



# Unfolding sustainability transitions in food systems: Insights from UK and French trajectories

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While the negative environmental, social and health impacts of the current food system have been acknowledged and evidenced for several decades, the recent and current transformations in food systems at diverse scales are not yet addressing the many inter-related stakes at play. Due to the much wider set of interactions in this consumption-production system, new conceptual tools are required for understanding and assessing sustainability transitions and what prevents them. The article will draw on the cases of France and the UK to examine these countries' national food systems' historical trajectories and suggest a periodization of these in order to reveal common characteristics and differences. This will show that despite common major trends and common transition or inertia mechanisms, pathways differ, especially from the 1990s, due to different configurations of power relationships between the state, economic actors and civil society in a context of an increasing competition between sustainability narratives that leads to an increasing fragmentation in food systems. It will lead us to join the recent progress in the sustainability transitions' community towards a shift in the analysis from a focus on niches' trajectories and effects to a deeper focus on power configurations and competing narratives, as well as to suggest a larger inclusion of socio-ecological and spatial dimensions.

agrifood systems | agroecological transitions | multi-level perspective

There is widespread evidence in the current food system regarding negative and interconnected sustainability issues associated with biodiversity loss, water pollution, soil degradation, climate change as well as diet-related health problems (1). Agricultural contributions to greenhouse gas emissions and food waste are fundamental concerns which need to be addressed, not least animal production, especially for red meat, using unsustainable levels of inputs in the dominating modes of production and under the current level of consumption (2). The food system is critical for the alignment of environmental (food, energy, and water) and health goals that is required across all sectors or consumption-production systems that compose the nature-society system. Meeting an increased population's global demand for food by 2050 requires significant dietary change and large reductions in food waste, with current technological or yield increases unlikely to meet these demands alone. These problems are exacerbated by a series of interconnected socio-economic and market asymmetries associated with ongoing land concentration, supermarketization, financialization, and digitalization, all of which tend to further encourage the scale and intensity of production and processing practices.

It is recognized that these interrelated challenges require system-wide changes (1, 3). However, despite the rising critiques over environmental impacts and sustainability issues at large, the related societal pressures, the diversity of alternatives "on the ground" and the increasing diversity of sustainability narratives, food systems have not so far demonstrated any profound transformation. This inertia or "resistance to change" of food systems is more often referred to as a "fact" rather than really systemically explored (4). Moreover, when it is explored, it is often with a focus on specific agricultural/food chains such as cereals, legumes, meat, dairy, etc. (5, 6), rather than in a more holistic and systems-based way. Nevertheless, the development of such "whole-system" approaches in the sustainability sciences (7) and in transition studies (8–10) is gaining ground. Among them, studies that adopt the multi-level perspective (MLP) framework have been influential in proving that the innovations that support sustainability transitions are not only technical, but also social, organizational/business, institutional and infrastructural. However, they tend to overlook how power relations within food systems are reconfigured over time and space in line with the increasing competition of sustainability narratives.

The questions we address in this paper are twofold: i) How has the agro-industrial food system emerged and stabilised in the post-war decades and to what degree have subsequent socio-environmental problems led to the destabilization of this system? And: ii) how can analyses of food systems be broadened and deepened in order to better understand how the increasing competition of sustainability narratives and related power configurations fosters or impedes current sustainability transitions?

We argue here that these questions can be addressed through a deep and systematic cross-national analysis of

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agrifood systems' trajectories. We have chosen France and the UK, two countries for which we can build on previous, longitudinal empirical work. These national food systems have not so far been compared in this perspective, and we hypothesize that they embody contrasting situations with regard to the two key research questions above, not least due to the differences in the role of public as opposed to private actions. This cross-national analysis is aimed at understanding the similarities and differences between the two trajectories, and especially investigating the role of different configurations of power relationships between the state, economic actors and civil society in orientating these pathways.

The first section will present the conceptual framework and the methods developed for this comparison. The second section will then describe the historical trajectories of the French and British agrifood systems. We will show that in the 1950s to 1980s, a period of state-led *agricultural modernization*, France and the UK followed more or less similar patterns. The processes of intensification, scale enlargement, and industrialization led to the stabilization of the agro-industrial food system. This brought positive improvements in this period in the well-being of most consumers and farmers (affordable food, stable farmers' incomes), but also negative environmental and social counter-effects, with the displacement of rural populations to cities, as well as the marginalization of alternative pathways. France and UK trajectories then diverged in what we will define as the *globalization/ecological modernization period*. The growing criticisms that food systems have confronted over time, the development of alternatives (organic farming, alternative food networks, more recently agroecology or plant-based proteins), and their translations into larger policy debates and reforms, have led to diverse adjustments but not yet to any profound transition towards a strong ecological and sustainability system. In the recent period (since the late 2000s), the multiplication of *competing sustainability narratives* in a context of greater climate urgency and overall instability leads to a wider than ever fragmentation in the food system.

In the discussion, we will show that this divergence of pathways in more recent periods can be understood through the analysis of the successive configurations of power relationships between the state, economic actors, civil society and of the increasing competition between competing sustainability narratives. At the regional scale (in each country), even more differentiated and contrasted trajectories can be observed, related to more diverse power configurations and degrees of legitimization of such sustainability narratives. This will lead us to discuss possible adjustments of the MLP framework, nuancing this approach by incorporating the inclusion of power, socio-ecological, and spatial dimensions.

## Conceptual Framework and Methods

Over the last three decades, diverse approaches have been elaborated to analyse transition mechanisms and pathways in food systems in the social sciences, either at the macro-scale, like Food Regime Theory (11), or at the micro-scale, with an increasing literature about alternative food networks (12), grassroot innovations (13), and re-peasantization processes (14). These examine "situated" mechanisms of change; while the processes of influence of such networks on larger

food systems remains a controversial question, amply debated since the early 2000s (15).

Adopting a meso-scale approach, the MLP examines the destabilization of given consumption–production system (such as energy and transport) by niches' development and landscape pressures and the transition pathways towards new "socio-technical systems" (16, 17). In this approach, radical innovations emerge in small and protected niches at the periphery of the existing system and gradually build up endogenous momentum. Niche innovations and exogenous "landscape" developments (i.e., slow-changing trends such as demographics, cultural repertoires, societal concerns, geo-politics, and macro-economic trends and shocks such as wars, financial crises, pandemics) create pressure on the regime, defined as the shared rules and institutions that shape the perceptions and actions of the system's actors (16). This leads to the system's destabilization and creates "windows of opportunity" for niche innovations, which then would further diffuse and disrupt the system.

Although it is mostly applied to other types of consumption–production systems (transport, energy etc.), some authors have applied it to food systems, which led to the inclusion of food practices as a research focus (10), and highlighted specific transition mechanisms such as the combination of the action of diverse "niches" (rather than one singular niche) which generates wider changes in visions and practices (18). Larger debates in and beyond the "sustainability transitions" community have also begun to better address power relations (19–21), which has led to clearer accounts of the non-linearity and contingency of transition pathways and of the contested visions of sustainability as well as of transitions. This also reinforced the recent progress in this community in the conceptualization of transition dynamics towards a more distributed, multi-source view of change (22, 23).

While the MLP is more often used at the scale of specific food industries (6, 21, 24), of specific agricultural segments such as the organic sector (25), or at the territorial scale (18, 23), there are few applications at the scale of national food systems (8); in contrast to other sectors such as energy and transport where most studies are at the national level. Thus our study aims to analyse the relevance of a national comparative framework and progressing this with the inclusion of power, socio-ecological, and spatial dimensions.

In this paper, we consider food systems to encompass the actors, institutions and rules that have an influence on, or aim to influence, agri-food dynamics and their material effects and practices associated with production, processing, retailing, and consumption, including civil society, public action, and research itself. This analytical category thus includes the diversity of actors and processes operating between production and consumption spheres, i.e., the "missing middles" (26).

The conceptual approach we apply to food systems pathways combines insights from the MLP with those from political ecology that have more specifically explored power relations (26–28). From the former, we borrow the attention to both global drivers and the rise of niches and their influence on the consumption–production system, which will help us address our first research question about the processes of stabilization, destabilization and inertia in national food systems. From the latter, we borrow the critical attention to the agro-industrial system, the related controversies and

alliances, and the situated power configurations. These partly explain the differences between the two national trajectories and thus will help us address our second research question about the understanding of the processes of fragmentation in food systems at all scales. This defines the analytical building blocks for our analysis of national trajectories: we will describe the main changes in key global drivers, in national laws, policies and regulations, the role of alternatives and niches and changes in power configurations (Table 1).

To build these analyses, we relied on longitudinal studies, conducted by the authors and their research colleagues involving combinations of ethnographic, documentary and interviews over 15 to 25 y. These focused on specific food industries (cereal, fruit, dairy, meat, etc.) at the national scale as well as on territorial food systems transitions (5, 18, 21, 29–33). The work also draws upon more recent collaborative and conceptual work undertaken on understanding the nature of sustainable food transitions (31, 32).

**Food Systems' Trajectories in France and the UK over Three Phases.** The often called "great transformation" of France's agriculture and food system (34) can be illustrated by some key indicators: the evolution of agricultural population (27% of the working population in 1954<sup>\*</sup>, 6% in 1988 and 3,5% in 2015), that of the total number of farms (2,3M in 1955, 590,000 in 2003<sup>†</sup>, 390,000 in 2020), and of the average farm size (14 ha in 1955, 42 ha in 1997<sup>\*</sup>, 69 ha in 2020).

The trends in the UK have been in a similar direction, if from a higher scale basis due to earlier dynamics of "rationalization" (i.e., enclosure, eradication of peasants, liberalized trade policies in the 19th and early 20th centuries). In England and Wales, the number of holdings fell from 300,000 immediately after WWII, to 175,000 by the 1990s and 105,000 in 2016. Agricultural employment was 50% in 1870, by 1945, 20% and by 1980 down to 4%, since then it has levelled off somewhat. The average farm size increased from 30 ha in 1870 to 86 ha in 2005, with quite a long-running bipolar agrarian structure. However, these figures vary greatly across each country. For example, in Wales which retained more of its small family farms, the mean size was 48 ha in 2005.

On the consumption side, other key indicators for these transformations are the part played by corporate supermarkets in food consumption (73% in 2017<sup>‡</sup> in France, over 80% in the UK, concentrated in eight or nine main supply chains); as well as the part of meat in food consumption [i.e., after a strong and prolonged increase in the post-World War II (WWII) decades, a more recent decrease, mainly due to health concerns, from around 105 kg/person/year in France in the 1980s down to 84.5 in 2020<sup>§</sup>; and from 104 grams/person/day in 2008 to 86 in 2019 in the UK (35)]. Finally, the portion of food expenditure in average household budgets, from around 40% after WWII down to 13% today in France, illustrates both the "success" of modernization strategies aimed at offering affordable food to consumers and reasonable incomes to farmers, and their limits with an increasing disjunction between the real cost of food and its price.

<sup>\*</sup>[https://www.persee.fr/doc/ecorou\\_0013-0559\\_2000\\_num\\_255\\_1\\_5151](https://www.persee.fr/doc/ecorou_0013-0559_2000_num_255_1_5151) accessed the 12/10/2021.

<sup>†</sup><https://www.insee.fr/fr/statistiques/1372289?sommaire=1372309> accessed the 12/10/2021.

<sup>‡</sup>[https://www.franceagrimer.fr/fam/content/download/56762/document/A4\\_vdef\\_%C3%A9volution%20d%C3%A9penses%20alimentaires%20m%C3%A9nages%20circuits%20distrib%202008\\_2017.pdf?version=4](https://www.franceagrimer.fr/fam/content/download/56762/document/A4_vdef_%C3%A9volution%20d%C3%A9penses%20alimentaires%20m%C3%A9nages%20circuits%20distrib%202008_2017.pdf?version=4) accessed the 12/10/2021.

<sup>§</sup>[https://www.franceagrimer.fr/fam/content/download/56762/document/A4\\_vdef\\_%C3%A9volution%20d%C3%A9penses%20alimentaires%20m%C3%A9nages%20circuits%20distrib%202008\\_2017.pdf?version=4](https://www.franceagrimer.fr/fam/content/download/56762/document/A4_vdef_%C3%A9volution%20d%C3%A9penses%20alimentaires%20m%C3%A9nages%20circuits%20distrib%202008_2017.pdf?version=4) accessed the 12/10/2021.

Diverse approaches have been applied to analyse this great transformation of agrifood systems across the social sciences. Whether they are anchored in political economy (34), political sciences (36), rural sociology (37) or geography (38), most lead to the identification of two roughly similar main periods in both countries, when considering post-WWII transformations: i) the agricultural modernization period (until the 1980s), and ii) the globalization/ecological modernization from the mid-1980s onwards. We will suggest here to distinguish a third period corresponding to more recent and ongoing trends, that we will argue have been partially generated by the effects of the (ongoing) 2008 crisis.

### 1950 to 1985: Agricultural Modernization and Intensification.

After WWII, the need to rebuild infrastructures and feed the national populations was a key and central aspect of post-war government policy in European countries, and not least in Britain and France. There was a consensus that this should be led by the centralized state, to alleviate food insecurity and support the industrialization and specialization of the food system. It was recognized that there was an effective synergy in policy goals of both the industrialization of the cities and the increasing agricultural productivity of the countryside. The latter would facilitate the further replacement of human labour through the mechanization of farming, and the former would increase the demand for urban employment and more secure and relatively cheap supplies of food.

From the 1950s onwards, the fast "modernization" of European agriculture resulted from the combined effects of key global drivers. These include technical innovations in agricultural production (mechanization, pesticides etc.), in food processing (processes of cereal fragmentation, new conservation inputs) and in food distribution (transport, emergence of the first supermarkets which would then, in the late 1970s and 1980s, gradually invade the peri-urban landscape and the foodscape in both countries), as well as major changes in food consumption patterns (changes in diets and cooking practices towards more convenience food). All these drivers led to what is sometimes called the "intensification turn" of the 1980s, with yields increasing and optimization (based on external inputs and new techniques) as a key aim, illustrating the translation of the productivist paradigm in the cereal sector (5) among others.

In that period, key milestones in the public policies are the guaranteed prices of the European Union Common Agricultural Policy (CAP) from 1962 onwards, and in France, the Modernization laws of 1960. Their objective was both increasing agricultural production and the social "catch-up" for the farming population (in terms of income and well-being).

The various reinforcing trends stabilized and locked-in the productivist system, while the peasant farming model and identity were increasingly marginalized and deemed unviable, despite scattered neo-rural initiatives (or "niches") especially in remote areas and the emergence of organic farming networks in the early 1960s. From the 1960s onwards, the typically French "co-management system" (whereby the agricultural sector represented by the main farmers' union—to the exclusion of other categories of farmers and rural actors—and the State would negotiate agricultural policy's orientations) characterized the power configuration at stake in the agricultural system (36). Similarly, in the UK, powerful farming unions were a

**Table 1. Key characteristics in national trajectories over the 3 periods (in blue and dark red, specific elements respectively for France and the UK)**

	1950 to 1985	1985 to 2008	2008 to 2020
Period	Agricultural modernization and intensification	Ecological modernization Rise of critics and of sustainability narratives	Competing agri–food–health–environment reconnections
Key global drivers	Technical innovation Changing consumption patterns towards convenience Rise in agri-business globally	Environmental impacts and over-production WTO and globalization of trade CAP reform, agri-environmental schemes European rural development policies (Leader) Rise of corporate retailers' power in supply chains	Climate change and biodiversity debates Increasing effects of geopolitics on trade Digitalization, financialization, decarbonization Changing consumption patterns around healthier diets (but) rise in food poverty
Key national laws and regulations	State-guaranteed prices and food price regulations Modernization (agricultural) laws 1960	Removal of price guarantees, milk quotas Organic label 1985 Multifunctionality framework 2001 Deregulation	Agroecological policy 2012 More support for organic conversions and diversification schemes Post-Brexit debates
Role of alternatives and niches	Marginalization of peasant and small-scale farming, scattered neo-rural initiatives in more remote areas	Development and legitimization of alternative farming networks (organic, peasant, extensive livestock etc.)	Proliferation of alternative niches Higher focus on food justice and food poverty
(National) power configurations and leading components	Powerful farming unions Co-management (agricultural sector and state)	Support to alternative networks by rural development policies Rising influence of retailers and environmental groups	Corporate retailers diversify their stocking Institutionalization of short circuits and alternative farmers' networks Environmental issues, animal welfare become key drivers

feature of the post-war productivist period, as they were brought into government not least to regulate price guarantees. Annual prices were negotiated and agreed upon between government and the national farming unions through to the 1970s. This was a quintessential form of state-led corporatism (39, 40). Meanwhile, during the 1950s and 1960s, the French agricultural sector was progressively structured by the strong cooperative movement, which led farmers' cooperatives to be key actors in the inputs providing, collecting and processing sector. In the UK as well, an increasingly powerful National Farmers Union organized marketing boards and farmer cooperatives (such as the Milk Marketing, the Meat and Livestock Commission, and Potato Marketing Boards) that regulated supply, demand and price fluctuations. These were producer-led powerful bodies which also developed bespoke processing industries (29), but progressively and in both countries, private players such as large seeds companies and mills took an increasing role.

In this first period, the convergence of innovations, strategies, and policies in the different components of the food system (production, processing, retailing sector, consumption) generated lock-in mechanisms that led to the stabilization of the agro-industrial food system.

**1985 to 2008: Ecological Modernization.** This productivist system that was reinforced during the post-WWII decades had a number of unintended consequences: primarily, interconnected environmental problems (such as water pollution, air pollution, acid rain), that were progressively acknowledged in public debates, and over-production, especially in dairy products. The recognition of these multi-faceted externalities was then addressed in the next period through policy reform and environmental policies.

While the interpretation of the first period is relatively consensual, and in fact is generally replicated in most "advanced nations" of the world, the subsequent phase gives place to diverse interpretations. Some authors highlight the globalization trend (41, 42), while others show the emergence of more diversified and ecologized trends, under the pressure of greener policies and/or based on the dynamism of alternative networks and civil societies—themselves pressuring towards greener policies (30). Indeed, many authors assess a combination of both trends through the notion of an emerging "environmental food regime" which describes the adjustments of incumbent/corporate actors (43), or that of bipolarity, which refers to the diverging models (both continued intensification and diversification) in food systems (44). The notion of "ecological modernization" echoes these adjustments of the food system to the rising stakes and critics but still retaining a modernization paradigm. Indeed, as this

<sup>3</sup><https://agreste.agriculture.gouv.fr/agreste-web/disaron/SynCon21376/detail/> accessed the 12/10/2021.

period progressed there was a rising concern, not least from environmental interest groups, about the damaging effects of modernization. In addition, there was a strong belief among ecological modernization theorists and corporate actors respectively, that these could be best ameliorated through more effective environmental policy interventions (45) and the race for new forms of technical innovation.

In this period, the key global drivers are the increasing acknowledgment of the productivist system's externalities themselves, the globalization of trade under the pressure of World Trade Organization (WTO) negotiation, the enlargement of the European Community (from the mid-1980s on with Spain, Portugal, Greece and later former Eastern Bloc countries), the successive CAP reforms from 1992 onwards with their pressure to green agricultural practices and the relative transfer of subsidies to rural development, and the ongoing rise of the power of corporate retailers in supply chains.

Despite these common trends, France and UK food systems trajectories began to diverge from here on. Of course, both countries had to translate the new European frame (the successive CAP reforms away from production goals and towards multi-functionality—in response to the over-production problems) into their national policies, but they did so in different ways. Regarding the 1999 European rule (1 259/99) for example, the UK, which was in favour of a faster and stronger dismantling of direct payments, translated the "eco-conditionality" and "modulation" principles into a "degressivity" policy in order to reduce these direct subsidies and increase those to the then recently created "second pillar" (rural development). While France, traditionally more protectionist, chose to adopt a redistributive strategy, aimed at favouring collective projects, smaller farms and a multi-actors/territorial focus (agricultural law of 1999) (46, 47). In both countries, these "ecologically modernizing" efforts held limited effects on intensive agricultural practices. In fact, they largely attempted to contain the problem rather than radically overturn it.

Another difference is the earlier recognition of organic farming in French law and its institutionalization from 1980 onwards as well as its structuration in specialized, independent retailing networks such as Biocoop—a lasting counter-tendency to the larger supermarketization trend and an example of the permanent process of "re-differentiation" that larger supermarketization trends impose on such networks (33). Whilst in the UK organic farm conversion became a voluntary incentive during the 1990s and 2000s, as organic sales and demand increased largely through the main supermarkets and under the influence of environmental and animal welfare groups and NGOs.

In both countries, besides alternative farmers' networks already being well established, scattered alternative food networks (crossing the production/consumption divide) (48) started to emerge to meet growing demands for local foods. Analysing the effects of these initiatives and networks in both countries and more generally in the EC, some authors see the emergence of a new territorial paradigm, partly supported by European rural development policies (49). However, in the largest and most intensive sectors such as cereals or dairy, diverse alternatives aimed at reducing the dependence upon chemical and or external inputs and shortening the chains remained marginalized in this period (5).

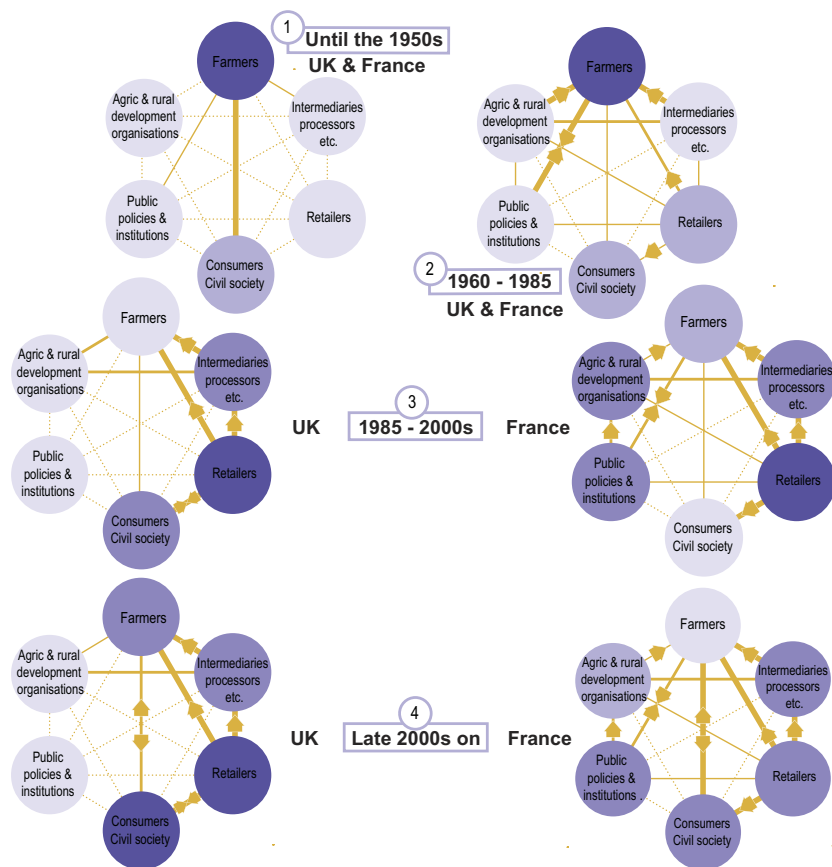
Power configurations also differ in both countries, with a more important and rising presence and supply chain power of corporate retailers in the UK than in France, and also a weaker role of public policies and stronger influence of environmental groups (Fig. 1). In France, the farming sector remains a key player in the definition of agricultural and food policies (food being under the same administration as agriculture, with a low inclusion of health/nutrition aspects for example), despite an increased legitimization of alternative farming networks (organic, peasant) from the 1990s on. These networks are increasingly supported by the administrative Regions<sup>¶</sup>, increasingly involved in rural development programs as an effect of the 1980s decentralization laws. In the UK, the national policies, including food and agriculture, were now more deeply entrenched in Thatcherite neoliberalist ideologies, and with these a regained belief in market mechanisms and consumer sovereignty. This was purposely encouraged through the abolition of retail prices maintenance and of the producer-led marketing boards, more relaxed planning controls, and the rise of corporate retailer-led food markets and food consumption. Food processing was also privatized and became dominated by a handful of companies, for instance in the dairy sector (29). This was a systemic shift. Indeed, bestowing more powers for food supply and delivery to the retailers and oligopolistic processors led some to propose that a shift towards private-interest corporatism had now largely replaced the state-producer/productivist corporatism of the previous period. Privately organized farm and food assurance schemes came to dominate the regulation of a more globalized food sector.

**Since 2008: Competing Agri-Food-Health-Environment Reconnections.** Finally, the recent and current period also gives way to contrasted accounts in both countries. In terms of global drivers, climate change and the deepening environmental crisis is increasingly at the forefront of public debates, culminating with the Paris COP 2015, while biodiversity extinction and health are also rising issues.

The food system is still affected by "old" ongoing trends (e.g., land concentration and supermarketization) but now also more recent trends (financialization, digitalization, decarbonization). The global financial crash, for instance, in 2007 to 2008, coinciding with hikes in fuel and food prices reflected the growth of the financial sector in food and farming worldwide (50). At the same time "land grabbing" by financialized corporates, increasing concentration in the non-farm parts of the food chain, and growing debts and cost-price squeezes were experienced by independent producers (31). On the consumers' side, both health concerns and climate change concerns lead to a strong decrease in meat consumption (35), with increasingly complex debates about good ways to farm and eat. This generates a diversity of competing paradigms and models advocating for agriculture-food-health-environment-climate reconnections (51), and increasing debates and controversies in which a wider diversity of actors take part.

In France, these debates led to the institutionalization of ecologized food and agricultural models with the institutional recognition of short circuits in 2008, the inclusion of the support to more diverse alternative networks in the government

<sup>¶</sup>(intermediary scale of public action, with 22 Regions in France at that time).



**Fig. 1.** National trajectories, over four periods. Re-configurations of power relations over time, until the 1950s and in the modernization period in both France and the UK, and in the 1990 to 2000s period and late 2000s to 2022 period in each of these countries. The degree of grey and of thickness of the lines indicates the components and interactions that characterize the power configuration in a given period in contrast to other periods. The arrows indicate i) the power exerted by a component on another one, e.g., retailers and intermediaries on farmers for both countries; ii) reciprocally by one component on another, e.g., civil society on retailers in the UK case, or public policies and farmers in France; or iii) the alliances of two components, e.g., farmers and civil society in France in the last period.

funding from the early 2010s, and the already strongly (and still much more) supported Chambers of Agriculture, and the agroecological national policy set up in 2012. This new agricultural policy focuses on food systems at large rather than only on agricultural practices, with the Territorial Food Projects scheme for example (introduced in the French law in 2014), but generated ongoing controversies (33) and critics over the related co-optation and greening processes.

In the UK, up until 2021 (Brexit), agricultural policies have tended to follow the orientations set by EU policies. There has been no such explicit espousal of agroecology until very recently as part of the post-Brexit UK ecological agricultural proposals under what is termed Environmental Land Management Schemes. The new schemes proposed are focusing upon payments to farmers for the delivery of "public good" environmental goods and services, including restoring water and soil quality, and a move away from direct land-based direct subsidies. These schemes might support a de-intensification of production methods and the espousal of what is being termed "regenerative farming", although the entry to the funding schemes will be voluntary. So far, these scheme proposals are subject to prolonged review. Nevertheless, it may encourage a shift for some farmers away from the lock-in tendencies of the intensive model of production, if this aligns with changes in practices and power configurations in the larger consumption-production system, as is observed in some regions (21).

There is an overall expansion and diversification of multi-actors' food networks (and of alliances across networks)

and projects acting both at the national and regional scales with a proliferation of alternative niches in both countries. In France, short supply chains are adopted by an estimated 23% of all farms in 2016<sup>#</sup>, and representing 10% of food consumption in 2020. More than half organic consumption is outside sales from the corporate retailers, against less than 10% in the UK. In both countries, alternative food systems have also diversified in their forms and aims, with an increasing focus on food poverty, food accessibility and food justice issues, although we cannot consider that they have brought a major breakthrough in the food system as a whole.

In both countries, in this period, power configurations are profoundly affected by the reinforcement of environmental/climate/health issues. On the one hand, these are accommodated by the powerful actors when for example corporate retailers diversify their stocking and discourses in order to respond to consumers' concerns, and on the other hand, provide a more varied source of radical innovations and networks. In France, the changes in power configurations are characterized by the institutionalization of short supply chains and alternative farmers' networks. This includes the extension of direct producers/consumers connections both through these short supply chains and through shared struggles (against new large infrastructure projects for example) or shared involvement in more transversal networks. In the UK, there seems to be more continuity with the previous period, with (in contrast to France) more active consumers'

<sup>#</sup> [https://agreste.agriculture.gouv.fr/agreste-web/download/publication/publie/Ana165/Analyse\\_1652105.pdf](https://agreste.agriculture.gouv.fr/agreste-web/download/publication/publie/Ana165/Analyse_1652105.pdf) accessed the 12/10/2021.

organizations that put pressure on supermarkets, for example on the issues of animal welfare.

## Discussion

Our periodization of the trajectories of the French and UK food systems shows that in both countries, the agro-industrial food systems that stabilized in the post-war decades and until the early 1980s, then became increasingly criticized and destabilized. In both countries though, the diverse emerging alternatives could not really dislodge these trajectories. Despite these common dynamic features, we observe different trajectories in the two countries since the 1990s. In this discussion, we will now show how this convergence and then divergence of national trajectories are due to different power configurations over time and space, in the context of an increasing competition between sustainability narratives.

**(Re)configurations of Power Relations over the Three Periods: Countering or Fitting to Neoliberalization.** The common emergence and stabilization of the agro-industrial food system in the post-war decades in both countries (and beyond) and then the diverging later trajectories, can be understood through the analysis of the specific power configurations that are at play in the two national food systems, and between their components (farmers, intermediaries, retailers, consumers/civil society, public policies and institutions, and agricultural and rural development organizations). These significantly diverge by the 1990s.

In both countries, in the 1960 to 1985 period (period 2 in Fig. 1), public policies supported the modernization of agricultural structures, especially through farmer and extension organizations, while market actors (retailers and intermediaries) were gradually increasing their power over both farmers and consumers, in contrast to the preceding period (not developed in the above analysis), when the links between farmers and producers were much more direct (period 1 in Fig. 1).

Since the early 1990s (periods 3 and 4 in Fig. 1), public policies and civil societies have played a different role in the two countries, leading to different power configurations, despite some shared features such as the increasing power of corporate retailers. In France, national agricultural policies were given more importance (throughout these two periods) than in the UK, not least due to the relative and prevailing political power of the farming sector. There has also been a stronger focus on product identification and multifunctionality (a framework introduced in the agricultural law of 2001) in the 1990s to 2000s and on agroecology since 2012. The political will to counter the effects of globalization and neoliberalization on the farming sector and in rural areas played a key role—of course to variable extents in successive governments. In the UK, there was stronger deregulation with neoliberal governments that have espoused more market-based solutions to agriculture and food. Farmers lost their powerful role both in government and in the marketplace. Large retailers were given more capacity for action and expansion over these two periods (through urban planning policies for example, where former livestock markets in market towns have been converted into giant retail superstores, with a subsequent decline in the number of independent grocers and butchers in the high street), leaving a larger market place for corporate retailing

than in France. The role of civil societies is also determinant with the increasing influence of environmental and animal welfare groups and NGOs in the UK, from the 1990s on (period 3 on Fig. 1). This appears more recently in France, where on the other hand, there seems to be stronger alliances between consumers/citizens organizations and alternative farming networks, especially since the 2000s (period 4 on Fig. 1) not only for marketing schemes for also against large projects of highways or supermarkets. The famous 1999 McDonald's restaurant dismantling in Millau and its subsequent debates and effects are an early example of such alliances.

These different and diverging power configurations are of course influenced by the historical social structure of agriculture—with a stronger concentration of land ownership and occupancy in the UK already established in the 19th century, as opposed to a persisting "family farming" structure in France—which generates long-term path dependency effects. They are also influenced by the cultural and material dimensions that agriculture, nature and food endorse in both countries (and the transformation of their relationships over time). For example, in France, food quality schemes, based on the "terroir" notion which strongly articulates food production and consumption within specific ecological and territorial settings, have been present and regulated since the 1930s, and are still a leading part of some French food chains dynamics (e.g. cheese, wine etc.), especially in some regions (see below). In the UK, this only became a feature in the 2000s on the back of many locally and regionally organized alternative food networks (30), and lacking explicit national government support (at least in England).

**Increasing Competition between Transition Narratives.** As previous studies at the regional scale have shown, power relationships are reconfigured over time under multiple processes of competition between rival sustainability narratives: controversies, struggles, alliances, legitimization strategies, as well as reciprocal "re-differentiation processes" that develop between more "conventional" and more "alternative" actors and networks (23, 33). These processes allow some sustainability narratives to gain legitimacy, and thus to be adopted by an increasing proportion of the actors and networks involved in some regional food systems, which in turn supports a wider transition of these regional food systems.

This competition between sustainability narratives also occurs at national and international scales, where increasingly diverse food-centred and agricultural paradigms and models advocate agriculture–food–health–environment–climate reconnections (33). Some flourish under the pressure of incumbent actors, as is the case with Climate Smart Agriculture, Sustainable Intensification, Nutrition-Sensitive Agriculture etc., that mostly maintain a productivist and technicist vision of agricultural production and food security (52). Others claim to develop more systemic, radical and holistic visions, as is the case of Agroecology and/or Food Sovereignty. These are increasingly advocated by consumer/citizens organizations, farmers' organizations (like La Via Campesina, whose presence in European and international debates has strongly increased in the last 10 y), and urban as well as rural associations and multi-actor networks (like the Inpact network and Arc2020 in France or the Sustainable Food Places, the Food and Farming Commission and the People's Food Policy coalition in the UK).

These alliances across different components/actors of the food system lead to different degrees of legitimation of transition narratives that also express different visions of agriculture–food–health–environment–climate reconnections (SI Appendix, Fig. S1). These encompassing narratives would link for example sustainable intensification and food security, agroecology and sustainable food diets, or organic agriculture and short supply chains. In the recent period, we can observe a growth in the number and variety of these differentiated alliances and of related agriculture–food–health–environment–climate reconnections narratives in both countries. There is indeed a growing political contestation between technologically and techno-science-driven "sustainable intensification" solutions supported by agro-industries and retailers; *vis a vis* the more radical and place-based approaches associated with agroecological practices and the recreation of shorter supply chains that potentially reconfigure and revalorize market power back to local and producer actors and/or claim equity and food justice goals. Of course, the different scientific communities play a key role in this competition of narratives and in these alliances; as exemplified by the lasting debates over the health and environmental benefits linked to organic agriculture, for example (33), and the scientific articulation of gene editing as a way of creating sustainable intensification whilst reducing former chemical inputs.

**The Spatiality of Transition Processes.** The national trajectories described above and their key numeric indicators have to be understood as an average, and the reality is of course much more contrasted and diverse within each country. In different regions, different sets of competing transition narratives linked to local power configurations can be observed. These are linked to local agricultural and social histories which emerge out of specific socio-ecological settings.

Indeed, at the regional scale, biophysical elements strongly determine food transition pathways both in terms of reversibility and potential ecologicalization. In some regions, soil quality and biodiversity have been durably impacted by intensive agriculture; and some infrastructural features may prevent or favour potential ecologicalization, like the size of plots or presence or not of hedges, that cannot be changed in the short term. In some contexts, biophysical features that were considered as obstacles, limiting factors etc. in the modernization/intensification period and models, are increasingly considered in terms of carrying capacity and valorization of diversity in some current narratives and initiatives.

In some regions like Ardèche and South West Wales, this leads to redesigning plant and animal production around redefined local and regional features, such as natural wine-making, local cattle breeding, and processing and organic production of local vegetable or cereal varieties. The systemic redefinitions of these arrangements were supported by alliances between farmers' networks, civil society and often (regional) public policies, i.e., by supportive power configurations. In other regions like Cheshire and Brittany, biophysical features are considered in terms of resource preservation and reduction of impacts and support less systemic redefinitions, while the intensive system remains prevalent (21).

When adopting a "worm eye view" (53) on food systems' dynamics, instead of an "eagle view" (not only in terms of spatial scale of study, but also in terms of the social and political scenes to be observed), we may find significant evidence

of new ways to relate to regional bio-physical features being experimented and then established thanks to a parallel reconfiguration of power relationships. This diversity is of course largely masked when reasoning at the national or even global scale. In the latest phase of our periodization, it is also the case that in France in particular, but in the UK too (not least through devolved governance in Wales and Scotland, for instance) a more territorial approach to food systems has emerged both through the rise of local and regional actors and through changes in governmental policies. These "re-territorialization" trends, which are re-enforced by a growing role of sub-national actors and institutions, are a result of long historical processes of valorization of the cultural dimensions of agriculture and food in some regions and countries (the "terroir" notion mentioned above).

**Addressing Power and Narrative Configurations in the Conceptualization of Transitions.** Considering the food system as a production–consumption system nested and embedded in the larger nature–society system, our analysis aimed at exploring the ways to address the increasing competition of sustainability narratives and related power configurations and understand how this fosters or impedes sustainability transitions in possibly diverse ways across time and space. Our comparative analysis of the UK and French food systems suggests that a "traditional" MLP perspective is more relevant to understand the first two periods of our periodization than the third one, which requires some conceptual adjustments.

Indeed, the first period (1960 to 1985) shows the emergence and stabilization of the industrial food system [or "corporate food regime" (11, 43)], allowed by a convergence of technical innovations, policy interventions, and socio-cultural changes (urbanization, commodification, etc.). In that period, the regime is not strongly questioned and is well anchored institutionally and technologically.

In the second period, from the 1990s, the increasingly recognized socio-environmental problems led to the destabilization of food systems which reacted through incremental and palliative improvements, and to the emergence of sustainable alternatives (alternative food networks, sustainable agriculture, organic farming, etc.) that gained in legitimation even though they did not profoundly affect the regime due to path-dependency effects. Some of these niches, especially the organic sector, followed the steps and trajectory described by MLP (experimentation; stabilization; diffusion/disruption; institutionalization/anchoring) (54).

The third period (since the late 2000s), however, requires a different analytical lens. The increasing number of competing sustainability narratives and related concrete models and alternatives cannot fully be interpreted as niches. While organic farming may indeed be and has been considered as a niche in MLP terms (25), this is not (yet) the case for more recent models and narratives. The much wider and faster proliferation of such sustainability narratives and models, as well as the reinforcement of criticisms of the incumbent regime's legitimacy (which is more eroded than ever), combine in creating an increasing fragmentation within food systems. This requires a revised conceptual framework. This is why we suggest a conceptual switch to interpret this third phase; from a focus on niches' trajectories and effects, to a deeper focus on power configurations and competing



narratives and networks, together with a stronger attention to their spatial embeddedness. The larger diversity of narratives, networks and power configurations in food systems in comparison to other consumption-production systems is linked to the metabolic specificity of food systems and the strong spatial variability that characterizes them. This also contributes to the distinctiveness of food systems' sustainable trajectories in that they cannot be understood exactly through the same perspectives as other consumption-production systems. This is particularly the case once a variety of sustainability narratives take hold, as they have to draw upon different degrees of re-embedded socio-natural elements.

Such a switch has also been advocated in other recent studies dealing with food systems' transformations through a political ecology lens (26–28, 55) and rejoins the call, within the sustainability transitions' community, for a more distributed, multi-source view of change in the conceptualization of transition dynamics in general (22). Indeed, the (struggling) niches and sustainability narratives that characterize the third period could be interpreted through the perspective of contrasting "fit and conform", "stretch and transform" strategies (56, 57). In this perspective, technology-focused niche innovations (like climate-smart agriculture or sustainable intensification) have a good "fit" with the regime, leading some regime actors to reorient towards them, while more radical social-focused niche innovations (e.g., agroecology, regenerative agriculture, food social security etc.) would imply/require a deeper "stretch" in the selection environment to be successful. We have shown the need to also examine the debates, alliances and coalitions across narratives and alternatives and how they influence power configurations in different ways across different scales (international, national which was our focus here, and regional).

To address the current food systems' trajectories, we thus suggest to conceptually and empirically examine four interconnected dimensions: i) the power configurations at play and how these are transformed by the debates, alliances, coalitions across narratives and alternatives; ii) the diversity of such emerging and competing narratives and alternatives/models that address and frame agriculture–food–health–environment–climate reconnections; iii) how these define and experiment arrangements linking situated biophysical and socio-natural features with technical, organizational (market) and social forms of innovation; iv) how these arrangements are in turn backed by supportive power configurations or countered by unsupportive ones. This re-conceptualization emerges out of our deeper comparative and historical analysis in the two countries and more particularly the elaboration of the third phase as depicted here.

**Current Trends and Future Perspectives.** The power configurations and the competition between transition narratives are both evolving fast. At the international scale, in the period running from the late 2000s to the 2020s, there has been a window of opportunity for paradigms and models claiming a radical reorientation of farming and food systems such as agroecology and sustainable food diets (with increasing recognition of agroecology by the Food and Agriculture Organization (FAO) for example (58), not least, according to actors involved in the food policy dialogue, under the influence of the "Brazilian model" (in alleviating food poverty and adopting agroecological policies). Models claiming

a reconciliation of production and environment (climate-smart agriculture, sustainable intensification etc.), have gained in legitimacy and power in international organizations, in the larger context of "neoliberalization" of agri-food governance (59) and an increasing imposition of the "decarbonization" framing regarding the issue of climate change. This led to the fiasco of the 2021 World Food Summit, denounced as being dominated by multinational corporations, philanthropists, and export-oriented countries (60), and which ended up being boycotted by numerous NGOs.

At national and regional scales, there are specific configurations of debates and power relations, especially in line with specific political changes. In the UK, the longstanding trends described above are currently taking on a new set of conditions: the combined ecological crisis in intensive forms of production; rising consumer awareness of healthy diets; and (post-Brexit and COVID) a growing re-localization of markets and production niches in some areas. What will be the effects of these new and recent trends? There is far more policy uncertainty now as the UK moves away from the CAP and develops its own national environmental management schemes on farms. Even in more intensively farmed regions, a more divergent spatial model of farming practices seems to be taking hold, involving insertions of "sustainable intensification", such as conditions placed upon farmers to deliver a wider set of ecological and carbon-neutral criteria on the one hand, and of regenerative and/or agroecological farming on the other. In France, the recent institutionalization of the territorial scale as the appropriate one to tackle food transitions has installed a different debate, with notions such as "food resilience" being increasingly adopted by civil society, market actors and policy-makers alike.

However, all countries and regions are exposed to similar global drivers and crises. The instability in food systems is partly due to their strong entrenchment and dependence upon the wider resource nexus of energy, water and mobility systems. In the current period (since the financial and food crisis of 2008, and more recently the Brexit, Covid-19 and Ukrainian crises), the food system dynamics have become more exposed to wider "nexus" effects associated with the growing global scarcity of resource inputs such as inorganic fertilizers and the increase in energy, transport and labor costs and consumer food costs. In this unstable context and because the origins and mobilizations of power configurations have diffused, there is unlikely to be a dominant or singularly hegemonic sustainable transition pathway in the future, equivalent to the historically coherent post-war productivist/modernization pathway. The competing and fragmented alliances and networks are indeed claiming and creating divergent pathways towards more sustainable food. This is highly spatially variable with different alliances and networks becoming more influential in one place or another, and wider system change being inhibited by still established power relations in governments and corporate firms which attempt to marginalize and dilute these networks. For instance, there is still a strong reliance upon narrow "technical-fix" solutions in climate smart-farming and food processing (such as the use of gene-editing) emanating from the conventional regime. These trends tend then to reject and oppose more radical agroecological place-based initiatives that are indeed taking hold and "anchoring" in some regions (like the Ardèche in France and parts of Wales in the UK).

Therefore, we need to conceptualize the most recent period as pluri-versal. How this unfolds is also reliant upon changing and segmented food consumer and market shifts, not least the growing pressures for health-related diets and reduced, or at least more extensively produced, meat production and practices. Consumer concerns are indeed playing an increasingly important part of power configurations (as Spaargaren et al., 2013 already pointed out over a decade ago) (10, 59). Yet institutionally and indeed politically they are still largely detached from the more land-based agricultural and environmental policies currently being formulated. Current food governance mechanisms and institutions have yet to fully embrace this challenge, and fully address the necessary agriculture–food–health–environment–climate reconections as is advocated by many experts groups (61)

and civil society alliances. The conceptual consequence of the increasing diversity (across time and space) and instability of power reconfigurations (and indeed the result of our inquiries into food systems) is the need, as we have attempted here, to build more nuanced and comparatively applicable principles upon which to view what seem to be the diverse sustainable transitions in food systems.

**Data, Materials, and Software Availability.** All study data are included in the article and/or *SI Appendix*.

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