Agency in transitions – Combined effect of multiple niches

Sibylle Bui

1. Introduction

Sustainability transitions receive increasing attention from scholars and the related body of literature has grown exponentially in recent years. However, due to the complexity of the processes involved, mechanisms of system reconfiguration remain a blind spot. Consequently, so does agency and the leverages which allow actors to trigger regime shifts. This paper aims at contributing to the characterization of transition mechanisms, based on the analysis of an on-going transition towards agroecology in a French small region, and thereby to the understanding of how actors can curb sociotechnical trajectories and bring about regime shifts.

The Drôme valley is a rural territory located in South-East France, where organic farming represents 30% in 2015 versus 5% at the national level. The high proportion of organic farming and the huge diversity of actors who base their development strategy on organic farming/products suggest that an agroecological transition is in process[1] and that the territorial scale provided local actors with levers which don't exist at other scales. To explore these hypotheses, I analysed the evolution of the local agri-food system since organic farming emerged in the valley, combining the multi-level perspective with a pragmatist approach.

The next section presents the conceptual challenges that need to be addressed to tackle agency in transitions. The analytical framework is presented in Section 3. Section 4 details the methodology designed to study the sociotechnical evolution of the local agri-food system in the Drôme valley, which is presented in Section 5. Section 6 stresses the transition mechanisms which allowed local actors to bring about a regime shift and discusses how these new insights question and enrich the multi-level perspective.

2. Conceptual challenges to tackle agency in transitions

The multi-level perspective (MLP) is the fundamental heuristics of the literature on sustainability transitions. It considers transitions result from interactions between processes at stake at three distinct analytical levels: the regime, i.e. the set of rules supporting the dominant technology, which gives stability to the sociotechnical system and maintains the actors on a given sociotechnical trajectory; the niches, where small networks of actors develop radical innovations, construct and test new rules around these innovations; and the landscape, which represents the exogenous sociotechnical context actors can't directly influence (Geels, 2002, 2011; Geels and Schot, 2007). When a niche develops sufficiently and appears as the most promising alternative, when tensions related to the dominant technology arise inside the regime, when landscape developments put pressure on the regime and reinforce these tensions, then "windows of opportunity" open up and the rules which have

[1] Organic farming as defined by IFOAM is a form of agroecology. Whether organic farming(s) in the Drôme valley are agroecological was an open question at the beginning of this research.

been developed in the niche percolate into the regime and provoke a regime shift. Over the past fifteen years, the incorporation of insights from a variety of disciplines and theoretical backgrounds into this heuristic have allowed refining many of the several dimensions involved in transition. However, understanding "why and how some niches set in motion transformational change at wider scales while others fail" (Berkhout et al., 2004, p.7) and subsequently, understanding "why and how some actors manage to trigger deep, systemic reconfiguration while others fail", remain key challenges for transition studies.

2.1. The need for a multi-dimensional and systemic approach to agency

The strength of the MLP is to analyse dynamics of coevolution between social and technical factors. However, transition studies tend to focus on processes of technological change (Shove and Walker, 2007). Most scholars describe the social impacts of or the social dynamics associated with technological change, e.g. how new coalitions are formed to resist pressure or to sustain niche innovations, how social changes at the landscape level influence regime or niche actors, and how the evolution of social representations makes regime actors change strategy and tackle a problem related to the dominant technology. Social aspects are taken into account, but the role of actors in transition dynamics is overlooked (Genus and Coles, 2008; Shove and Walker, 2007; Smith et al., 2005).

Numerous attempts have been made to shed light on agency dimensions. Geels and Schot (2007), building on Giddens' structuring theory (1987), argue that actors may both reproduce and change the rules and invite analysists "to zoom in on actors" (p.414). This invitation paved the way for many refinements: Elzen et al. (2011) analysed how normative pressure exerted by "outsiders" can influence the regime, Geels and Verhees (2011) showed how framing struggles between incumbent and alternative discourses performed on public stages impact cultural legitimacy and thereby influence sociotechnical evolutions, and others authors analysed more in depth the trajectories and roles of specific actors, including farmers (e.g. Lamine, 2011; Lamine et al., 2014), intermediary actors (e.g. Hargreaves et al., 2013) and civil-society (e.g. Hargreaves et al., 2011; Seyfang and Haxeltine, 2012; Seyfang and Smith, 2007). Following Smith and Stirling (2010) who emphasized the necessity of taking into account the political dimension of sociotechnical dynamics, Grin et al. (2011) demonstrated that transitions imply change in power relations. Various typologies were then mobilised or created to analyse shifts in power relations, including by Avelino and Wittmayer (2016) who stress that the focus should be on analysing levels of dependencies between actors, and Rossi et al. (forthcoming) who show that niches are "enabling relational spaces" where actors build equal interactions and collective agency.

Those various contributions fruitfully identify some specific dynamics and levers through which actors manage to influence some of the regime rules. Nevertheless, a systemic analytical framework highlighting the mechanisms by which the whole set of regime rules is profoundly altered and highlighting the way actors operate these mechanisms is still needed (Avelino and Wittmayer, 2016; Geels, 2018; Grin et al., 2011).

2.2. The need to clarify the MLP concepts

If this challenge has not been met yet, it is not only because scholars have focused on specific dynamics, dimensions or actors, it is also due to the blur contours of the MLP concepts. The definition of a regime is rather unprecise, making it difficult to use the MLP empirically

(Berkhout et al., 2004). Moreover, it may refer to the system or to its set of rules, depending on the author (Markard and Truffer, 2008) or even the publication[2]. Niche is also quite a broad notion, which leads some authors to note that the levels of niche and regime may overlap (Elzen et al., 2012) and that depending on the analytical choices made by the scholar, one technological evolution might be interpreted as an incremental change or as a regime shift (Genus and Coles, 2008). Niches and regimes are both sociotechnical configuration, but they differ in size and stability (Geels and Schot, 2007). Another distinguishing feature is that niches support radical innovations "that deviate from existing regimes" (Geels, 2011, p.27). This definition leaves much space for interpretation and has sometimes led to inappropriate use of the MLP. Indeed, many innovations are analysed without discussion of their radical nature. Techno-centred approaches are a significant trend in transition studies (Shove and Walker, 2007) where the issue of transition is sometimes restricted to the issue of broad dissemination of an alternative technology with lower environmental impact. The need for reflexivity in the empirical use of the MLP (Smith et al., 2010) is sometimes not met, which produces a certain amount of studies focusing on innovations which do not radically diverge from the dominant system (Avelino, 2011) in terms of technological paradigm, practices and rules – and giving incremental innovations the status of niche innovations, mistakenly. Examples in the agricultural sector are cases of innovations aiming at mitigating the environmental impact of intensive farming and breeding, which certainly induce changes in farmers' practices and at the system level, but which actually contribute to the adaptation and reproduction of the dominant, unsustainable sociotechnical system.

3. Addressing these challenges with a pragmatist, whole system approach

Avoiding these pitfalls is necessary to identify transition mechanisms and how actors operate them. The literature does provide all the necessary elements for conceptual clarification and it is the analyst who must make some choices (Geels, 2011) – and make them explicit. Here I chose to consider niche and regime as two analytical levels both corresponding to sociotechnical configurations which differ in size and stability, as proposed by Geels and Schot (2007). As my case study relates to the farming sector, I consider that the regime is the dominant sociotechnical configuration, formed around farming systems making intensive use of chemical inputs. This configuration is stable by definition - which is why I also refer to it as the "dominant system" - and it is underpinned by a set of rules. Niches are smaller and less stable sociotechnical configurations gathering various actors, whose rules radically differ from the rules at stake in the regime.

Which rules are we talking about? We saw in section 2 that multiple approaches and typologies have been proposed and that, although the notion of rule is a key concept in the MLP, it is rather unprecise (Genus and Coles, 2008). Rules are "what lies underneath the activities of actors" (Geels, 2011, p. 31). In the literature, regime rules encompass a wide

[2] Geels (2011, p.31) explains: "System then refers to tangible and measurable elements (such as artefacts, market shares, infrastructure, regulations, consumption patterns, public opinion), whereas regimes refer to intangible and underlying deep structures (such as engineering beliefs, heuristics, rules of thumb, routines, standardized ways of doing things, policy paradigms, visions, promises, social expectations and norms). So 'regime' is an interpretive analytical concept that invites the analyst to investigate what lies underneath the activities of actors who reproduce system elements ». According to this definition, the system encompasses a variety of heterogenous elements, ranging from material components (artefacts, infrastructures), to practices (consumption patterns) and rules (regulations, public opinion). Yet rules are precisely what defines a regime (Geels, 2002): the conceptual blur turned to fog!

variety of heterogeneous elements[3], which makes the empirical characterisation of rules difficult. To characterise rules as well as their evolution, I propose a pragmatist approach considering that the "activities" of actors consist of a set of *practices* and *interactions*, and that what lies underneath is the actors' *representations*[4]. On this basis, niches and regimes are defined as networks of actors whose set of representations, practices and interactions are underpinned by different sets of rules. Saying niche are small sociotechnical configurations whose rules radically differ from the regime rules then amounts to saying niches are small networks of actors whose representations, practices and/or interactions radically differ – i.e. on most points - from those in the regime.

Geels' recommendation is that "the analyst should first demarcate her object of analysis and then operationalise the analytical levels from the MLP" (Geels, 2011, p. 31). However, I believe operationalising the analytical levels should come out of the analysis. Indeed, I think the difficulty to reflect the role of actors in transition processes is due to two epistemological pitfalls. The first one is that social groups are defined ex ante. According to Pinch and Bijker (1984), a social group is an organised or unorganised group of individuals who share the same set of meanings attached to an artefact. It is therefore sometimes convenient to distinguish various social groups within a social category, if the individuals composing this category don't all share the same set of meanings. In the present case, the motivations leading farmers to convert to organic farming are diverse: some farmers convert e.g. for health reasons, while others are engaged in a philosophical reflection on man's relation to nature or in economic opportunism. The technical and commercial options they chose relate to these motivations and determine their transformative potential (Lamine et al., 2014). However, although the MLP literature stresses the need to base the analysis on social groups (Geels, 2004), actors are generally considered in a monolithic view and authors use categories of actors ("farmers", "consumers", "public authorities", "retailers"...) rather than social groups (for a review of these categories and of the various typologies used in the literature, see Wittmayer et al., 2017). Consequently – and this is the second pitfall, also stressed in Genus and Cole (2008) - niche and regime actors are identified ex ante, based on whether they do or do not use an alternative technology or contribute to its development. For example, scholars who worked on the case of organic farming (Belz, 2004 in Switzerland; Smith, 2006 in the UK) considered "organic actors" and "regime actors" (non-organic actors). Yet there is not *one* organic farming, but *various* forms of organic farming, ranging from highly diversified and self-supporting farming systems to highly specified and (organic) input-intensive farming systems. Similarly, there is not *one* conventional farming. These various farming systems are implemented by diverse social groups, embedded in various supply chains and supported by different networks of actors, some contributing to the reproduction of the system and others inventing e.g. new distribution channels or new consumption patterns.

To account for this complexity, I adopted a whole system approach (Geels, 2018) and conducted a "flat" historical analysis, i.e. without defining ex ante social groups nor networks. I considered that the local agri-food system encompasses all the actors who have an influence on or aim at influencing agricultural and food dynamics. To distinguish between the dominant

[3] Beliefs, social norms, world views, lifestyles, consumption patterns, users' expectations, technological paradigms, research agendas, heuristics, problem definitions, values, policies, regulations, contracts… (Elzen et al., 2012; Geels, 2002, 2011; Geels and Schot, 2007; Rip and Kemp, 1998; Shove and Walker, 2007)

[4] Actors' representations are here broadly defined and encompass all elements that influence their practices and interactions: the values the actors uphold; the way they define their role (their objectives, missions, strategies and the criteria they chose for evaluation) and the others' roles; the problems, issues and solutions they identify; their vision of agriculture, of rural development, or organic farming, of the future…

sociotechnical configuration (the regime) and alternative configurations (niches), I studied the sociotechnical dynamics at stake in the Drôme valley since the emergence of organic farming, through the prism of the three variables presented above:

- The actors of the agri-food system and their interactions;
- Their technical, social, marketing and organisational practices;
- Their representations.

I considered the regime consists of the sociotechnical configuration gathering actors whose practices and representations are in line with the macro-scale dominant agri-food system; and that niches are alternative configurations, gathering actors whose practices and representations differ radically from those of the regime[5].
To analyse if these configurations stabilise or are destabilised over time, I incorporated concepts of enrolment and interessement from actor-network theory (ANT). I considered that a sociotechnical configuration stabilises as more and more actors are enrolled (Latour, 1992), which leads to the alignment of the representations of the various actors involved in the network (Callon and Law, 1982), as well as the alignment of their practices[6]. In turn, enrolment destabilises other configurations by depriving them of some actors[7]. Interessement is mobilised to shed light on another form of influence. Interessement is the process by which one actor enforces other actors into new roles and activities (Callon, 1984). It leads to a change in practices and representations of the "interested" actors but not to their alignment with those of the "interesting" actor: the configurations the interested actors are part of are not destabilised, but the set of practices and representations they are composed of is partially modified.

[5] As stressed by (Darnhofer et al., 2014, p. 199), « the challenge is, then, to distinguish between radical change and those marginal changes which are part of the ongoing adaptations of the regime (that is changes that do not question fundamental values, paradigms, social expectations and norms, lifestyles of users, or institutional arrangements and regulations)". To do so, we use Avelino's proposition to distinguish between synergetic *versus* antagonistic dynamics vis à vis landscape developments (Avelino, 2011).

[6] The founders of the MLP already mobilised insights from ANT (including Geels, 2002; Geels and Schot, 2007; Rip and Kemp, 1998) and despite the ontological controversies this generated (Geels, 2010; Genus and Coles, 2008; Shove and Walker, 2007), further combining ANT and MLP was proven possible and relevant to analyse processes of niche development (e.g. by Diaz et al., 2013) and niche-regime interaction (cf. Bui et al., 2016). The originality of my approach here is on the one hand, to consider the building and breaking of alliances not only through the lens of interests and representations but also focusing on practices, and on the other hand, to additionally incorporate the concept of interessement (see below) which allows a more nuanced characterisation of influences.

[7] ANT analyses the construction of sociotechnical networks focusing on the relations which link the various elements within one singular network. It analyses how enrolment processes allow building a "system of alliances", by cutting the "competing associations" which linked enrolled actors to other actors (Callon, 1986). However, it doesn't analyse how breaking these ties impacts the sociotechnical network the enrolled actors where part of, nor does it shed light on how the emerging network influences the practices and representations of the actors outside the network. As such, it doesn't allow studying the impact of niche-regime interactions. Here I mobilise ANT in a whole system approach (i.e. taking into account all the components of the sociotechnical system) which allows analysing how an emerging sociotechnical configuration influences the practices and representations of actors outside this configuration, and vice versa.

4. Designing a qualitative and inductive methodology for a "whole system" approach

This pragmatist, whole system approach was used to analyse the case of the Drôme valley. This is a small rural area of 2200 km² and 54000 inhabitants, located in South-East France, between the alpine foothills and the Rhône valley. When I started my research, organic farming accounted for 16% of cultivated areas (versus less than 3% at the national scale). Additionally, it was the basis of or at least part of the strategy of a wide variety of local actors: economic operators marketing organics products locally farmed and processed; the Chamber of agriculture which employs many organic advisors, conducts experiments on alternative and organic farming techniques and convenes every two years a huge professional fair on this topic; a profusion of initiatives encouraging organic production and/or consumption, as well as local authorities. Between 2009 and 2014, the municipality communities of the valley carried out a very ambitious agenda named "Biovallée". This agenda aimed at making the Drôme valley a reference territory for sustainable development. Agriculture was one of three key strategic domains, with the objective to reach 50% of organic farmers, 80% of local and/or organic products in school canteens and a 50% reduction of pesticide use. All these elements suggested that locally, actors had managed to build up a new sociotechnical system around organic farming.

To understand if a transition process was on-going and if so, how local actors had managed to trigger a new sociotechnical trajectory at the local scale, I conducted an historical analysis of the sociotechnical evolution of the agri-food system, at the scale of the valley, from the late 1960's when organic farming first appeared until 2015. As exposed in section 3, I adopted a whole system approach and defined empirically the network of actors composing the local agri-food system. I considered all the local actors who have an influence on or aim at influencing agricultural dynamics: local authorities, The Chamber of agriculture, the agricultural education institutions, the main agricultural economic operators (input suppliers, processors, farmers' marketing cooperatives and other agri-businesses), civil-society initiatives and farmers' associations and unions. In a pragmatist stance, I analysed how their practices, representations and interactions evolved over time, particularly through the creation and breaking of alliances and the unfolding of controversies and conflicts. As we will see in section 5, this allowed to distinguish between various sociotechnical configurations and to analyse their interactions.

This inductive methodology combined ethnographic and archival work. The field work was carried out between 2012 and 2014. I observed 59 situations of interactions[8] to see how interactions and practices are built in present time and I conducted 24 comprehensive interviews[9] to obtain actors' interpretation of past and present events and circumstances. Additionally, 30 interviews conducted between 2011 and 2013 by colleagues in the frame of other research projects were integrated into the analysis. The ethnographic work was complemented by archival work. The qualitative analysis of more than 700 documents[10] gave

[8] Agricultural committees and working meetings of local authorities, training sessions organised by extension services, project steering meetings, general assemblies and board meetings of various associations and cooperatives, conferences...

[9] I interviewed some farmers, current and former elected officials and agents of local authorities, current and former advisors and elected officials of the Chamber of agriculture, some members and the director of a farmers' cooperative, members, administrators and coordinators from civil society and farmers' associations...

[10] Project documents, guidance documents, minutes of general assemblies and board meetings, minutes from work meetings, article from general and specialised press, newsletters and communication tools, grey literature...

me access to data on past controversies, negotiations, conflicts, and failed initiatives. It allowed me to deconstruct the reinterpretation actors may make in present time and to retrace the processes of sociotechnical evolution as precisely as possible.

5. The agroecological transition in the Drôme valley (1970-2015): a two-step process

The Drôme valley is composed of various communities of municipalities. The institutional context has evolved over time, but there have always been two main communities of municipalities: one in Val de Drôme, the downstream part of the valley, and one in Diois, the upstream part. They gather most inhabitants and surfaces, and were the founders of the Biovallée programme. To simplify things, the following analysis will only take those two communities into account.

5.1. Initial sociotechnical context

> "[In the agricultural secondary school]*, I was formatted, as all the kids back that time, that is to say to productivism, farm expansion* [...] *and fertilizers, agrochemicals, etc. So we came out very, very formatted. And when I settled into farming, I was in this spirit. And I remember, I had settled for two months I think, and my uncle* [...] *came to see me, and he came with a fertilizer salesperson. In the countryside, dealers always come along with a farmer because it appears like a guarantee.* [...] *He said to me: "Oh, this land hasn't seen fertilizers for a long time, you should buy NPK, potash, nitrates and all. Otherwise you'll have no grass for your animals".* [...] *Neither did the veterinary know about phyto*[therapy] *approaches nor veterinary homeopathy, so we did work with antibiotics, it was extremely traditional. On top of that came the farm technicians, who were totally in a vision... when you settled, to get the Young Farmer Grant* [...] *you had to fit in a framework for investment, to buy equipment, to invest tremendously. So I was totally into this vision* […] *with the advice from the technician of the Chamber of Agriculture, with the training of the agricultural secondary school. And the social context too, because it is just as strong, as significant as the good advice from professionals*." (Former breeder, who settled into farming in the Drôme valley in 1972)

The story told by this producer shows that in the 1970's in the Drôme valley, like elsewhere in France and in Europe, the local agri-food system was aligned with the paradigm of agricultural modernisation. The dominant sociotechnical configuration gathered producers, sanitary and extension services, and the agricultural school around a vision of the "good agriculture" based on mechanisation and intensive use of chemicals. It also gathered marketing farmers' cooperatives and local authorities. In this sociotechnical configuration, the agricultural school and the Chamber of Agriculture played a major role since their strategies and activities strongly shaped those of the other actors, and local authorities played a minor role limited to the implementation of national agricultural policies. Those policies encouraged agricultural restructuring and intensification and the development of income-generating products to maintain farming activities and combat rural depopulation. It is in this context that organic farming (OF) emerges.

OF is developed in the area both by innovative newcomers and local farmers (Polo and Veyron, 1982) who feel at odds with intensification and convert to organic farming to translate "their set of values into a set of practices" (Barrès and Bonny, 1986). The newcomers who settle as organic farmers mostly have urban background and come from France, Holland and Switzerland. Most of them are part of the second "back-to-the-land" movement which took

place after 1975 in France, and yearn for living in the countryside and entering the existing social and economic networks (Hervieu and Léger, 1979). As a result, they generally join the traditional agricultural structures such as farmers' cooperatives and exchange and experimentation groups. This mix fosters the development of OF locally.

5.2. Step 1: differentiation of two configurations within the regime

In the 1990's, OF represents a few percent in Diois. The growing proportion of organic farmers and the creation of the organic label in 1985 incite the four local farmers' cooperatives, who consider they exist to serve the farmers, to elaborate a project to structure organic supply and marketing chains for organic farmers to access the inputs they need and to add value to their products[11]. The aim is to build dedicated infrastructures: silos, tanks, composting platforms, storerooms for organic inputs. To cover the investments, the cooperatives need to increase the share of organic sales, so the project also aims at encouraging conversions and involves developing advisory skills, including by conducting experiments.

The cooperatives easily convince the elected officials of the community of municipalities of Diois (CCD) to support their project. In a context where rural development policies take a "territorial" and a "quality" turn (Buller, 2002; Goodman, 2004), OF appears as a way to maintain agriculture thanks to a better reward of products and to create a positive image of the area. Together, CCD and the cooperatives found a non-for-profit association to lead the project.

This alliance is critical as it allows benefiting from the support of *departemental* authorities[12] which have direct connection with EU agents and manage to get a special envelope from the European Union. These credits act as a driving force: the cooperatives benefit from funds national and regional institutions wouldn't have granted otherwise and the resulting, high rates of funding incite the cooperatives to develop a more ambitious and longer program. The initial six-year project is deployed for ten years and gives visibility to Diois, which starts appearing as an innovative area at the national scale. The influx of funding has other symbolic impacts locally: it increases both the legitimacy of organic farmers who stop being perceived as eccentrics, and the credibility of OF as a way forward for the whole local agriculture. This translates into the conversion of Diois agricultural leaders and consequently of more farmers. Additionally, it fosters the enrolment of CCD, as shown by the title of its guidance document in 1995: "*Organics, the future of Diois*". The recruiting of the coordinator of the project by CCD in the late 1990's proves the institutionalisation of this vision and of the role of CDD as a legitimate stakeholder.

The inter-cooperative program has a structuring effect both technically and commercially - OF reaches 10% in 10 years. It also has a significant impact on the representations of the other actors of the local agri-food system. To participate in the project to receive funding, the Chamber of agriculture recruits its first organic advisor and the agricultural school implements its first training module on OF: OF, which had hitherto been an invisibilised model to the major players, is put on their agenda. Consequently, in the 2000's, in the downstream area which is

[11] Back then, the organic label was assigned to the whole holding, and holdings in the Diois area generally farmed cereals, grapes, and aromatic and medicinal plants. Initially, only the grain cooperative and the aromatic and medicinal plant cooperative were engaged in the reflection. To structure organic chains, they managed to enrol the supply and the wine-growing cooperatives.

[12] In France, Départements are the next institutional and administrative level above municipalities' communities.

more intensive than Diois, many farmers, processors and other cooperatives engage in organics[13].

This momentum is maintained with the combined actions of various actors. In the early 2000's, the CCD proposes "land management agreements"[14] to support conversions and the measure is very successful. For Diois cooperatives, organic crops have the highest profitability, they allow them to maintain themselves and even to grow. For instance, in 2006, for the grain cooperative, organic crops represent 30% of the collection but generate 45% of the revenue related to cereals marketing. In an increasingly competitive environment where small cooperatives tend to disappear, OF represents a solution for local farmers to keep control of their cooperative tool. The grain cooperative invests in a seed platform to produce organic seeds adapted to local conditions. It also merges with the supply cooperative and redefines its advisors' routines, disconnecting their salary from product sales[15], focusing their activity on extension services and developing their 'organic' skills (trials on high value crops and advices on farm seeds to foster farmers' self-sufficiency). The other cooperatives also continue supporting the development of OF. For instance, the wine-growing cooperative purchases grapes the same price as organic grapes during the conversion period, although they can't be processed as organic. These combined actions allow OF to raise from 10 to 25% in a few years in Diois[16]. Thanks to their positioning on OF, small holdings and their cooperative structures are better maintained in the Diois than elsewhere in France.

As organic farming develops, its image evolves. The Chamber of agriculture starts acknowledging its technical interest: it creates new positions for organic advisors, implements dedicated experimentations, and in 2007 organises a professional fair on alternative and organic techniques[17]. This legitimises OF as a sound technical model. One advisor witnessed a shift in representations at this period: conventional farmers started saying they were "*not technical enough to convert to organic farming*". The Chamber becomes the number one chamber for OF and gains recognition at the national level. However, in its guidance documents, OF remains a marginal issue: recruiting organic advisors is a way to retain control of extension services, in a context where organic farmers gain significance and Diois cooperatives further develop (organic) advisory skills. At this period, the agricultural school also makes a strategic move towards OF. Threatened with closure, it decides to specialise on OF, which eventually does avoid closure.

[13] This is of course also fostered by changes at the landscape level consisting of an increase of demand for organics, but the dynamics is much stronger in the valley than elsewhere and interviews and archival work allowed us to identify that it results from the shift of the major players.

[14] In France in the late 1990's, land management agreements (*contrats territoriaux d'exploitation*) are the main instrument to foster sustainable agriculture. This French program is a national application of the "second pillar" (i.e. rural-development related) of the European Common Agricultural Policy. Its implementation is decentralised: local authorities elaborate together with local agricultural actors a standard contract defining the set of practices that will allow farmers to benefit from public support for five years. This decentralisation caused great heterogeneity in local implementation. The Diois area was characterised by a focus on organic farming and the tremendous success of the contract (although the Chamber was not forthcoming).

[15] Before the merging, all employees worked in both cooperatives.

[16] During the 2000's, the organic grain collection reaches 30% and the production of organic wine multiplies ten-fold, resulting in the creation of almost forty jobs. The wine-growing cooperative reaches 116 employees, which is significant in a territory of 10 000 inhabitants.

[17] The latter is so successful it becomes a two-yearly event attracting many: 4000 in 2007, 16500 in 2017.

All organic chains of the valley experience a boom in the 2000's. The local aromatic and medicinal plants chain is particularly emblematic here. The outstanding quality of its products achieves international recognition and many companies who wish to process these products settle in the valley – generating hundreds of employments, mostly in the downstream part. The municipality community of Val de Drôme (CCVD) starts considering OF as an economic drive. It proposes CCD to elaborate together a project at the scale of the whole valley, taking organics as the foundation of an endogenous development. In 2006 they cease the opportunity of a national call for "rural centres of excellence", and design a project focused on the sectors of organic aromatic and medicinal plants and eco-construction – another well-developed sector in the valley. In 2008, they cease another funding opportunity offered by the Region[18], which calls for innovative pilot projects with an integrated approach to sustainable development. This encourages the two institutions to move towards a more ambitious and integrated project: the Biovallée programme, which aims at making the Drôme valley the European territory of reference for sustainable development. The objectives for local agriculture include reaching 50% OF in 2015 and are far more ambitious than the national goals prevailing at that time (table 2). OF is promoted as a model agriculture: CCVD has also been enrolled and its vision and policies are now aligned with those of CCD. Thanks to their alliance in the Biovallée program, local authorities increase three-fold their budget for agriculture and thereby strongly enhance their capacity to orient the other actors' activities.

	National objectives for 2018/2020	Biovallée objectives for 2015
% organic farming	20%	50%
Reduction in pesticide use	-30% if possible	-50%
% organic or local products in school canteens	20%	80%

Table 2 – Ambitious objectives of the Biovallée programme in the food and farming sector

Hence, a first transformation of the sociotechnical system starts in the early 1990's. A new sociotechnical configuration emerges within the regime, as a result of the change of practices of some farmers and the inter-cooperative project. It aggregates more and more elements thus becoming more stable. Practices and representations of the various actors of the agri-food system co-evolve during two decades, and at the end of the 2000's, the regime is composed of two sociotechnical configurations, which partially integrate the proposal of organic farming[19]: one which remains in line with the paradigm of agricultural modernization and one which gathers some farmers, the Diois cooperatives, the two local authorities and the agricultural school around a new sociotechnical trajectory and a set of representations I propose to refer to as the paradigm of 'ecological modernization'. 'Ecological' because OF is considered as a way forward for all local agriculture, and 'modernisation' because it doesn't question the functioning of the dominant system. As we will see in the next section, this is the first step towards a further, more profound reconfiguration of the local agri-food system.

[18] In France, Regions are the next institutional and administrative level above Départements and municipalities' communities.

[19] « Partially » because neither embraces the proposal of organic farming in all its technical, environmental, economic and social dimensions, as it is defined by IFOAM or in the Charter of the French organic movement.

5.3. *Step 2: development of a radically alternative configuration and interaction with the regime* [work in progress – to be synthetized and complemented]

In the 1990's appears a new collective actor representing organic consumers in the sociotechnical system. At this period, the Diois area is experiencing a demographic renewal. Newcomers yearn for a quality of life contrasting of the urban model... and for organic food. There is only one small grocery store in the city of Die, where they can't find all they are looking for. A dozen families creates in 1990 a joint buying group in the Diois area, firstly informal, and then under the status of a community organisation called La Carline. They rent a small facility where a few voluntaries organise twice a week the distribution of organic dry goods. Among its members, some are farmers who progressively raise the awareness of the other members of the group to agricultural issues. These farmers are all organic and new settlers who arrived recently[20].

La Carline's objectives evolve over time. As a result of the interactions between some farmers and consumers, they progressively integrate the social dimension attached to the development of organic farming: after a few years, the stated objective is to promote organic food for health and environmental reasons, but also to support local farmers. However, the purchasing policy is based on criteria of guaranteed organic quality and price, without making a distinction between local farmers and wholesalers, which in practice favours wholesalers: the objective is not so much to support local farmers, it is to support small-scale farming[21]. Although supporting small-scale farming becomes an important value for the members of La Carline at this period, it is not yet translated into practices.

In 1992, La Carline is invited to be a member of the mixed commission which attributes the Nature et Progrès organic label[22] and thereby gains legitimacy as the unique organisation representing organic consumers. It then starts implementing actions to raise the awareness among general public and elected officials.

La Carline's activity strongly develops. The number of members rises from 30 to 300 in the 1990's, and up to 600 in the 2000's – which shows that locally demand for organic food increases. The raising number of members and the greater variety of products generate more than 425 000 euros revenue. The voluntary participation and the small facility where products are distributed are not sufficient anymore. La Carline recruits four people and moves to a bigger place, which opens every day. During this period, awareness as well as the understanding of the complexity of agricultural issues are rising. The employees – which are all historical members of the association - actively look for local suppliers. The selling of local, fresh fruits and vegetables is also implemented: consumers and producers learn together how to set up a local food chain. Nevertheless, local products remain a very small part of the sales, accounting for only 5%. The impact is limited in terms of revenue, but it is very strong at the cognitive level.

The representation of organic farming inside La Carline strongly evolves during the 2000's. It gradually entails additional aspects, providing it a transformative potential. It embraces

[20] Contrary to those who arrived in the 1970-1980's, they don't participate in farmers' cooperatives because they market their products directly or in specialised, organic supply chains.

[21] As advocated in La Carline's newsletter at this period, the wholesalers La Carline works with mostly purchase their products from small-scale farmers.

[22] Nature et Progrès is a French pioneer organisation of organic farmers, which created in 1961 the first specifications for organic farming. It label is assigned by local commission composed of farmers and consumers (participatory guarantee system). Its standards are a lot higher than the European label for organic farming, and include economic and social specifications. It is very well developed in the Drôme department.

broader values such as social equity, which La Carline translates into practices by offering a fair price to producers, durable and good paying jobs to its employees and by seeking to make organic food accessible to all. This representation changes towards a much more radical vision of organic farming than the one of the other actors of the valley, which explicitly questions the organisation and governance of the local agri-food system. This impacts its objectives and the network of actors its members consider to be relevant to reach them. Indeed, in the late 2000's, La Carline seeks to influence the development of short supply chains and to support the setting-up of new organic and small-scale farmers in the Diois area. Most of all, it pursues this goal no more for the sole benefit of its members, but to develop an alternative economic tool which brings together producers, consumers and retailers around local food chains. In 2008, it adopts the status of a "collective-interest cooperative society", with a shared governance between these three groups: it becomes what can be called a niche in a multi-level perspective.
La Carline's activity was hitherto only accessible for members. Changing its status allows it to open a 160 m² store open to everyone. Its commercial success is rapid and tremendous, reaching more than 1.4 million euros revenue and supply 10% of the local population in 2012. This changes the image of organic consumers, often perceived as "retarded hippies", and fosters recognition, including by CCD which invites La Carline to be a member of agricultural committee. It also awards grants for La Carline to develop local supply. These grants foster the creation of a genuine collaboration between La Carline and the Chamber of agriculture around the training of market gardeners and the structuration of various local supply chains.

In the late 2000's, other initiatives which also evolve into sociotechnical niches emerge[23]. One of them is a logistic platform called Agricourt which gathers in its governance consumers, producers, processors, private restaurants and canteen managers and provides a wide variety of organisations with local products from small-scale - mostly organic – holdings. Initially, it was a community association created in 2009 by a group of parents who wanted their children to eat better at school and to conduct awareness-raising measures to convinced other parents, elected officials and canteen staff of the importance of feeding children with fresh and seasonal products instead of agro-industrial food. Its members rapidly realised that awareness was not the only issue and that there were logistic barriers for fresh food provision. They decided to tackle these barriers and to create a distribution platform to supply school canteens. During the feasibility study, they met producers, got acquainted with agricultural issues and realized that they should share the governance of the platform with local producers. In their search of financing, administrators of Agricourt met CCVD. As their initiative would help reaching Biovallée's objective for school canteen, they benefited from critical support. The activity started in 2011, with a few primary schools identified during the feasibility study and a few buying groups created by inhabitants wishing to support the development of Agricourt. At first, it relied strongly on voluntary work (more than 1000 hours the first year) but it rapidly grew, as more producers but also local, small-scale processors joined the project, to serve more and more clients. This growth and public subsidies (investment aid from local authorities, State-aided contracts) allowed the platform to quickly develop skills and build infrastructures.
The governance was widened to all actors concerned by the development of short food chains as their understanding of agri-food issues improved. Objectives co-evolved, and now

[23] For a more detailed analysis of the creation and development of the catering initiative Agricourt and of the farm incubator Compagnons de la terre, see Bui et al. (2016)

encompass structuring local food supply chains and paying fair prices to the farmers to support local, small-scale agriculture. Practices are defined accordingly: trade margins are lower for products from local and small-scale holdings to better pay such producers and to encourage clients to choose these products; all orders, even non-profitable orders, are completed; prices are defined in coordination with the producers... The rules which are built within Agricourt are elaborated or at least validated by the board, which means they are the result of a compromise between consumers and producers.
Interactions with a wide diversity of actors has strongly influenced Agricourt's representation of its own activity. Its members now consider their activity as a service of general interest and as a tool to develop the local economy, to foster food democracy and to give citizens greater control of the food economy. They ensure accessibility to quality food for all inhabitants of the valley and serve a great diversity of organisations (primary and secondary schools, nurseries, private restaurants, company restaurants, groups of inhabitants), even in remote places and for micro organisations which are not profitable. The next step is to turn into a cooperative and to include local authorities in the governance. In 2015, Agricourt was working with 80 local producers, with more than forty food buying groups, nurseries, schools as well as private and company restaurants. 60% of meals served in school canteens were prepared with products supplied by Agricourt, i.e. fresh and seasonal products from local, small-scale farmers and processors and a fair distribution channel. In other words, Agricourt influenced local consumption and distribution patterns in a significant way.

Another case of sociotechnical niche is an initiative of a community association called Compagnons de la Terre, which was created in 2006 by some farmers and employees of the agricultural school. Initially, the aim was to foster the setting up of young farmers in the valley. Acknowledging that young people coming out of the agricultural school faced difficulties in setting up because they were mostly atypical potential entrants to farming (i.e. people not coming from farm families, who have innovative projects and wish to settle in organic farming) and because farmers who retire usually prefer to cease their land to a neighbour farmer than to someone they don't know – and even more when his/her project is original - Compagnons de la Terre created a farm incubator for potential entrants to come and test their project for two years. There, they could test its technical feasibility, but also set up marketing circuits and build up a social network that would help them to find land. Compagnons de la Terre provide land, equipment and project guidance, but more on aspects related to networking and life plan. For technical advice, the idea is that project holders are put in contact with advisors from the Chamber of agriculture and local farmers.
The farm incubator is created in 2008. At first, Compagnons de la Terre see the farm incubator as "the missing link" of the conventional land-access system. Accordingly, it sets up a steering committee gathering the Chamber of agriculture and the other actors traditionally involved in farmland management, as well as CCD. It easily gets support from CCD which had been stressing the issue of setting up in agriculture for decades, and consequently decides to lend 1,5 ha for the farm incubator. However, a change in the majority the same year threatens the project: the area becomes classified as a nature reserve, which strongly constrains the project (for example, impeding the construction of greenhouses). Moreover, as no formal links bound the participant organisations, the steering committee progressively crumbles. Compagnons de la Terre, who had in mind from the start the project of creating "decentralised incubators" try to set up alternative collaborations and to find other locations but don't succeed.

In 2010, CCVD contacts them and asks them to manage a farm incubator it wishes to create in the frame of the Biovallée program, offering land and funding to buy equipment, carry out the work to adapt the holding and to hire a coordinator. These new resources will lead Compagnons de la Terre a lot further than they expected.
Seven project holders settle in the farm incubator between in 2011-2012. They all wish to market directly their products. Thanks to the Biovallée funding, Compagnons de la Terre build new infrastructures such as a cold room, a processing plant and a facility for farm sales: the farm incubator does not only provide production means, but also processing, storage and distribution infrastructures.
From the start Compagnons de la Terre expressed in their status their will to support organic farming, to develop new forms of transfer of knowledge and skills and to favour the creation of new economic opportunities in respect of the environment and social ethics. This position in support of new forms of education and advisory services and of a divergent representation of the contribution of agriculture in economic activity certainly explains why the initial network organised by Compagnons de la Terre crumbled.
[+ co-construction with CCVD of an alternative scheme of farmland management: CCVD buys land and lends it to Compagnons de la Terre. A project holder sets up and can buy the land after the test period. Then CCVD buys another land]

[+ case of the goat farmers' union and its project on phytotherapy and aromatherapy. Funded then rejected by the regional coordination body for research on goat farming because not critical enough, this project is funded in the frame of the Biovallée programme, despite the lack of academic support. The experimentation program starts with a dozen farmers, and a pharmacist and a veterinary who teach them how to elaborate themselves some treatments for their animals and how to evaluate the results. The program lasts for two years, then the union manages to enrol FIBL, a Swiss research institution specialised on organic farming mostly present in Switzerland, Germany and Austria, which seeks to expand its activity in other EU countries. At the end of the second phase of the program, the national organisation in charge of farmers' lifelong training asks the farmers' union to organise training sessions on phyto and aromatherapy for farmers coming from all over the country. Following the enrolment of FIBL and this national recognition of the importance and interest of the program, the topic is put on the agenda of the regional coordination body for research on goat farming]

[These various initiatives share a common set of representations I refer to as the paradigm of "radical ecologisation", as its representation of the "right agriculture" is totally different from the one in the dominant paradigm, both in terms of farming system and in terms of agri-food system. Surprisingly, these initiatives have very few interactions back then: the paradigm of radical ecologisation is supported by a network as conceived by Thomas Hughes (1983), a seamless web].

[+ Reshaping of the Biovallée programme following the failure of collaborations with mainstream actors and resulting of interactions with these niches. The initial strategy of the Biovallée program was to foster the structuration of a local agro-industrial cluster specialized in organic products, to encourage farmers' conversions to organic farming and to maintain the added-value in the territory. However, these outlines have strongly evolved as the program was implemented.]

[+ Further fundamental changes come about in the sociotechnical configuration related to ecological modernisation. Including, evolution in the role of the cooperatives, e.g. the grain cooperative. In 2008, it sets a target of 100% organics. It initiates the creation of a cooperatives' union for cereals marketing with neighbour cooperatives which wish to delegate this task, which allows it to manage larger volumes and improve its knowledge and bargaining power in the market of organic cereals. Then it buys a feed mill and turns it organic to provide outlets for diversification crops[24] and in 2012 it invests in an organic egg-firm to ensure the added-value is distributed to the farmers. With the objective to keep its autonomy, this cooperative combines an original position which is not to grow not to draw attention from larger cooperatives, with a more classical strategy of vertical integration. This allows knocking down the barriers organic grain chains usually encounter. It doesn't intentionally seek to change the dominant system – most of its collection and the eggs are sold in long circuits - yet it creates new practices which lead to a greater control of the supply chain for the farmers and their cooperative, and all the organisations it is linked to are located in or near the Drôme valley. It thus invents a new model contributing to the ecologisation of farming practices and to the relocation of the major part of the supply chain.]

[+ The budget of the Chamber of agriculture has been decreasing for a decade, which forces it to look for project financing and consequently, to actively contribute to the development of organic farming and to the Biovallée programme - although it is not one of its priority and although it still embraces the productivist paradigm, as demonstrated by the fact that its elected official denigrates the objectives of the Biovallée program, saying that "*organic farming can't feed the world!*".
During this period, the Chamber of agriculture works with the cooperatives on the testing of varieties, supports farmers who wish to convert and conducts part of the animation of their subsidised projects to develop OF. It also organises demonstrations days and training sessions on alternative techniques, in the frame of the Biovallée program, which gather conventional and organic farmers and contribute tearing down barriers. During one of these demonstration days I attended, a local company of agricultural machinery showcased a self-engineered equipment for mechanical weeding: various local actors, such as this company, join the dynamics around OF, and the artefacts and practices they build foster interessement and enrolment of more farmers. + creation of an experimentation platform (it had refused of few years earlier)]

[Agricultural school: The content of the training (farm-saved seeds, animal phytotherapy...) show that it aligns with the paradigm of radical ecologisation.]

6. Discussion: insights on transition mechanisms and agency

The analysis of the evolution of representations, practices and interactions between actors of the local agri-food system shows that a profound reconfiguration of the whole local agri-food system - i.e. a transition - is on-going in the Drôme valley. As we will see now, it appears to be a much more complex dynamics than described by the MLP. Accounting for this complexity allows shedding light on the agency dimension of the transition process.

[24] Conversion to organic farming implies higher crop diversity on the farm, to reduce reliance on pesticide use.

6.1. A two-step process occurring through interessement and enrolment mechanisms

The first step occurred in the 1990's and consisted in the differentiation of two sociotechnical configurations, which partially integrate the proposal of organic farming, within the regime: one which remains in line with the paradigm of agricultural modernization, one which gathers some actors around a new sociotechnical trajectory and what I refer to as the paradigm of 'ecological modernization'. This latter configuration gathers the farmers' cooperatives of the Diois area. First, it enrols local authorities (CCD). The enrolment of CCD is performed in the 1990's through the inter-cooperative project which tackles the issue of maintaining local agriculture – an increasingly critical issue at that time for CCD and which had found no solution in agricultural modernisation. The enrolment of CCVD is performed in the 2000's as the cooperatives' trajectories demonstrate OF is an economic driver. Second, it influences the other actors of the dominant system (interessement processes). To receive funding from the inter-cooperative project, the Chamber starts providing advisory services to organic farmers and the school starts proposing training in organic farming. Then, as organic farming expands, the development of advisory skills by the cooperatives constrains the Chamber to recruit more advisors on OF to preserve its hegemony in the local agri-food system. In the 2000's, the commercial and technical success of organic farmers and cooperatives further influences regime actors. The representation of OF switches from a marginal model, only suitable for farmers from mountain areas who need to position themselves in niche markets, to a sound and relevant technical model, as shown by the creation by the Chamber of a dedicated professional fair and of an experimentation platform. This legitimises OF and provokes a massive adoption of some OF practices by conventional farmers (e.g. nowadays 50% of all local grain farms use mechanical weeding), i.e. the alignment of their representation with the one of the Chamber and, to some extent, to the mainstreaming of some agroecological farming practices. The representation of OF in the dominant configuration also changes in relation to commercial aspects. It becomes a strategic sector, as shown by the positioning of almost all economic actors on organic farming or products – a momentum reinforced by the increasing demand for organics at the landscape level. Hence, the paradigm of agricultural modernisation locally evolves which puts OF on the agenda of all the actors of the local agri-food system.
The paradigm of ecological modernisation also evolve. The sociotechnical configuration carrying it stabilises over time, as more actors bringing in more resources are enrolled (CCVD, agricultural school, machinery retailer…). The new actors, infrastructures, artefacts, practices and representations it aggregates form a larger and more coherent set of elements. Their interactions make new representations emerge, including more autonomy and control for farmers and relocation of the supply chains, which gradually provokes the total re-organisation of parts of the agricultural sector, e.g. for arable crops.

The second step takes place in the recent period. Actors in line with a paradigm of "radical ecologisation" manage to enrol regime actors (the two local authorities), thanks to their commercial success (case of Carline) or through their participation in the Biovallée program (cases of Agricourt, the goat farmers' union and Compagnons de la Terre). Ultimately, in the 2010's, some actors in line with the paradigm of radical ecologisation manage to enrol some regime actors: the two local authorities. Parallel to that, the agricultural high school also embraces this paradigm because it allows it to develop specific skills preventing closure.

Analysing changes in practices, representations and interactions between actors sheds light on processes of enrolment on the one hand, and processes of interessement on the other hand. Processes of enrolment lead to visions and practices alignment, making some actors move from one sociotechnical configuration to the other. Thus, some actors circulate from one sociotechnical configuration to another, which leads to a greater number of actors in alternative configurations. Figure 2 brings to light two steps.

The first step corresponds to the setting-up of a 'transition context': the representations of some regime actors align with the paradigm of ecological modernisation and they start considering OF as a way forward for all local agriculture. This first step is essential, because their visions become compatible with more radical representations[25]. It is preparatory and necessary to the transition process provoked by the enrolment of these regime actors into the more radical, alternative sociotechnical configuration (second step), composed of multiple niches. Contrary to the "stretch and transform" process described by Smith and Raven (2012) through which the mainstream selection environment is restructured in ways favourable to the niche, here the process is contingent and does not result from a niche's deliberate action to transform the selection environment.

[25] This confirms the importance of accounting for the discrepancy within the regime stressed by Smith et al. (2005).

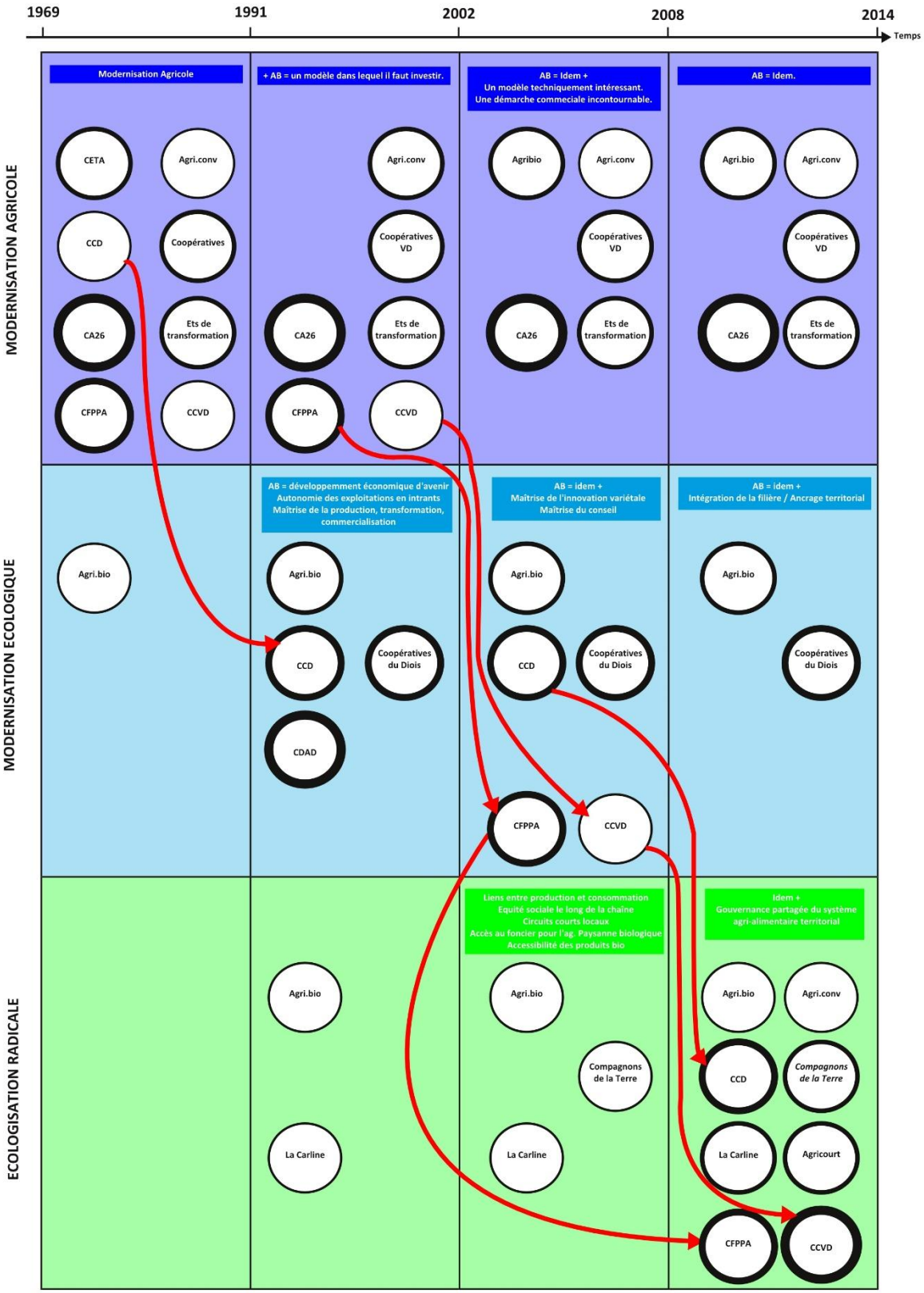

Figure 2 [to be translated to English] – Circulation of actors from one configuration to another. The three horizontal bands are the paradigms. The columns are the various time periods. In colour rectangles are described the representations of organic farming, so their evolution can be note from the left to the right. The circles are the actors. Line thickness is related to the actors' influence capacity i.e. power. Small, white rectangles attached to the circles show emerging practices [to be added]. The red arrows show the circulation of actors from one configuration to another along time.

6.2. The combined effect of multiple niches

Our socio-historical analysis shows that various initiatives evolving into niches co-exist and interact with the regime in the recent period. These initiatives have different proponents and trajectories. La Carline and Agricourt were created by civil society and emerged at the margin of the regime, whereas the aromatherapy project and the farm incubator were pushed forward by agricultural actors, within the regime. Despite these differences, all trajectories follow a unique sequence pattern (cf. Bui et al. 2016):

- Phase I: objectives are related to a rather specific problem or issue and carried by a homogeneous group of actors (individuals from the same social group or, as it is the case for initiatives created by agricultural actors, the network of actors in charge of the issue in the dominant system).
- Phase II: these individuals gradually realise through their interactions with other actors that the issue they wish to tackle is linked to other agricultural challenges, that these challenges are related to the way various actors interact and that their initiative will have greater impact if they build an alliance with these actors. This increasing awareness leads them to define new objectives and to invent new forms of interactions, new practices or new infrastructures. They enlarge the circle of actors involved. This process leads to a greater specification of the objectives and to a profound modification of the network of actors involved (enlargement and change in the governance for all viewpoints to be expressed in the cases of Agricourt and La Carline, break with the incumbent network of actors and creation of new alliances in the other cases). This is when the initiative becomes a niche. During this phase, interactions with local authorities provide key resources (funding, legitimacy) and intensify exchanges and interdependencies between the involved actors.
- Phase III: the coevolution of practices, representations and interactions within the niche leads to the construction of an alternative model (economic for La Carline and Agricourt, of land management for Compagnons de la Terre, related to animal-health management for the goat farmers' union) and to the construction of radically alternative visions of food and farming issues, as well as the related network of relevant actors. These visions are gradually shared by a wider range of local actors, including outside the niche, including by local authorities.

Eventually each niche aggregates various elements (infrastructures, practices, representations) in an alternative model which impacts various components of the local agri-food system. For instance, La Carline influences farming practices by providing outlets for local organic farmers, consumption practices by giving access to organic food at a reasonable price for all inhabitants of Diois, public policies by being a member of the Diois agricultural committee, supply chains as it supports local food chains and symbolic meanings by changing the image of organic consumers by building a viable economic tool. However, if each niche influences various components of the sociotechnical system (consumption, production, processing, distribution, research, extension or public policies), it has a significant impact on only one or two components: La Carline works with only a few dozens local producers but supplies a tenth of Diois population with organic products; the aromatherapy project only involves fifteen farmers but it managed put the topic of alternative treatments back on the agenda of the regional coordination body for research on goat farming; the farm incubator has only welcomed a dozen project holders so far but it strongly impacts local policies on farmland management; Agricourt also works with a few dozens producers of the Drôme valley

but it allows 60% of the meals served in school canteens to be made out of products coming from local, small-scale farmers and fair supply chains.
The multi-level perspective considers that various radical innovations are developed in niches, until one of them appears as the most promising and that it is the interaction between this niche, the regime and the landscape that possibly trigger a sociotechnical transition. Our whole system analysis of the sociotechnical dynamics in the Drôme valley shows that multiple niches co-exist and exert pressure, simultaneously but not in a coordinated manner, on the various dimensions of the regime. It is this simultaneous pressure exerted by niches aligned with the same paradigm that provokes a reconfiguration of the local agri-food system. This result calls for the following modification of the MLP diagram proposed by Geels (2002, 2011):

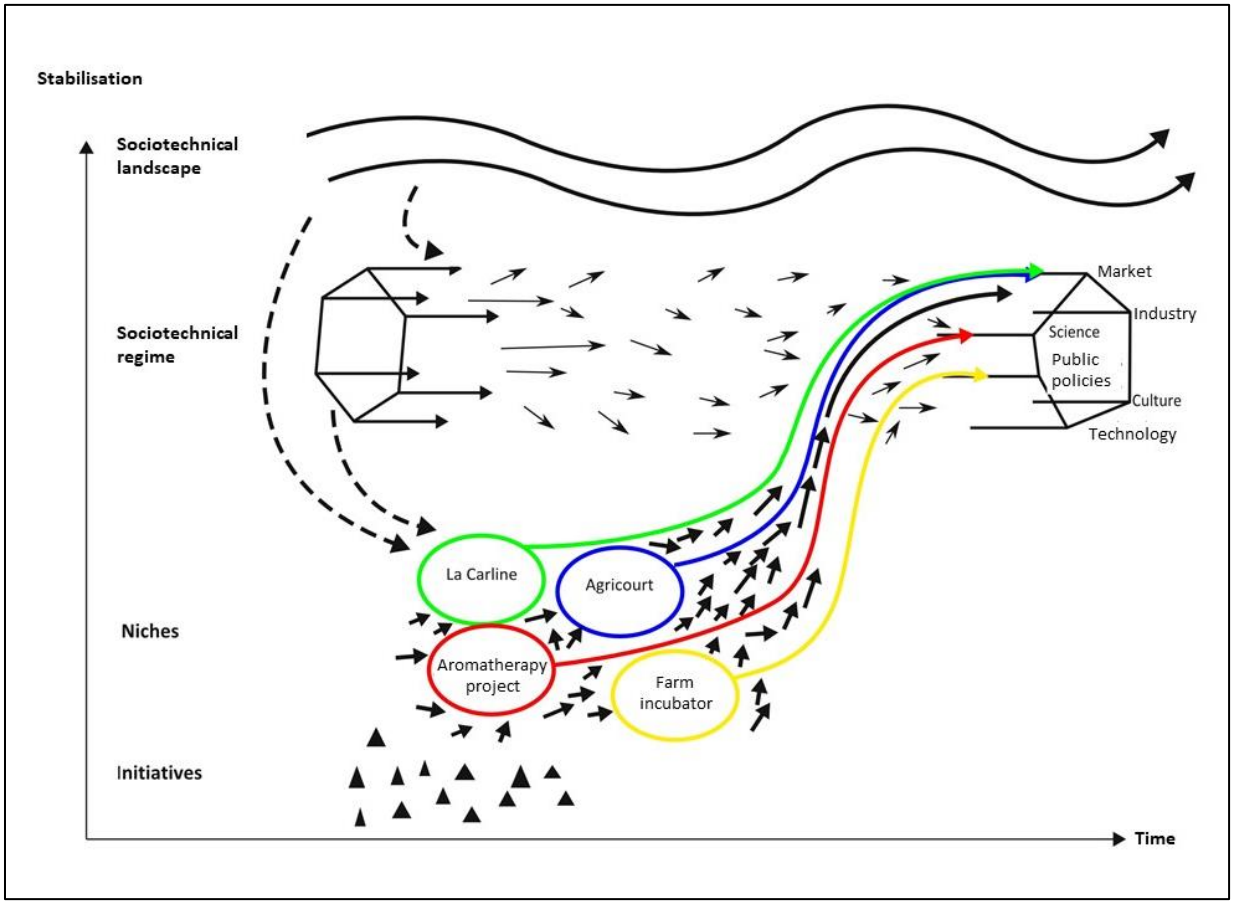

Figure 4 – Co-existence of multiple niches impacting the regime simultaneously: various niches co-exist, become aligned with the same paradigm, enter in interaction with the regime and simultaneously exert pressure on the various components of the agri-food system, which triggers a transition process. An additional level ("initiatives") is introduced as the analysis showed the relevance of studying niches trajectories from the start, before they actually are niches.

6.3. Redefining the relevant network of actors: changes in power relations [work in progress]

As stressed by Geels (2005, p.453), "because the linkages between processe at different lovels are made by actors in their cognitions and activities, the dynamics are not mechanical, but socially constructed. [...] Transitions are contested and different groups struggle, negotiate and form coalitions". Looking at the practices, representations and interactions between

actors allowed us to highlight the coexistence of a dominant configuration, aligned with the paradigm of agricultural modernisation, and two alternative configurations, one aligned with the paradigm of ecological modernisation, and the other aligned with the paradigm of radical ecologisation. We showed in Section 5 that the actors in line with alternative paradigms managed to make OF a structuring element of the agri-food system, which indicates that the power relations have been altered.

Our historical analysis shows that enrolment processes allow actors to change power relations. First, organic farmers manage to bring forward their practices and visions through the enrolment of the cooperatives and CCD, which lead the Chamber and the agricultural school to consider OF falls within their scope and to modify their activities accordingly (setting up organic advice and training). As the actors in line with the paradigm of ecological modernisation managed to enrol more numerous and more powerful actors, power relations were modified, and they could influence the representations of incumbent actors, as well as orient their activities. As previously described, this trigger a first reconfiguration process, prior to a deeper reconfiguration resulting from niches-regime interactions.

Analysing these interactions between four niches and the regime sheds light on the mechanisms of deeper reconfiguration. Within niches, actors build and test new rules. These rules radically differ from those underlying the dominant system, since they question the organisation of this system. For instance, Agricourt and La Carline both say they want to be a platform or a store "*not like others*". They both call for reconnecting producers and consumers and for defining new business practices, giving greater control of the food chain to producers and consumers. The project of the goat farmers' union designs a strategy of animal health management which give back to farmers control of inputs, knowledge and prescription. Lastly, Compagnons de la Terre acts to widen the management of farmland to civil society and local authorities, to ease the setting up of atypical entrants in farming. Hence, the radical nature does not lie in the technology, but in the calling into question of the organisation of the agri-food system. The projects built in the niches challenge the dominant system, which creates conflicts between niche actors, calling for social innovation, and some of the regime actors seeking to maintain their dominant position.

The development of niches occurs through enrolment processes performed by niche actors. These enrolments lead to the creation of new links allowing the integration of new actors in the project. Contrary to what ANT usually considers, these enrolment processes don't trigger the breaking of competing associations that enrolled actors previously had with other actors. The development of the four initiatives, fostered by the enrolment of local authorities, doesn't imply the breaking of competing associations. It implies the creation of new associations, not *instead of* but *additionally*. There are breakings in the cases of the farm incubator and of the phytotherapy project, but they are provoked by external actors who supported the initiative at the beginning and then stopped (e.g. the Chamber stop attending the steering committee of the farm incubator, the regional coordination body for research on goat farming stop funding research on phytotherapy).

Within niches, actors build new links with other actors, without necessarily willing to challenge the incumbent regime. The interactions between the practices and representations of these various actors made possible by these new links foster the emergence of new ways of addressing the problems and new ways of considering the governance[26] of the agri-food system – distributing more broadly decision-making power related to the organisation of food

[26] Governance considered as distribution of decision-making power

chains, of research, of land management. Thus, the rules built in the niches results from an evolution of the vision of the network of "relevant" actors to tackle a given issue.
Through their interactions with CCVD, niche actors convince elected officials and officers their vision is relevant, and the enrolment of CCVD provokes the integration into the network considered as "relevant" in the regime, of actors who were previously excluded: local authorities in the network of actors managing farmland, FIBL and private experts in the research network, small farmers in the catering agenda, consumers and producers in the governance of food chains. This leads to the weakening of the Chamber of Agriculture.
Thus, this rebalancing of power relations is induced by a reciprocal adjustment of visions (between actors involved in niches, and between niche and regime actors) which leads actors to modify their representation of the relevant network of actors, to enrol new actors and to create new alliances. This change in reciprocal visions takes roots in the niches, then extends to the other actors of the agri-food system due to the key role of local authorities and due to the defection of mainstream actors. Progressively, the practices and representations built within the niches become "structuring" elements of the agri-food system.
Between these two analytical stances (reciprocal visions and power relations), there are no causal relations but an iterative process rather corresponding to the notion of "circular causality" (Geels, 2011, p. 29). Within niches, visions start evolving, which leads actors to perform enrolments and build alliances. These enrolment and alliances in turn influence the visions of the actors involved in the niche and of the actors outside the niche, including their vision of the network of "relevant" actors.
Hence, the reconfiguration of the sociotechnical system implies a change in power relations, which occurs through mechanisms of vision adjustments that actors provoke through enrolment processes. This deep reconfiguration results in the widening of the governance of the agri-food system to non-agricultural actors, such as civil society (consumers in our cases) and local authorities. A change from a political dominance of the local farming sector by agricultural actors towards a shared governance model, at the territorial scale, can be noted in the recent period.

6.4. Territorial scale [work in progress]

Conclusion [work in progress]

Adopting an inductive, pragmatist and whole system approach allowed me to show an agroecological transition is on-going in the Drôme valley, and to identify the mechanisms and the role of actors in this transition process. This process appears to be much more complex than described by the MLP. Indeed, it is a two-step process. The first step occurred in the 1990's and consisted in the differentiation of two sociotechnical configurations, which partially integrate the proposal of organic farming, within the regime: one which remains in line with the paradigm of agricultural modernization, one which gathers some actors around a new sociotechnical trajectory and what I refer to as the paradigm of 'ecological modernization'. In the 2010's, the second step results from interactions between networks of actors promoting radical innovations (niches) in line with a paradigm of 'radical ecologisation' and some regime actors engaged in the divergent trajectory.
I show that these various niches each act on one component of the sociotechnical system. Impacting the regime simultaneously but not in a coordinated manner, they trigger a regime

reconfiguration together. Looking at interessement and enrolment processes, I then show how these niches enter in interaction with the regime and how, with the creation of new forms of coordination, niche actors succeed in changing the balance of power within the local agri-food system. Therefore, transitions are no longer a matter of niche scaling-up or niche accumulation. The challenge is to create the conditions to stimulate the coexistence of a diversity of initiatives that develop social innovations and to foster their interactions with the dominant system. Lastly, the territorial scale allowed local actors overcoming the lock-in effects which predominate at the national and global scales, offering them some levers which do not exist at these scales. This advocates for an agroecological transition which is variegated, consisting of multiple locally embedded food systems.

Acknowledgement: this research was conducted in the frame of my PhD thesis (2015) funded by INRA and the Rhône-Alpes region, and also benefited from financial support from ANR Dynrurabio and Core-Organic HealthyGrowth projects.

Bibliography

Avelino, F., 2011. Power in transition: empowering discourses on sustainability transitions.

Avelino, F., Rotmans, J., 2009. Power in Transition: An Interdisciplinary Framework to Study Power in Relation to Structural Change. Eur. J. Soc. Theory 12, 543–569. https://doi.org/10.1177/1368431009349830

Avelino, F., Wittmayer, J.M., 2016. Shifting power relations in sustainability transitions: a multi-actor perspective. J. Environ. Policy Plan. 18, 628–649.

Barrès, D., Bonny, S., 1986. Une Ethique de la pratique agricole : agriculteurs biologiques du nord-Drôme. Paris.

Belz, F.M., 2004. A transition towards sustainability in the Swiss agri-food chain (1970–2000): using and improving the multi-level perspective. Elzen BFW Geels K Green Eds Syst. Innov. Transit. Sustain. Chelten. UK Edw. Elgar 97–114.

Berkhout, F., Smith, A., Stirling, A., 2004. Socio-technological regimes and transition contexts. Syst. Innov. Transit. Sustain. Theory Evid. Policy Edw. Elgar Chelten. 48–75.

Bui, S., Cardona, A., Lamine, C., Cerf, M., 2016. Sustainability transitions: Insights on processes of niche-regime interaction and regime reconfiguration in agri-food systems. J. Rural Stud. 48, 92–103. https://doi.org/10.1016/j.jrurstud.2016.10.003

Buller, H., 2002. Re-creating rural territories: leader in France. Sociol. Rural. 40, 190–199. https://doi.org/10.1111/1467-9523.00141

Callon, M., 1986. Éléments pour une sociologie de la traduction: la domestication des coquilles Saint-Jacques et des marins-pêcheurs dans la baie de Saint-Brieuc. Année Sociol. 19401948- 169–208.

Callon, M., 1984. Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay. Sociol. Rev. 32, 196–233. https://doi.org/10.1111/j.1467-954X.1984.tb00113.x

Callon, M., Law, J., 1982. On interests and their transformation: enrolment and counter-enrolment. Soc. Stud. Sci. 12, 615–625.

Darnhofer, I., Sutherland, L.A., Pinto-Correia, T., Sutherland, L., Wilson, G.A., Zagata, L., others, 2014. Conceptual insights derived from case studies on 'emerging transitions'

in farming, in: Transition Pathways towards Sustainability in Agriculture: Case Studies from Europe. L. Sutherland, I. Darnhofer, G. Wilson, L Zagata, pp. 189–203.
Diaz, M., Darnhofer, I., Darrot, C., Beuret, J.-E., 2013. Green tides in Brittany: What can we learn about niche–regime interactions? Environ. Innov. Soc. Transit. 8, 62–75.
Elzen, B., Geels, F.W., Leeuwis, C., van Mierlo, B., 2011. Normative contestation in transitions `in the making': Animal welfare concerns and system innovation in pig husbandry. Res. POLICY 40, 263–275. https://doi.org/10.1016/j.respol.2010.09.018
Elzen, B., van Mierlo, B., Leeuwis, C., 2012. Anchoring of innovations: Assessing Dutch efforts to harvest energy from glasshouses. Environ. Innov. Soc. Transit. 5, 1–18. https://doi.org/10.1016/j.eist.2012.10.006
Geels, F., 2004. From sectoral systems of innovation to socio-technical systems - Insights about dynamics and change from sociology and institutional theory. Res. POLICY 33, 897–920. https://doi.org/10.1016/j.respol.2004.01.015
Geels, F., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Res. POLICY 31, 1257–1274. https://doi.org/10.1016/S0048-7333(02)00062-8
Geels, F.W., 2018. Disruption and low-carbon system transformation: Progress and new challenges in socio-technical transitions research and the Multi-Level Perspective. Energy Res. Soc. Sci. 37, 224–231.
Geels, F.W., 2011. The multi-level perspective on sustainability transitions: Responses to seven criticisms. Environ. Innov. Soc. Transit. 1, 24–40. https://doi.org/10.1016/j.eist.2011.02.002
Geels, F.W., 2010. Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. Res. Policy 39, 495–510. https://doi.org/10.1016/j.respol.2010.01.022
Geels, F.W., 2005. The dynamics of transitions in socio-technical systems: A multi-level analysis of the transition pathway from horse-drawn carriages to automobiles (1860–1930). Technol. Anal. Strateg. Manag. 17, 445–476. https://doi.org/10.1080/09537320500357319
Geels, F.W., Schot, J., 2007. Typology of sociotechnical transition pathways. Res. Policy 36, 399–417. https://doi.org/10.1016/j.respol.2007.01.003
Geels, F.W., Verhees, B., 2011. Cultural legitimacy and framing struggles in innovation journeys: A cultural-performative perspective and a case study of Dutch nuclear energy (1945–1986). Technol. Forecast. Soc. Change 78, 910–930. https://doi.org/10.1016/j.techfore.2010.12.004
Genus, A., Coles, A.-M., 2008. Rethinking the multi-level perspective of technological transitions. Res. Policy 37, 1436–1445. https://doi.org/10.1016/j.respol.2008.05.006
Giddens, A., 1987. La constitution de la société, PUF. ed. Paris.
Goodman, D., 2004. Rural Europe Redux? Reflections on Alternative Agro-Food Networks and Paradigm Change. Sociol. Rural. 44, 3–16. https://doi.org/10.1111/j.1467-9523.2004.00258.x
Grin, J., Rotmans, J., Schot, J., 2011. On patterns and agency in transition dynamics: Some key insights from the KSI programme. Environ. Innov. Soc. Transit. 1, 76–81. https://doi.org/10.1016/j.eist.2011.04.008
Hargreaves, T., Haxeltine, A., Longhurst, N., Syefang, G., 2011. Sustainability transitions from the bottom-up: civil society, the multi-level perspective and practice theory.

Hargreaves, T., Hielscher, S., Seyfang, G., Smith, A., 2013. Grassroots innovations in community energy: The role of intermediaries in niche development. Glob. Environ. Change 23, 868–880. https://doi.org/10.1016/j.gloenvcha.2013.02.008
Hervieu, B., Léger, D., 1979. Le Retour à la nature: au fond de la forêt, l'État. París Seuil.
Hughes, T.P., 1983. Networks of power: electrification in Western society, 1880-1930. JHU Press, Baltimore.
Lamine, C., 2011. Transition pathways towards a robust ecologization of agriculture and the need for system redesign. Cases from organic farming and IPM. J. RURAL Stud. 27, 209–219. https://doi.org/10.1016/j.jrurstud.2011.02.001
Lamine, C., Navarrete, M., Cardona, A., 2014. Transitions towards organic farming at the farm and at the local scales: the role of innovative production and organisational modes and networks, in: Organic Farming, Prototype for Sustainable Agricultures. Springer, pp. 423–438.
Latour, B., 1992. Where are the missing masses? The sociology of a few mundane artifacts.
Markard, J., Truffer, B., 2008. Technological innovation systems and the multi-level perspective: Towards an integrated framework. Res. Policy 37, 596–615.
Pinch, T.J., Bijker, W.E., 1984. The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. Soc. Stud. Sci. 399–441.
Polo, M., Veyron, M., 1982. L'agriculture biologique dans la Drôme. Evolution depuis 10 ans. Problèmes techniques des agriculteurs. ISARA, Lyon.
Rip, A., Kemp, R., 1998. Technological Change. In: Rayner S., Malone EL (editors). Battelle press.
Seyfang, G., Haxeltine, A., 2012. Growing grassroots innovations: exploring the role of community-based initiatives in governing sustainable energy transitions. Environ. Plan. C-Gov. Policy 30, 381–400. https://doi.org/10.1068/c10222
Seyfang, G., Smith, A., 2007. Grassroots innovations for sustainable development: Towards a new research and policy agenda. Environ. Polit. 16, 584–603.
Shove, E., Walker, G., 2007. Caution! Transitions ahead: politics, practice and transition management. Environ. Plan. A 39, 763–770.
Smith, A., 2006. Green niches in sustainable development: the case of organic food in the United Kingdom. Environ. Plan. C Gov. Policy 24, 439 – 458. https://doi.org/10.1068/c0514j
Smith, A., Raven, R., 2012. What is protective space? Reconsidering niches in transitions to sustainability. Res. Policy 41, 1025–1036.
Smith, A., Stirling, A., 2010. The politics of social-ecological resilience and sustainable socio-technical transitions. Ecol. Soc. 15, 11.
Smith, A., Stirling, A., Berkhout, F., 2005. The governance of sustainable socio-technical transitions. Res. Policy 34, 1491–1510. https://doi.org/10.1016/j.respol.2005.07.005
Smith, A., Voss, J.-P., Grin, J., 2010. Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges. Res. POLICY 39, 435–448. https://doi.org/10.1016/j.respol.2010.01.023
Wittmayer, J.M., Avelino, F., van Steenbergen, F., Loorbach, D., 2017. Actor roles in transition: Insights from sociological perspectives. Environ. Innov. Soc. Transit. 24, 45–56. https://doi.org/10.1016/j.eist.2016.10.003