. Actually, we could observe that territorial schemes gradually move in their priorities from rural development to the emergence of food strategies. With Covid pandemic crises, climate change and the war in Ukraine, some topics re-emerge as front line: food sovereignty, food resilience and adaptation to climate change. Future AET must be in capacity to take into account those issues, integrate and adapt long-term agriculture and food strategies to those issues.

6.3. Geographical issues: are there specific contexts that are favorable for Agroecology Territories?

Several papers questioned the regional conditions that are favourable for pathways to sustainable agriculture and food. Some authors observed that such regions are characterised by quite strong (although threatened) territorial authorities and policies, attachment to local products or local origin, and territorial identities in France and Italy (Lamine et al., 2019a). Analysing the different factors that characterise regions where Bio-district developed in Italy. Mazzocchi et al. (2021) reveal that the importance of diversified farms, and the presence of Local Action Groups were correlated to the development of Bio-districts. The authors also highlighted that more Bio-districts could be observed in disadvantageous and mountainous areas (Mazzocchi et al. 2021). Periphery, rurality and insularity are pointed out as well as factors that contribute to the development of a territorial strategy in the case of Bornholm (Manniche et al., 2009). Most of the analysed schemes rely on calls for projects and a selection of the regions that have the most relevant project. This can cause inequalities among territories in their capacity to build a place-based project and gather stakeholders. It is for instance more difficult in peri-urban areas to observe such dynamics because of low community cohesion. To conclude, the research revealed differences according to history, geographical context, local identity, and community cohesion. These factors could also explain different observation over Europe, as for instance in France and Italy, where long-term pathways of

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endogenous development on geographical indication products help to support community-based programmes for agroecology.

6.4. Should EU set a place-based scheme for Agroecology Territories?

At this stage, we could question the relevance to develop a specific place-based scheme, based on agroecology principles to enhance pathways towards AETs, aiming to act on sustainable management of resources and sustainable food systems. Such a programme is currently experimented in France through private funding, the Tetraa programme⁶ was launched by the Carasso foundation, with a strong partnership with AgroParisTech and developed in 9 French territories in which multi-stakeholders groups are established to support transitions to agroecology. This programme could be considered as an “Agroecology territory Living Lab” as it includes networking, transdisciplinary research, and real-life community and setting. Yet, results are to come.

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Based on existing literature and previous research, some first elements can nevertheless already be highlighted to point out issues and conditions to foster development of AETs. The Participatory Action Research lead in France on AET from 2013 to 2018⁷ revealed a difficulty to enroll stakeholders on an holistic and systemic approach of transition; both for stakeholders that refer to their scope of action (farmers, citizens, ...) and researchers who refer to their field of expertise (Vandenbroucke et al. 2017). A difficulty can be observed in operationalizing global and systemic approaches on transitions. The main result of this research is to consider that even if a systemic and global frame for agroecology transitions is relevant to support long term strategies, it does not make sense for stakeholders to develop concrete actions of transition. To step in action, farmers and agronomists developed an experimentation on soil biodiversity at field and farm scales. While objectives could be global, action was relevant on specific object and scale, with a reduced group of farmers and scientists. So, to enhance to the development of AET, it may be more relevant to establish local institutions that could hold and monitor long-term strategies based on AET principles, and hold a multi-stakeholder adaptive governance. The literature review highlights that a place-based or territorial approach for agriculture and food transition is relevant and that such territorial approach must take into account:

- Long-term strategies for multi-stakeholders’ cooperation and learning processes. The development of territorial synergies for agroecology is not a short-term issue. It relies on long-term coordination among stakeholders and on learning processes that provide capacities for adaptation to external factors (Piroux et al., 2018; Vandenbroucke et al., 2020; Mehmood et al., 2020).
- Bottom-up and community supported strategies. Place-based approach for transition can integrate community issues and livelihoods and the importance of bottom-up approaches

⁶ <https://programme-tetraa.fr/>

⁷ TERRAE, Agroecology Territory, was a PAR programme hold by ISARA and consisted in experimenting transitions to agroecology territories in three territories: Roannais, Pilat, and Boucles du Rhône en Dauphiné.

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emerge as a result of different analyses (Dias et al., 2021). It contributes to empower communities in grounding and re-position their strategies within the frame of dominant regimes (Horlings et al., 2020).

- Transversal approach that connects food system strategies and sustainable management of common resources (biodiversity, water, land) (Gascuel and Magda, 2015; Wezel et al. 2016; Lamine et al., 2019b).

6.5. Are Agroecology Territories specific types of Living Labs?

Within the overall frame of the AE4EU project, we question whether AETs could be considered as specific type of LLs. The TETRAA programme mentioned above, could be a good example of an AET LL as it aims to encourage territorial innovations, including users, research infrastructure and covering the three dimensions of adaptation of agricultural practices, conservation of biodiversity and natural resources and embeddedness of local food systems through a systemic approach at territorial scale.

Nevertheless, our results highlight that AET and LL are different concepts that might have different temporalities (innovation-based project versus long-term territorial strategy – but both can apply to either AET or LL as not yet clearly defined), objectives (problem-based innovation versus long term place-based transformation), stakeholders (territorial multi-stakeholder versus more problem-solving oriented selection of stakeholders). AET could rather be considered in its capacity to encapsulate and foster conditions for the development of LLs. Actually, it could be demonstrated that AET can enhance conditions to support the development of LL, and even improve the transformative capacity of them. In the Pilat PNR case study, the role of the PNR to enhance the creation of a GIEE - a group of farmers engaged in change of practices - highlights that the key contribution of the PNR to support the administrative application of the group of farmers, enlarge the panel of local stakeholders involved in the project and thus amplify the scope of action including education in technical high school and sensibilizing future young farmers.

7. Conclusion: Key highlights and recommendations:

This report stressed the relevance of the concept of AET to foster agroecology transitions in Europe. The Farm to Fork Strategy actually refers to the different level of governance to achieve transitions to sustainable food systems (European Commission, 2020): *“The transition to sustainable food systems requires a collective approach involving public authorities at all levels of governance (including cities, rural and coastal communities), private sector actors across the food value chain, non-governmental organisations, social partners, academics and citizens”*. The implementation of this strategy relies on many different place-based schemes over Europe, either regional, national or European schemes. To reach the target of the farm to fork and other related strategies, **establishing a complete inventory of place-based schemes that contribute to transitions to sustainable agriculture and food systems as well as assess them according to agroecology principles** seems to be a key step to foster agroecology transition at the territorial level in Europe. This will allow to identify key issues and progress toward more integrated approaches of existing place-based schemes.

Rather than being considered as specific type of LL, AETs should be seen through their capacity to encapsulate and foster the development of LLs via their place-based approach involving a multi-stakeholder and adaptive governance.

The case studies analysed highlight the role of place-based schemes, and point out some first key levers on stakeholders and community concern and involvement, and multi-stakeholders’ governance. A further focus on the dynamic of stakeholder is required to deepen the understanding of how synergies and action are taken at the territory level. Nevertheless, based on literature review, previous research and this work some key success factors can be highlights to encourage and foster the development of AETs and setting up place-based programmes in Europe.

To conclude this report, the following recommendations to set up territorial schemes in Europe for agroecology transition can be highlighted. Territorial schemes should be:

- Based on bottom-up approaches and community supported strategies.
- Develop a multi-stakeholder governance that holds a long-term strategy for the territory, within the dominant political frames and markets.
- Include the three domains of AETs to guarantee a holistic approach from the management of natural and other resources to food systems.
- Create conditions for multi-stakeholder interaction, knowledge creation and learning processes.
- Foster the development of living labs and improve their transformative capacity.
- Support scaling-up initiatives in terms of scope of action, stakeholders involved, or enlarged land and number of farmers involved.

Conclusion: Key highlights and recommendations:

- Assess and monitor transition processes regarding the 13 principles of agroecology (HLPE 2019).
- Empower communities to develop long-term and multiscale analysis of the upcoming challenges, such as food sovereignty and climate change.

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Conclusion: Key highlights and recommendations:

Annex 1

Table 6: Interview questions for general informants.

Target information	Question
Country level transition	Are there policies at the country level that encourage transition in the domains of the food system?
Potential AETs in the country	Does the AET concept relate to regions or territories in your country or other European countries?
	Can you identify regions or territories like this that could be interesting case studies? <i>*Do you know if there is research there already?</i>
	Can you identify in those territories some transitions that are happening in the three domains of AET?
	Do you know the territory well enough to explain the territory in detail? If not, can you advise me a potential contact person?
Territorial schemes	Are there existing schemes such as Bio-districts or Eco-regions that encourage agroecology transitions?

Conclusion: Key highlights and recommendations:

Table 7: Grid for interview with key informants in AETs (W. Buckner, B. Grard, P. Vandenbroucke, Feb 2022)

Target information	Questions and prompts
Informant information	What is your age and gender?
	What is your occupation and for which organization are you working with?
	Can you tell me about your work with this territory?
Agriculture in the territory	What forms of agriculture are happening in the territory? *Are there forms of agriculture that are dominant or more common than others?
	Are there features unique to the territory in terms of production, processing, crops or livestock grown? *Are there examples of PDO or geographic indicators?
	What would you consider are the boundaries to the territory? *Geographic? *Stakeholder network used as boundary measurement?
Policies related to agroecology	What policies exist that are related to agroecology and the food system? *Policies connecting stakeholders?
Stakeholder information	What are the roles of the stakeholders in the territory? *What is the role of research projects in the territory?
Adaptation of agriculture practices	Does the territory have existing initiatives in transitioning to sustainable agriculture? *Closing resource cycles of nutrients and biomass *Increasing self-sufficiency of inputs *Soil health and functioning *Animal health and welfare *Agroecosystem biodiversity at the farm
Conservation of Natural Resources and Biodiversity	Does the territory have initiatives in conservation of natural resources and biodiversity? *Biodiversity at landscape scale *Adaptive management of biodiversity and genetic resources *Positive ecological interactions among elements of agroecosystems
Embeddedness of food systems	Does the territory show the presence of an embedded food system? *Short and fair food systems *Diversified diets *Circular economy *PDO or geographic designations of origin?
Transversal category targeting governance, knowledge sharing	What methods of knowledge sharing exist in the territory? *Horizontal, vertical, role of formal and informal sharing. *Actors driving transition
	What social and cultural issues are considered in the territory? *Culture and

Conclusion: Key highlights and recommendations:

and cultural issues	tradition, gender and social equity. *Actors driving transition
	What type of governance structures exist? *Does this allow for stakeholder management? *Use Responsible governance section of Grid 3 transversal domain for talking points and prompts
Barriers/drivers and key success factors	Have there been key success factors in the transition? *Are there key dates that can be noted such as policies, funding, research etc.?
	What are the other drivers of transition in the territory?
	What have been the barriers and main difficulties?
*Additional section for territory stakeholders	What is your role in agroecology transition in the territory?
	What is your vision for agroecology in the territory? * <i>Science, movement, practice?</i>
	How agroecology changed your day-to-day life?
	How do other territory stakeholders view agroecology?

Conclusion: Key highlights and recommendations:

Annex 2

Table 8: Comprehensive transition indicator grid. (Group AgroEcos, 2021, W. Buckner, B. Grard, P. Vandenbroucke, 2022)

Transition process Indicator	Description	Elements of transition process	Reference(s)
Adaptation of agriculture practices			
Closing resource cycles of nutrients and biomass (A1)	Generating synergies between arable and livestock production systems.	Nutrients cycles	(Pelzer et al., 2020)
		Biomass	
Increasing self-sufficiency of inputs (A2)	Valorizing local resources and creating farm systems based on ecosystem services of the territory; Reducing or eliminating dependency on purchased inputs; Collective risk perception, risk assessment and risk governance.	Self-sufficiency of inputs	(HLPE, 2019; Moraine et al., 2019)
Securing and enhancing soil health and functioning (A3)	Agriculture practices that improve soil health and functioning are used on the farm and field scale	Soil health and function	(HLPE, 2019)
Ensuring animal health and welfare (A4)	Animal health and welfare are considered vital in livestock management	Animal health and welfare	(Dumont et al., 2013)
Maintaining overall agroecosystem biodiversity in time and space at the farm scale (A5)	Having a holistic view of the species combination to improve robustness of the system with interspecific diversity.	Maintaining biodiversity in time	Presentation by E. Ollion 2021
		Maintaining biodiversity in space	
Conservation of Natural Resources and Biodiversity			
Maintaining overall agroecosystem biodiversity in time and space at landscape scale (C1)	Increasing the compositional and configurational heterogeneity in a landscape	Maintaining biodiversity in time	(Fahrig et al., 2011; Tschardt et al., 2005)
		Maintaining biodiversity in space	
		Access to genetic resources (seeds, livestock breeds etc...)	(Anderson et al., 2019; HLPE, 2019)
Adaptive management of biodiversity and genetic resources (C2)	Adaptive management of the common land that conserves natural resources and biodiversity	Adaptive management for biodiversity (land and water...)	(Anderson et al., 2019; HLPE, 2019)
Enhancing positive ecological interactions among elements of agroecosystems (animals, crops, trees, soil and water) (C3)	Synergy, integration and complementarity among elements of agroecosystems.	Animals	(Anderson et al., 2019; HLPE, 2019)
		Crops	
		Trees	
		Soil	
		Water	

Annex 3

Hierarchy of barriers and drivers of agroecology transition at the farm scale. The number of interview each theme is found is shown in parenthesis.

- Barriers
 - Specialization of farm systems (12)
 - Already financially invested in monoculture (1)
 - Farmer loyalty to conventional agriculture (2)
 - Fear of earning less income (2)
 - Fear of lower yields (1)
 - Lack of financial security (2)
 - Lack of financing for transition (3)
 - Not enough time to diversify (1)
 - Farmer beliefs (3)
 - Farmers do not see themselves as landscape conservationists (1)
 - Larger workload (1)
 - Reluctance to try new crops (1)
- Drivers
 - Business development (increasing income) (9)
 - Meeting consumer demand (2)
 - Accessing subsidies (3)
 - Different sources of income (1)
 - Higher price for organic/agroecological (3)
 - Desire for independence from global markets (1)
 - Reducing fertilizer (avoiding costs) (1)
 - Social Actions
 - Farmer's own desire/belief (1)

Annex 3

Hierarchy of barriers and drivers of agroecology transition at territory scale. The number of interview each theme is found is shown in parenthesis.

- Barriers
 - Farmer beliefs (3)
 - Loyalty to traditional supply chain relations (family/friends) (1)
 - Gap between citizens and farmers (1)
 - Youth do not want to be farmers (1)
 - Environment prevention (3)
 - Climate change (1)
 - Damage from wild fauna (1)
 - Water availability (1)
 - Knowledge of transition (3)
 - Lack of models for transitions (1)
 - Low amount of knowledge in alternative forms of production (2)
 - Land access (3)
 - Cost of land (1)
 - Farm size (1)
 - Land abandonment (1)
 - Land grabbing for tourism and urbanization (1)
 - Supply chain (5)
 - Consumer perception of sustainable food (1)
 - Decreasing prices (1)
 - Restrictions of CAP (1)
 - Undeveloped supply chain (2)
- Drivers
 - Environmental concerns (6)
 - Avoiding water pollution (1)
 - Adaptation to climate change (2)
 - Higher drought resilience with non-conventional production (1)
 - Protecting insect biodiversity (1)
 - Wanting to increase soil health (1)
 - Adapting to access new markets (4)
 - Close markets (1)
 - Market niches (1)
 - Marketing directly to consumers (1)
 - Marketing to tourists (1)
 - Social Actions (6)
 - When farmers drive/lead the transition (1)
 - Food education for general public (1)
 - Public pressure to transition (2)
 - Rural development policies (1)
 - Sense of common community in the territory (1)