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What do our research friends say about the coexistence and confrontation of agricultural and food models? Introduction to the special issue

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Abstract

The coexistence and confrontation of agricultural and food models are an issue that is evincing much interest from the media and the political and professional fields. It is also an active area of research, a fact which led to a call for articles and the publication of a special issue. This article introduces and analyzes the 9 articles selected and published in 2020, and characterizes the diversity of the associated research (issues, fields, disciplines). After shedding light on the polysemy involved, as well as the fundamentals of the concept of agricultural and food model mobilized by the authors, we examine how they consider situations of coexistence. We identify three epistemological postures that reflect the contrasting positions of the authors vis-à-vis knowledge, actors, and action: functionalist coexistence, coexistence based on power relations, and coexistence in a transition perspective. These studies encourage the development of new research perspectives, in particular in order to make progress in the theorization of the coexistence and confrontation of agricultural and food models.

Keywords Coexistence · Confrontation · Agricultural models · Food models

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Introduction

The story of a one-size-fits-all agricultural and food model is well and truly over. The Green Revolution and the production-oriented industrialization of agricultural and food systems—backed by trade liberalization and globalization—have marked recent human history through the domination of a single agricultural and food model (in surface area, production volume and value, dominant social and economic positions, cultural hegemony, etc.) (Prével 2008; Rastoin 2008; McMichael 2009; Allaire and Daviron 2019). The industrialization of agricultural and food systems consists of the production of low-cost food of standardized quality for mass markets through the use of inputs that are themselves of industrial origin and by a reliance on economies of scale and processes of regional agricultural specialization. This industrialization is primarily driven by a massive intensification of the flows of goods and capital, major technical transformations, in particular those involving genetics (fixed varieties, GMOs, etc.), and the use of chemical inputs and fossil fuels (Daviron 2019).

But this model, sometimes termed ‘conventional’ (Beus and Dunlap 1990), is no longer considered a harbinger of better times. Territories, sectors, and innovation systems are witnessing the emergence and more marked recognition of a diversity of alternative agricultural and food models, which are now orienting the thinking, identity, projects, and actions of actors (Goodman 2003; Deverre and Lamine 2010; IPES-Food 2016; Le Velly 2017; Gaitán-Cremaschi et al. 2019). These models seek to overcome the socio-economic, environmental, and health shortcomings of the dominant model, and to respond to new challenges (demographic, climate change, biodiversity loss, growth in inequalities, global health, etc.) (Caron et al. 2018). Thus, certain agricultural models, such as family farming, persevere and are reinvented in a new project (Gasselin et al. 2014; van der Ploeg 2018) while others, such as ‘corporate farming’ (Hervieu and Purseigle 2015), do not result from the evolution of a past model, but from an unprecedented emergence.

It is therefore essential to characterize this current differentiation of agricultural and food models, a differentiation that is observed not only in actors’ practices, but also in the field of discourse and ideas. Indeed, we consider agricultural and food models to be abstract, schematic, and simplified representations that actors use to designate particular forms of agriculture and food activities (Gasselin et al. 2020a, b). An agricultural or food model can therefore correspond to (i) the archetype of a reality observed either today or in the past; (ii) a desired or rejected future (an affirmation that is social, union-oriented, or based on identity, etc., for example peasant agriculture for Via Campesina); or (iii) a set of standards for action in a certification and evaluation process (for example organic farming). While it is important to evaluate and compare different models on this basis, in particular in their economic, social, environmental, spatial, and health dimensions, it seems just as essential to us to study the interactions that occur within this reconstructed diversity of agricultural and food models. How do interactions between actors take place and how are they organized (knowledge systems, social relationships, markets, etc.)? What flows of material are involved (inputs, productions, etc.) and what are the technical rearrangements at the interface of this diversity? What does the term ‘coexistence of models’ encompass: does it refer to cohabitation, complementarities, synergies, coevolutions, hybridizations, confrontations, competition, marginalization, or exclusions? Under what conditions are these interactions favourable to innovation or adaptive

processes? What configurations of this coexistence of agricultural and food models can help meet contemporary challenges? This special issue on the ‘Coexistence of agricultural and food models’ proposes to provide some answers to these questions.

These issues have been under study by the research community for several years, in France (Petit et al. 2018) as well as elsewhere (Argentina, Brazil, the USA, the Netherlands, Japan, Belgium, etc.). As a result, it is an area of research whose objects and questions must be refined and structured within a French and international research community, which is itself under construction. This special issue is one of the first collective scientific productions on this theme. It will be accompanied by a forthcoming book on the topic (Gasselin et al. 2020b).

After a brief overview of the 9 articles¹ in this special issue, we undertake a two-stage analysis. We start by studying how the researchers problematize the analyzed situations of coexistence. We then examine the authors’ epistemological postures. We conclude by discussing the research perspectives that this special issue opens up.

Overview of the 9 articles: diversity of issues, fields, and disciplines

In this first part, we briefly present the articles of the special issue, with the caveat that our summaries are not supposed to replace the authors’ own abstracts of their articles. Indeed, we only provide a concise overview of the authors’ research in the chronological order of publication, between February and September 2020,² and then highlight the diversity of issues, fields, and disciplines.

1. Yannick Sencébé, Florence Pinton, and Ademir Antonio Cazella analyze the unequal coexistence of two agrifood systems in Brazil between 1985 and 2015. The authors reveal the institutional cohabitation, alliances, and power relations between the actors (state apparatus, professional and economic actors, social movements) in the context of two divergent projects: a project for food sovereignty based on family farming and a project for food security based on agribusiness (Sencébé et al. 2020).
2. Christophe Albaladejo highlights three types of agriculture (business farming, small-scale family farming, and conventional farming) in the Argentinian Pampas, which he characterizes by their integration into institutions (agricultural development model) and by their integration into the territory (territorial mediation). The author emphasizes that the relationships between these models are more along the lines of a copresence and not of coexistence which would suppose ‘the construction of a local public space and a profound change in the models’ current strategies’ (Albaladejo 2020).

¹ We sent out a call for articles on various international scientific platforms (Springer, ResearchGate, Academia, thematic scientific networks, etc.). In response, we received 18 articles. Each was evaluated by double-blind reviews by two reviewers. Seven articles were rejected; nine were accepted and included in the special issue. One article has been accepted in the varia section (non-focus articles), and another is still being corrected/evaluated at the time of this article’s writing.

² In the rest of the text, we will refer to the articles by their corresponding numbers.

3. Bertille Thareau, Clara Pailleux, and Guilhem Anzalone analyze the conceptions that farmers in western France have of their profession and of the relationship between agriculture and biodiversity. The authors show that the farmers' relationships with environmentalist actors (associations) and non-agricultural actors (local authorities) orient these opinions. These actors contribute to the competition between professional agricultural models by seeking to define and promote a form of agroecology (Thareau et al. 2020).
4. Coline Perrin and Adrien Baysse-Lainé analyze how the urban authorities of three large French cities influence the coexistence of agricultural models through their modalities of managing peri-urban agricultural land. The authors show that public allocations of farmland are important initiatives for the institutional recognition of sustainable-agriculture models. They are a driving force within urban policies aimed at supporting a transition towards agroecology (Perrin and Baysse-Lainé 2020).
5. Christine de Sainte Marie, Mariagiulia Mariani, Morgane Millet, Claire Cerdan, and François Casabianca analyze the contentious issue of the coexistence of cheese made from raw milk and cheese made from pasteurized milk in areas of protected designation of origin (PDOs), in particular for Saint-Nectaire and Ossau-Iraty cheeses. The authors challenge the idea that raw milk and pasteurized milk production cannot exist side by side within PDOs. They promote the multi-level perspective framework of socio-technical transitions as a relevant analytical framework for situations of coexistence (de Sainte Marie et al. 2020).
6. Nadège Garambois, Claire Aubron, Nathan Morsel, Myriam Latrille, Lucien Jallot, and Valentin Lhoste compare the agrarian dynamics of four small French agropastoral regions since the 1950s. The authors reveal the parallel development of production systems with high labour productivity that leverage pastoral resources. They highlight the conditions under which such systems coexist with more inputs-intensive systems by analyzing land competitions, market differentiation strategies, inequalities in support by public policies, and shortcomings of technical advisory systems (Garambois et al. 2020).
7. Pierre Gasselín, Sylvie Lardon, Claire Cerdan, Salma Loudiyi, and Denis Sautier present a research agenda on the situations of coexistence of agricultural and food models at the territorial scale. The authors stress the importance of understanding the interactions between agricultural and food models at this scale. They propose an analytical framework based on four dimensions of territorial development: the tension between specialization and diversification, innovation, adaptation, and transition of food systems (Gasselín et al. 2020a).
8. Clémentine Rémy and Hubert Cochet analyze a supposedly 'win-win' project for the simultaneous development of capitalist farming and family farming in Zambia. The authors highlight the contradictions inherent to the project (asymmetries in water management and sharing of generated value, etc.) and implementation difficulties (displacement of families, low attractiveness for investors, etc.). They call into question the impacts expected of the project on family farming, as well as in terms of national benefit (Rémy and Cochet 2020).
9. Yuna Chiffolleau, Anne-Cécile Brit, Milo Monnier, Grégori Akermann, Maxime Lenormand, and Florent Saucède propose an interdisciplinary approach for characterizing a city's supply system and analyzing its resilience. The authors test this

approach for the French city of Montpellier and its neighbouring areas, mainly for the tomato. They show that the complementarity between short and long supply chains and the articulation of three spatialized markets favours the resilience of the city's supply (Chiffolleau et al. 2020).

We are delighted that the articles selected cover a wide geographical field and several disciplinary orientations in the human and social sciences. Indeed, among these nine articles, eight pertain to areas of research in France (3, 4, 5, 6, 9), South America (1, 2), and Zambia (8). Only one article proposes a transversal analytical framework without any geographical anchoring (7). This variety is an invitation to comparative approaches to situations of coexistence. Issues of coexistence therefore arise in different world regions, however with different problematizations, to which we will come back in this introduction's second part. Four articles propose disciplinary theoretical and methodological frameworks in sociology (1, 3) and geography (2, 4). These articles confirm the relevance of disciplinary studies which reaffirm their preferred subjects (for example power relations in sociology, territorial integration in geography). In addition, five articles propose interdisciplinary approaches combining geography, sociology, economics, and/or the management sciences (5, 7, 9) or else refer to comparative agriculture (6, 8).³ This interdisciplinarity, favourable to—or even necessary for—the analysis of complex systems (Desfontaines and Hubert 2004), seems very suitable to us for characterizing and interpreting situations of coexistence of agricultural and food models. The diversity of disciplines also shows that there is no single theoretical framework for analyzing situations of coexistence; it has to be constructed/proposed/adapted by the authors according to their disciplinary anchoring, the research theme, etc.

Diversity of models and of situations of coexistence

In this part, we analyze how the authors organized their research on the coexistence of agricultural and food models. To be able to do so, we first examine how they mobilize the concept of a model and then take a look at the situations of coexistence they study.

But what are these models that the authors refer to repeatedly?

All the articles in this special issue use the term 'model' (a total of 412 occurrences in the main texts of the 9 articles) systematically in reference to agricultural production: agricultural/farming model (1, 2, 3, 4, 5, 6, 7, 8, 9), agricultural development model (1, 2, 3, 6, 7, 8), farmers' professional model (3), production models (5). Only four articles use the model with reference to food themes (1, 5, 7, 9), in particular on issues of food sovereignty and security (1) and food supply in cities (9).

³ Even though comparative agriculture is a discipline in its own right, with its own methods and concepts (Cochet et al. 2007), we have classified it here as an interdisciplinary approach, because it is also the integration of methods and results of agronomy, zootechnics, and social science disciplines such as history, agrarian geography, and the rural economy.

The term model is used to designate social forms of agriculture: family agricultural model (1, 2, 8), latifundia model (1), peasant model (7), and business farming model (1, 2). Sometimes, the term refers to socio-technical forms of production and processing: agro-industrial model (1, 7, 9), cheese-making model (5), technical model (6), frugal functional model (6), large mechanized farms model (8). Some authors tack on a qualifier to designate the type of development project: productivist development model (2, 7), modernization model (2, 7), capitalist development model (2), Green Revolution model (1), and sustainable-agriculture model (4). Some articles qualify the role of the model in society, markets, public policies, research, professional organizations, or territories: dominant model (2, 3, 5, 6, 7, 9), conventional model (2, 3, 4, 7), alternative model (4, 5, 7, 9), hegemonic model (2, 7), agroecology model (3), universalist model (2), unorthodox model (6), and win-win farming model (8).

In every article, its authors define the types of models they use in the analysis. However, the authors of only three articles (2, 3, 7) offer a conceptual definition of a model: agricultural development model (2), professional model (3), agricultural and food models (7). Moreover, the analysis of the models is often dual in the sense that it contrasts only two types of models: family-run farming vs agro-industry (1), conventional farming vs agroecology (3, 4), raw milk cheese vs pasteurized milk cheese (5), frugal farming systems vs non-frugal farming system (6), capitalist farming vs family farming (8), and short supply chains vs long supply chains (9). Of course, this duality is forced on the authors: Brazilian agricultural policies and public institutions are dual (1), the judicial system has dualized the ‘raw milk vs pasteurized milk’ controversy in cheese PDOs in France (5), the documentation of the Zambian development project dualizes the project’s actors and objectives (8), etc. This dualism, widely discussed in many disciplines since the Renaissance, does not, however, reduce the authors’ analysis to a Manichean perspective. Indeed, all the authors of this special issue take care to account for the diversity of systems, practices, and positions of actors outside the models to which they refer.

We consider as a starting point the observation that agricultural and food models are abstract, schematic, and simplified representations that actors, including researchers, use to designate specific forms of agriculture and food systems (7). From this general framework, we identify two epistemic postures in the research covered in this special issue.⁴ The first is to see the model as the analytical archetype of a reality observed today or in the past. This makes it possible to reduce the complexity of reality and to examine how practices, representations, discourses, and identities come closer to or move away from the archetype chosen by the observer. The second posture defines the model as a desired or rejected future. Research then focuses on specifying how different categories of actors and institutions refer to models: public policies (1, 2, 3, 4, 5, 6, 7, 8, 9), local authorities (3, 4, 9), social movements (1, 2), markets (2, 9), professional agricultural organizations (1, 5), agricultural advice (2, 6), research (1, 2), international institutions (8), environmental associations (3), and food processing industries (5). Some authors focus in particular on analyzing how standards (specifications, evaluation procedures, etc.) underpin agricultural and food models, in particular by exploring issues of justice (4) and controversies (5). All the articles in this special issue use these

⁴ None of the articles refers to the mathematical models used in certain sciences (economics, ecological sciences, agronomy, etc.).

two analytical and normative meanings of the model, without, however, always explaining the tensions and dialectics between them.

Situations of coexistence: ad hoc analytical constructions

After shedding light on the polysemy, as also on the basics of the concept of the agricultural and food model, we examine how the actors consider situations of coexistence. A situation of coexistence of agricultural or food models can be envisaged at different organizational, spatial, and temporal scales and by studying specific actors, objects, and interactions. We consider that a situation of coexistence and confrontation is defined by (i) the actors or systems considered, (ii) their interactions (conventions, regulations, material or money flows, controversies, power relations, etc.), (iii) the specific objects analyzed (practices, work, technical systems, prices, natural resources, quality criteria, knowledge, identity, etc.), and, finally, (iv) the setting considered, i.e. the framework in which the interactions are considered (a farm, a cooperative, a territory, a sector, an innovation system, a governance mechanism, etc.) (Gasselin et al. 2020a, b). In this part, we first analyze the geographical and temporal dimensions of situations of coexistence, and then the actors, interactions, and objects studied in the 9 articles.

Where are the situations of coexistence to be found?

The situations of coexistence studied in this special issue are notable for the territorial scales they concern: nations (1, 8), large agricultural regions (2, 3, 8), cities and their peri-urban territories (4, 9), and small agricultural regions (5, 6, 8). Thus, all the authors of this special issue place the situation of coexistence within a delimited territory. However, some of them differentiate themselves by more or less asserted geographic epistemologies. For some authors (4, 6, 7, 8, 9), space and territory not only formalize the location of the processes studied, but also help to determine the configuration of coexistence and confrontation of agricultural and food models because of its geographical characteristics (environmental conditions, demography, urbanization, territorial layout, etc.) and historical characteristics. Some authors take pains to characterize these territories, for example agro-pastoral regions (6) marked by the presence of low-productivity ecosystems and difficult access conditions. It is at the scale of small agricultural regions (6, 8) that the analysis highlights possible functional complementarities between farms, as also competition in access to resources and outlets. Looking at small regions does not mean that comparisons cannot be made to determine the specificities and regularities of their agricultural development. Other authors choose the intermediate scale of large agricultural regions, such as the humid Argentinian Pampas, renowned to be one of the richest regions in the world for its soils and climate (2). Here, the geographer, conscious of the farmers' territorial pacts, emphasizes how essential geohistorical characteristics are for understanding the conditions of copresence between 'triumphant business farming' and small and medium farmers. This is not a geodeterministic reading of action and events, but rather an observation 'that a form of agriculture can be defined through its mode of territorial integration and therefore through the type of territory that it helps produce' (2). Other authors (4, 5, 7), without saying so explicitly, agree with this perspective through which they examine the

coexistence of agricultural and food models in terms of their territorial integration and the territory that results from it.

Geographers (2, 4) and comparative agriculture researchers (6, 8) endeavour, as may be expected, to map their situations of coexistence and to describe the local issues of territorial development. However, spatialization is not reserved for these disciplines that are intrinsically linked to the study of the geographical fact. One of the interdisciplinary articles (9) spatializes the processes studied in great detail (food supply chains: spatialized markets, product flows, relationships between actors). The authors adopt the concept of ‘foodshed’, analogous to watershed, referring to the geographical space mobilized to feed cities (Peters et al. 2009). In this sense, these authors spatialize situations of coexistence in ad hoc spatial configurations that are relevant for studying geomarket flows of agricultural products and interactions between food supply actors. Other authors (4) also evoke specific geographical entry points adapted to the situations of coexistence being studied, such as urban foodscapes⁵ (Moragues-Faus and Morgan 2015), which opens up exciting perspectives.

When are the situations of coexistence to be found?

The temporal aspect is also considered in different ways in the articles in this special issue. Some authors propose a historical perspective of 50 years (5, 6), 30 years (1, 2), or 10 years (3, 4, 8). These articles use history as a context, a narrative, and the basis of a causal explanation of current situations. They are not, therefore, historical articles in the disciplinary sense of the term; i.e. they are not based on theoretical and methodological frameworks that are explained, justified, and discussed. Past events, actors, and ideas are not the articles’ main objects. The authors use history to propose a periodized chronology and to explain the differentiation of the agricultural and food models being studied. Each of the articles perceives the past in a particular way: it can be a matter of changing power relations in social, political, research, or training spaces (1, 2), the dynamics of socio-professional networks (3), the shifts in urban land policies (4), the construction and transformation of product qualification rules (5), the transformation of landscapes and production systems (6), or the implementation of an agricultural investment project (8). Article 7 emphasizes the importance of analyzing the processes of situations of coexistence and confrontation of agricultural and food models (specialization or diversification processes, innovation processes, adaptation and transition processes), without proposing a specified time horizon or a historical theorizing of these processes. The core of article 9 deals with the food supply of Montpellier City during the tomato production and consumption season, but here too the actors are placed in a process of transformation of the city’s agricultural and food policies. All the authors trace history to present the actors, the models they promote or criticize, the relationships that bind or oppose these actors, and the major objects around which these relationships are organized (political control; control over resources, especially land; product quality; generation of economic value; a city’s food supply; etc.).

In this special issue, the coexistence and confrontation of models are studied by taking recourse to history. All the authors offer at least a contextual history to introduce

⁵ This term appears synonymous with ‘food environment’. The added-value of the foodscape concept is how food is examined in relation to the landscape (Vonthron et al. 2020).

the situation of coexistence being studied. But some authors go beyond this contextualization by implicitly or explicitly supporting a historical theory. Article 1 defends the idea of the permanence of an unequal coexistence between Brazilian agribusiness models and family farming models within the framework of a dual institutionalization, but this uneasy coexistence is still largely dominated by the agribusiness coalition, including in terms of support from public resources. Article 2 argues that the historical transformations of Pampean agriculture in Argentina have created conditions preventing a move away from a configuration of copresence between family farming and business farming; i.e. there is no common space for discussion between the actors of these agricultural models, and therefore, no coexistence is possible. Article 6 supports the thesis that the development of livestock farming in France since the 1950s has focused on a technical model aimed at increasing the physical productivity of labour to the detriment of value creation. This historicization helps the authors highlight the factors that hinder the emergence of economical livestock farming, and then question the future of pastoral systems in difficult farming areas. Articles 5 and 7 address temporality by analyzing the multi-level transition of socio-technical systems towards sustainability, an approach that has proliferated since the 2010s and which offers a new way of understanding the dynamics of change (Lawhon and Murphy 2012).

Which actors coexist around which objects?

After analyzing the socio-spatial scales and temporal dimensions of situations of coexistence and confrontation, we now examine the actors, their interactions, and the objects studied.

Our first observation is that the situations studied pertain, above all, to agricultural issues (1, 2, 3, 4, 5, 6, 7, 8). Some articles examine the agriculture-food relationships in terms of food sovereignty and security issues (1), of health issues and gastronomic heritage (5), or from a food system perspective (7). One article clearly concentrates on the food issue by studying the conditions of a city's food supply (9). Another aspect of the research in all the 9 articles is that it focuses on relationships between actors, although some authors also examine interactions between productive systems (6, 7, 8). The actors under consideration depend on the scales (nation, region, sector, etc.) and issues involved. That said, producers are always included in the analysis, with varying degrees of care taken by researchers to differentiate between them, as well as between their professional organizations. Researchers also pay close attention to public entities, whether governments (1, 6, 8), technical or administrative organizations (5, 8), training or research institutions (1, 2), local authorities (3, 4, 7, 9), or international organizations (8). In contrast, civil society organizations, such as social movements (2) and environmental associations (3), are less taken into account.

All the articles discuss confrontations between actors, whether concerning political or ideological opposition (1, 2, 7), competition in access to resources (land, public sector support, agricultural advice, etc.: 1, 2, 4, 6, 7, 8), hierarchies of representations of the 'good farmer' (3), project divergences (8), or market competition (5, 9). These confrontations can result in large-scale social conflicts (1, 2), stigmatization (3), wars of influence in the arenas of local political power (4), or litigation (5). However, conflicting relationships between actors are sometimes silent or invisible due to the absence of space for coexistence, which leads to situations of copresence (2). In Latin America, the

historical socio-economic duality produces marginalized groups that struggle to make their voices heard, with resistance being ‘a way to stay alive, multiform and decentralized, on the part of the social movements engaged in the defence of food sovereignty and agroecology’ (1).

The interactions expected to be favourable between different agricultural and food models are analyzed less often. They include environmental contractualization (3), the design of new urban agricultural models (4), technical complementarities (5), innovation and adaptation processes (7), supposedly win-win agreements between family farming and capitalist agriculture (8), and the resilience of a city’s food supply system (due to not only the complementarity between short and long supply chains, but also spatialized markets: 9). However, these observed or expected benefits of the situation of coexistence between models are often outweighed by major drawbacks. For example, in Zambia (8), the expected synergy between family farming and capitalist agriculture (attraction of investors, reduction of public debt, increases in production and productivity, job creation) has proven to be clearly much less beneficial than expected (competition for irrigation water, immobilized land, lack of dialogue, reduction in the area cultivated per farmer, displaced families, low attractiveness for investors, etc.).

The articles highlight major objects around which the relationships between actors in situations of coexistence and confrontation between models are organized. First and foremost are public policies: they impact or even determine the configurations of coexistence situations at the European scale (6), national scale (1, 2, 5, 7, 8), and urban scale (property rights, city food projects: 4, 9). These policies sometimes promote the legitimization of certain models by public authorities (1, 2, 4, 6, 7, 8). Land is the second main focus of the articles in this special issue. Land tenure systems are discussed in terms of issues of food security and social inequality (1). The management of peri-urban lands by local public authorities leads to an examination of their distribution and issues of land justice (4). The land tenure issue is sometimes studied in terms of the contrasting agronomic suitabilities of the land and its diversified uses in the landscape (arable land, irrigated land, woodlands, moors, etc.). It is thus a matter of understanding the processes of land and water concentration (conditions of access and sharing) and the actors’ strategies (6, 8). The land tenure issue is also viewed through the prism of processes of regional specialization or diversification and the challenges of biodiversity management (land sharing vs land sparing) (7). Scientific research is the third major subject discussed in the articles: it is singled out for having favoured some agricultural models, especially during the Green Revolution in Brazil (1), and for having served the interests of Argentinian business farming (2). The research community is also called upon to take coexistence situations better into account by mobilizing suitable analytical frameworks (2, 7). Technical systems are the fourth focus of attention of the authors of this special issue. These technical systems form the basis of controversies between actors, mark the models under debate (e.g. concerning animal feed: economic and self-sufficient models vs intensive models), and determine the conditions of interactions between productive systems (organization of labour, fertility transfer, resource sharing, certification of technical itineraries, etc.) (6, 8). Markets and supply chains are the fifth subject considered by the authors of this special issue. The processes of qualifying technical processes and the geographical origin of products form the basis for direct oppositions between supply chain actors

(‘Camembert war’: 5). Equally intense oppositions between actors can also be based on the competition and complementarities between short and long supply chains (9). Training (2) and agricultural advice (6) are secondary subjects in this special issue, even if they can be central to the understanding of determinants and effects of situations of coexistence.

Finally, it should be noted that some articles study issues through a specific focus on topics such as biodiversity (3), land (4), milk processing in cheese-making (5), an agricultural development project (8), or the tomato sector (9). Other authors consider situations of coexistence in a broader perspective, for example around food sovereignty issues (1). Thus, some authors advance an integrative vision by studying the coexistence between models with regard to issues concerning policies, science, markets, and civil society (2), by integrating technical, economic, and spatial dimensions (6), or from a territorial development perspective (7).

Three epistemological postures

In the two previous parts, we noted the diversity of the areas of study, disciplines, problems, and situations of coexistence studied. Looking beyond this diversity, we identify in this special issue three main types of concerns the authors have, as proposed in article 7, which reflect their contrasting positions with regard to knowledge, actors, and action.

Functionalist coexistence

A first set of articles examines the functional complementarities resulting from situations of coexistence. These articles rely in general on an understanding of the interactions between socio-technical and socio-ecological systems (3, 7, 8, 9). The authors of article 3 highlight the complementarities between farmers and non-agricultural actors (associations, local authorities) in western France that define socio-professional trajectories and conceptions of the farming profession and biodiversity, which are thus not solely inherited from the conceptions and knowledge of the farmers’ family and its environment (3). According to the literature review undertaken in article 7, the interactions between agricultural and food models can optimize a territory’s heterogeneous resources, help multiply the sources of innovation, can engender fruitful hybridizations between innovations originating from different models, and sometimes improve adaptive capacities of agricultural systems and increase the resilience of territories. The Zambian irrigation project aims to foster complementarities between family farmers and capitalist farmers, even if the analysis of the project’s implementation belies this hope (8). In southern France, the analysis of complementarities between supply chains shows that they help build up a city’s food resilience (9). These articles’ authors thus propose a functional analysis of situations of coexistence, often viewed through the prism of systemic thinking, even though it is not always explicitly claimed as such. Attention is then focused on the interactions between actors and components of the system, for example between family farming and capitalist agriculture, and on the system’s emerging properties (resilience, vulnerability, innovation capacity, etc.).

Coexistence based on power relations

A second set of articles studies the power relations between actors and the conditions of governance of a diversity of agricultural and food models (1, 2, 3, 4, 5, 6, 7, 8). The authors then examine the effects of domination or aim to restore silenced identities and fight against marginalization (7). These studies interpret and sometimes condemn situations of exclusion in a criticism of power relations (economic, political, and social).

In the first place, the articles on non-Western countries highlight power relations, even though the intensity of these relations is observed to decrease from Brazil to Argentina to Zambia. The coexistence and confrontation of agricultural models in Brazil have been structured by social organizations and movements as well as by the public policies implemented (1). Large-scale and corporate agriculture enjoys the support of the powerful Ministry of Agriculture, Livestock, and Supply. In the 2000s, food sovereignty became an objective that brought together multiple social movements, including the one advocating agroecology, thus legitimizing the contribution of family farming to national food security policy (*Fome Zero*). At the same time, the world of agribusiness structured itself and was strengthened with the support of the State, to ensure Brazilian leadership in the international commodities market, while at the same time 'greening' itself. This coexistence has not, however, made it possible to challenge the inequalities of access to resources between these two agricultural models, nor the power relations between the social worlds each represents. In the Argentinian Pampas, the power relations between the respective proponents of these agricultural models are less intense and less violent than in Brazil, but they are nonetheless very marked (2). They are especially evident in the social and professional agenda (media, unions) and in science and technology, with a strong opposition between agroecology, an approach explicitly linked to small-scale family farming, and agribusiness, identified with business farming. However, small and medium farmers in the Pampas are practising original forms of agriculture, described as 'discreet innovations' (Albaladejo 2001), without actually becoming part of an effort and organized actions of resistance against a dominant capitalist model. In Zambia, the supposed complementarity between family farming and capitalist agriculture is in fact translated into power relations between the actors of the irrigation project (8). For example, some village chiefs retain their authority and role in the management of social problems and conflicts, but have lost their power to allocate irrigated and rainfed agricultural land. Farmers are thus put in an uncertain and precarious position in terms of access to land.

In France, power relations are less pronounced than in the other countries studied in this special issue. The professional trajectories of French farmers who are part of networks of ecological sociability and their conceptions of their profession depend not only on their alliances, but also on their criticisms of environmental, professional, and territorial organizations (3). The hierarchization of knowledge (professional vs environmentalist) determines the contours of the professional worlds in which farmers practise their professions. In the management of land in three French cities, the authors note a 'gradient of coexistence' in which the relationships between old and new farmers and public actors range from open conflict to a hybridization of models, according to the following typology: open conflict, tensions, distrust and suspicion, mutual indifference, collaboration, and hybridization (4). Tensions between actors sometimes result

in lawsuits or arbitrations by public authorities, such as in the case of claims of unfair competition between local cheese-makers and industrial cheese producers (5). Power relations can also be observed around technical issues: raw milk cheeses vs pasteurized milk cheeses, fermented or unfermented fodder. In French agro-pastoral regions, researchers observe competition for land between the so-called frugal farms and suckler farms that do not make optimal use of pastoral areas that benefit from premiums (6). They also identify farmer strategies for differentiating themselves in short supply chains in competitive urban markets. Farmers publicize the positive impacts of economical agro-pastoral farms on the quality of taste and distinctiveness of their products to their clientele. In the articles in this second set, the researchers develop a critical approach to situations of coexistence and confrontation of agricultural and food models.

Coexistence in a transition perspective

The third set of articles (3, 4, 5, 7) considers coexistence as a situation of transition of agricultural or food models. We define transition here as a change that is analyzed in—and sometimes supported by—a transformative perspective, especially on issues of governance and public action, learning, and the brakes and levers of change (Hill and MacRae 1996; Geels 2010; Lawhon and Murphy 2012).

In this group, two articles (3, 4) consider the agroecological transition as a major contextual element, but do not conceptualize it. In western France, the authors identify four types of farmers according to their conceptions of their profession and of biodiversity (3). These representations are part of socio-professional trajectories partly determined by their interactions with non-agricultural actors. The authors interpret these socio-professional trajectories with respect to the diversity of the farmers' social origins and analyze their place in the agroecological transition. In French cities, public allocations of farmland are a driving force of urban policies aimed at supporting a transition towards agroecology and more sustainable food systems (4). The transition is then seen as a process to 'include all farmers and invite them to progress towards more respect for the environment'. In the city of Lyon, this transition is promoted by local authorities at three levels: transition of crops, practices, and marketing methods. 'The vision is not coexistence but rather the necessity of a general transition: every farmer should progress in these directions' (4). However, the authors point out that this perspective of local authorities is out of step with the 'coexistence experienced' by actors who report a gradient of coexistence, in which agricultural models compete not only for access to land, but also for public support and legitimization.

The other two papers in this set (5, 7) conceptualize the coexistence of models in the legacy of Geels and Schot's (2007) work on the multi-level transition of socio-technical systems. More specifically, they are part of the emerging field of the geography of transitions (Lawhon and Murphy 2012; Hansen and Coenen 2015; Truffer et al. 2015). These two studies focus on the principle of interactions between the socio-technical landscape (the environment in which society is embedded), the socio-technical regime (rules, practices, and actors that guide or constrain actions), and the niches (spaces in which more radical innovations are built). However, the geography of transitions concentrates on the dynamics of the niches themselves, which make coexistence possible, but do not focus on technological issues, nor shed light on geographical dimensions (local arrangements, silent innovations, spatial dimensions of the transition,

taking of power games between actors into account, attention paid to often neglected actors such as consumers and workers, etc.).

These three epistemological postures (functionalist coexistence, coexistence based on power relations, and coexistence in a transition perspective) are not mutually exclusive. Indeed, researchers often adopt overlapping or hybrid positions in the articles in this special issue, even if each article primarily projects only one of these three postures. Furthermore, the epistemological posture of researchers varies depending on the research they are involved in at any one time, as also over their scientific trajectory (Petit et al. 2018).

Discussion and perspectives

This special issue brings together 9 articles on the coexistence and confrontation of agricultural and food models that concern areas of research in France (3, 4, 5, 6, 9), Argentina (2), Brazil (1), and Zambia (8) or offer a general analytical perspective (7). The authors focus on the interactions between agricultural and food models, defined as analytical archetypes of a reality observed today or in the past, or as a desired or rejected future by the actors. In this sense, they go beyond a long trajectory of research which, for nearly 70 years, has been striving to identify the diversity of models, to characterize their differentiation, and to compare their economic, social, and environmental performances. This look at the relationships between agricultural and food models is sure to revitalize research in these areas. In his article (2), Christophe Albaladejo reminds us of the ‘hegemony’ of the agricultural development model of the 1960s and 1970s, in the definition of Gramsci, who sees it as intellectual, political, and moral leadership underpinned by a universalist will (Piotte 2020). Does this hegemony still prevail? Of course, alternatives abound, but are they truly a ‘promise of a difference’ (Le Velly 2017) or merely fronts for a productivist modernization attempting to become more acceptable? This special issue does not provide a clear-cut answer to this burning question, but the examinations of situations of coexistence and confrontation of models do contribute to providing one.

Of course, these 9 articles do not represent the diversity of research already carried in this area, even though most of it dates from recent times (Jank et al. 2006; Hervieu and Purseigle 2015; Gwiazdzinski 2016; Loring 2016; Polge et al. 2018; Chia and Dulcire 2019; Cialdella et al. 2019; Joltreau and Smith 2020; Ong and Liao 2020; Rossi et al. 2020). These studies focus mainly on agricultural issues, leaving a large area of research open on food systems, which some researchers are beginning to explore (Fournier and Touzard 2014; Galliano et al. 2017). Nevertheless, these 9 articles already encompass a wide scientific horizon. They bring together a large diversity of disciplines and ways of analyzing agricultural and food models, on the one hand, and situations of coexistence, on the other. In addition, we have identified three contrasting epistemological postures adopted by the researchers. This small sampling of research, which lends itself to comparison, consists primarily of case studies, since only two articles (2, 7) propose elements of theorization of coexistence and confrontation of agricultural and food models. Indeed, there is still little theoretical work in this field (Hervieu and Purseigle 2015; Loring 2016; Dumont et al. 2020). This means there is considerable scope for new work in this area of research and we invite our ‘research

friends' to discuss existing theoretical frameworks and to propose new theoretical and conceptual perspectives.

As we have seen, these 9 articles emphasize the importance of considering the issues of governance, and even of management (Caron 2020 (forthcoming)), of the diversity of agricultural and food models and their coexistence, not only at the territorial level and in markets, but also in public policies, professional organizations, the research community, and training and advisory entities. Designing or planning coexistence implies an intentional management of diversity and interactions. Governing coexistence will make it possible to avoid exclusions, regulate unequal competition, optimize the heterogeneity of resources, organize transitions, ensure procedural and redistributive justice, inform controversies, and facilitate conflict mediation. Much has to be invented before methods can be found that can give concrete shape to these governance capacities.

Jean-Christophe Kroll (Bustos 2013) warns us that advocating for the coexistence of production models 'to make room for everyone' is politically very convenient. Thus, refusing to choose would amount to choosing the strongest. However, some authors (4, 7, 8, 9) show that situations of coexistence are likely to foster innovation or build up the resilience of production systems, territories, and supply chains. That said, all the authors point out the failures or the fragility of the expected benefits of coexistence. There therefore exists a vast field of research into the conditions under which situations of coexistence become conducive to sustainable development.

We hope you find this special issue a stimulating and rewarding read.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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