

The role of territorial conditions in influencing the sustainability of farming systems and strategies across Europe: a comparative analysis

José Muñoz-Rojas^a, Fabio Bartolini^b, Damian Maye^c, Susanne von Münchhausen^d, Egon Noe^e, Teresa Pinto-Correia^a, Martin. H. Thorsoe^f, Danielle Vergamini^b

^aICAAM-Universidade de Évora, Portugal, jmrojas@uevora.pt

^bUniversità di Pisa, Italy, fabio.bartolini@unipi.it; daniele.vergamini@agr.unipi.it

^cCCRI-University of Gloucestershire, UK, dmaye@glos.ac.uk

^dHNEE-Eberswalde, Germany, Susanne.vonMuenchhausen@hnee.de

^eCentre for Rural Research, South Denmark University, enoe@sam.sdu.dk

^fAgroecology-University of Aarhus, Denmark, martinh.thorsoe@agro.au.dk

Abstract: *Innovativeness of farming strategies can enhance the sustainability of European farming systems. However, this is constrained by the many requirements faced by producers to secure their financial sustainability in the shorter-term. In such context, territorial conditions, materializing mainly at the local to regional levels, influence the efficiency of such strategies. In this paper, we examine the diversity of situations across Europe. Our conceptual framework draws from the concepts of space, place and landscape. Space is a dimension of farming that is reflective of its scale, extension and location. The concept of place allows considering social attachment to the land, whilst landscape relates to the connections between nature, culture and economics that shape rural territories. In the paper, we address six regional case studies comprising various agricultural commodities. For each of these, we evaluate the influence of place, space and landscape in driving the sustainability of different farming systems and strategies. To bring up the territorial and governance dimensions of sustainability, we also considered communities and institutions. We co-constructed case study data and information in close collaboration with multiple stakeholders, using a mixed range of quantitative and qualitative methods of social enquiry. Our findings indicate how the territorial conditions that are contingent to European regions and localities directly impact on the sustainability of farming strategies and systems, with space, place and landscape each playing a key role this process, although further theoretical reflections and empirical case studies are still required.*

Keywords: *Farming Systems; Farmers Strategies; Institutional Arrangements; Sustainability; Territorial Conditions.*

Introduction

Justification and key objectives of the paper

The trend towards a globalized economy and culture is a key force driving changes in patterns of agricultural production, trade and consumption (Josling, 2012). From a territorial perspective these changes are reflected in the fact that the existing mosaics of rural habitats and farming systems are mutating in rapid, complex and largely unpredictable ways (Wenbin; Qiang-yi; Verburg et al. 2014). Many of these changes are geared towards the homogenization of the rural landscapes that co-exist across the world, and of the societies, economies and policies that underpin such landscapes. Such changes are expected to trigger social, economic and ecological externalities which are too frequently disregarded at the expense of economic growth. The extent and potential of such externalities, and the impact in the sustainability and diversity of farming systems and rural landscapes is being thoroughly scrutinized by scientists, analysts, activists and policy-makers across the world (Seppelt, Beckmann, Ceasau, et al, 2016). However, the afore-mentioned trend of agricultural homogenization and globalization is not yet ubiquitous, and a complex mosaic of farming systems with multiple environmental and social values can still be found that is highly influenced by territorial conditions that materialize at the local and regional levels. This dual picture (globalization vs local sustainability) is well aligned with the idea of “glocal” that is currently employed to explain issues as relevant as climate change (Gupta, Van der Leeuw & de Moel, 2008).

It is now widely acknowledged that, to cope with the multiple challenges arising from the aforementioned processes of change, more innovative farming management decisions are required (Brodt, S., Six, J., Feenstra, G., Ingels, C. & Campbell, D., 2011). This demands that we begin by enhancing our efforts to better grasp the multiple drivers that influence such complex trends of change and dynamics. To reflect on this, we adopted the theoretical framework developed under the SUFISA H-2020 project (Grando, Bartolini, Brunori et al, 2015), which itself is underpinned by Porter’s theories of competitive strategies and decision making (Porter, 2008). The theoretical framework that we adopted deploys a set of conditions (C) that influence strategies (S) undertaken by farmers and other key actors, resulting in different sustainability-related performances (P), which can ultimately be associated with individual or typologies of farming systems. Besides, we also considered the role of Institutional Arrangements. Institutional arrangements (IAs) comprise horizontal cooperation among farmers and vertical coordination among diverse actors and networks of the agricultural production chain, along with the key role played public intervention tools such as policies, funding schemes and incentives (Figure 1, in Mathijs & Bonjean (2017)).

To identify and characterize farming strategies and their drivers in a way that is useful for contrasting theoretical or scientific models with contingent realities on the ground, a research agenda is required whereby knowledge is co-constructed involving a wide range of stakeholders. These requirements are closely met by trans-disciplinary science (Guimarães et al, 2017). Trans-disciplinary approaches to research and action are deemed fundamental to effectively disentangle the complex set of processes and dynamics that are jointly driving change in agriculture and associated farming systems (Francis, Lieblein, Breland et al, 2003). Furthermore, it is also important to consider the differences in decision making across multiple spatial-temporal scales and institutional contexts (Groot, Rossing, Jellena et al, 2007).

Whilst recognizing the overall validity of this generic contextualization, we argue that farming decisions, strategies, and subsequent performances are not solely driven by the many conditions considered in the mainstream economic and social sciences literature (Grando, Bartolini, Brunori et al, 2015). In addition to the former, other territorial conditions that are mainly operationalized across the regional to local scales are as relevant. Such conditions may include bio-physical cultural and structural aspects that are contingent to each region or locality. Consequently, gaining a better understanding of such territorial conditions shall help better disentangle the existing territorial heterogeneity of farming systems across Europe.

This is key to design policy and economic instruments that are better tailored to reflect on farmers' differing motivations, perceptions and interests across diverse contexts.

With this challenge in mind, within this paper we aimed to explore how certain territorial concepts can be used to help unravel the role of conditions in influencing the sustainability of farming systems and strategies across Europe. To do this, we based our analysis on the results of a comparative analysis performed among 6 countries and related agricultural commodity sectors (table 1).

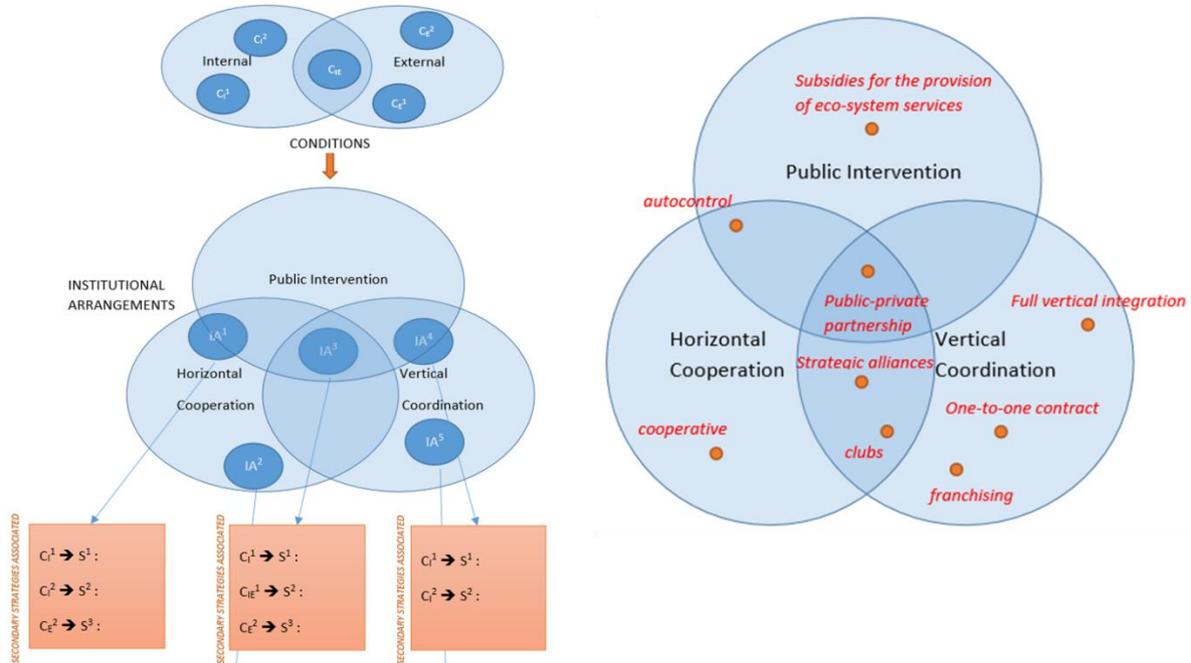


Figure 1: Flows and components of Institutional Arrangements, including horizontal cooperation and vertical coordination. For a detailed definition of these concepts, see Mathijs & Bonjean (2017).

Territorializing farming systems: space, place and landscape.

Among the many territorial concepts that could be potentially used to attain the aforementioned objectives, we selected those of landscape, place and space. These three concepts have been considered in the scientific literature as especially valuable to better understand the complexity of territorial processes and dynamics (Davenport & Anderson, 2005; Görg, 2007). Despite much of their original purposes were to help build more solid social theory foundations for geographical research, especially in relation to urban dynamics (Harvey, 1993; Smith, 1996), much progress has been lately made in the use of these three concepts may potentially contribute to the governance farming and rural land-use systems (Arts *et al*, 2018).

For our own purposes, space was interpreted as a geographical dimension of farming that is reflective of its scale and geographical location and relationships (e.g. distance, remoteness, accessibility, peripherality, centrality etc...). Adding the concept of place allows the consideration of social and personal attachment to the land, whilst in our view landscape relates to the connections between nature, culture and economics that materialize as spatial settings on which different rural actors, networks and institutions mutually interact.

The consideration of space as material and objective has been long-questioned from the post-positivist perspective dominating in the social sciences (Soja, 1989). This is also the case for the scalar dimension of space (Marston, 2000). However, we argue that scale still has an objectively measurable nature which is crucial to analyse territorial dynamics of change in the farming sector.

In addition, considering space and scale (Gibson, Ostrom & Ahn, 2000) is useful to unravel the complexity of institutional and spatial-temporal levels across which farmers' conditions and decisions are framed, and also the spatial and scalar miss-matches that are detected amongst decisions by various private and public institutions, leading to multiple inefficiencies (Cumming, Cumming & Redman, 2006).

In our interpretation, the concepts of place (Castle, 1998) and landscape (Pedroli, Pinto-Correia & Cornish, 2006) contribute to our discussion by respectively adding the sense of belonging (place) and the jointly perceived and material context (land-landscape) which are both important aspects of farmer's mental realms, and which strongly influence decision making and strategies of relevance for land-use change.

Thus, by adding space, place and landscape to the debate on farming systems, in our analysis we aimed to integrate together the biophysical, socio-economic, perceptive, cultural and scalar dimensions that drive differences in strategic options undertaken across diverse territories and farming systems. It is expected this will help in overcoming the multiple trade-offs constantly being faced by farmers and others (e.g. crop production vs ecosystem protection).

Alas, the use of these concepts should also help better align multiple spheres and scalar levels across which land-use decisions are made through governance, planning and management (e.g. farm-level vs landscape-level). In this sense, and according to Pinto-Correia & Kristensen (2013), the demand for public goods, such as biodiversity and cultural landscape values, is enacted at the landscape level whereas, in contrast, land management is performed at the farm to plot levels. This provides further justification as for the relevance of the concept of space (and of spatial scales) for the purposes of this paper.

Moreover, the addition of place and landscape into our analysis is also aimed at 'going beyond public participation' (Muñoz-Rojas et al., 2015) and this way support the implementation of an action-focused research program for farming systems that is closely aligned with the principles of trans-disciplinary research (Guimarães *et al*, 2017). Achieving such an ambitious goal needs to be underpinned by a full-life-cycle action schedule which can only be built in continuous and long-term interaction with relevant stakeholders, and where gaining mutual trust is the main key to success.

Economic sustainability: soft or hard?

Underpinning both the whole logic of the paper is the 'highly contested' concept of sustainability (Thompson, 2011). Among the many existing interpretations of sustainability, our research had originally been based on that of "financial sustainability" (Grando et al., 2015), which is in theory similar to "economic sustainability" (Hardisty, 2010). However, the close ties that exist between traditional notions of economic and "soft" sustainability, render our extended intentions for the analysis of sustainability closer to that of "hard" sustainability. This is especially important, having been argued that "soft" interpretations of sustainability are illegitimate (Biely, Maes & Van Passel, 2018).

Alas, to adopt a hard sustainability approach, we discerned within the traditionally single social dimension of sustainability, among those of community and institutions (figure 2). These two dimensions are well aligned with the concepts of place, space and landscape that we had decided to use as key lenses through which to examine the role of territorial conditions in influencing farmers' strategies and decision making.

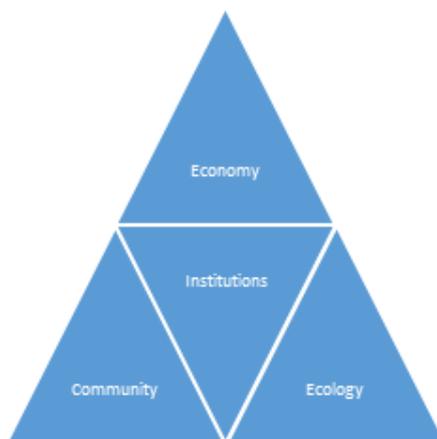


Figure 2: Interpretation of sustainability, where community and institutions are also considered.

Methods and Case Studies

To be able to test our arguments, we implemented a series of actions that were set within the context of various of the tasks planned in the SUFISA (“Sustainable Finance for Sustainable Agriculture and Fisheries”) research project, funded by the European Commission’s H-2020 program (Grant agreement 635577). Within the scope of this project, the aforementioned CSP framework had been proposed as a basis to analyse the financial sustainability of key agricultural commodities and related farming systems across Europe. Furthermore, this intended to be achieved using a broad and fully encompassing participatory research framework that permeates the whole project. However, initially the territorial aspects that are the subject of this paper had been mostly absent from this project’s tasks and objectives, which were mainly influenced by more traditional social and economic theories and research methods. Therefore, the various tasks and steps that are hereafter described correspond to the various decisions undertaken to embed territorial aspects onto the successive steps that had been planned originally for the project (Grando et al, 2015).

It is therefore important to indicate that the actions and steps hereby described do not stem from a purposely designed ex-ante research plan, and that they were designed and tested as a result of subsequent discussions internal to the project consortium that followed the realisation by researchers and stakeholders in SUFISA (<http://www.sufisa.eu/partners>) of the importance of territorial aspects in shaping farm-system decision making. Further theoretical reflections, which are synthesized in the introductory chapter to this paper, led us to check concepts such as space, place and landscape to explore whether adopting territorial approaches and perspectives may add any complementary knowledge about the sustainability of farming systems to that which is expected using more standard socio-economic approaches. The following points indicate how such territorial approaches and concepts were effectively tested across the various steps and actions that had been planned as part of the project:

- A) **Theoretical Framework:** One first step within the project was to identify and list the range of broader types of Conditions, Strategies and Performances (CSPs) that, stemming from a literature review, could be considered as potentially influencing the sustainability of a diversity of farming systems in Europe. The original set of CSPs identified through an initial scoping exercise had proved to be almost invariably socio-economic in nature (Grando et al, 2015), thus lacking important territorial dimensions. In view of this, we decided that a first step should be to consider, as well, the spatial scales and related administrative levels (e.g. Global to National vs Regional to Local) at which each of the CSPs originally identified would be potentially enacted. In addition, the original list of CSPs would also need to be altered to reflect some conditions and strategies that either directly reflect landscape functions and place attachment.

Examples of conditions that could be added to reflect sense of place included some subjective and perceptive variables, such as whilst for space one could look at spatial relationships such as remoteness and accessibility, and the spatial location of farms in relation to their neighbours. We then decided that the attribution of each of these spatial, landscape and dimensions would need to be discussed among all partners, so that they could be incorporated into the final conceptual framework to be delivered over the first year of the project (2015-2016).

B) Case studies and inventory (desk-based review): Among the wide range of conditions and strategies defined throughout the theoretical framework, the key ones were then identified for each of the case studies and commodities to be selected in each partner country. The case studies were based both on a commodity and region (table 1), and were selected to reflect the widest possible diversity of commodities (all the way from vegetables to animal products), production modes (ranging from organic and traditional to super-intensive and even industrial), functionality (mono to multi-functional), and bio-physical (Mediterranean to Nordic ecosystems, climates and landscapes) and governance (following a gradient of bottom-up to top-down) situations that can be encountered across European farming systems. The identification of C and S would then be pursued for each of these case studies through a series of inventories looking at the following sources of information: media (both public and specialized or technical), scientific and grey literature, public and private databases and sectoral statistics, regulations and legislation, technical documents and industry data and standards. By considering the revised set of C and S identified in step A for this analysis, the inventory would be inherently reflective of the various territorial dimensions and concepts that we argue to be important in influencing the sustainability of different farming systems across a wide range of local and regional contexts.

C) Following, a set of participatory analyses had been planned within the SUFISA project using mixed qualitative-quantitative methods of enquiry including; interviews with 10-15 expert stakeholders for each of the commodities and case studies addressed, 2-3 focus groups with producers in each region and commodity and 1 participatory workshop with a wide range of private and public experts representing farming and industry, policies and regulation, finance, lobbying, and trade at the same former level. This all happened in parallel with the elaboration of the regional and national inventories (section B) during the years 2016-2018. The aims of these participatory approaches were various, namely; to contrast and expand on the findings from the inventory of C and S, to identify any divergences between what is reflected in science, legislation and policies and the financial and industrial sectors and the expectations, aspirations and interests of farmers and other key actors, and to scope some preliminary visions and aspirational scenarios for the future of each case study in view of incoming decade. This last point is especially important in view of important future reforms to the CAP, the implementation success of which will very much depend upon the degree to which they are capable to consider the aspirations of different producers and their contexts (EC, 2017). Following from the former a survey was to be conducted over 150 producers per case study and related commodity. With this survey, we aimed at moving beyond the individual identification of C and S achieved throughout the previous inventorial and participatory exercises, and onto the characterization of IAs that are essential components of the theoretical framework described in the introductory chapter of this paper. Alas, we also aimed to identify the key Performance (Ps) resulting from the strategies implemented, and how such performance was perceived and interpreted by those implementing land management actions at the farm level, and what this meant for the future sustainability of their farms and businesses.

To address the territorial aspects of the survey, a spatial stratification of the farms and farmers to be surveyed was originally proposed considering conditions that are reflective of the territorial heterogeneity that is intrinsic to each case study commodity and region.

Examples of this could include ecological conditions, such as water availability or climate, that are reflective of high-production systems, and structural conditions, such as remoteness and peripherality that are commonly associated with marginal agricultural systems. However, and following some further reflection, this was acknowledged to be a whole independent task by itself, thus potentially complicating unnecessarily the implementation of the survey. Thus, we decided to cluster and select the farmers to be surveyed based on the municipalities and lower-level administrative units (LAUs in EU administrative terminology) upon which their farms were located. Although this is a far-from-ideal solution, in regions where sufficient territorial diversity persists, this should be enough to provide with a valuable picture of the overall mosaic of bio-physical and structural conditions influencing farmers' strategies. Regarding the territoriality of IAs, it was clear to us that aspects such as horizontal cooperation among farmers cannot be effectively understood unless the spatial, and in some specific cases also the landscape dimension is considered. Thus, following the classic models of economic geography (Soja, 1989), one would assume that farmers tend to cooperate more closely with others with farms that are placed closer to them, and thus with whom they share similar concerns and limitations, but also importantly with other producers farming similar landscape types, and thus confronting similar limitations.

Based on the knowledge to be sequentially gained along all of the formerly described steps, we ultimately aimed to synthesize the levels of influence that local and regional territorial Conditions have on the main Strategies currently in place and resulting Performances. To achieve this, we devised a simple method on which such levels of influence are subjectively marked from low (+) to high (+++). The influence of territorial conditions would be then expressed for each of the three territorial variables chosen (landscape, place and space), whilst the levels of impact of each sector over each of the sustainability components defined under our theoretical framework (Figure 2) would also be addressed following a similar evaluation criterion (low (+) to high (+++)). In our case, those in charge of evaluating these marks would be the same researchers who had actively implemented the analysis of the diverse tasks above-described for each of the case studies to be selected. We considered that their independent and sequential implementation of stages B and C over more than 2 years of work in their own case studies, placed these partners in an adequate position to be able to judge (subjectively) through a simple assessment rule the impacts in the case of their own case studies. In contrast, the co-construction among all partners of the territorial aspects reflected in the conceptual framework (step A) places them all in an equal position to understand and interpret the various theoretical concepts and aspects being assessed. Despite if we acknowledge that this method has limitations related to the subjectivity in the interpretations to be followed by those assessing their own case studies, this is an approach that suited well the resources available and potential outreach of our proposed exercise.

Results and discussion.

Resulting from the implementation of step A in our proposed methodology, we obtained a revised set of Conditions influencing farmers Strategies that considers territorial aspects (Figure 1). It should be reminded at this point that before adding the extra dimensions related to both place and landscape (in red in figure 1), and to place and scale (coded under various scalar categories in brackets, also in figure 1), consensus was searched among all partners in the SUFISA project (<http://www.sufisa.eu/partners>). This project brings together agricultural economists, sociologists and geographers, along with a wide range of stakeholders operating in different public and private tasks, thus representing differing degrees of familiarity and interest in spatial and territorial aspects. This did not defer the fact that all those involved during stage A agreed to acknowledging the key importance that should be attributed to the territorial aspects of sustainability and decision making, and thus, that these should be represented in a revised conceptual framework.

A vast majority of the Conditions (and Strategies) that had originally been identified throughout the literature analysis in stage A could be attributed a spatial scale of occurrence, with many of them being realized at the local to regional scales that are at the core of in this paper (coded as R/L in figure 3).

However, we also identified others that occur preferably at global to national scales, a fact that aligns well with the ‘global’ trends and related tensions that we exposed in our initial theoretical reflections. Regarding the identification of new Conditions (and Strategies) that are not reflected in the mainstream sociological and economic literature (figure 1, new Conditions in red), they are in many cases related to territorial dimensions that we deem essential for farming systems and strategies. These dimensions of decision-making are too frequently miss-considered from orthodox economic and geographic perspectives, which tend to associate them to already discredited deterministic approaches and positions (Soja, 1989). Overall, it is clear for us that territorial Conditions should be granted a greater role than the one they actually play in understanding the set of Strategies by farmers and their underlying spatial logic.

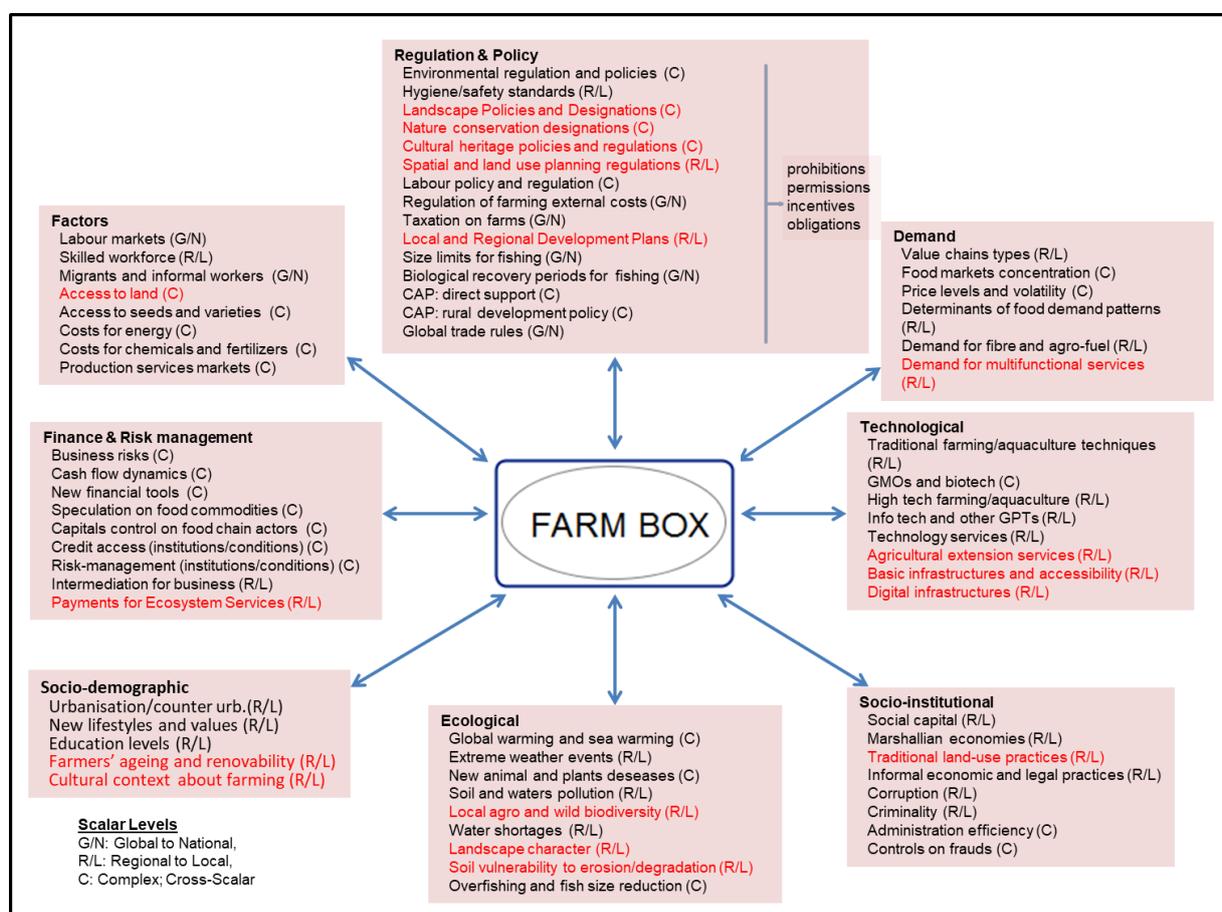


Figure 3: Enhanced set of Conditions identified following consideration of landscape and place-related aspects (in red) and also the spatial dimensions (in brackets) of decision making in farming systems.

Furthermore, and when these revised sets of Conditions and Strategies were applied to build National and Commodity case studies required in the project (<http://www.sufisa.eu/publications>), their relevance became self-evident throughout a majority of case studies. However, it was also clear from this analysis that the relative influence of such territorial Conditions and Strategies varies enormously among cases that are set upon different socio-cultural and bio-physical contexts, and that represent extreme poles of the intensification-extensification spectrum.

Once we had fully implemented step A, the next step (B) started with the selection and characterization of adequate case studies. This was based on the experience and information accumulated by each of the partners involved, following the criteria of

representativeness of the diversity of situations to be encountered. Table 1 lists the range of SUFISA case studies that were included in our analysis.

This selection of cases contains extremes of extensive and intensive production systems, represented respectively by the sector of beef rearing in Montado silvo-pastoral systems of Southern and Central Portugal and by the production of poultry in industrial systems in Denmark. However, major differences also exist within single commodities and regions, such as olive oil production where traditional/extensive, intensive and super-intensive systems with very different characteristics currently co-exist. Stemming from the secondary analysis of CSP that is also part of step B of our methodology, the importance of considering multi-level spatial interactions in farming systems was made evident, as illustrated by one of the case studies selected; extensive cattle production in a an agro-forestry system, the Montado, in Alentejo (Portugal). Within this case study, multiple policy requirements are imposed upon the farmer which are approved at different institutional levels, resulting in a complex and frequently uncoordinated mosaic of policy Conditions influencing farmers decisions. This includes National and Regional targets set either by the National Government (e.g. Decree-Law 155/2004 of the 30th June on the Protection of Holm and Cork Oaks) or Internationally (e.g. CAP policy reform 2015; Natura 2000 Network) levels. However, these are requirements that need to be realized through decisions undertaken at the farm (or even at times, plot) level. Thus, multiple challenges arise in the upscaling and downscaling of information and decisions that can only be addressed by adopting a spatial approach. The documentary analysis of Conditions and Strategies for the same case study also reflected the relevance of places and landscapes for our analysis. The consideration of place may help explain why many farmers and public institutions decide to maintain farming systems that, such as the Montado, are characterized by much lower profitability rates that other alternatives. Accordingly, the consideration of landscape into the analysis allows to jointly account for the multiple socio-economic, cultural and bio-physical elements that render this system highly sustainable (Ferraz de Oliveira, Azeda & Pinto-Correia, 2016). Despite of the latest impulse that is being given to Landscape approaches (Arts et al, 2018), the complexity that is inherent to the concept of landscape, and especially to its applications for land-use management and planning turns its use for achieving sustainable land-use into a ‘wicked’ challenge (Duckett et al., 2016).

Table 1: Case studies selected for the analysis.

Commodity	Country	Region	Farming System and Production Mode
Cattle	Portugal	Alentejo	Montado-Extensive silvo-pastoral rangeland system
Wine	Italy	Toscana	Traditional/Extensive
Milk	UK	Somerset	Open Grassland/Extensive
Olive Oil	Portugal	Alentejo	Extensive/Traditional, Intensive/Irrigated and Super-Intensive
Poultry	Denmark	Central Denmark	Intensive/Industrial
Germany	Oilseed Rape	Wetterau	Extensive/Rain-Fed

Following up from the individual reflections of each partner based on the wide range of outputs obtained from the multiple actions contained in steps B (desk review) and C (participatory exercises and surveys) we obtained an assessment of the relevance of each of the three territorial concepts considered for each of the 6 case studies selected. These are synthesized in table 2.

The majority of these results clearly align with the preconceptions that each team had about each sector analysed. This is the case, for instance of the Portuguese Montado, where the influence of space, place and landscape was detected to be very high for strategic decision making, including by farmers, policy makers and other key stakeholders. It was found how at times farmers operating in this system opt to favour a series of management options that clearly enhance the ecological and social aspects of sustainability in detriment of those of economic nature (see table 3). In contrast, super-intensive and industrialized production systems, such as poultry production in Denmark represent an opposite extreme, with landscape, place and space a minimum influence on decisions and strategies currently in place for the sector. This bears opposite results in the sustainability analysis, where economic and financial aspects of sustainability are clearly deemed to be prevalent for the poultry Danish sector (table 3).

Other commodity-based production systems, such as olive oil groves (also in Portugal) are characterized by their complex nature, with extensive and super-intensive production systems co-existing that are respond to a very different degree of influence of the various territorial variables considered. This also has effects on the type of sustainability favoured in one and the other production mode. As for the rest of case studies examined, they are mostly placed in more moderate situations of both territoriality and sustainability, thus being potentially vulnerable to become rapidly degraded should their territorial aspects be insufficiently considered when defining strategies for their future management.

Table 2: Evaluation results of the relevance of the variables considered (space, place and landscapes) in influencing current dominant strategies for each sector and commodity selected. + represents the lowest relative levels of influence, whilst +++ is attributed to the highest ones.

Case Study & Country	Cattle production in Montado (Portugal)	Olive Oil Production: Intensive + Extensive (Portugal)	Wine (Italy)	Milk (UK)	Poultry (Denmark)	Oilseed Rape Germany
Territorial Variables						
Space	xxx	xxx (Traditional) xx (Intensive)	xx	xx	x	xx
Place	xxx	xx (Traditional) x (Intensive)	xxx	x	x	x
Landscape	xxx	xx (Traditional) x (Intensive)	xxx	x	x	xxx

Table 3: Evaluation results of the influence of the diverse components of sustainability in shaping current dominant strategies for each sector and commodity studied. As with table 1, + represents the lowest relative levels of influence, whilst +++ is attributed to the highest ones.

Case Study & Country	Cattle production in Montado (Portugal)	Olive Oil Production: Intensive + Extensive (Portugal)	Wine (Italy)	Milk (UK)	Poultry (Denmark)	Oilseed Rape Germany
Ecologic	xxx	xx(Traditional) x (Intensive)	xx	x	x	xx
Social	xxx	xx(Traditional) x (Intensive)	xx	xx	xx	xx
Economic	x	x (Traditional) xxx(Intensive)	xxx	xx	xxx	xx
Institutional	xx	xx (Traditional) xxx (Intensive)	xxx	x	xxx	xxx
Community	xxx	xx (Traditional) x (Intensive)	xx	xx	xx	x

Conclusion and further steps forward.

Territorial aspects are seldom considered in the analysis of the farming strategies towards sustainability. Paradoxically, they are acknowledged to be especially influential in face of gradually globalised markets and institutions. As shown by Castells (1996, 1997 & 1998), place and space, importantly including interactive flows of material and immaterial nature along with local and regional identities (which are directly related to landscapes), play a determinant role in the way societies develop and communities flourish or decay. The challenge arising is therefore how to progress in analytical terms so that these dimensions are incorporated in the economic analyses and sustainability assessments of farming systems.

Throughout six empirical case studies across Europe, we confirmed that the consideration of territorial dimensions to the analysis of farming systems can facilitate gaining a better understanding of the kinds of Strategies undertaken by farmers, and of their effects on the different dimensions of sustainability (including non-traditional ones, such as institutions and communities). Furthermore, this approach can also be used to refine knowledge about the multiple trade-offs that farmers face when defining future strategic options for their businesses. In addition, it can also be useful to gather information about, and engage with other actors with a role in defining the strategic futures for the farming sector, including; policy makers and planners, market and financial agents and lobbyists of various kinds. However, our results so far are limited to a few individual case studies, and improved actions will be required before definitive lessons are learnt that can be tested in a wider range of situations and contexts. This potentially includes comparative inter-regional and inter-commodity analyses which can be co-constructed by various teams of regional and commodity experts brought together to jointly reflect on the differences and similarities among different case studies, which have been to date only examined in an individual basis. We also preview further future actions that will help enrich the relevance and applicability these results, including the generation of future commodity-, regional- and international-scenarios that will be developed along Summer and autumn 2018, and that will aim to inform and influence future policies and funding programs that are better adapted to the heterogeneous set of situations encountered across Europe, and to the differing aspirations of farmers and other key stakeholders.

Concluding, we can point out how our findings (so far) show how farming Strategies (including Institutional Arrangements) by farmers and other stakeholders are influenced by the different territorial Conditions under which they operate. In general, differences among farming systems with diverse Conditions frequently occur as expected. In addition, we can also assert that adding a territorial perspective to the analysis of the sustainability of farming systems in the context of globalisation is a valuable step to move towards strategic options that should be better grounded in the reality of farm systems and other local and regional governance institutions. In this sense, adding a territorial and enhanced sustainability dimensions allowed us to enrich and expand the original CSP model adopted beyond its original socio-economic approach. Moving beyond classic, and gradually contested economic and sociological paradigms towards more integrative interpretations that also consider cultural, perceptive, institutional and environmental aspects of reality is an important step to better match the “hard” interpretation of sustainability that is advocated to device more innovative Strategies and attain more efficient Performances in the Farming sector.

Acknowledgements

This work was developed within the project SUFISA-Sustainable finance for sustainable agriculture and fisheries (Horizon 2020 Grant agreement 635577), and by National Funds through FCT - Foundation for Science and Technology under the Project UID/AGR/00115/2013.

References

- Arts, B., Buizer, M., Horlings, L., Ingram, V., van Oosten, C., & P. Opdam (2018) Landscape Approaches: A State-of-the-Art Review. *Annual Review of Environment and Resources* 2017 42:1, 439-463
- Brodt, S., Six, J., Feenstra, G., Ingels, C. & Campbell, D. (2011) Sustainable Agriculture. *Nature Education Knowledge* 3(10):1
- Castells, M. (1996) *The Rise of the Network Society, The Information Age: Economy, Society and Culture Vol. I.* Cambridge, MA; Oxford, UK: Blackwell.
- Castells, M. (1997) *The Power of Identity, The Information Age: Economy, Society and Culture Vol. II.* Cambridge, MA; Oxford, UK: Blackwell.
- Castells, M. (1998) *End of Millennium, The Information Age: Economy, Society and Culture Vol. III.* Cambridge, MA; Oxford, UK: Blackwell.
- Castle, E.N., (1998) A Conceptual Framework for the Study of Rural Places. *American Journal of Agricultural Economics*, 80-3, (1998), 621–631
- Cumming, G. S., D. H. M. Cumming, and C. L. Redman. (2006) Scale mismatches in social-ecological systems: causes, consequences, and solutions. *Ecology and Society* 11(1): 14.
- Davenport MA, Anderson DH. (2005) Getting from sense of place to place-based management: an interpretive investigation of place meanings and perceptions of landscape change. *Soc. Nat. Resour.: Int.J.* 18(7):625–41
- Duckett, D., Feliciano, D., Martin-Ortega, J., Muñoz-Rojas, J., (2016) Tackling wicked environmental problems: The discourse and its influence on praxis in Scotland. *Landscape and Urban Planning*, 154 (2016), 44-56.
- European Commission- EC., (2017) *The future of food and farming.* Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels, 29.11.2017. COM(2017) 713 final, 27 pp. [available at: https://ec.europa.eu/agriculture/sites/agriculture/files/future-of-cap/future_of_food_and_farming_communication_en.pdf]
- Ferraz-de-Oliveira, M.I., Azeda, C., Pinto-Correia, T., (2016) Management of montados and dehesas for high nature value: an interdisciplinary pathway. *Agroforestry Systems*, 90(1): 1-6
- Francis, C., Lieblein, G., Gliessman, S., Breland, T.A., Creamer, N., Harwood, R., Salomonsson, L., Helenius, J., Rickerl, D., Salvador, R., Wiedenhoef, M., Simmons, S., Allen, P., Altieri, M., Flora, C., & R. Poincelot, (2003) Agroecology: The Ecology of Food Systems. *Journal of Sustainable Agriculture* 22-3, 2003
- Gibson, C.C. Ostrom, E. & T.K. Ahn, (2000) The concept of scale and the human dimensions of global change: a survey. *Ecological Economics*, 2000 (32-2), 217-239
- Grando, S., Bartolini, F., Brunori, G., Mathijs, E., Avermaete, T., et al (2015) *Deliverable 1.1: Conceptual Framework (WP1).* SUFISA H-2020 Project [available at: <http://www.sufisa.eu/publications>]
- Görg C. (2007) Landscape governance. The “politics of scale” and the “natural” conditions of places. *Geoforum* 38:954–66
- Groot, J.C.J., Rossing, W.A.H., Jellema, A., Stobbelaar, D.J., Renting, H. & M.K. Van Ittersum, (2007) Exploring multi-scale trade-offs between nature conservation, agricultural profits and landscape quality—A methodology to support discussions on land-use perspectives. *Agric. Ecosyst. Environ.*, 120 (2007), pp. 58-69
- Guimarães, M.H. Fonseca, C., Gonzalez, C & M.T. Pinto-Correia, (2017) Reflecting on Collaborative Research Into the Sustainability of Mediterranean Agriculture: A Case Study Using a Systematization of Experiences Approach. *Journal of Research Practice*, 13-1 (Article M1, 2017)
- Gupta, J., van der Leeuw, K., & H.de Moel, (2007) Climate change: a ‘glocal’ problem requiring ‘glocal’ action. *Environmental Sciences* 4-3 (2007)

- Harvey D. (1993) From space to place and back again: reflections on the condition of postmodernity. In: Bird J, Curtis B, Putnam T, Robertson G, Tickner L, eds. 1993. *Mapping the Futures: Local Cultures, Global Changes*. London: Routledge, pp. 3–29
- Josling, T. (2012) New Trade Issues in Food, Agriculture and Bio-physical Resources, in A. Narlikar, M. Daunton, and R. M. Stern (eds.) *The Oxford Handbook on the World Trade Organization*, Oxford University Press
- Mathijs, E., & I. Bonjean, (2017) Market power or the power of market; where should policy intervene?. Position paper [available at: <http://www.sufisa.eu/publications>]
- Marston, S.A. (2000) The social construction of scale. *Progress in Human Geography* 24,2 (2000), 219–242
- Muñoz-Rojas, J., Miller, D., Morrice, J., Papageorgiou, F., Mylonas, D., Tsemperlidou, M., Bell, S., Kuhlmann, F., Bruns, D., Mahne, T., Stojanovic, T., Del Alcazar, H., Noguera, J. (2015) Going beyond public participation: an exploration of the role of ICT Tools to implement the European Landscape Convention (ELC) through challenge, learning, innovation and cooperation. In L. Miklos. *The landscape, the European Landscape Convention and the law. 17th International Symposium on Landscape and Landscape Ecology. 27-29 May 2015. Nitra, Slovakia*
- Pedroli, B., Pinto-Correia, T. & Cornish, P. (2006) Landscape – What’s in it? Trends in European Landscape Science and priority themes for concerted research. *Landscape Ecology* (2006) 21: 421.
- Pinto-Correia, M.T., & L. Kristensen, (2013) Linking research to practice: The landscape as the basis for integrating social and ecological perspectives of the rural. *Landscape and Urban Planning*, 120 (2013), 248-256.
- Porter, M.E, (2008) The Five Competitive Forces That Shape Strategy, *Harvard Business Review*, January 2008, pp. 79–93.
- Seppelt, R. M., Beckmann, S., Ceaușu, A.F., Cord, K., Gerstner, J., Gurevitch, S., Kambach, S., Klotz, C., Mendenhall, H.R.P., Phillips, K., Powell, P.H., Verburg, W., Verhagen, M., Winter, M. & T. Newbold. (2016) Harmonizing Biodiversity Conservation and Productivity in the Context of Increasing Demands on Landscapes. *BioScience* (2016) 66 (10): 890-896
- Smith N. (1996) Spaces of vulnerability: the space of flows and the politics of scale. *Critique Anthropol.* 16(1):63–77
- Soja, E. (1989) *Postmodern Geographies: The Reassertion of Space in Critical Social Theory*. London: Verso Press, 1989.
- Wen-bin, W, Qiang-yi, Y., Verburg, P., Liangh-Zi, Y., Peng, Y. & T. Huan-Jung, (2014) How Could Agricultural Land Systems Contribute to Raise Food Production Under Global Change?. *Journal of Integrative Agriculture* 13(7):1432–1442.