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INTEGRATION BETWEEN AGRICULTURE, LANDSCAPE MANAGEMENT AND DESIGN

Territorial design for sustainable agrifood systems: development and testing of a cross-disciplinary review framework

Lorène Prost^a, Marion Casagrande^a

^a Université Paris-Saclay, AgroParisTech, INRAE, UMR SAD-APT, 91120, PALAISEAU, France

The transitions to sustainable agrifood systems face systemic challenges that require to consider the influences of different stakeholders. Focusing on the territorial level, which encompasses spatial, social, institutional, and ideal dimensions, is crucial for effectively supporting these transitions. This study outlines the development of an exploratory review framework, derived from literature, to extract and identify key features of territorial design across disciplines. The resulting framework categorizes key aspects of territorial design such as territory dimensions, designed objects, design activities and group characteristics. The framework was then tested on five articles from various disciplines. The cross-cutting analysis revealed that territorial design involves creating spatial objects and governance processes accounting for spatial and social dimensions of a territory, and in some cases the design of public policies and/or symbolic representations (institutional and ideal dimensions). Emphasizing co-design, stakeholder dialogue and collaborative learning, often through transdisciplinary and interdisciplinary approaches, the process integrates analysis and synthesis phases. Our analysis also highlighted gaps, such as a limited focus on agricultural issues. These results need to be confirmed by studying a larger number of articles. If confirmed, this could lead to further research to develop methods for implementing territorial design that effectively supports sustainable agrifood transitions.

Keywords: Landscape, territory, design, review, cross-disciplinary

Purpose

Numerous research studies have underlined the highly systemic dimension of the transitions required to move towards more sustainable agrifood systems, encompassing primary agricultural production, food distribution and household consumption (FAO, 2021). We will further refer to these transitions as SAS – sustainable agrifood systems – transitions. The SAS transitions raise a large number of challenges in terms of farming systems: farmers' work, representations, organizations and knowledge (Prost et al., 2023). Nonetheless, as shown by studies about lock-ins (e.g. Vanloqueren and Baret, 2009; Meynard et al., 2018), treadmills (e.g. Bakker et al., 2020) or relational dimensions (e.g. Darnhofer, 2020), such transitions are also shaped by the other agrifood system stakeholders: input suppliers (e.g. availability or not of resistant cultivars or specific equipment), purchasers (e.g. requirement of purity), processing industries and value chains (e.g. requirement of using standardized raw products, in quality and quantity), consumers (e.g. requirement on the quality and prices of products) or institutional actors (e.g. regulations about agricultural practices). In addition, the spatial dimension of transitions needs to be considered when addressing sustainability issues such as improving water quality in catchments, enhancing biodiversity or introducing legumes in crop sequences.

To seriously investigate and support this highly systemic nature of transitions, one solution is to work at an integrative level encompassing all elements of the agrifood systems. This is what systems agronomy intends to do when it calls for working at a landscape or territorial level (Rizzo et al., 2022). In this communication, we consider that the territorial level includes four dimensions: (i) material (spatial or physical), (ii) social (organizational or relational) (iii) institutional (formal or informal) and (iv) ideal (symbolic representation) (Pachoud et al., 2022; Angeon et al., 2024). What would it mean then to consider transition at a territorial level? When addressing SAS transitions, a whole body of literature assumes that such transitions call for innovative design. They require agriculture to move in directions that are for now ill-defined, full of uncertainties, context-dependent and, in short, fundamentally unknown (Prost, 2021). The research studies on such design processes described their nature, the way to support them or the tools to organize them (see Prost (2021) for an overview). However, except for a very few studies (e.g. Etienne, 2014; Della Rossa et al., 2022; Boulestreau et al., 2023), these studies are focusing on changing farming practices and systems. They rarely explicitly encompass (i) the needed changes in the practices of the various stakeholders involved in SAS transitions and (ii) the territorial level. We thus aim at investigating the concept of “territorial design” as it seems promising to analyze and support SAS transitions. However, it varies from one author to another, and from one discipline to another, which means that there is no consensual definition but rather a multi-faceted concept (Prevost et al., 2018). As a result, we are interested in identifying the diversity of definitions and implementations of this concept across disciplines to improve its application in supporting SAS transitions. In other words, we aim at exploring what is known about territorial design, what we can learn from this approach, and what is missing if we want to use territorial design to support SAS transitions. This communication is a first step in that direction: it aims at developing and testing a review framework (this communication) that will then be used, in further studies, to produce a comprehensive literature review on territorial design and ultimately support territorial design processes in research projects to contribute to SAS transitions.

Approach

We carried out two-step exploratory review, which is close to a scoping review (Munn et al., 2018) where the identification and selection of the references are not systematic.

Firstly, we built a review framework, from the literature, that sheds light on various aspects of the concept of territorial design: ‘*territory*’, ‘*design*’, ‘*territorial design*’ as such. The *territory* aspect was explored according to the 4 above-mentioned territorial dimensions (Pachoud et al., 2022; Angeon et al., 2024). The *design* aspect was characterized according to the description of co-design processes in design literature (Stempfle and Badke-Schaub, 2002; Cross, 2007; Barcellini et al., 2015). We also relied on the few articles directly describing different types of *territorial design* (Parente & Sadini, 2017; Hémon et al., 2023): design ‘in the territories’ considers territory as a design context, design ‘of territories’ considers territory as a design object or design ‘for territories’ considers territory as a complex relational system that includes and amplifies the two other types. These elements were combined to build a framework that constitutes the first result of the “Findings” section.

Secondly, we applied this framework to a sample of 5 articles (Barrett, 1992; Neuman and Zonneveld, 2018; Braun et al., 2021; Jolivet-Duval et al., 2021; Pachoud et al., 2023). We selected these articles as they described approaches and/or results likely to lead to the design of sustainable territories. As we wanted to test the ability of our framework to be used on a diversity of disciplines

and approaches, we chose these 5 articles from different disciplines: ecology (Barrett,1992); landscape architecture and urban planning (Neuman and Zonneveld, 2018); in economics (Braun et al., 2021); design sciences (Jolivet-Duval et al., 2021) and geography (Pachoud et al., 2023).

Findings

First version of the review framework

We have developed a review framework, summarized in Fig. 1, that explicitly relies both on territory and design aspects.

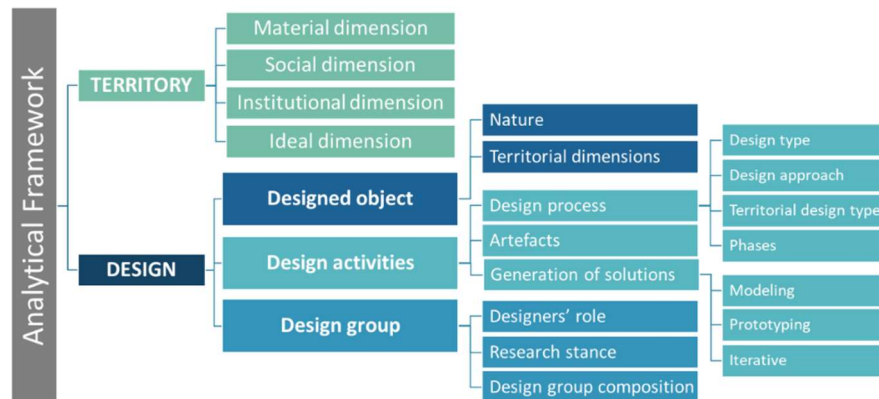


Figure 1 – The review framework relies on different aspects (first level), dimensions (second level) and categories (third and fourth level).

On the one hand, the review framework distinguishes the dimensions of the territory that are addressed: (i) spatial, (ii) social (iii) institutional and/or (iv) ideal. The material dimension refers to tangible territorial resources (spaces, flows, infrastructure, e.g. plots, rivers, storage facilities). The social dimension refers to organizational or relational dimensions (e.g. coordination between stakeholders along supply chains). The institutional dimension refers to “the rules of the game” included in formal institutions (political structure, contracts, property rights) or institutions (beliefs, norms, culture, etc.) and the ideal dimension refers to intangible resources, such as the symbolic representations that stakeholders have of the territory.

On the other hand, we used 3 dimensions to characterize the design aspect: 1) the type of designed object, i.e. the objects devised to attain specific goals, 2) the characteristics of the design activities and 3) the characteristics of the design group. We described the *designed objects* according to their nature (e.g. a combination of cropping systems, a coordination between value-chain actors, public policies) and the territorial dimensions they cover (spatial, social, institutional, ideal). We described the *design activities* through: (i) the characteristics of the design process (type, approach, territorial design type, number and type of phases) (ii) the type of artefacts used to represent the design objects (e.g. sketches, pictures, maps, mock-ups, mind mapping) and (iii) the way the solutions were generated (e.g. modelling and simulation, stakeholder workshops). We finally paid attention to the *design group* characteristics and described (i) the role of the designer (with regard to the whole design group), (ii) the type of research stance (transdisciplinary and/or interdisciplinary) and (iii) the composition of the design group (number and type of stakeholders when available).

First outcomes of the cross-cutting analysis

We first applied the framework to each article, sorting the information and content according to the different dimensions and categories of the framework (see Fig. 1). We then compiled all these elements into a cross-cutting analysis, in which we compared and synthesized the information for each category of the framework. From the analysis of the 5 articles, we gained more insight on the territorial design approach. “Territorial design” is a design approach applied to the territory, which involves considering stakeholders, co-constructing and experimenting (Jolivet-Duval et al., 2021). The approach results in designing a spatial object (spaces and flows) and/or a process that creates governance capacity (Neuman and Zonneveld, 2018), which respectively contribute to the spatial and social dimensions of territory. Jolivet-Duval et al. (2021), Neuman and Zonneveld (2018) and Pachoud et al. (2023) also reported a strong connection with the design of public policies, thus accounting for the institutional dimension of territory. The design of symbolic representations, accounting for the ideal dimension of territories was addressed in Jolivet-Duval et al. (2021) and Pachoud et al. (2023). Barrett (1992) only addressed the spatial dimension of territory, through landscape design, while Braun et al. (2021) emphasized the social dimension when designing the organization of an agrifood value chain.

In this approach of territorial design, the process of engaging stakeholders in dialogue and the tools designed to support this interaction (Neuman and Zonneveld, 2018; Jolivet-Duval et al., 2021; Pachoud et al., 2023), as well as the resulting collaborative learning (Braun et al., 2021), are key. These elements stand out as more important than the formal outcome (i.e. the implementation of the designed object) The approach therefore calls for co-design of solutions, that could create governance capacities (Neuman and Zonneveld, 2018) and co-production of knowledge (Pachoud et al., 2023). Co-design requires to involve a diversity of stakeholders: architects, landscape architects, urban planners, associations, elected representatives, policy makers, civil servants, farmers, food processors, trading companies, inhabitants and researchers from various disciplines (geography, sociology, anthropology, urbanism, agronomy, agro-landscape ecology, climatology, geomorphology, agribusiness, communication sciences, food economics) (Barrett, 1992; Neuman and Zonneveld, 2018; Braun et al., 2021; Jolivet-Duval et al., 2021; Pachoud et al., 2023). As a result, in the 5 studied articles, the authors described both (i) transdisciplinary processes, bringing together researchers and non-academic actors to solve complex problems and (ii) multidisciplinary processes supported by a bundle of disciplines.

The territorial design process also appears as encompassing (i) analysis (understanding the problematic) and (ii) synthesis (generating and formulating solutions) phases (Barrett, 1992; Neuman and Zonneveld, 2018; Braun et al., 2021; Jolivet-Duval et al., 2021; Pachoud et al., 2023). Barrett (1992) also explicitly added an evaluation phase to the process and Jolivet-Duval et al. (2021) and Pachoud et al. (2023) described a “pivot phase”, between the analysis and synthesis phases, that aims at generating controversy to transform perception. Depending on the articles, the approach is based on artefacts that address different territorial dimensions: spatially explicit artefacts (e.g. maps) (Barrett, 1992; Neuman and Zonneveld, 2018; Jolivet-Duval et al., 2021; Pachoud et al., 2023), social and organizational artefacts (e.g. mind mapping) (Braun et al., 2021), ideal artefacts with symbolic representations of the territory (e.g. drawings or photomontages) (Jolivet-Duval et al., 2021; Pachoud et al., 2023). The generation of solutions can result from modeling (Barrett, 1992) or from expert knowledge elicited during facilitated workshops (Braun et al., 2021; Pachoud et al., 2023).

Practical & theoretical implications

The first version of the review framework was successfully applied to 5 articles whose content was classified into framework's categories. We will therefore carry on our exploratory review by applying the framework to a larger number of articles that cover a diversity of disciplines and approaches that contribute to the design of sustainable territories. However, we will not seek to carry out an exhaustive review. We expect that the cross-cutting analysis of a larger body of literature will help to complete and refine the outcomes of the first analysis.

Beyond the characterization of territorial design approaches provided by the cross-cutting analysis of 5 articles, this analysis also highlights blind spots. We found that the 5 articles studied did not address all the issues needed to support the territorial design of more sustainable agrifood systems. In other words, in the articles analyzed (except for Pachoud et al. (2023) territorial design does not take agricultural issues on board, and we have not identified any agricultural objects being transformed as part of the approach. For example, in those articles, agronomy is not mentioned as a discipline to be associated in the interdisciplinary process, whereas it could support the agricultural dimension of change. Also, detailed information on tools and artefacts are lacking in the 5 articles, whereas this could be very useful to undertake new action research aimed at designing more sustainable territories. We will thus endeavor to find articles from various disciplines and describing new case studies to fill the above-mentioned gaps when carrying out the overall study.

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