

Chapter 14

Considering the Diversity of Transition Trajectories



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1 The Necessity of an Agroecological Transition

Highly productive but environmentally unsustainable agricultural production models are now running up against the limits of our planet, resulting in demands for a quick and comprehensive transition of agricultural models (De Schutter, 2010). This transition—commonly understood as a passage from one state to another—is highly complex in reality when we consider current agricultural systems, which are fully or partially embedded in often globalised food systems. Indeed, the diversity of actors, practices and norms in the agricultural and food sector make up a multitude of interacting sociotechnical systems. A change in farmer or consumer behaviour can contribute to a process of transition, but the extent of the change that is necessary and desired requires a strategy thought out on a large scale within a constructed theoretical framework. And this framework will need to incorporate the multi-actor and multi-scale dimension of the transition.

According to the model of Geels and Schot (2007), it is the interactions between the actors at the heart of an existing system and those situated on this system's periphery which will initiate the process of transition. On the one hand, within the industrialised agrifood system—which is dominant in Europe and even worldwide—standards define what is acceptable and desirable, actors often share a long common history, and these actors coordinate around practices. This is known as an organised 'sociotechnical regime'. The actors in this dominant regime interact to improve the system according to and consistent with their own criteria and, in this way, maintain it.

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Globalised milk production and processing systems¹ or soy-feed based industrial pig farming are two good examples of this type of dynamics of improvement without any fundamental change. On the other hand, outside the dominant regime, niche innovators propose, often on a small scale, other ways of doing and thinking about agriculture and food. Finally, influential factors (media, consumers, citizen dynamics, cultural changes, etc.) determine the long-term trends of the ‘landscape’ in which the actors evolve. These trends can have a positive or negative effect on the dynamics of transition.

At the same time as this theorisation of transition processes proposed by Geels and Schot (2007), a new innovation paradigm² gained in importance at the beginning of the twenty-first century: agroecology gradually emerged as an alternative to the trajectory of technical mastery that marked the great modernisation of agriculture after the Second World War (Wezel et al., 2009; De Schutter, 2010; Holt-Giménez & Altieri, 2013). Inspired by the concept of the ecosystem, agroecology as defined by Altieri (1987) looks beyond the plants and animals themselves to improve the efficiency and sustainability at the farm and food system levels. Agroecology seeks to optimise the agricultural system on the basis of synergies with natural processes and aims at an independence from synthetic inputs (pesticides, chemical fertilisers). Furthermore, an agroecological farming system is farmer-driven, which implies that farmers regain their decision-making autonomy and socio-economic principles are implemented (Dumont et al., 2016). This initial definition of agroecology has, moreover, since been extended to the scale of the entire food system by including the economic, sociological and political dimensions within agri-chains and national and international governance systems (Francis et al., 2003; Gliessman & Tittonell, 2015).

In a context of transition, an agroecological pathway can emerge either from the dominant regime through a process of insularisation (Vankeerberghen et al., 2014) or the development of an innovation niche. These niches can have older or younger historical roots: from organic farming, which has significant historical background (Bellon & Penvern, 2014), to the more recent emergence of models built on the principles of permaculture (Ferguson & Lovell, 2014).

Still a novel proposition in Europe in the early 2000s, agroecology is now presented as a credible alternative to agricultural systems that are more dependent on synthetic inputs and based on a mastery over nature (HLPE, 2019). As the agroecological movement grows, new questions arise. Does it contribute to a radical break with the models inspired by the Green Revolution, as proposed by Altieri (1987) as early as the 1980s, or does it constitute a gamut of new technical proposals that will allow the current regime to evolve from within (Conway & Toennissen, 1999)?

¹ *Das System Milch* (2017), documentary film by Andreas Pichler, www.dassystemmilch.de.

² We recall that the concept of innovation paradigm refers to the technical approach chosen to respond to a question or a problem (Vanloqueren & Baret, 2009). For example, when confronted by a fungal cereal disease, conventional farmers will choose to use chemical solutions (fungicides) whereas organic farmers will use biopesticides or shift to a variety or varietal mixture with higher resistance to diseases (Vanloqueren & Baret, 2008).

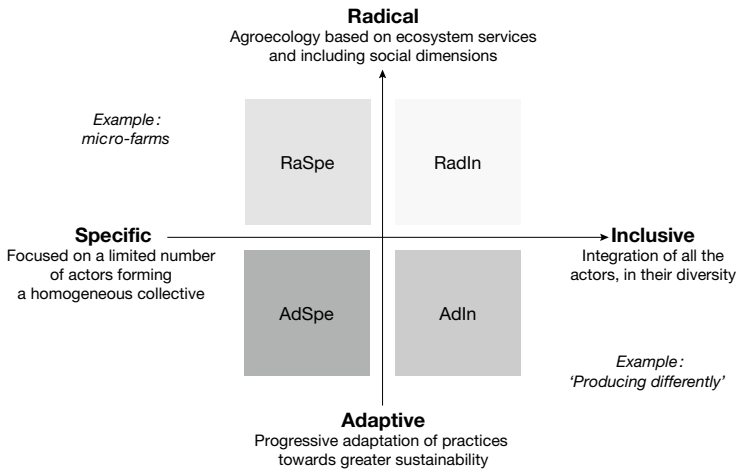


Fig. 1 Two axes and four quadrants to situate transition approaches in agriculture. The axes make it possible to situate agricultural initiatives and approaches in four contrasting quadrants: RaSpe (radical and specific approach), AdSpe (adaptive and specific approach), RadIn (radical and inclusive approach) and AdIn (adaptive and inclusive approach)

2 A Two-Dimensional Framework to Situate Transition Approaches

To address this question, we propose a framework that aims to situate agroecological proposals in a two-dimensional space: on the one hand, the scope of the proposal, and on the other, its degree of radicality (Fig. 1). By analogy with the concept of the ecological niche (Chase & Leibold, 2003), our hypothesis is that the different spaces defined by these two axes gather initiatives with diverse or specific properties and behaviour.

Agroecological proposals range from that of Stéphane Le Foll for French agriculture (Le Foll, 2012; Pluvinage, 2013; MAAF, 2015) to small-scale enthusiastic ones for microfarms (Morel, 2016). When we look at how collective organisations are structured, we can distinguish, on the one hand, to the left of the ordinate axis, the proposals that are aimed at a particular specific group of actors, usually of committed and already convinced persons. Most often, these are small-scale proposals, even though these collectives may subscribe to a broader ambition for change. In general, the actors participating in these initiatives form a relatively homogeneous group whose intention is to bring about change by gradually expanding from one person to the next.³ On the other hand, to the right of the ordinate axis are inclusive proposals that aim, from the outset, to modify the entire agricultural system by integrating all existing forms of agriculture at the scale of a region (Antier et al., 2017), a country

³ This notion of proximity has now gone beyond simple geographical proximity through the ‘magic’ of the Internet.

(Solagro et al., 2016), Europe (Poux & Aubert, 2018) or the entire world (Dorin et al., 2011). The target groups of these initiatives are heterogeneous in nature, as they encompass the diversity of an entire agricultural sector (milk, meat, cereal production, etc.). The Ecophyto⁴ initiative in France corresponds to this second type of proposal: the goal being to reduce pesticide use in the country by involving all the actors in French agricultural systems (Guichard et al., 2017). The intention of inclusion does not by itself exclude a strong ambition for change. It takes into account the agricultural system as a whole and aims to change the behaviour of all its actors. In so doing, it opens up a much larger field of action than those of the smaller-scale proposals.

The nature of the expected change varies along the vertical axis in Fig. 1. A proposal above the abscissa axis corresponds to the requirement of a radical change most often driven by a logic of a break with the existing dominant system. Those below the abscissa axis have an adaptation objective in which the systems' actors have to embark on a trajectory of gradual and adaptive transformation.

At the technical level, the proponents of radical change advocate a comprehensive reconfiguration of systems (relinking of crop cultivation and livestock husbandry, agroforestry, etc.). In a more progressive vision, adaptive change is based on a pursuit of efficiency (more sparing use of pesticides or fertilisers, precision farming, etc.). Substitution approaches (e.g. organic farming model without synthetic inputs) are intermediate between these two types (Hill & MacRae, 1995).

The intersection of these two axes creates four quadrants in which agroecological initiatives and approaches can be situated: RaSpe (radical and specific), AdSpe (adaptive and specific), RadIn (radical and inclusive) and AdIn (adaptive and inclusive). Situating empirical initiatives in these quadrants makes it possible to highlight their strategy to contribute to an agroecological transition. This positioning is not normative and is not meant for comparisons between different initiatives. It does, however, make it possible to discuss, from the moment an initiative emerges, a specific trajectory favourable to the agroecological transition.

In the RaSpe (radical-specific) quadrant, we find, for example, small-scale and specific initiatives such as permaculture (Ferguson & Lovell, 2014), micro-farms and urban farming. These models are characterised by the small size of the areas cultivated (often less than 5 ha) and the specificity of the actors (most often farmers with no mainstream agricultural background). These initiatives are often managed by local collectives involving farmers and consumers. At the technical level, the initiatives in the RaSpe quadrant are often focused on diversified horticulture, but their goal can extend to a model that imagines a territory entirely covered by micro-farms.⁵ These initiatives are not inclusive (in terms of integrating a wide range of actors and production methods), as each of them advocates a specific type of model. They

⁴ <https://agriculture.gouv.fr/ecophyto>.

⁵ On this subject, see Simon Gouin's article (in French) published in Bastamag.net on 18 June 2014, titled '*Bienvenue dans l'agriculture de demain, libérée des pesticides et du pétrole, et créatrice de dizaines de milliers d'emplois*' ('Welcome to the agriculture of tomorrow, free of pesticides and fossil fuels, and creator of tens of thousands of jobs') (<https://www.bastamag.net/Bienvenue-dans-l-agriculture-de>).

are deployed on a small scale, but they could reach a significant global production capacity if they were replicated widely (Morel, 2016).

In the RadIn (radical-inclusive) quadrant, we find initiatives such as conservation agriculture or farmer seed networks (Demeulenaere & Bonneuil, 2010). A large-scale change is expected, but one that remains anchored to the existing agricultural network. In France, the proposals of the Centres for Initiatives to Promote Agriculture and Rural Areas (CIVAM⁶) are also located in this quadrant. In these approaches, agroecology is not always identified as the innovation paradigm being mobilised. As for conservation agriculture, there exist differing views of its degree of radicality. Some authors believe that its practices place it instead in the AdIn (adaptive-inclusive) quadrant (Landel, 2015). On the one hand, conservation agriculture appears to be a radical change of vision, favouring ecosystem services and biodiversity (Chabert & Sarthou, 2020). The concept of ‘living soil’ is mobilised, as opposed to a soil that has lost its biological activity after years of chemical-based agriculture (Lemieux, 1996). These aspects imply that conservation agriculture can be thought of as a technical model radically different from that of tillage-based agriculture inherited from history, and hence it clearly belongs in the RadIn quadrant. On the other hand, the fact that conservation agriculture is still very dependent on glyphosate brings it closer to the AdIn quadrant, as an inclusive adaptation strategy, but without breaking with the dominant ‘conventional farming’ model (Ferdinand et al., 2020).

The purpose of proposing a classification into four quadrants (and the illustrative examples mentioned above) is to stimulate such debates on the intentions and strategies of transition initiatives. Indeed, the aim is not to judge the respective qualities of different transition proposals in a normative way, but instead to foster a debate on the possible options and the scope of their change strategy, and to understand the possible synergies or potential antagonisms between proposals. An analysis of the positioning of the different actors, in a dynamic and comparative logic, will open up the possibility of a coordinated vision of the agroecological transition. The aim is not to build a consensus—a consensus that that would anyway be unlikely to be reached—but to help find complementarity between the approaches and clearly understand the horizon and potential impacts of each of them. Furthermore, the classification we propose is not set in stone; it could evolve over time and be modified appropriately when new types of initiatives emerge.

In the AdIn quadrant, we can include initiatives such as pesticide reduction schemes (Ecophyto), policies in favour of diversification (Meynard et al., 2013) and territorial approaches aimed at preserving water catchments (Becerra & Roussary, 2008). The objective of this category of initiatives is to help a large group of farmers, or even all the farmers in a country, change and improve their practices. Even if these proposals are based on small-scale initiatives, sometimes quite different from the dominant farming models and farm types, for example the Ecophyto demonstration farms (Cerf et al., 2015; Guichard et al., 2017), the objective is for everyone to embrace the proposed change. It must be noted that the trade-off between inclusion and radicalness in these AdIn initiatives can lead to failures, results that are slow to

⁶ French: *Centres d’initiatives pour valoriser l’agriculture et le milieu rural (CIVAM)*.

appear (Écophyto), dubious justifications (glyphosate vs. climate) or even outright greenwashing. As AdIn initiatives are conceived to be implemented on a large scale, they should provide the ideal framework for a process of generalisation of new practices and a potential reconfiguration of the existing regime. Given the slow pace of these changes, it is in these AdIn systems that the ‘lock ins’ and roadblocks to transition have most often been studied (Cowan & Gunby, 1996; Vanloqueren & Baret, 2008; Meynard et al., 2013).

Finally, it is difficult to attribute initiatives to the AdSpe (adaptive-specific) quadrant since adaptive processes usually have a broad scope. Regional PDO (Protected Designation of Origin) differentiation initiatives such as the structuring of the Comté cheese sector could probably correspond to this quadrant (Jeanneaux & Perrier-Cornet, 2011).

3 Mapping Initiatives to Help Reflect on an Agroecological Transition Pathway

A canonical reading of Geels and Schot’s (2007) transition theory leads to a horizon where the initial regime, under the influence of the sociotechnical landscape and niches, reaches a new state. However, other horizons of a transition process can be imagined. One other possible outcome is the emergence of an alternative regime alongside a dominant regime that has itself changed (Dumont et al., 2020). The coexistence of these two regimes (a regime inherited from the dominant regime and a regime emerging from the convergence of innovation niches) can manifest in different ways: competition between regimes, cooperation between regimes or each regime ignoring the other, with each of them developing its own value chain and targeting a different type of consumer. Such a coexistence of regimes would lead to market segmentation across the entire sociotechnical context, i.e. not only in economic dimensions, but also in norms, relationships between actors and practices.

The development of a specific Limousin cattle agri-chain in Wallonia (southern Belgium), in parallel with the still dominant Belgian Blue cattle agri-chain, corresponds to this situation. Breeders have developed this new agri-chain as an alternative niche, most often undertaken and marketed as organic farming. It has developed gradually, initially relying on marketing through already developed French networks before setting up its own marketing and distribution network (the first auction was organised only in 2014; Buron et al., 2014). Today, in Wallonia, 80% of beef cattle belongs to the conventional breed, the Belgian Blue, and the remaining 20% belongs to French breeds (mainly Limousin, Charolais and Blonde d’Aquitaine).

It is difficult to discern when a developing niche becomes a regime—either by substituting the dominant regime or by coexisting with an already existing regime (Fig. 2). This is all the more true for our example since other niches have developed in Wallonia following a similar pattern: Charolais, Blonde d’Aquitaine, Angus, etc.

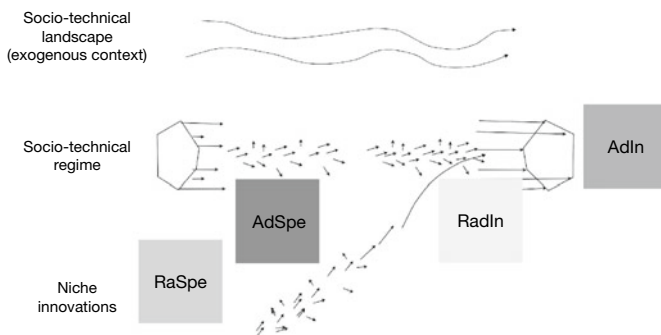


Fig. 2 Positioning of the different quadrants in the Geels and Schot model. The axes make it possible to situate agricultural initiatives and approaches in four contrasting quadrants: RaSpe (radical and specific approach), AdSpe (adaptive and specific approach), RadIn (radical and inclusive approach) and AdIn (adaptive and inclusive approach) (see Fig. 1). Adapted from Geels and Schot (2007)

The criteria to determine when a niche becomes a regime could be the extent of the niche’s development, or the establishment of a distinct network of actors.

Is market size or market share sufficient to distinguish between niche and regime? Are the new initiatives the work of a very small number of actors, or do they now constitute a real value chain involving major players? Do they have 5, 10 or 20% market share? The objective is not to set a standard or a threshold, but rather to understand the role that each initiative can play in the transition of an entire sector, such as the beef sector in Wallonia. What status should be accorded, for example, to the micro-farms that are proliferating, to farmer seed networks that are being set up, or to the short supply chains that are developing? Even though these initiatives have a high media profile, they remain negligible compared to the global seed system or the global market.

This issue of the coexistence of two regimes can also be discussed from two perspectives, that of polarisation and that of the ‘glass ceiling’ (Fig. 3). When seen through a perspective of polarisation, the coexistence of two regimes implies a re-organisation around two contrasting poles, with the disappearance of intermediate models. This is the case in the milk sector, where two main models are perceived today as promising. The first is a model based on increasing the farm size and optimising processes through the use of automated milking robots, precision farming equipment and more intensive and mechanised feeding methods. The second is a model of adding value through on-farm processing, or in very short networks, and the development of close ties with consumers. At least at present, most farmers believe that the path to be followed is that of modernisation and expansion. And yet, this predominant choice leads to competition between farmers, and between dairies, and to a headlong rush into overproduction that requires new markets to be found (Pouch & Trouvé,

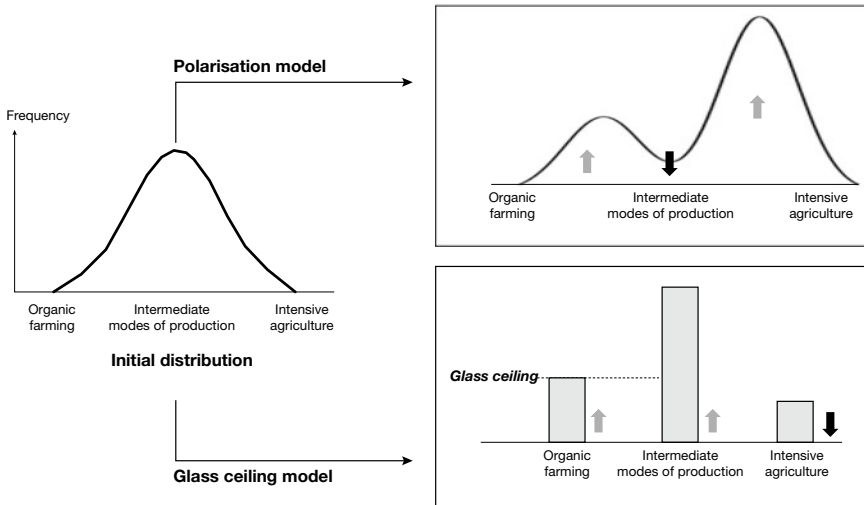


Fig. 3 Two models of changes in the distribution of existing systems

2018). A key element of this evolution, in a highly integrated sector like milk,⁷ is the development of new governance models and related processing and/or marketing structures (De Herde et al., 2019).

The other perspective is that of a coexistence of regimes consisting of a niche's substantial development and, in parallel, a corresponding erosion of the dominant regime, but only up to a certain limit described as a 'glass ceiling'. The development of organic farming in Europe has led to this type of coexistence, alongside conventional farming and markets. Indeed, after an initial spurt (Darnhofer et al., 2019), the increase in the share of organic farming seems to slow down for no discernible reason (Willer et al., 2019).

These examples also illustrate the difficulty of setting a common horizon—i.e. a shared vision of the future and a set of associated objectives. While the work of the IPCC on climate change (Porter et al., 2017) and that of IPBES on biodiversity loss (Pascual et al., 2017) call for a rapid response and a reorganisation of our societies, the issue of new trajectories opens up the debate on the balance to be struck between rapid implementation and long-term planning. Should we act quickly at the risk of choosing ineffective or insufficient solutions, of ignoring the rebound effects or of creating polarisations between those convinced of the need for radical change and those in favour of gradual adaptation? Or should we, in contrast, plan, set objectives, give ourselves time to validate the various possible trajectories, convince the most reluctant amongst us, and ensure that there are no unanticipated negative effects? Moreover, it is not easy to allocate resources in terms of research priorities, citizen involvement and political debate in order to find a balance between implementing

⁷ The milk sector, due to the very nature of the product and the way it is currently processed, requires a tight integration of all its actors, from collection of raw milk to distribution of final products.

available solutions and investigating desirable horizons. The bulk of the scientific literature on agroecology, which is now firmly on the political agenda, mainly focuses on agroecological practices and their implementation. Research on the roadblocks to agroecology and on its systemic dimensions is increasing but is still not very significant.

Given the ecological challenges of the twenty-first century and the significant role of the agricultural sector, one might expect that proposals for sociotechnical development trajectories for sectors such as dairy, meat or, more generally, agriculture as a whole would pay close attention to not exceeding planetary limits, and that trajectories that break with the past would be designed and followed. Such prospective approaches have been developed in the energy domain (Association négaWatt et al., 2012) and for agrifood systems (Paillard et al., 2010; Solagro et al., 2016; Poux & Aubert, 2018). In the energy sector, these trajectories now have legal backing (mandated increases in the share of renewable energy, etc.), come with consequences in case of deviations, and are integrated into corporate strategies. However, in the agrifood sector, foresight has so far had little impact on regulatory frameworks and company strategies. We think that such prospective approaches could actually contribute to the agroecological transition by defining a desired future horizon. This would enable the design and implementation of strategic changes that are more far-reaching than those of current trajectories stuck in business-as-usual ruts or which undertake only minor adaptive changes in response to short-term constraints.

4 Conclusion: The Challenge of Diversity

How can we reconcile the diversity of current agricultural and food systems with the necessity and rationales of transition? Can the academic and research world contribute to the evolution of our systems beyond merely alerting us to climate and biodiversity issues?

A geographical map does not tell the whole story, but it does allow us to situate ourselves and to understand the linkages between scales. In the absence of a typology, a plan, and foresight, the agricultural sector, in all its diversity, has difficulty finding a consistent response to the challenges of sustainability. It functions today as if it were following a GPS that shows the direction of the journey without the destination being clearly defined. Most of the proposals are technical and focused on the 'farm' system without taking into account the social and economic conditions for change. Ecologically intensive agriculture (Griffon, 2013), conservation agriculture (Kassam et al., 2019) and the '4 per 1000' initiative (Rumpel et al., 2019) all claim to be responses to the challenges of the twenty-first century. But they are characterised by an essentially technical bias that underestimates the part that cultural, social and economic dimensions have played in the past trajectories of agricultural systems and will certainly play in future ones. Emphasising the need to change farm-level practices (reducing pesticides, tillage, etc.) tends to make us forget the role that actor networks, political and economic choices, and macroscopic phenomena such

as market globalisation have influenced and continue to influence the evolution of agricultural and food systems. Broadening the reflection to include these dimensions requires an awareness of the importance of these systemic factors, and the laying out of a broad and well-documented vision from which the trajectories to be undertaken can be negotiated together.

Situating oneself clearly in relation to a process of transition and an existing sociotechnical regime, as we propose here, should make it possible to foster debates that would move us away from a binary logic to construct credible and collective trajectories.

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