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Towards a process-relational approach to farming

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Dissertation submitted in partial fulfillment of the

Doctor of Philosophy (PhD) in Sociology

Innsbruck, September 2021

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Ika Darnhofer, am 1. Sept. 2021

Acknowledgements

While I have written this thesis alone, I have not done so in an isolated bubble. Life is but a flow of relations and I too am entangled in heterogeneous processes that have enabled, challenged, and supported me throughout the writing of the thesis. These processes have not started when I registered for a PhD in sociology, and will keep unfolding long after I have completed it, hopefully. I would like to acknowledge and thank them.

To UBC for hosting me during a sabbatical, allowing me to spend time at their wonderful campus situated on the traditional, ancestral and unceded territory of the Musqueam people. There, I not only got in touch with indigenous studies, but also found the time to explore and to be inspired by relational sociology, process ontology, and the philosophy of Barad and Deleuze.

To my supervisors, Markus Schermer for graciously taking on a 'higher semester' and letting her pursue her ideas freely, and Bernhard Weicht for giving me most helpful pointers where to dig deeper.

To Hermann for all our many conversations about academia and for sharing the never-ending wonder at how it works, despite it all.

To all my dear friends who never tire of reminding me that life should not be all work and no play: Kathi, for always being there and for cooking the most soul-nourishing food; Laurence for so openly discussing life's tribulations ever since those days at the EFN; Sabine for sharing her passion for organic farming since our very first day at the BOKU; Margit for her encouragement and support; Arno for always being there when I need material help.

To Xana, for keeping me grounded and for the fun of being students at the same time.

To Garmin, for reminding me that I too am an embodied mind.

To COVID-19, this still unfolding confusion, a grand example of how the unexpected can lead to radical changes in a short amount of time, how life's unfolding is full of surprises, how planning is often a futile endeavour, how social and natural processes are deeply imbricated. The resulting travel restrictions, lockdowns, and home office directives were most timely: they reduced the busy-ness of 'normal' life, minimized 'distractions', and allowed me to focus on reading-thinking-writing towards this thesis.

To Alexandra Elbakyan and the www without whom access to scientific publications would be immeasurably more cumbersome.

To the host of humans and nonhumans that are entangled in the processes that weave the tapestry of my life. Through personal interactions, social media, books, or artworks, they are inspiring me to think differently, and enable me to see the ever-present possibilities for a different becoming. All it takes is an open mind and a different doing, daily.

Abstract & Kurzfassung

Abstract

Given the social and environmental impacts of modern agricultural practices, there is a widespread agreement that the agrifood system needs to change. Agronomists, agricultural economists, human geographers and rural sociologists have been mobilized to identify causes and interrelations, and to recommend ways to address various issues faced by farmers. While various recommendations have been put forward, many of these issues have proven persistent. This thesis explores whether revisiting ontological assumptions can help approach the conundrum differently. It invites to question the humanist view of the farmer (whose decisions are mostly guided by cognitive reasoning), the substantialist view of the farm (as made of inert matter), and the mechanistic understanding of change (as following fixed cause-effect relations). The thesis outlines a process-relational approach to farming, where the farmer is reconceptualised as a posthuman subject, the objects and animals populating the farm as being agentic, and farming as an emerging, unfolding process. The approach builds on Actor Network Theory and Assemblage Thinking which have deconstructed totalities; on New Materialism which sees 'things' as agents along with humans; and on Process-Relational Sociology, which sees all entities as constituted by relations. A process-relational approach conceptualises farming as a process that constantly needs to be enacted, and can thus always be assembled and actualized differently. As such it questions hierarchies, predictability, and controllability, while foregrounding complexity, indeterminacy, and possibility. The approach not only proposes a different conceptualisation of farming, it also calls for more awareness of the performativity of research practice. It is thus an invitation to expand conceptual imaginaries, to engage in methodological experimentation to open up what has been foreclosed and simplified, and to use non-representational writing styles to go beyond representing what 'is' towards capturing the fluidity of open processes of becoming.

Kurzfassung

Angesichts der sozialen und ökologischen Auswirkungen moderner landwirtschaftlicher Praktiken besteht weitgehend Einigkeit darüber, dass sich das Agrar- und Ernährungssystem ändern muss. Nicht zuletzt im Rahmen der Agrarsoziologie wurden Ursachen und Zusammenhänge erforscht, wurden Lösungswege aufgezeigt. Dennoch haben sich viele Probleme als hartnäckig erwiesen. Diese Dissertation stellt sich die Frage, ob ein anderer ontologischer Ausgangspunkt neue Einsichten ermöglichen kann. Dazu wird ein prozess-relationaler Ansatz entwickelt, der auf der Akteur-Netzwerk-Theorie, der Assemblage-Forschung, dem Neuen Materialismus und der prozess-relationalen Soziologie aufbaut. Der Ansatz betrachtet den/die Landwirt*in als posthumanes Subjekt, versteht Gegenstände und Tiere als Aktanten, und begreift die Landwirtschaft als sich entfaltender Prozess. Durch diese Konzeptualisierung werden Dichotomien, Hierarchien und Vorhersehbarkeit hinterfragt, werden Heterogenität, Komplexität und die allgegenwärtige Möglichkeit einer unerwarteten Entfaltung in den Vordergrund stellt. Der Ansatz denkt nicht nur das Untersuchungsobjekt neu, er fordert auch mehr Bewusstsein für die Performativität der Forschungspraxis ein. Er ist somit eine Einladung neue Begriffe zu entwickeln und mit Methoden zu experimentieren, um die Fluidität offener Prozesse konzeptualisieren und erfassen zu können.

Table of content

List of publications submitted as part of the cumulative dissertation

The following publications represent the main part of this cumulative dissertation (Part II):

I. Darnhofer, I. (2020). Farming from a process-relational perspective: Making openings for change visible. *Sociologia Ruralis* 60: 505–528. doi: 10.1111/soru.12294

II. Darnhofer, I. (2021). Farming resilience: From maintaining states towards shaping transformative change processes. *Sustainability* 13(6): 3387. doi:10.3390/su13063387

III. Darnhofer, I., S. D'Amico, E. Fouilleux (2019). A relational perspective on the dynamics of the organic sector in Austria, Italy, and France. *Journal of Rural Studies* 68: 200–212. doi: 10.1016/j.jrurstud.2018.12.002

CRediT: *Ika Darnhofer*: conceptualisation, theoretical framework, investigation and analysis for the Austrian case study, lead in writing: original draft, review and editing. *Simona D'Amico*: conceptualisation, investigation and analysis of the Italian case study, writing: review and editing. *Eve Fouilleux*: conceptualisation, investigation and analysis of the French case study, writing: review and editing.

Part I: Setting the scene

1. Introductory overview

We cannot solve problems using the same thinking we used when we created them.

attributed to Albert Einstein

1.1. Rural sociology: linking society and nature

Rural sociology may sometimes seem like an intellectual backwater. This may be linked to rural spaces being conceptualised as at the periphery or as marginal, in contrast to the urban, which is seen as central, especially in the 21st century, where more than half of the world population lives in cities. It may also be linked to the fact that rural sociology has been less concerned with abstract reasoning, having always been an 'engaged science', i.e. one that works "with the mess of the world" (Lowe, 2010, p. 311).

This commitment to knowledge that makes a difference in the 'real' world, is partly due to its origins. The emergence of rural sociology in the United States in the 1930s is linked to the Great Depression and the demand for social science knowledge to inform government programmes addressing the needs of farmers and the rural poor (Lowe, 2010). In Europe, rural sociology emerged in the 1950s, closely tied to the reconstruction efforts after World War II (Kötter, 1967; Lowe, 2010). As in the US, rural sociology was often institutionalized in agricultural universities, leading to strong formative relationships with agricultural economics and natural sciences (Lowe, 2010). Initially, rural sociology was thus mostly an aid to the diffusion of agronomic practices developed by scientists, helping the spread of the modern farming technologies that were transforming agriculture in the second half of the 20th Century. The aim was to provide information to extension services, so that agricultural productivity could be increased and farmers integrated into modern society.

Later on, rural sociology widened its scope to include various sociological issues faced by people living in rural areas, so that nowadays studies within rural sociology may or may not include farmers. There are numerous studies of the response to various groups within rural society to broader processes of modernisation, demographic changes, globalisation, liberalisation, mobility, urbanisation, digitalisation, access to natural resources, tourism, food consumption, energy production, conflicts, justice, or gender dynamics. Many of these transcend traditional spatial boundaries, highlighting multiple rural-urban interconnections.

Yet, research in rural sociology often focuses on farmers, so that in effect much of rural sociology is a 'sociology of agriculture' (see Buttel, Larson, & Gillespie, 1990; Carolan, 2021; Cloke, 1997; Newby, 1983)[1]. In the European Union, this may partly be due to the funding available for research projects which aim to inform the Common Agricultural

[1] As this thesis focuses on farms and farmers, it may be more precise to situate it within the 'sociology of agriculture'. However, this term may convey a divide between agriculture and non-farm related activities in rural areas, possibly implying limits to what is considered relevant to farming. I find the potential implications of such a divide problematic, given the interactions between agricultural production and food consumption (see Carolan, 2021); given that on-farm activities are closely linked to the surrounding natural space and wider social dynamics; and given that the majority of farms in Austria are part-time farmers (i.e. most of the income of the farm family stems from off-farm or non-agricultural activities). I thus keep with the term of 'rural sociology', which is more widely used and more inclusive, even if still implying a potentially unwarrented distinction between urban and rural spaces.

Policy; and partly due to the fact that in rural areas much of the land is owned by farmers, so that wider societal issues, such as those tied to natural resource management, energy production, or climate change tend to involve farmers.

Initially, the research concerns focused on farmers' attitudes towards technological progress and perceptions of the modernisation of rural society. From the 1990s onwards preoccupations included the motivations for farmers to engage (or not) in environmentally friendly agricultural practices and alternative food systems. Rural sociology thereby highlighted distinct peasant rationalities (see van der Ploeg, 2013, 2018), which nuanced the view of farmers as economically rational entrepreneurs, a conceptualisation often taken in agricultural economics. The studies also foregrounded that farms are not just businesses, since they are also the home of farming families. Thus farmer's choices are not only guided by agronomic or economic aspects, but include considerations for the family's quality of life, as well as farm succession.

Studies in rural sociology – partly in conjunction with human geographers – also highlighted the multifunctionality of agriculture, pointing out that rural areas are not just central as places of food production, but also areas for recreation, production of renewable energy, and essential for responses to climate change through alleviation of the impact of floods and drought (Marsden, 2006; Woods, 2009). Social and cultural narratives of rurality were thus extended to the material dimensions of the rural. Indeed, the rural can no longer be understood only as a social construction, where its symbolic status as idyllic is contrasted to the alienating life in cities, where harmony with nature is emphasized, where cultural landscapes convey identity, encouraging belonging, communal and altruistic social forms. Indeed, as the rural is also a space where humans seek a connection with nature, rural sociology is not just concerned with social orders. In the rural there is something beyond the 'social' at work, a materiality that is not reducible to social categories, it is 'more than human' (Whatmore, 1999). This has led to the insight that the rural needs to be understood "as a *hybrid* space, one that mixes up social and natural entities in creative combinations" (Murdoch, 2003, p. 264, italics in original).

The focus on complex interrelationships between societies and natural environments and the understanding that the separation of natural and social worlds is artificial, requires theories that take both seriously (Goodman, 2001). If we are to understand farming as a hybrid process, as co-constituted by humans and nonhumans (Noe & Alrøe, 2006), we need to use a perspective that "celebrates, rather than marginalises, the heterogeneous diversity of rural objects and entities" (Murdoch, 2003, p. 264).

1.2. Family farms in turbulent times

Agriculture is mostly organised in the form of family farms. Their crucial role in society has led the United Nations to declare the 'Decade of family farming 2019-2028' (FAO & IFAD, 2019). It recognizes that family farms not only provide the majority of our food and the backbone of rural society, they also maintain biodiversity, cultural landscapes, provide recreation facilities, produce energy, maintain traditions and customs. Yet, they face increasing pressure as they have to cope with climate change, soil depletion and biodiversity loss, neoliberalism, volatile markets, technological innovations.

In Austria, the number of farms has been decreasing ever since the 1950s. This has been linked to the rationalisation and modernisation of agriculture, with its focus on efficiency, calculability, predictability, and control (Ritzer, 2008). This modernisation paradigm is reminiscent of technological determinism, where technology appears to be autonomous, and the technologist's standards of judgement, focusing on efficiency and productivity, is removed from political and ethical discourse, trumping all other moral or

ethical criteria (Lawson, 2007). Modernisation is compatible with and reinforced by agricultural economists' norms, which focus on economies of scale to reduce unit production cost, and on optimising cost-benefits-ratios to maximise farm income. The emphasis on modernisation, technologisation and economisation has led to larger farms, and this enlargement process goes hand-in-hand with some farmers giving up, making land available for the remaining farms. The trend towards fewer farms is on-going: in Austria, between 2010 and 2016, on average 1.880 farms were given up each year (BMLRT, 2020).

While the discourse around agriculture is dominated by modernisation, and thus the values of agronomists, agricultural engineers, and economists; the work of rural sociologists highlights that family farming is much more than an economic activity that uses technology and modern agronomic sciences to harness natural processes in order to produce food and fibre. They focus on family farms as a social system, highlighting that household dynamics, the values and perceptions of family members, as well as wider social norms need to be taken into account (Oedl-Wieser & Schmitt, 2017; Schallberger, 1999; Vogel & Wiesinger, 2003). They have studied a number of aspects related to the persistence of family farms, including what enables succession (Suess-Reyes & Fuetsch, 2016); the persistence of gender inequities (Contzen & Forney, 2017); how farmers' habitus predisposes them to act in particular ways (Shucksmith, 1993); whether social norms around the 'good farmer' (Burton, 2004) may constrain options which are perceived as feasible; or the role of autonomy in ensuring the attractiveness of farming as a vocation (Stock & Forney, 2014).

The methods of choice in rural sociology are carefully gathered qualitative interview-based data which are meticulously coded using software, as well as questionnaire-based surveys of farmers' attitudes and perceptions, analysed using rigorous statistical methods (Lowe, 2010). Studies are often designed as comparative studies, to take into account differences in national and regional culture, and the heterogeneity of rural contexts more generally. Thus, much of rural sociology tends to be an empiricist exercise in 'normal science' (see Funtowicz & Ravetz, 1993). Indeed, many empirical studies assess the current situation and develop policy recommendations, with the aim to guide future developments.

Clearly, these methods and approaches build on specific assumptions and help bring about a certain world (Law, 2004; Lowe, 2010). Many studies build on the implicit assumption that policies have predictable effects, and thus that the world can be gently and gradually nudged in the 'right' direction, e.g. one that is more environmentally friendly and socially equitable. This contrasts with the view of the world as volatile, uncertain, complex and ambiguous (a 'VUCA world'). This characterisation of a world that changes quickly and often unpredictably is also found in Bauman's (2000) 'liquid modernity'; or in Rosa (2017) who characterised our society as one which systematically requires growth, innovation and acceleration.

In this context of on-going change, one that requires farmers to adapt, the concept of 'resilience' has come to the fore. The rise of resilience is linked to the insight that if complexity and the resulting unpredictability of societal dynamics are taken seriously, persistence over the long time cannot be achieved through a 'command-and-control' approach (Holling & Meffe, 1996; Slätmo, Fischer, & Röös, 2017). Indeed, specifying a goal and defining each step to reach it does not account for emerging challenges and opportunities, which often require to adapt the steps, and possibly even the goal. This shift from stability to change, from predictability to adaptability, has promoted 'resilience thinking' which is about the ability to buffer shocks, to adapt, and to transform (Benson & Craig, 2014). The concept of resilience has also been taken up by the

European Union, whose 'Farm to Fork strategy' points out that "The EU's goals are to reduce the environmental and climate footprint of the EU food system and strengthen its resilience" (EU, 2020, p. 7).

The ability of farms to adapt and transform is all the more important as the current agrifood system is widely understood as unsustainable. Indeed, it is increasingly critiqued for its multiple failings, which include the environmental impact of intensive production practices on water, soils, biodiversity, but also unhealthy diets, inequity, unfair trading practices, lack of democratic influence, and contribution to climate change of modern agrifood supply chains (EC, 2018; IAASTD, 2009). As a result, calls for a transition towards sustainable agrifood systems abound (IPES-Food, 2016; TEEB-AgriFood, 2018), not least to fulfil the Sustainable Development Goals and the Paris Agreement on Climate Change. To fulfill them may well require a transformation at all levels: the farm-level production practices, the organisation of the value chains, agricultural policies, the role of corporations, international trade, as well as consumer's diets and related habits.

This raises a host of questions: How can family farms persist in a world of industrializing food production and processing? How can they face the tensions emerging from the consumer culture, the capitalist structure of society, and the dominant neoliberal policies? How can they persist in futures that may be characterised by increasingly erratic weather patterns caused by climate change? How can they cope with broader turbulences such as the ones caused by the COVID-pandemic? More generally: how can family farms persist while responding to a host of emerging challenges?

While much empirical evidence will be required to contribute site-specific answers to these questions, another important issue is how change itself is conceptualised. Is it caused by specific events or is it on-going? To what extent is change (un)predictable? When faced with change, is there but one way forward or are there (always) multiple options? Who defines these options and how are they apprehended?

1.3. Of stability and change

As our understanding of agriculture is influenced by the natural sciences, it is helpful to consider how they conceptualise stability and change. Generally, ecosystems are understood as dynamically stable, i.e. while states change, they tend to do so in a fairly predictable manner, as long as an ecosystem remains within a basin of attraction. This equilibrium-centred view is frequently illustrated by the concept of succession, where an ecosystem develops towards a climax community (see Holling, 1986). This understanding of nature as fundamentally stable, i.e. as guided by fixed cause-effects relations, allows predictability once the biological, chemical and physical processes are understood well enough. Based on this understanding, various management measures can be instigated to steer ecosystems and manage them towards desired ends.

This understanding underlies a broader engineering understanding of natural resource management, where the aim is to reduce the variability of a target variable through applying external controls. This informs agricultural sciences, i.e. plant production and animal husbandry with their emphasis on operational efficiency. Similarly, neoclassical economics, which is the dominant school of thought in agricultural economics, builds on the 'general equilibrium theory' with a similar mechanistic understanding of the economy.

The approaches in much of the natural sciences and agricultural economics, thus build on the assumption that the world that is more or less stable, i.e. develops along a

predictable path. The approaches are thus built on an understanding of the world, which Law (2004, p. 145) characterised as: assuming a reality that is independent and prior to an observer; that is definite in shape and form; that is singular (there is only one reality); that is constant (there are general and invariant laws and processes and nothing changes unless it is caused to change); where objects are passive (they stay the same unless caused to change); and that is universal (causal links are generally the same in all possible locations). These (often implicit) assumptions have shaped the conceptualisation and operationalisation of farms: it sees fixities and seeks observable variables that are linked to mechanisms that 'cause' change.

A very different understanding builds on complexity thinking. It not only emphasizes that change is ever present, it also emphasizes that change is often discontinuous, unpredictable, that surprises are inevitable. These surprises "occur when causes turn out to be sharply different than was conceived, when behaviours are profoundly unexpected, and when action produces a result opposite to that intended – in short, when perceived reality departs *qualitatively* from expectation" (Holling, 1986, p. 71, italics in original). Thus while the dominant notion of stability "emphasizes equilibrium, low variability, and resistance to and absorption of change", resilience promotes a different understanding, one that emphasizes "high variability, and adaptation to change" (Holling, 1986, p. 76). Resilience is thus about "cultivating the capacity to sustain development in the face of expected and surprising change and diverse pathways of development and potential thresholds between them", as such it includes persistence, adaptability and transformability (Folke, 2016, p. 1).

The assumptions underlying resilience thinking and complexity thinking can thus be at odds with those underlying quantitative models in agronomy and agricultural economics. These tend to prioritize techno-scientific rationales and quantitative models of the operation of farms, thereby conveying that farming is machine-like and predictable. And indeed, the modernist farm is characterized by simpler relationships, standardisation, and various ways to lock down certainties, e.g. contracts, metrologies, machines, irrigation, feed supplements (Campbell, 2020, p. 24). This focus on the knowable technical world tends to create an illusion of being able to predict, to plan, to control, which can convey a misleading certainty to decision makers. Indeed, these approaches may well underestimate real-world complexity and the fundamental uncertainty of future developments of on-farm projects, of markets, technologies, and societies (see Lorino, 2018). As such it may be important to question the conceptualisation of farms and agriculture regarding the extent to which they downplay the temporal structure of social practices and the uncertainty involved in dealing with an unknowable future (see Langley, Smallman, Tsoukas, & Van de Ven, 2013).

In sociology, the view of the world as undergoing predictable change has been tempered by focusing on social phenomena rather than on the material world. Within social phenomena, change and stability are frequently conceptualised as the result of the interplay between social structures and human agency. Thus, in rural sociology, change on farms is often understood as driven by the pressures of modernisation, globalisation, rationalisation, which are countered by various forms of farmers' resistance, e.g. through their engagement in organic farming or alternative food networks. However, the broader transformative ability of these alternatives has been questioned, pointing out that they often remain a niche, leaving the mainstream untouched. When striving to change agrifood systems towards inclusion, justice and fairness, the question thus remains: are farmers limited to a politic of resistance, or can we conceptualise a politic of possibility (see Denzin & Giardina, 2019; Gibson-Graham, 2006)?

Sociology has highlighted the role of human perception of events. Within rural sociology, studying farming practices and why they (do not) change thus tends to focus on farmers' accounts, privileging language, discourse, meaning making, perception, values, identity, culture. Indeed, much research is done from the point of view of constructivism, which points out that ideas and meanings of gender, culture, or practices are not fixed and inevitable but the product of social forces, ideology, history (see Berger & Luckmann, 1966). Constructivism thus highlights the representations and meaning given to practices by farmers, and the consequences of these meanings for their farming practices.

Rural sociology has highlighted the diversity in meanings, and thus that 'the farmer' is not a unitary category. Indeed, empirical studies tend to focus on the concerns of white, heterosexual, cisgender, married, able-bodied men. Rural sociology has engaged in social critique, highlighting patriarchal power relations within farming families and in the wider rural world. It has also highlighted that the neoliberal normative taxonomies privilege agriculture as a profit-oriented enterprise, thereby sidelining the complexities of farming as guided by multi-generational family groups, as well as quality of life aspects. In the context of environmental concerns it has pointed out that research tends to be biased towards the anxieties of dominant cultures, ethnic groups, and farm types, and thus fails to acknowledge that different groups are differently impacted by societal changes. A wide range of studies within rural sociology has thus engaged in voicing the experiences, insights and understandings of those who tend to be excluded and marginalized in studies guided by agricultural economics, or agronomic and technological concerns.

Yet, this focus on social phenomena such as power, justice and marginalization, has often led sociologists to bypass the question regarding the ontological character of biophysical reality and its contribution to human societies (Escobar, 2010). As a result there has been a tendency to emphasise the autonomy of social processes from the natural world, and accounts tend to portrait nature as a passive entity, as a material background for human action (Murdoch, 2001). For example, studies of why farmers' environmental behaviour changes (or not), tend to give primacy to social variables such as power, knowledge, discourse, mental beliefs, and desires. These may include farmers' hopes and fears, their concerns, their reasons for selecting some production practice or other, as well as the societal structures that maintain traditions and impede change, or the perceived economic pressures and their influence on production choices, which then have specific environmental impact on e.g. biodiversity, soil organic matter, or on nitrate leaching into the groundwater. The focus is clearly on changes that result from human action and social structures, while acknowledging that change may have intended as well as unintended effects, i.e. an approach that is less deterministic than the one often taken in agricultural economics and natural sciences.

1.4. Research questions

This thesis takes as a starting point the diagnosis that on the one hand the dominant agro-food system and modern agricultural practices need to change to address a host of sustainability issues, and on the other hand it seems that the structures of society impede this needed change. Rural sociology has provided ample empirical evidence on farmers' manifold resistances to productivism, their engagement in alternatives to modernised agriculture, their initiatives, and the constraints they face. The focus of this thesis is not on contributing additional empirical evidence.

Rather, I want to focus on the contribution of science, on the role of our conceptualisations and the more or less implicit assumptions underlying the concepts we use: how do we define a farm? What do we include? What do we exclude? Whom do we consider as actors on a farm? What relationships do we prioritize? What invisibilities do we produce? What fixities do we bring about? How do we contribute in shutting down options and suppressing alternatives? As Campbell (2020, p. 14) points out: if we question how modernity is made on farms, it may point towards ways to unmake it. How we, as researchers, look at farms is not separate from the types of becomings that we make (in)visible. What farms are understood as being, as doing, is closely tied to our ontological gaze. As researchers, we tend to be involved in simplifying and ordering the world, in expelling complexity and taming unpredictability, in dividing and excluding (see Mol & Law, 2002). These activities are not innocent, they may well produce fixities through foregrounding some 'inevitabilities' by highlighting some possibilities rather than others.

In this thesis, I revisit the ontological legacy of the Enlightenment and explore alternative understandings that have been proposed within the 'ontological turn'. This allows me to explore implications of overcoming the modernist understanding of farmers as the only ones with agency, of objects on farms as passive, as well as a mechanistic approach to change, which foregrounds stability, predictability, control.

This thesis thus explores two closely related research questions:

- What conceptual openings are afforded by conceptualising farming as a hybrid socionatural formation, one that deeply intertwines humans and nonhumans? What implications does it have to build on an ontology where agency is distributed, where objects are affective?
- What conceptual openings are afforded by understanding farming as a process, as emerging from relations that are constantly being made and remade? What implications does it have to conceptualise change as pervasive, on-going, unpredictable?

1.5. Structure of the dissertation

As this is a cumulative dissertation, it comprises two parts: Part I which sets the scene by presenting the theoretical and conceptual reasoning, and Part II which includes the three published papers that form the main part of the dissertation.

The aim of Part I is to explore conceptual issues and theoretical developments that have guided my reconceptualisation of farming towards a process-relational understanding. In the next section I thus summarize the foundational ontological assumptions underlying modernity and how they have shaped the understanding of farmers and farms. I also briefly visit some 'turns' that have marked different emphases in rural sociology. This visit is necessarily exceedingly brief, meant to be but a quick reminder for the reader, and allowing to contrast this modern worldview with the one underlying postmodernism.

In section 2.2. I summarize the different ways various 'posts' have questioned the ontological assumptions underlying modernity. This includes broad movements such as postmodernism, poststructuralism, postconstructivism, and posthumanism. From these questionings alternative ways to overcome binaries such as culture/nature, mind/body, human/nonhuman have emerged. They have also led to a more fundamental questionning of 'substances' and a foregrounding of processes, encouraging a move from being to becoming. These questionings have deep implications for research practice, which is explored in section 2.3.

In section 3, I present four selected theoretical approaches, which I have found particularly helpful in reconceptualising farming, and which I use as building blocks for a process-relational approach: Actor Network Theory, assemblage thinking, new materialism and process-relational sociology. Based on these, in section 4, I formulate three propositions that underly a process-relational understanding of farming. In this section 4, I also briefly summarize the three publications that form the main part of the dissertation, highlighting how they explore this understanding. I close Part I with the openings that this conceptualisation of farming might enable.

2. Ontology matters

2.1. A (very) brief primer on the Enlightenment and its remnants

Je pense, donc je suis.
I am thinking, therefore I exist.

René Descartes, Discours de la méthode. Pour bien conduire sa raison et chercher la vérité dans les sciences (Discourse on the method of rightly conducting one's reason and of seeking truth in the sciences), 1637

2.1.1. The legacy of Descartes and Newton

Many of the concepts we use are historical constructs that originate in the Enlightenment. These concepts orient – and may constrain – our thinking. They define the types of problems that are meaningful and define their solution space. The concepts, the vocabulary we use shapes the differences we make, the relations we foreground, how we think of change. As such ontology, i.e. theories about what exists, have a deep influence on how farms, farmers and farming are conceptualised.

The dominant worldview in modernist western sciences builds on the 17th century philosopher René Descartes[2], who split the world into dichotomous independent elements (Overton, 2015, p. 16). The first cartesian split is the assumption that bodies and minds are independent, and thus that matter was 'out there', a materialistic nature, an independently existing substance, that can unproblematically be studied by cogitating minds. Isaac Newton further developed Descartes' mechanistic idea of the universe as a huge clockwork, redefining the nature of matter in a way that conceived of all bodies as fundamentally inactive, i.e. they remained at rest unless and until acted upon by an external force, which can be illustrated by the billiard ball notion of the universe (Overton, 2015). This 'clockwork' understanding allowed for materialist, reductionist analysis, i.e. splitting an event or thing into its elements to arrive at an understanding of it, and synthesis being a simple reconstruction, a simple putting the individual pieces back together.

The ontological legacy of Descartes and Newton (see Escobar, 2010; Overton, 2015) can be summarized as:

- There are distinct categories, allowing a clear split into either/or categories: mind/matter, subject/object, society/nature. As the split is accepted, one term is supressed, creating a hierarchy.
- Matter exists independently of an observer, it is pre-given and pre-discursive.
- Matter is inert, fixed, thus stasis is the natural state. Matter does not change by itself, movement and change only comes from external forces.
- Matter is a substance. Elementary substance is uniform, e.g. atoms are identical, yielding a uniform universe.

[2] The history of dualism between mind and body goes back to the ancient Greeks, not least of which Plato. This dualist philosophy of ideas vs. matter has been critiqued by Aristotle, and the issue has remained an ongoing dispute in late antiquity, in western medieval and renaissance philosophy (Robinson, 2020). However, the more modern versions of dualism have their origin in Descartes' *Meditations*, which were influential in the Enlightenment.

- The world is understood in mechanistic terms, i.e. there is a focus on material causal explanation, on efficient mechanisms, on unchanging laws.
- Entities are independent and interaction between them is reduced to additive combination (the whole is the sum of the pieces). This allows reductionistic analysis.
- As outputs are in some way proportional to inputs, cause-effect relations are amenable to mathematical modelling. Change is thus deterministic and, in principle, predictable. The world might be complicated, but it is not complex.

These basic ontological assumptions paved the way for the 18th century Enlightenment, which sought knowledge based on rational and reasoned grounds, rather than on the grounds of authority and church dogma (Overton, 2015). In particular British Empiricism built on the split between subject and object, between mind and matter, understanding the real as mind-independent, as residing in the object, which is understood as a fixed, inert matter (Overton, 2015). This fixity led to the understanding that there is only one truth, which is independent of the observer. Thus, in scientific inquiry, it is not possible to entertain multiple legitimate perspectives.

In modern western culture, matter is still seen as essentially passive stuff, which can be set in motion by human agents; in other words, matter is inherently void of agency and meaning (Coole & Frost, 2010). We take it for granted that there is a natural world 'out there', that this world is real, that it is independent of us. We can directly perceive the world as it is, through our senses. This epistemological realism lets us assume that the world inside our minds is an accurate representation of the world (Escobar, 2010).

Another legacy of the Enlightenment is essentialism. This is the belief that things possess an unchanging core, an underlying universal nature, independent of context and interaction with other things, an essence that is more fundamental than any variation (Escobar, 2010, p. 92). The aim of natural sciences is to uncover the essence of an object by studying its attributes, allowing to produce reliable knowledge of its workings.

Overall, modernity can be thought as being about the increasing mastery of nature, not least through science which is seen as the anchor of a regime of knowledge that claims to be able to get to the Truth (Blaser, 2013, p. 555). Modernity can thus be understood as hinging upon a specific arrangement of three elements: an ontological distinction between nature and culture; a dominant tendency to conceive difference in hierarchical terms; and of time as linear, progress as continuous and inevitable, a path that everyone would eventually follow, the triumph of rational organization (Blaser, 2013).

As part of the modernist project, agriculture is to be guided by natural sciences which inform plant production, animal husbandry, and the development of farm machinery. They strive to improve productivity and efficiency, which is measured by quantifiable variables. The goal of farmers is normatively assumed to be in line with this modernist project, i.e. they too strive to master nature, to optimise productivity. Thus farmers who question progress or (selectively) resist the modernisation of agriculture, are either romantics, laggards, or ignorant, and in any case not to be taken seriously.

2.1.2. And rural sociology?

Rural sociology has long been at pains to point out the extent to which modernist assumptions fall short of empirical evidence. Indeed, while farmers take technical production advice into consideration, and consider economic implications, farmers are also clearly influenced by social norms, family dynamics, individual preferences and experiential knowledge (e.g. Edwards-Jones, 2006).

Yet, rural sociology usually limits itself to the social dimension of issues. In the context of agriculture this may be farmers' perception of agri-environmental measures, the power and tensions at the heart of environmental politics, how claims about conventional and alternative farming practices are produced, or how agricultural knowledge is constructed and shared. As such rural sociology maintains the boundary between 'society' and 'nature' (Goodman, 1999, 2001), i.e. maintains the foundational assumption which allocates natural and social entities into two distinct ontological categories, all the while acknowledging that natural reality is significant in shaping social processes.

In his review, Murdoch (2001) identifies two reasons for the reluctance of sociology to move away from 'the social' so as to be able to effectively engage with the ecological challenge: firstly, by focusing on social factors and social explanations, sociologists seek to demarcate their discipline from the natural/physical sciences, which goes back to the 19th century roots of the discipline. Secondly, there is a concern that questioning the boundary may underplay the significance of social aspects of ecosystems, i.e. there is a risk of losing the ability to explain social beliefs about nature and social practices towards the environment. Indeed, questioning the boundary may be seen as undermining 'human exceptionalism', i.e. that humans are unique in their cognitive abilities, their ability to use language, their reflexive sense of self which allows them to make conscious choices, and take concrete action based on these reflections.

2.1.3. Some 'turns'

There have been various 'turns' in social inquiry, each of which seems to imply a change of course or direction, a turning away and a turning toward. But as Surkis (2012) points out, this should not be understood as pinpointing a singular and coherent 'turn' that has taken place, since one trend has not been superseded by another. While a 'turn' does indicate innovation and renewal, multiple strains of interrogation coexist, with a diversity of arguments.

Over the past 30 years, these 'turns' have included the linguistic, the cultural, the spatial, the performative, and the practice turn. Each of these 'turns' is a rather heterogeneous phenomenon, with fuzzy conceptual and disciplinary boundaries (Genner, 2020). They often build on different definitions of key terms, not least driven by disciplinary perspectives (e.g. sociology, geography, anthropology) and by the issues that are dominant in a specific field of study. What unites each turn, is that it identifies an aspect that has received too little attention, yet is crucial to understanding a phenomenon, so that focusing analyses on it promises new insights.

For example, the **linguistic turn** denotes a philosophical investigation of the relation between language and social reality, pointing out that language does not 'simply' reflect reality, but that language constructs reality, through the process of naming, labelling, classifying, relating (Chai, 2000, p. 513 and Fairhurst, 2009, both in Alvesson & Kärreman, 2011).

The **spatial turn** points out not only that space and place are a social construction relevant to the understanding of social phenomena, but also that space facilitates and creates a stimulus for social action, i.e. that where things happen is critical to knowing how and why it happens (Warf & Arias, 2009).

The **cultural turn** breaks with various forms of structural and economic determinism, re-evaluating agency over structure, and by foregrounding meaning, it is aligned with constructivism. Social life is seen as "inherently plastic, capable of being continually

remade through lifestyle choices, value-judgements and changing definitions of self-interest" by individuals and groups (Nash, 2001, p. 80). Studies following the cultural turn thus focus on a host of immaterial things such as culture, values, meaning, imagination; they focus on subjectivity and its efficacy in constructing even the most apparently 'natural' phenomena (Coole & Frost, 2010). In farming, the concept of the 'good farmer' (Burton, 2004) is emblematic for the cultural turn in rural studies (see Cloke, 1997). It moves research away from a focus on individual attitudes and values, foregrounding the role of (mostly unconscious) socialisation processes and identity formation. It points out that what is understood as a 'good farmer' in an area, influences decision making, as it motivates the demonstration of skilled role performance through the ability to produce cultural symbols that are visible to farming peers, such as weed-free fields, healthy livestock, and tidy farmsteads (see Burton, Forney, Stock, & Sutherland, 2021). This highlights how farmers' cultural models and local knowledge systems can inform farmers' decision-making.

The cultural turn, by showing that power is present in any attempt to represent material reality, also highlights epistemological issues, i.e. the socially constructed nature of scientific inquiry (Whatmore, 1999, p. 23). By highlighting how nature is mediated not least by discursive conventions and human interpretation, it points out the contingency of knowledge claims about 'real-world' entities and processes, and thus calls for a clear distinction between the material and our communication, i.e. our representation of this material.

The **practice turn** (see Reckwitz 2002; Schatzki, Knorr Cetina, and von Savigny 2001; Shove 2017) highlights that by focusing on what people say, too little attention is being paid to actual behaviours and acts. Yet, the two can be quite disconnected as people may express awareness and intent without translating it into action. The practice turn foregrounds non-cognitive aspects, emphasizing the routinized character of action, as well as its dependence on tacit knowledge and implicit understandings. It thus shifts the analytical focus from discourse to embodied practice and performativity (Weenink & Spaargaren, 2019). As such the practice turn works against the logocentric conception of social agency, which follows the assumption that 'I think therefore I act' (Burkitt, 2016). The practice turn thus highlights that much of everyday life is unreflexive and not necessarily amenable to introspection. Indeed most of the time humans are involved in doing without much thinking about it, and if asked about it, may struggle to explain their doings (Anderson & Harrison, 2010, p. 7). By pointing out the limit to re-present in words the purported reasons for actions, it also points out that "the root of action is to be conceived less in terms of willpower or cognitive deliberation and more via embodied and environmental affordances, dispositions and habits" (Anderson & Harrison, 2010, p. 7). Agency is thus relocated in practice or performance, since we also think and act through our body (Whatmore, 2006).

The **performative turn**[3] builds on the seminal work by Judith Butler (1990) who highlighted that gender categories are not given, they are not 'natural' and should not be understood as 'essences'. The concept of performativity is thus used to counter the positivist stance, which conceptualises e.g. gender as a fixed attribute of a person, thereby essentialising categories and positing stable entities. The performative turn highlights how subjects and categories are ceaseless production, the outcome of reiterated social performances, an open-ended process (Licoppe, 2010).

[3] The performative turn in the social sciences should be distinguished from the performative turn in arts and culture, as understood in theatre theory, where it is used in the context of analysing performances.

2.2. Questioning modernity: the ontological turn

The 'posts' announce a radical break with the humanist, modernist, imperialist, representationalist, objectivist, rationalist, epistemological, ontological and methodological assumptions of Western Enlightenment thought and practice.

Elizabeth St. Pierre, Post qualitative research, 2013, p.455

2.2.1. A realist critique…

While many of the 'turns' have highlighted social mechanisms that were so far not sufficiently appreciated, **critical realism** urged researchers to pay more attention to ontology, to understanding presuppositions and assumptions underlying methods. It argued that it is not sufficient to discuss what to look at and how to best go about it, it is also necessary to clarify what exists and how it exists. It thus questioned the assumptions underlying positivism (there is a reality independent of us and we can know it through collecting empirical data), as well as those underlying social constructivism (knowledge is constructed by society).

Roy Bhaskar (1975, 1998) proposed a middle ground by positing that there is indeed a reality independent of us, but our knowledge of it is relative, it is always historically, socially and culturally situated. By distinguishing the domain of the real from the domain of the empirically knowable, he made a clear distinction between ontology and epistemology.

Bhaskar (1998) distinguishes between the empirical (what we experience and what is observed in scientific experiments), the actual (recurring regularities and unique events which might be context dependent), and the real (the underlying mechanisms or causal laws, which we cannot know directly but some of whose effects we may be able to observe or experience). It has also proposed that the domain of the real is both distinct from and greater than the domain of the actual. As such critical realism exposed the 'epistemic fallacy', i.e. the anthropocentric bias of much of the Western philosophical tradition, which mistakenly reduces the question of 'what is' to the question of 'what we can know' (Bhaskar, 1998).

Starting in the 1980s, critical realism developed into a series of philosophical positions which sought to develop a post-positivist social science, i.e. an alternative to approaches concerned with regularities, with social 'laws', with regression-based variables models; as well as an alternative to the strong interpretivist approach which denied explanation in favour of interpretation (Archer et al., 2016).

Critical realism is not a unitary framework, but rather a reflexive philosophical stance which informs empirical investigation. At its heart, it is about ontology, asserting that much of reality exists and operates independently of our awareness or knowledge of it. As such it has pointed out that, in the past social sciences have focused on methods and forms of explanation, but have given insufficient attention to the nature of the social world, i.e. the underlying presuppositions about the nature of order, causes, agency, structures, processes, relations, people. It has called for 'ontological reflexivity' to avoid naively importing causal models from natural sciences into the social world.

2.2.2. … and some 'posts'

As an Enlightenment program, modern science builds on the foundational notions that a physical reality exists outside of the human mind, and that this reality can be apprehended and understood by humans. These assumptions have not only been questioned by critical realism, but also by postmodernism and poststructuralism. While distinctions between these two 'posts' can be made in various ways, the two terms are often used interchangeably when used to critique the assumptions underlying practices within science. Both postmodernism and poststructuralism deconstruct oppositions. In many ways they blur boundaries and cut across binaries such as agency/structure, nature/culture, mind/matter, so that there is no longer a hierarchy of one over the other, so that one is no longer seen as more powerful than the other (see Karakayali, 2015). They opened the way for new approaches such as non-representational theory, feminist posthumanism, Actor Network Theory, and assemblage theory.

Postmodernism[4] critiques accepted theories in the natural and social sciences, in particular the assumptions about human subjectivity, knowledge, and progress. It denies the possibility of modernist science, pointing towards pluralistic knowledge claims and the ability to represent and textualize matter, while also blurring the distinction between the knowing subject and the known object (Gilbert, 1995). For example, Donna Haraway questioned the positivist view, in which the 'real world' informs knowledge, and pointed out that knowledge contributes to making the world in profound ways (Escobar, 2010, p. 94).

Poststructuralism, a French term, is defined in relation to academic theorizing 'after structuralism', as it builds on a critique of French structuralism, where Claude Lévi-Strauss was a key proponent. Structuralism sees social behaviour as structured similarly to language (as understood by Ferdinand de Saussure), i.e. social life unfolds in regular, rule-bound ways and just like a native speaker, people follow rules without being aware of doing so. In structuralism, everyday activities are by and large reflections of the broader cultural norms and values, i.e. the larger social structures. People thus mostly act based on the roles defined by these norms, rather than being independent actors making independent decisions. Poststructuralism challenged such top-down, determinist theories of social structure and power, pointing out that structuralism overemphasises regularities, social continuity, and stability at the expense of change and possibility (Fox & Alldred, 2017, 2018b). Poststructuralism is also frequently linked to the role of language, to the textual emphasis of the deconstructionist current (St. Pierre, 2013b). Poststructuralism treats language not as a reflection of 'reality' but as constitutive of it. It points out that discourse is the process through which social reality comes into being, it is "the articulation of knowledge and power, of statements and visibilities, of the visible and the sayable" (Escobar, 2010, p. 93).

Postconstructivism is another umbrella term, it too does not designate a unified theory or approach. It critiques constructivism as one-sided, as 'oversocialised' since it reduces everything to social construction. Postconstructivism thus denotes a turn to materiality. It aims to understand relations between the biophysical and the social/cultural, including knowledge, while avoiding the pitfalls of constructivism and essentialism (i.e. naïve Cartesian realism, the realism of essences). This renewed attention to materiality takes various forms, e.g. a focus on practice, on relations, networks, embodiments, performances or attachments between various elements of the social and biophysical

[4] The term 'postmodern' has a range of meanings, which includes the historical period following modernity as defined by political, social, or economic institutions; as well as an aesthetic style in art or architecture that characterised the era from approx. the 1850s to World War II (Heise, 2004).

domains; and with it comes a renewed attention to practice and engagement with the world, rather than representation (Escobar, 2010).

Another related 'post' is **posthumanism**[5] which also has different standpoints and movements. What they have in common is that they leave behind the notion of liberal humanism[6], i.e. that the human agent is exceptional because it has a reflexive sense of self, and this conscious affirmation of one's subjective experience is essential for agency. Indeed, in this context, only humans have agency, since agency is understood as depending on the capability to rationally reflect on options and initiate concrete action in the world. Posthumanism counters this dualism between active humans and passive objects and with it strives to overcome the hierarchical notion of the primacy of humans over nonhumans that is deeply rooted in Western thought (Braidotti, 2019a; Ferrando, 2013). By questioning that only humans have agency, a fundamental assumption of social sciences, posthumanism questions its focus on human action. By de-emphasising subjective human traits such as reason, meaning making and imagination (Buser, 2014), and by replacing (human) agency with 'affect', posthumanism supplies concepts which allow to reintegrate humans with the environment (Fox & Alldred, 2018a). By conceiving matter as lively, vital and 'vibrant' (Bennett, 2010), agency is distributed, which unsettles the social/natural divide: "humans as enmeshed with rather than outside non-human nature" (Head & Muir, 2006, p. 510).

The various 'posts' thus denote a broader ontological turn. Yet, unlike other 'turns', the this turn is not so much about highlighting a specific aspect that deserves more in-depth attention, but a profound challenge to modernity and its ontological assumptions.

As a whole, these trends (which are by no means completely coherent or aiming in the same direction) reveal a daring attempt to look at social theory in an altogether different way – one could broadly be termed 'flat' (Escobar, 2010, p. 101). Indeed, the alternatives collapse a number of dualisms underlying many theories in sociology, incl. agency/structure, nature/culture, animate/inanimate, reason/emotion, mind/matter, micro/macro, surface/depth. The ontological turn thus favours a monist ontology that cuts across such dualistic categories (Fox & Alldred, 2018b). Understandings of social phenomena in terms of structures, systems, or mechanisms is replaced with a focus on processes and the micropolitics of events and interactions.

Overall, the 'ontological turn' thus indicates a host of shifts: from epistemology to ontology, from hierarchical to flat, from dualistic to relational thinking, from structuration to self-organisation, from transcendence to emergence, from substance to process, from representation to enactment (Escobar, 2010, 2017). These shifts have foregrounded novel concepts such as hybridity, networks, assemblages, relations, processes, emergence, affect.

[5] Gladden (2018:35 italics in original) identifies two broad strands within posthumanism, noting that it "can be understood either as 'post-*humanism*', a critical response to and deconstructive working-through of the assumptions of humanism, or as '*posthuman*-ism', a philosophy of future engineered beings whose capacities are expected to surpass those of contemporary human beings". This second understanding delves into the various possibilities for human enhancement that are brought about through science and technology, such as virtual reality, nanotechnology, artificial intelligence; and with it a resignification of what it means to be human.

[6] Building on Braidotti, one could point out that this understanding reflects an Eurocentric habit of thought, as many Indigenous philosophies differ strongly from these assumptions. In which case it would be more accurate to say that posthumanism is a critique of Eurocentric privilege, and post-anthropocentrism is a critique of species privilege (see Braidotti, 2019b, p. 71).

2.2.3. Matter as agentic, affective, vibrant

The ontological turn casts aside the foundational boundary between the social and the natural. By rejecting the object/subject binary, by challenging any distinction between the materiality of the physical world and the social constructs of human thoughts and desires, the purity of pre-established categories is challenged and the world is understood as hybrid (Fox & Alldred, 2018b)(Fox & Alldred, 2018b). This enables an exploration of how each affects the other, and how things other than humans can be 'agents' instigating social processes. Understanding matter as agentic also opens the production of the world to a wide variety of forces, from physical interactions, to biological processes, to social encounters, through to thoughts, desires, feelings, memories (see DeLanda, 2006a, p. 5). This ushers in a posthuman sociology that engages productively in the world beyond the human, it builds on an understanding of agency that no longer privileges human action. Rather, all matter is seen as 'affective', i.e. it possesses a 'capacity to affect and be affected' (DeLanda, 2006a, p. 4; Deleuze & Guattari, 1987, pp. 127–128).

While matter is seen as agentic, it is not understood as volitional; it is affective but not willed (Washick & Wingrove, 2015, p. 64). There is thus no argumentation that humans and nonhumans are the same (Hultman & Lenz Taguchi, 2010, pp. 528–529). Rather, different bodies (machinery, fields, crops, animals, farmer) have different capacities, different styles of becoming, depending on the qualities by which they actively differentiate themselves (Colebrook, 2002, p. 84; Hultman & Lenz Taguchi, 2010, p. 533).

It is important to note that this 'undoing' of the subject does not mean that the subject is cast away altogether. Guattari comments on his and Deleuze's thinking on subjectivity as plural and polyphonic: this is not a question of anti-humanism, but a question of whether subjectivity is produced solely by internal faculties of the soul, interpersonal relations, and intra-familial complexes, or whether nonhuman machines, such as social, cultural, environmental, or technological assemblages enter into the very production of subjectivity itself (Goodschild, 1996, in Hultman & Lenz Taguchi, 2010, p. 534).

As Whatmore (2006, p. 604) argues, if the agency of 'things' plays an important role in the effectiveness of our human actions, then human agency is only part of the story. To effect change we might need to overcome the concept that 'we' are in control and can impose our will on hapless material 'things'. Understanding agency as shared thus implies that we need to take the vitality of plants, animals, and machines seriously, that we no longer conceptualise them as passive, as the raw material humans use for their activities.

By questioning the notion of agency and recognizing the agency of nonhumans, the ontological turn also questions our understanding of change, of causality: it "compels us to think of causation in far more complex terms, to recognize that phenomena are caught in a multitude of interlocking systems" (Coole & Frost, 2010, p. 9). It thus redirects efforts towards more-than-human modes of enquiry, exploring ways that allow us to include e.g. animals and technological devices in sociological analysis. We need to attend closely to the rich array of the senses, dispositions, capabilities and potentialities of all manner of social objects and forces assembled through, and involved in, the co-fabrication of socio-material worlds (Whatmore, 1999, 2006).

It also implies a new relation with the materiality of the human body, i.e. the acknowledgement that humans are more than cognitive processes and rational thought. This redirects concerns from meaning to affect, from sense-making to the sensory dimension of acting in the world, from what things mean to what they do (Whatmore, 2006). It shifts the attention to a sensibility that allows humans to be affected, to

cultivate a sensory attentiveness, and thus to develop relational capacities through being sensitive to how things produce effects in human bodies. This invites a different approach to environmental sustainability and social relations, through a focus on underexplored micropolitics. Indeed, if our bodies, our senses are important to how we act, then there are limits to what changes can be achieved by paying attention only to cognitive processes and rational thought.

2.2.4. From substances to processes: A relational becoming

Ever since the pre-Socratic Greek philosopher Parmenides, Western thought has built on the assumption that the primary units of reality are static substances, i.e. that they have an unchanging essence, thus allowing research to focus on what 'is' (Seibt, 2017). This bias may well be tied to the cognitive disposition of European languages[7], and the prioritisation of static entities (substances, objects, states of affairs, static structures) at the root of Enlightenment.

Questioning static substances shifts attention towards changing processes, thus foregrounding activity. The focus is no longer on 'being' but on 'becoming', no longer on what an entity 'is' but what it 'does'. The focus is on the process of "arranging, organizing, fitting together of disparate actors, objects, techniques, organizations, representations" (Baker & McGuirk, 2017). The aim is no longer to find the 'essence' of an entity, i.e. its pre-existing attributes, but on the capacities produced in bodies, things and social formations. The aim is no longer to identify more or less fixed structures or mechanisms which determine outcomes, but on relations and the processes they enable (Baker & McGuirk, 2017).

These processes and relations are understood as contingent and ephemeral, a mix of habitual and non-habitual connections, always reassembling in different ways. This differentiation is ongoing, always subverting identity. While giving rise to concrete biophysical and social forms, processes are always changing (Escobar, 2010, p. 95). Acknowledging that a relation is ever only provisional implies resisting the notion of stability. The world is understood as emergent and in flux. Empirical attention thus shifts towards how processes come together to render their never pre-determined effect (Anderson & MacFarlane, 2011, p. 126; Baker & McGuirk, 2017).

This does not mean that there are no durable orders, but that these orders are open, provisional achievements, they are multiplicities, composed of complex and shifting relations (Anderson & Harrison, 2010, p. 18). Structures may be more or less enduring, as relations may sediment and congeal, however this materialization is always contingent, precarious, unstable (Coole & Frost, 2010, p. 29). The primacy of process opens up the question of change (Anderson & Harrison, 2010, p. 18): how do things hold together? How are orders disrupted? How do orders fail? How are new orders coming into being, if only momentarily? The attention is on the various forces at play, on relations, as these enable matter's interaction within events, on the unpredictable ways in which assemblages of relations develop around actions and events (Deleuze & Guattari, 1987, p. 88).

[7] Norbert Elias (1978:111) notes that "our languages are constructed in such a way that we can often only express constant movement or constant change in ways which imply that it has the character of an isolated object at rest, and then, almost as an afterthought, adding a verb which expresses the fact that the thing with this character is now changing. (...) We say, "The wind is blowing," as if the wind were actually a thing at rest which, at a given point in time, begins to move and blow." (see West, Haider, Stålhammar, & Woroniecki, 2020, p. 314; Mancilla Garcia, Hertz, & Schlüter, 2020).

This understanding of the world is consistent with the theory of complex adaptive systems, which recognizes that a particular outcome is the effect of a network of interactions, whose dynamic processes are variable and often unpredictable (Morin, 2007; Urry, 2005). Biophysical and social systems thus do not tend towards a state of equilibrium. Rather, their dynamics are marked by contingency, immanent self-organisation, and self-transformation. Many phenomena (incl. weather, health, crime, social movements) are understood as emergent systems, marked by considerable instability and volatility; there is a continuous redefining and reassembling of key elements that result in a system's capacities to evolve into new and unexpected forms (Coole & Frost, 2010, p. 14). Effects can thus not be construed as possibilities that were already latent in some initial moment. Indeed, patterns of organisation are the result of innumerable interactions between manifold elements, interactions that successively transform those elements, so that it is impossible either to predict outcomes in advance or to repeat an event (Coole & Frost, 2010, p. 14). The focus is not on outcomes that are assumed to be determined by some clearly identifiable material force or power relation, but on processes that are fundamentally open, contingent, uneven, unpredictable. Similarly, subjectivities are understood as being constituted as "open series of capacities or potencies that emerge hazardously and ambiguously within a multitude of organic and social processes" (Coole & Frost, 2010, p. 10).

2.2.5. Multiplicity and political ontology

These ontological moves also highlights ontological multiplicity, i.e. the "coexistences at a single moment" (Mol & Law, 2002, p. 8). As Mol and Law (2002, p. 9) talk about organisations, I could talk about farms: as machines, organisms, brains, cultures, political systems, psychic prisons, fluxes in transformation, or instruments of domination. All these various modes of ordering coexist, overlap and interfere with one another (Mol & Law, 2002). And it is not that each of them reveals an aspect of a single coherent farm, but that they are multiple versions of reality. Each farm is multiple. "We need to think about what it is to be more than one and less than many" (Mol & Law, 2002, p. 11). A set of possibilities that are partially connected (Mol & Law, 2002, p. 17). The question is no longer whether to simplify or to accept complexity, "it becomes instead a matter of determining *which* simplification or simplifications we will attend to and create and, as we do this, of attending to what they foreground and draw our attention to, as well as what they relegate to the background" (Mol & Law, 2002, p. 11).

Ontological multiplicity is a notion that goes counter the assumption that there is ‚one-world world' out there, one reality that is supposedly external and independent of us, where our challenge is to describe it accurately (see Law, 2011b, 2011a). The ontological turn is thus also about understanding ontology as political, as foregrounding the diversity of ways of conceiving what exists. Political ontology is about "telling stories that open up a space for, and enact, the pluriverse" (Blaser, 2013, p. 553). It is a commitment to the pluriverse (Escobar, 2017). It is acknowledging that we have is a diversity of worlds, rather than diverse cultures that perceive a single/universal reality (Blaser, 2013, p. 553).

As Mol (1999:77) emphasises: it is reality itself that is multiple: it is not about different perspectives, it is about "a reality that is *done* and *enacted* rather than observed". That another world is possible refers to this opening of new possibilities to bring about a different world by knowing, by acting differently, by actualizing a different possibility from the infinite possibilities of the pluriverse (Blaser, 2013). Multiplicity is thus distinct from perspectivalism, where a diversity of watching eyes capture different attributes or aspects of a single reality, leaving that reality untouched in the centre (Mol, 1999).

2.3. Onto-epistemology and post-qualitative research

The separation of epistemology from ontology is a reverberation of a metaphysics that assumes an inherent difference between human and nonhuman, subject and object, mind and body, matter and discourse. Onto-epistem-ology – *the study of practices of knowing in being – is probably a better way to think about the kind of understandings we need.*

Karen Barad, Meeting the universe halfway, 2007, p. 185

2.3.1. Performativity of research

These ontological moves have deep implications for knowledge formation, i.e. for what we do when we engage in research practice, as well as for the role of science in society. Modernist science attempts to accurately describe reality, building on the assumption that there is one unified world, one reality that is external and independent of us. However, when we follow the ontological turn, our research practices and texts can no longer be understood as describing a pre-existing, fairly stable world 'out there'. The researcher can no longer be seen as separate, as standing outside of the world, as an impartial observer: "knowing does not come from standing at a distance and representing but rather from *a direct material engagement with the world*" (Barad, 2007, p. 49, italics in original).

An important starting point is Donna Haraway's critique of the notion of 'objective' knowledge and a singular, unsituated truth. She pointed out that research too often performs what she labelled the 'god trick' (Haraway, 1988, p. 582), i.e. the ability to see everything from nowhere. Yet, human accounts are necessarily individuated and knowledge is necessarily situated in a specific context and research practices. Thus, *what* we research is an enacted entanglement with *how* we research it, which questions the separation of ontology and epistemology. In the words of Karen Barad (2007, p. 185, italics in original): "Practices of knowing and being are not isolable; they are mutually implicated. We don't obtain knowledge by standing outside the world; we know because we are *of* the world. We are part of the world in its differential becoming."

As such, from a postmodern perspective, a given piece of research reveals as much about a research community than it does about the phenomenon under study (Thompson, 2002). In particular, it can highlight the taken-for-granted assumptions, normative interests and disciplinary boxes that systematically shape theoretical analyses of empirical phenomena, as well as the rhetorical and narrative conventions, social interests, and tacit institutional influences that shape the stories researchers tell (Thompson, 2002). Thus, distinctions we make are never 'neutral', since they are socially situated, linked to social power constellations, to various political and academic interests. However, we need to go further than such a critical analysis. We also need to go beyond acknowledging that the world is complex, that relations are dynamic, elusive, ephemeral, unpredictable(Morin, 2007; Urry, 2005).

Acknowledging this complexity implies that we choose which aspects of a phenomenon we want to focus on, a choice which necessarily implies that we exclude a multitude of others. And more fundamentally, it points out that our research practices, the concepts we choose to give meaning, the specific context in which we make these choices, are all deeply involved in producing a specific phenomenon (Mauthner, 2016). Indeed, our concepts are not "abstract ideations of inherent attributes of independently existing objects" (Baker & McGuirk, 2017, p. 432). Rather they are "material enactments that contribute to, and are part of, the phenomena we describe" (Barad, 2007, p. 32).

The ontological turn thus highlights the performative aspect of western science, i.e. how it brings about what it purportedly studies, how we participate in making reality. In the words of Blaser (2013, p. 552): "stories are not only or not mainly denotative (referring so something 'out there'), nor are they fallacious renderings of real practices. Rather, they partake in the performance of that which they narrate". Researchers are part of a practice of handling, of intervening in the world, of enacting one of its versions, bringing it into being (Mol & Law, 2002, p. 19). Actions are not so much reflections of underlying structures (of *the* world or *the* individual) but rather enactments of a world and an individual (Harrison, 2000, p. 502). Modernity is just one particular way of worlding, but there are many other practices, performances, and enactments (Blaser, 2013). Each will foreground certain aspects, certain relations, implying what is important about what. There are a variety of orders, modes of ordering, logics, frames, styles, repertoires, discourses, which do not reinforce the same simplicities or impose the same silences (Mol & Law, 2002, p. 7).

The ontological turn questions that things have inherent essences, that entities have 'natural' qualities, that objects have a stable existence and fixed attributes. It collapses the subject/object binary. There is not some reality 'out there', independent of the researcher. There is no pre-existing 'thing' or fixed attribute of this 'thing', that we can measure. Methods are thus not purely technical devices which enable us to capture the world 'as it is'. Rather, our research practices and the 'real world' are deeply entangled. Methods build on (often implicit) assumptions and reproduce them in one form or another; they do not simply describe the world but also enact it (Law, Ruppert, & Savage, 2011; Law & Urry, 2004). Methods are thus performative of the social, i.e. they tend to produce the worlds they claim to be describing (Law, 2004).

Our methods tend to tacitly embed the character that we assume a collectivity to have, so that we in effect create 'collateral realities' (Law et al., 2011). For example, many interview-based methods assume that interviewees are verbally competent subjects who can comprehensively articulate why they have chosen a particular course of action, assume that they are rational choosers because they are influenced by information, and assume that these choices are based on relatively stable attitudes and preferences. These assumptions exclude all other forms of 'making' interviewees, e.g. as creative, ambivalent, reinterpreting, revisiting, revising, evolving, changing. Making the assumptions explicit allows to discuss their implications: what worlds do we bring about, reinforce, solidify (Fox & Alldred, 2015b; Law et al., 2011)?

Research thus does not 'report' on something that is already there, but the choice and deployment of particular methods will help produce social realities by producing specific arrangements of presences and absences (Law, 2004, p. 143). Research is thus political: it is directly implicated in the construction of social worlds (Law & Urry, 2004). This shifts epistemological issues from questions of correspondence between description and reality (Barad, 2003, p. 802), towards the performative, ethical aspects of research: what worlds do we contribute in making? What do we strengthen? What fixities do we produce? What stabilities do we reinforce? What do we keep invisible and unsaid? What (im)possibilities do we highlight?

As Law (2004) points out, the ontological turn raises new possibilities by pursuing different questions: What imaginaries do we enact when we distribute agency more generously and no longer treat the natural as passive? If the world could always be made otherwise, who chooses (and how) which of the possible realities are more desirable? If realities are enacted multiply, how do we apprehend (and thus promote) this multiplicity? What can research do to enable new imaginations, opening up new possible worlds?

Indeed, acknowledging more-than-human agencies would challenge researchers to *do* research differently: "to perform, to engage, to embody, to image and imagine, to witness, to sense, to analyse – across, through, with and as, more-than-humans. It also invites researchers to open research relationships, thinking, and representations to beings, things, and objects previously ignored as active agents" (Dowling, Lloyd, & Suchet-Pearson, 2017, p. 824).

Research is then less guided by an illusory search for 'truth', but by an ethics of engaging with the world. Researchers are invited to ask themselves how they can contribute to open new possibilities, to bring about a different world, not least through a different way to think about the world (Anderson & MacFarlane, 2011, p. 126). It invites us to reflect on the inclusions and exclusions, divisions and associations, and the types of agencies we might repress, obscure, marginalize, often without noticing (Greenhough, 2012).

Acknowledging the potentially catalytic agency of the researcher, it invites a reflection on our ability to instigate new relations, all the while acknowledging limited control, since interventions necessarily have a host of unintended effects and consequences. As processes emerge and unfold, the effects of an intervention remain largely unpredictable and indeterminate (Greenhough, 2012). Yet, it urges us to resist the allure of established methods, to build new relations between concepts used in analysis, and to challenge the conventions of academic writing and publishing.

By acknowledging the performativity of methods, as well as the multiplicities in the data, the aim of research is no longer to uncover the essence or truth of the data. Indeed, there are always multiple realities being enacted in any event. The purpose of interpretation is much more about bringing about a different viewpoint, to escape dominant norms and habits of mind. It is about highlighting differences and possibilities, in the awareness that "a different reality is not *the* reality, but *a* (potential) real" (Lenz Taguchi, 2012, p. 278 italics in original).

The ontological turn, in many ways, challenges the foundations of "conventional humanist qualitative methodology" (St. Pierre, 2013, p. 447). Indeed, the 'posts' do not just deconstruct concepts, they also deconstruct how research is performed and reported. Challenging commonly held assumptions about knowledge and research, there is an effort to expand how to study social processes, inviting innovations and opportunities within what has been labelled 'post-qualitative research' or 'post-qualitative inquiry' (Lather, 2016; Mazzei 2016; St. Pierre, 2013, 2014).

2.3.2. The entangled researcher

Most social science methods posit the representation of their research subjects as a faithful rendition of the world 'as it is', thus results are reported in an impersonal and neutral manner, building on predefined and fixed quality criteria to ensure validity. In most cases, the aim is, through thick description and interpretive contextualisation, to uncover meanings and values which are understood as awaiting the researcher's discovery, interpretation, and representation (Vannini, 2015a, p. 320).

However, according to Karen Barad, the 'seeing' we do as researchers is *not* a matter of simply looking and passively gazing on something as a neutral spectator. Rather, it must be considered an *achievement* that requires a complex set of practices to be accomplished (Barad, 2007, p. 51). 'Seeing' must be *learnt* by a *doing* and an iterative *practicing*, disciplining our minds and narrowing our attention and thinking into taken-for-granted routines. These arrangements structure and regulate our relationship with the data, and thus determine what we see (Hultman & Lenz Taguchi,2010, p. 535).

Yet, taking the agency of matter into consideration, it is more than that. Building on Deleuze and Guattari, Colebrook (2002) points out that thinking is not localised inside the mind of an isolated agent, rather it can be understood as taking place in-between heterogeneous bodies and agents. "Thinking is not something that is grounded on a decision or rational cataloguing of different external objects: rather it is an event that happens *to* us – it 'hits us' or 'invades us'" (Colebrook, 2002, p. 3). Thinking is to be understood as distributed in networks and assemblages of matter, organisms and discursive meaning in an encounter (Colebrook, 2002; Hultman & Lenz Taguchi, 2010, p. 536).

This entanglement demands much more of the researcher, than mere reflexivity (Hultman and Lenz Taguchi, 2010). Indeed, reflexivity is thought to be an inner mental activity, it invites the researcher to take 'a step back' and reflect about how and what she sees or thinks. As Barad (2007, p. 87) writes: "reflexivity, like reflection, still holds the world at a distance". Thus subjects (knowers) and objects (known), as well as discourse and reality, words and things, are still seen as separate entities. In contrast, a relational materialist perspective is critical of the idea of thinking and reflection as inner mental activities inside a separated human being. It points out that we can never reflect upon something on our own: to reflect means to inter-connect with something. Reflection is always done in the midst of a complex network, never the product of an isolated individual that reflects upon something from an external point of view (Hultman & Lenz Taguchi, 2010).

Similarly, subjects, understandings, theories are joint constructions, produced through the interaction between respondents' accounts, how we make sense of these accounts (Mauthner & Doucet, 2003; Riach, Rumens, & Tyler, 2016). The researcher becomes entangled in relations and objects, rather than studying their structures and symbolic meanings (Vannini, 2015).

There is thus a clear understanding that "data are *made* rather than found, *assembled* rather than collected or gathered, and *dynamic* rather than complete or static" (Ellingson & Sotirin, 2020, p. 819, italics in original). This dynamism comes not only from the engagement with the data, where the meaning of data changes with each reading, informed by new theoretical considerations which emphasises different relations. It also comes from the involvement of the researcher, engaged in an on-going becoming, changed by the insights the data allows (Ellingson & Sotirin, 2020, p. 824).

For example, Hultman and Lenz Taguchi (2010, p. 526) have explored one way to enact a relational materialist approach, building on the materialism of Donna Haraway (2008, 2016), Karen Barad (2007) and Bruno Latour (2005), and influenced by the philosophy of Gilles Deleuze and Félix Guattari (1987). Hultman and Lenz Taguchi (2010:534) propose to consider data itself as being a constitutive force, as working upon the researcher as much as the researcher works upon the data. They build on Karen Barad's 'diffractive' reading of data, a seeing which is not in any way limited to the gaze of the eye, nor understood as mirroring and representing the world (Barad, 2007, p. 88). A diffractive 'seeing' or 'reading' the data activates the researcher as being part of – and activated by – the waves of relational intra-actions between different bodies, concepts, meanings in an event *with* the data. As a researcher reads the data diffractively she installs herself in an event of 'becoming-with' the data. As Hultman and Lenz Taguchi (2010, p. 537) point out, it is not about reading the data to unfold 'what actually happened', it is about an encounter with the data, a being affected by the data, an event in which something new is created with the data. It is an intertwined relationship, a mutual transformation.

2.3.3. Beyond re-presenting the farmer's truth

Realist representational research typically portrays social existence through the "lenses of rational behavior, politico-economic causation, cognitive planning, instrumental interaction, and mechanistic predictability" (Vannini, 2015a, p. 320). Everyday life is thus seen as primarily taken-for-granted realities, habits and routines, which are understood as sameness and repetition. It builds on a humanistic notion of a person, a farmer as an autonomous subject, independent and detached from his environment. It also builds on a conventional representational model, where thought is understood as *a re-presentation* in our mind of what is *presented* to us, as a mirror of nature (Buser, 2014).

Interviewing is thus traditionally based on the assumption that "voice makes present the truth, and *reflects* the meaning of an experience" (Mazzei & Jackson, 2009, p. 4). Interpretation thus falls into the 'representational trap' of trying to figure out what the interviewee really means; it positions the subject of research as the source of meaning, with themes emerging from the data (Lenz Taguchi, 2012; Mazzei & Jackson, 2009).

All these assumptions have been problematised by poststructuralism, which theorises the farmer as situational, contextual, discursively inscribed. The farmer as subject is not understood as autonomous, unitary, coherent (see Hultman & Lenz Taguchi, 2010, p. 531). There is no fixed identity. It also acknowledges that there is an irreducible difference between representation and the lived world, i.e. what is said in words can never fully capture life as it is lived (Thrift, 2000). Action is not the result of deliberate reflection and sense-making, nor is it comprehensively re-presented in an interview. Data is thus necessarily partial and incomplete (Mazzei & Jackson, 2008; Lenz Taguchi, 2012).

Broadly speaking, three caveats should be taken into account when engaging with interviews and the data they generate: firstly recalling the past on why certain actions were (not) taken is not an accurate re-presentation: farmers are not self-aware conscious subjects; nor do they have perfect recall or an eidetic memory, they are likely to revisit the past based on more recent experiences. Thus, the interview itself is a 'performative presentation' which enacts and co-constitute social worlds (Anderson & Harrison, 2010). Secondly, the decision to act is not solely the result of cognitive processes, but of a host of non-conscious affective processes. Farmers (and researchers) are not just rational minds, they are also bodies, have emotions, they affect and are affected (Pottinger, 2020). Thirdly, the anthropocentric view which focuses on human agency, on human voices, and interpersonal interactions, does not adequately acknowledge the constitutive force of matter (Mol, 2002; Law, 2004; Alaimo & Hekman, 2008; Lenz Taguchi, 2012). Indeed, a farmer is imbricated with machinery, animals, plants, nature, all of which affect her, action is thus the result of a subtle intertwining of the social and the physical.

Clearly, there is a need to go beyond the taken-for-granted meaning of words, and see that (some of) them are an attempt to convey that which cannot be fully articulated or described. The use of words is more than an attempt to re-present the world, it often seeks to move beyond the purely perceptible, concrete. It is an invitation to identify terms that convey "lively and energetic imaginaries such as fluidity, contingency or instability" in the stories told (Buser, 2014, p. 234). Words that foreground the aspects of farming that are "perpetually forming and deforming, appearing and disappearing as bodies enter into relation with one another" (Anderson, 2009, p. 79, in Buser, 2014, p. 234). To render the shifting relationships and movements between bodies and objects, a quasi-autonomous dynamic that "emerges from and is constructed by relational encounters between human and non-human bodies" (Buser, 2014, p. 234).

The aim would thus be to find ways to highlight the liveliness of everyday interactions, by animating rather than deadening the relations between people, objects, animals, forever becoming something originally unplanned (Vivanni, 2015a, p. 320). It is about experimenting with ways to engage with giving voice to nonhuman agency, finding ways to embrace "the messy-ness of entangled worlds" (Dowling et al., 2017, p. 825). The aim of non-representational approaches is thus to use methodological strategies of vitality, performativity, corporeality, sensuality, and mobility, to research and re-present the sensory experiences, emotions, affective atmospheres and flows of life (Vivanni, 2015b; Dowling et al., 2017).

This also applies to the writing of a scientific text, the primary mode of academic representation, which too often requires us to 'distort' into clarity the fuzziness, ambiguity and indeterminacy that pervades life-as-it-is-lived (van de Port, 2016, p. 168). Indeed, academic writing is often artificial in its tidiness, clarity, consistency, coherence, organizational efficiency and linearity, guided by a will towards usefulness and applicability (Vannini, 2015b). The process of writing an academic text is tied to theoretical frameworks, literature and findings from earlier studies, the researchers, the context in which research takes place, i.e. cultures and traditions that surround scientific inquiry, journals, editors, reviewers, readers; all of which establishes specific capacities and constraints for how data is interpreted and how it is reported (Fox & Alldred, 2015). Thus, rather than finding an 'underlying order' that is 'hidden', we tend to impose order on a messy reality, a reality which most often is vague, diffuse, ephemeral, changes like a kaleidoscope and may have little pattern even if we create a coherent narrative after-the-fact (Law, 2004, p. 2).

As Phillip Vannini forcefully argues, non-representational writing styles should "strive to animate rather than simply mimic, to rupture rather than merely to account, to evoke rather than just report, and to reverberate instead of more modestly resonating" (Vannini, 2015a, p. 318). The aim is to generate new possibilities by animating, enlivening, rupturing and re-imagining. As such non-representational research seeks to emphasize "the fleeting, viscous, lively, embodied, material, more-than-human, precognitive, non-discursive dimensions of spatially and temporally complex lifeworlds" (Vannini, 2015a, p. 318). This invites a much wider range of writing genres and styles than typically found in traditional journals. It is about searching for ways to be more expressive and impressive, being evocative and affective, taking risks, exercising passion, finding creative ways to re-configure thinking, sensing (Vannini, 2015a, 2015b).

It is an invitation to experiment with forms of writing that blur the creative and the rational e.g. by using fictional vignettes (see e.g. Rabbiosi & Vanolo, 2017), which allow to purposefully re-present and re-arrange rather than directly report exact words as is most often done by including excerpts from interviews (Dowling, Lloyd, & Suchet-Pearson, 2018). One may also use the "material-affective liveliness of images, words, and art works as things in the world which incite, move, anger, transform, delight, enchant or otherwise affect" (Anderson, 2019, p. 1120). However, there is no doubt: with experimentation comes the responsibility of methodological transparency and explanation (Rabbiosi & Vanolo, 2017).

The ontological turn is composed of many trends, which are united in their search for alternatives to modernist-substantialist commitments. It raises a number of methodological implications, and challenges us to perform our role as researchers differently. In the framework of these broader onto-epistemological considerations, several theoretical approaches have emerged, which provide more specific guidance on how farming could be reconceptualised.

3. Selected theoretical approaches

The question is not what you look at, but what you see.

Henry David Thoreau, Journal, 5 Aug. 1851

In this section, I will briefly present four theoretical approaches that I have found particularly helpful for conceptualising a process-relational approach to farming. These theories share ontological and epistemological commitments, even if they have different inflections, not least due to their respective disciplinary roots. Each of these four theoretical approaches are rather broad school of thoughts, still emerging, marked by experimentations and explorations tied to specific research interest. There is no orthodoxy.

To conceptualise farming as a process where humans, nonhuman animals, and 'things' intermingle in complex ways, theories that allow for interactions between humans, nonhumans and matter, that conceptualise how the agency of various entities shape the unfolding process, are particularly useful. Here the two theories that I build upon are Actor Network Theory (ANT) and assemblage thinking (or assemblage theory). Both help to think how sociality and materiality are intertwined, and highlight that paying attention to material process in the social world can be analytically useful (Legun & Henry, 2017, p. 77).

Both ANT and assemblage thinking focus on networks of heterogeneous entities (people, ideas, texts, animals, plants, materials, technologies) that enable or constrain action in different ways. Both highlight the need to take account of the agency of nonhumans. Both point out that the network, the assemblage is an on-going process where various elements are incorporated or removed. And indeed, there are numerous similarities between ANT and assemblage theory, since they have a similar intellectual trajectory (Müller, 2015). Moreover, they overlap, as is demonstrated by the use of the term 'assemblage'. As Buchanan (2015) points out, studies that use the term 'assemblage' are not necessarily anchored in the work of Deleuze and Guattari. Indeed Latour (2005) also uses the term in his book 'Reassembling the social', and a number of researchers use the term 'assemblage' rather than 'network' in the context of ANT. Yet, the way the two theories have developed and how they are used is somewhat different. ANT-inflected studies tend to focus on how a network came to be and what has allowed it to become stabilized, thereby highlighting the numerous relations that make things possible. Assemblage-inflected studies tend to focus on the yet-ongoing process of assembling, highlighting that there is no determinism, that ruptures are always possible. Moreover, while ANT is particularly well suited to capture aspects of materials, assemblage thinking may have a greater sensitivity in differentiating between capacities, e.g. of animals and materials; and it may have greater sensitivity for the productive role of affect (Müller & Schurr, 2016).

Furthermore, I build on New Materialism to delve deeper in the conceptualisation of the agency of nonhumans, and through it reinforcing the shift away from anthropocentrism which is already present in ANT and assemblage thinking. Both conceptualise agency as distributed; i.e. it is not possessed by an element in the network, but results from the way these elements relate to each other. New Materialism reinforces the notion of agency as diffuse, so that the intentionality of human actors becomes less influential and deterministic. Acknowledging the fact that nonhumans are outside of human control, that they influence actions beyond human intentionality, opens an expansive world of

possibility (Legun & Henry, 2017). Indeed, a posthuman approach foregrounds that options shift without human will or consent, so that the unfolding of events is not inevitable, but rather emerges, often surprisingly (Legun & Henry, 2017). Moreover, New Materialism is mostly based on a process-based ontology, proposing that everything is in a continual process of becoming.

To deepen this relational aspect within the social world, I build on relational sociology, which theorizes relations either as inter-action, i.e. relations that bring separate entities together, or as trans-action, which posits relations of interdependence between entities.

For each theoretical approach, I will very briefly present some applications in the context of farming. The aim is not a comprehensive literature review, but an indication how the theories have been applied in this context and the kind of insights they allow to generate.

3.1. Actor Network Theory

Actor Network Theory (ANT) emerged from work within the sociology of science and technology, which initially focused on the social construction of scientific knowledge. It pointed out that scientists are part of society, and highlighted social variables such as interest, beliefs, or culture as determinants of scientific practice. However, authors such as Bruno Latour and Steve Woolgar critiqued this oversocialised conception of science (Latour & Woolgar, 1979). They highlighted that more attention needs to be put on the material conditions that enable scientists to act effectively in the world, and thus pointed out the need to situate humans in a complex array of heterogeneous relations. Subsequently, Actor Network Theory was developed by Bruno Latour, Michel Callon, Madeline Akrich, John Law, and Annemarie Mol. Work on ANT has been particularly fruitful in integrating technological aspects, building on Science and Technology Studies (STS).

ANT emphasises the interconnections, the relations, and the on-going work and co-construction that links humans and nonhumans. ANT thus flattens the modernist hierarchy between humans and nonhumans, it overcomes dualistic thinking by highlighting the complex networks that link social, natural, and technical elements (Murdoch, 2001). ANT has highlighted the numerous relations that make phenomena possible, pointing out that many of them have become invisible and are thus forgotten. By making them visible, it enables reengaging with foreclosed alternative possible imaginings (Legun & Henry 2017).

As a result, 'the social' is not seen as a distinct domain of reality (Latour, 2005, p. 4), and with it comes a dissolution of the concepts of 'social structure' and 'underlying mechanisms'. Latour (2005, pp. 65-66) rejects any sense of social forces working 'behind the scenes', replacing these entirely with localized, more or less short-lived interactions or associations. The task of the sociologist is thus not to describe and explain 'social forces', but to explain how a range of heterogeneous elements from the physical, biological, economic, semiotic and other 'realms' may be assembled to produce a network (Latour, 2005, pp. 5-6). These networks are the outcomes, not the causes of interactions, so the focus is on the relational micropolitics of events, activities and interactions themselves (Fox & Alldred, 2018, pp. 320-1). Within ANT, "action is not what people do", but what is "accomplished along with others in an event, with the specific opportunities provided by the circumstances" (Latour, 1999, p. 288). Action is thus not just the result of human intentionality acting upon passive material objects, but a result of complex sets of relations.

The focus is thus on the activities and interactions, as in ANT the efficiency of technical systems are not essential properties of specific technical devices. Rather, their 'efficiency' is produced through a continuous process of translation. Indeed "their apparent solidity or obviousness only holds inasmuch as this ceaseless work of translation stabilizes a heterogeneous actor network which 'performs' them and gives them their coherence" (Licoppe, 2010, p. 182).

In its application within the farming context, ANT has drawn attention to how farming practices are an effect of a network of heterogeneous materials. When Noe and Alrøe (2006) propose to understand a farm as an actor-network, it allows them to highlight that a farm is a heterogeneous system composed of many different kinds of entities, including soil, machinery, animals, people, knowledge, regulations, etc. These entities are involved in physical, biological, and knowledge relations. Seeing farms from an ANT approach highlights that the entities get their forms and performance through the relations in which they are located, e.g. whether a cow grazes or is stable-fed with concentrates, will affect what kind of cows it is, incl. how much milk she produces (Noe & Alrøe, 2012).

Similarly, Singleton and Law (2013) show how farming practices order heterogenous elements, including people, animals, material artefacts, talk, knowledges, and economic relations. They point out that we need to avoid imagining that a calf is a calf is a calf: if things "are stable this is because the practices themselves are repetitive. Without such repetitions things don't hold steady" (Singleton & Law, 2013, p. 262). A calf is made to be a calf in a particular way because it is tagged, documented, entered in a register, regulated, controlled, and direct payments are received. These practices have relational effects, they enact specific identities.

Several authors (Donaldson, Lowe, & Ward, 2002; Law, 2006; Law & Mol, 2011; Law & Singleton, 2009; Murdoch, 2003) have used ANT to analyse the foot and mouth disease, which broke out in the sheep population in the UK in 2001. They showed that the unfolding of the disease was a hybrid event, which "aligned natural, social, economic, political and technological processes within a complex and heterogeneous network of effects" (Murdoch, 2003, p. 266).

Gray and Gibson (2013) used ANT to highlight the interdependence and tensions in modern farming. They pointed out that ANT allows to overcome the image of farmers as individual, autonomous decision makers, who are fairly free to decide how to manage their farm. They explored how actors, objects, and social institutions affect one another, i.e. how farmers are co-constituted by the relationships within the network. They highlighted that networks of people, technologies, and institutions expand and constrain farmers' choices in ways that modify their relationships, actions, and identity (Gray & Gibson, 2013, p. 85).

Material agency was also highlighted by Dwiartama and Rosin (2014), who draw attention to the ability of rice, through its character and nature, to exert power, in terms of enabling or inhibiting humans in Indonesia to achieve desired outcomes. Rice is thus not a mere passive object to be used by humans, it shapes the manner in which the adaptive capacity of humans is expressed. The resulting adaptation strategies are influenced by the materiality of rice, in particular its fluidity; and by its capacity, as an object and symbol, to connect to a wide variety of entities (Dwiartama & Rosin, 2014). How change unfolds is thus not just the result of the agency and intentionality of humans, but also of the materiality of nonhumans; it is the result of a complex interplay between human and nonhuman actants (Dwiartama, 2016).

Much attention in ANT-inflected studies is on how networks have been established, how the heterogeneous actants have been enrolled, and how the network is maintained through on-going work. However, while "realities and identities are generated in patterned and heterogenous practices" (Singleton & Law, 2013, p. 262), these practices are also malleable, there is variation. This creates a 'breathing space' within which alternative orderings and alternative realities may be enacted. Calves can also be made differently, e.g. by observing them, by caring for them, by building on experiential knowledge rather than following formal rules and relying on expert knowledge. This can be understood as a form of resistance to specific realities, a resistance against the notion that there is no alternative: "It is not simply that other farming worlds are possible, though this is certainly true. It is also the case that multiple farming worlds exist – and are endlessly coming into existence" (Singleton & Law, 2013, p. 272).

Carolan (2020), in a study on big data and digital farming platforms, retraced farm data value chains. He shows the orchestrated relations among humans, non-humans, products, spaces, places and practices, highlighting the widely distributed nature of these digital farming platforms. He shows how different platforms build different relations between humans, nonhumans, products, and practices, thus orchestrating different politics, different normativities, different social orders, different algorithmic governance regimes. Given these differences, lock-in is not inevitable.

ANT is well-known for its symmetry, i.e. that the same consideration is given to humans and nonhumans (animals, machines, texts), and by considering all of them actants, it overcomes human exceptionalism. However, Jones (2003) notes that while this theoretical approach brings out oppressed subjectivities from the shadows, it may well undermine their identity as distinct subjects. This is particularly relevant in the context of animals: should they really be considered on the same terms as machines? Indeed, Whatmore and Thorne (2000, p. 186) note that nonhuman agency in ANT has a 'technical inflection'. This led Jones (2003, p. 294) to ask whether "it is reasonable to treat animals symmetrically, as blanks, as things that take their identity from their relational interconnectivities alone". He argues that animals have an agency and otherness that is different from that of tools, they have different capacities and tendencies, affecting networks differently, making their enrolment in networks more problematic in both practical and ethical terms. Similarly, we may need to counter the habit of regarding flora as passive. Yet our understanding of the specific capacities of plants' agency is at its infancy (Pitt, 2015). These authors call towards tuning into the world's livingness and treating all living species more respectfully.

Overall, by not distinguishing a priori between humans and materials, ANT offers a socio-material perspective and decentres 'reified totalities' (Müller, 2015, p. 28). By integrating the agency of materials, objects, technologies, guidelines, regulations, statistics, it has highlighted how they make possible, shape and sustain complex networks. ANT takes into account that the effects they produce are not predetermined, but dependent on the co-constitutive relational arrangement of which they are part (Jones, 2006, p. 187). ANT also insists on the processual nature of the socio-material: 'there is no social order. Rather, there are endless attempts at ordering' (Law, 1994, p. 101, in Müller, 2015, p. 30). As such, there are no inherent characteristics or universal principles that determine outcome. There is but the provisional organization of heterogeneous entities, which enables new ways of acting.

However, ANT may miss or deny characteristics (e.g. of humans, of animals, of plants), and the consequences of these characteristics when animals are enrolled into networks. Indeed, it can seem bereft of a sensitivity to the otherness of animals (Jones, 2003). Yet animals – be it in the form of farm animals, wildlife, or insects – have a significant and

contested role in farming, a role that has been very visible in food crises with animals at their centre, be it salmonella on chicken eggs, BSE in cattle, or foot and mouth disease in sheep and cattle. Animals have a particular form of agency and particular demands for ethics, demands which cannot be satisfied if animals are subsumed in a general category of nonhumans, especially in the context of the growth of environmental concerns and questions of animal welfare (Jones, 2006).

3.2. Assemblage thinking

Thinking in terms of assemblages was initially put forward by Gilles Deleuze and Félix Guattari and later developed as 'Assemblage Theory' by the philosopher Manuel DeLanda (2006). The term 'assemblage' may sound French, but it is actually an English translation of the French word 'agencement' used by Deleuze and Guattari, who only rarely use the French term 'assemblage' (Phillips, 2006).

Much empirical work using assemblages is linked to the specific development of assemblage thinking by Manuel DeLanda (2006, 2016). For DeLanda (2006b, p. 253) the key idea in Deleuze's theory is the exteriority of relations, i.e. that not only "relations are external to their terms, but also 'a relation may change without the terms changing' (Deleuze & Parnet, 2002, p. 55)". DeLanda thus points out that assemblages are not totalities, where parts are fused into a seamless whole. Rather, the components of an assemblage have a certain autonomy, they may be detached from it and plugged into another assemblage, or they may be attached differently within the same assemblage (DeLanda, 2006b, p. 253). The exteriority of relations also implies that the properties of components cannot explain the relations which constitute an assemblage, as the assemblage is not the result of an aggregation of the components' properties, but the actual exercise of the component's capacities (DeLanda, 2006a). These "capacities do depend on a component's properties but cannot be reduced to them since they involve reference to the properties of other interacting entities" (DeLanda, 2006a, p. 11).

Assemblage thinking is used in quite different ways. Some use it as a label to describe pre-given socio-spatial organisations and relations, thus displaying remnants of essentialism (Allen, 2012). However, generally it is deployed to emphasise four types of processes (see Anderson & MacFarlane, 2011; Baker & McGuirk, 2017; McFarlane, 2009): (1) by drawing attention to the labour of assembling and re-assembling, it emphasizes temporality, i.e. how past associations inform the present; (2) as an assemblage connotes groups or collectives, agency is seen as distributed, foregrounding the active role of materials and nonhumans; (3) as an assemblage may not be internally coherent and as there is no singular line of determination or hegemonic force, it connotes emergence and multiplicity, so that the outcome of any given situation cannot be pre-determined; (4) it points out that relations may endure, but they may also change and be disrupted, as such it emphasises fragility, provisionality, uncertainty, surprise. Indeed, assemblages tend to have unexpected and indirect outcomes, where things do not develop as planned, which Bentia (2021, p. 15) referred to as "the agency of the unexpected".

In human geography, assemblage often refers to the composition of heterogenous elements into some form of provisional socio-spatial formation (Anderson, Kearnes, McFarlane, & Swanton, 2012; Anderson & MacFarlane, 2011). An assemblage may include a gathering of humans, plants, animals, materials, technologies, techniques, norms and events, all of which have the capacity for agency, within and beyond the assemblage (Baker & McGuirk, 2017). Similar to ANT, assemblage thinking focuses on how things are put together while retaining their diversity.

Assemblage is thus part of a reconstitution of the social that seeks to blur divisions between the social and the material, between structure and agency (DeLanda, 2006a). It remains open as to durability and types of elements and types of relations involved, and is thus a response to the a priori reduction to any fixed form (Anderson & MacFarlane, 2011). The aim is to resist the 'naturalisation' of social orders and instead become attentive to the 'processes of composition', how assemblages are "held together so as to endure while always also retaining the potential to be assembled otherwise" (Greenhough, 2012, p. 203).

Rather than describing 'an' assemblage, i.e. describing a grouping, the focus is thus on the practice of assembling, on the ceaseless labour involved in bringing heterogeneous elements together, arranging them, forging connections between them (Li, 2007). Indeed, an assemblage is continually in the process of being made and remade, an on-going process of "arranging, organizing, fitting together of disparate actors, objects, techniques, organizations, representations" (Baker & McGuirk, 2017, p. 431). There is thus an emphasis on active composition, on connecting, combining, aligning relations, which is realised in a "congested field of projects, actors and ambitions" (Baker & McGuirk, 2017, p. 430). Any particular configuration must be worked at, a work that includes aligning motivations, translating ideas, developing new practices, marshalling resources, developing expertise, building relationships (Baker & McGuirk, 2017). This disparate work puts the emphasis on how the composite, the grouping is contingent, which implies that it remains provisional, uncertain, fragile, and thus revisable (Anderson & MacFarlane, 2011).

Assemblage thinking thus encourages the study of systems made up of components and processes, rather than looking at totalities, i.e. large unified social objects, illustrating the precarity of what looks solid and immutable (Lather, 2016). It encourages a sceptical attitude towards the appearance of unity, coherence, permanence, and invites to foreground how it arose over time. "An assemblage is a collection of elements that come together to affect, and this capacity to affect could not be realised without the assemblage" (Mancilla Garcia, Hertz, & Schlüter, 2020, p. 235). The agency, i.e. the capacity to act, cannot be separated from the assemblage. While humans may have intentional agency, i.e. make the decision to act in a certain way, this decision itself, as well as the outcome, is shaped by all the elements in the assemblage. Agency is thus "located in the complex interinvolvement of humans and multiple nonhuman actants, which together form an effective assemblage" (Bennett, 2015, p. 88).

The work by human geographers shows among other that an assemblage does not need to be in a space of proximity, since various technological devices blur spatial boundaries, enabling to assemble components that are physically far apart. For example Jones, Heley, & Woods (2019) applied assemblage reading to the global wool industry, showing how global economic restructuring impacts local rural societies in Wales. Jones et al. (2019) thus show that while components and relations change over time, wool production persists in a specific place. This allows to understand how temporary arrangements of human and nonhuman components come into being in specific sites, at a specific time, are maintained and break apart.

At the farm level, assemblage theory allows to reveal the human (farmer, veterinary, neighbours, advisor), material (technical, soil, equipment, buildings), nonhuman (animal, plants, wildlife, diseases) as well as intangible (laws, policies, norms, social discourses, routines) elements assembled for farming to occur. A farmer thus attempts – more or less successfully – to coax together a variety of entities, each with their own agency and capabilities (Sutherland & Calo, 2020). As such assemblage thinking provides the tools to ask: how does a farmer's identity influence the shape of her farm?

And how do the material properties of that farm shape her identity? (see Sutherland & Calo, 2020). Indeed, the work of Jan Douwe van der Ploeg (1985, 2000) on 'farming styles' has amply shown that there is no technological or economic determinism, but that the farmer's world view shapes how production is organised, delimiting a rather wide space of possibility. What assemblage theory adds, is a focus on the relations between the elements, thereby highlighting that assemblages are precarious since the configurations are constantly changing (Müller, 2015). Indeed, all the elements of the assemblage have untapped skills, abilities, capacities that could be used, that would have different effects, if they were assembled differently (Sutherland & Calo, 2020).

Legun and Burch (2021) considered how the prospect of future robotic technologies influence the strategies and practices in apple orchards, i.e. how they become involved in this future-making process. They highlighted the concurrent emergence of the logic embedded in strategies and the practices, which are constrained by the material realities of the technology. As such the farm is not a passive backdrop of the agency of the farmer, but the "farm *participates* in enabling and constraining action while shaping what kinds of worlds become imagined" (Legun & Burch, 2021, p. 381, italics in original).

Forney (2021) also pointed out that the elements of an assemblage are not obedient followers of the collective purpose that frames the assemblage. Indeed, within an assemblage such as the farmer organisation 'IP Suisse', there are multiple processes that are unfolding simultaneously. These include pressures by retailers, the impact of bureaucratisation, and a collective empowerment of farmers through learning, collaborations, and experiments. The analysis points towards continuous processes of change, with diverse future potentialities. Forney (2021) thus highlighted the value of going beyond the dominant processes to foreground more marginal processes, some of which may enable a fairer and more sustainable food system. The diversity of processes within an assemblage is also highlighted in a study focusing on two regional cheeses: a market cheese and a cooperative cheese (Forney, 2016). Both cheeses are enacted in networks of relations through repeated processes of meaning, attribution and translation; and importantly, they exist simultaneously, casting away binary oppositions and opening up new spaces for the 'alternative' within the 'conventional' (Forney, 2016).

Such studies show that the grip of neoliberalism on the future is not monolithic, and that assemblage-inspired approaches allow to identify spaces of difference. By making their presence visible, studies contribute to "making the un-thought thinkable and the undoable routine" (Carolan, 2013a, p. 148). Thus, the aim of assemblage-inflected research is not to come up with fully formed alternatives, but rather to highlight spaces where routines and practices are being altered, making different doings visible, thereby shift affectivities.

Assemblage thinking thus shows that any assemblage is just one way to practice farming, that there is no technological or economic determinism; and that any farming practice is undergoing changes, changes that may be in the elements or in the relations, enabling different capacities to be expressed. Assemblage-inflected studies, by looking for novelty, rather than just dominant practices, have shown how farmers have enlarged 'the possible' and 'the doable' (see Carolan, 2013). Indeed, the relational instability of practices creates openings for re-imagining practices, and spaces for new doings (Carolan, 2013b; Lewis & Rosin, 2013).

Importantly, assemblage thinking goes beyond informing empirical research. It is also about becoming aware that we, as researchers, are part of the research-assemblage (Fox & Alldred, 2015a). As Campbell and Rosin (2011) pointed out, two long-term research programmes had important enactive power in shaping the organic agricultural sector in New Zealand: they rendered 'thinkable' particular trajectories, while also reinforcing

'metric-centric' environmental audit systems. Assemblage thinking thus invites us to be reflexive in our engagement with research settings.

3.3. New materialism

As with Actor Network Theory and assemblage thinking, new materialism is a specific movement within posthumanism and covers a range of sometimes divergent theories, that nonetheless have several characteristics in common. New materialism (Bennett, 2010; Coole & Frost, 2010; Dolphijn & van der Tuin, 2012) was initially a reaction to the representationalist and constructivist radicalizations, which somehow lost track of the material realm. Within new materialism, matter is not in any way viewed as something static, fixed, or passive; something waiting to be shaped or moved by some external force. As a result, humans are not seen as autonomous agents imposing their free will on a passive material world, but rather humans are seen as located within an extensive system of relations, within which 'things' are agents along with humans. These 'things' are heterogeneous; materiality takes many forms: talk, bodies, texts, images, machines, architectures, etc. (Higgins, Bryant, Howell, & Battersby, 2017).

New materialism is 'new' in contrast to Marx's historical materialism, which focuses on the development of social institutions and practices within a broad economic structure tied to material production and consumption. Marx thus tied economic rationality to materiality, which capitalism constructed as 'natural', and thus unassailable and unchangeable (Coole & Frost, 2010, p. 26). In new materialism materiality is plural, open, complex, uneven, contingent, and should be understood in a relational, emergent sense (Coole & Frost, 2010, p. 29; Fox & Alldred, 2018, p. 317).

Also, new materialism does not limit itself to the human meanings 'embodied' in social structures or objects, or to the perceived material constraints of human action, since it is not about cognition but about affect (Coole & Frost, 2010). It thus builds on a different account of how materiality matters, one that focuses on the agentic contribution of nonhuman forces, which may be operating in nature, in the human body, or in human artifacts. The world is thus composed of networks that contain both humans and nonhumans working together in a way that cannot and should not be distinguished. It invites us to reconceptualise animate and inanimate nature, as well as technology, artifacts, and objects, as produced by and productive of human capacities (Washick & Wingrove, 2015).

New materialism conceives of matter as "possessing its own modes of self-transformation, self-organization, and directedness, and thus no longer as simply passive and inert" (Coole & Frost, 2010, p. 10). Materials are seen as having vitality, by which Bennett (2010, p. viii) means "the capacity of things – edibles, commodities, storms, metals – not only to impede or block the will and designs of humans but also to act as quasi agents or forces with trajectories, propensities, or tendencies of their own." New materialism thus goes further than classical phenomenology: it is not just our noticing that gives things their agentive force in the world. Rather, these things are assembled within a web that itself allows for the 'noticing' to occur; this web is not empowered by our noticing it, but rather empowers those within its frame (Coole & Frost, 2010).

For example, Phillips (2016) has detailed the agency of plastics within alternative food distribution. She has shown that they perform a very specific work that shapes, influences, and disrupts practices in these alternative food networks. Plastics are negotiated and experimented with, since the issues linked to resource extraction and disposal is a constant matter of concern. Plastics thus influenced the "situated practices of re/making markets with differentially valued materials" (Phillips, 2016, p. 215). She

has shown that plastic is a source of action: it has efficacy, can do things, make a difference, produce effects, alter the course of events.

Nature is seen as an agentic force that interacts with the other elements (culture, history, discourse, technology). Nature acts and these actions have consequences for both the human and nonhuman world (Alaimo & Heikman, 2008, p. 5). There is thus a need to find ways of understanding the agency, significance and ongoing transformative power of the world, of capturing the interactions between phenomena that are material, discursive, human, more-than-human, corporeal, and technological; a need to combine social construction with an understanding of the agency of the material world (Alaimo & Heikman, 2008).

In the context of farming, Rosin, Campbell, and Reid (2017) highlighted the agency of metrics in showing how the sustainability of vineyards is understood in New Zealand; in particular, how metrics influence the subjectivity and practices of farmers by participating in a variety of relationships, leading to an unexpected re-organisation of social and environmental relations that orient production networks. Similarly, Alrøe et al. (2017) have shown how metrics are active in driving changes in practices and mindsets.

Legun (2015), based on her analysis of dwarfing technologies in apple orchards, highlighted how using a materialist perspective, technologies do not just facilitate or congeal economic relations by influencing which practices are selected or what actions seem possible; they can also create them. Indeed, technologies generate unforeseen effects, enabling experimentation, articulating ideas in new ways.

In the context of natural resource management, new materialism not only disturbs the conventional sense that agents are exclusively human, it also deeply questions the corollary presumption, that humans have the right or the ability to master nature (Coole & Frost, 2010, p. 10). New materialism has thus been used to challenge basic assumptions about the ways we exploit and interact with nature, so that "Nature can no longer be imagined as a pliable resource of industrial production or social construction" (Alaimo & Heikman, 2008, p. 4). As Bennett (2010, p. ix) puts it: "Why advocate the vitality of matter? Because my hunch is that the image of dead or thoroughly instrumentalized matter feeds human hubris and our earth-destroying fantasies of conquest and consumption". Thus, acknowledging that matter is not dead and inanimate may contribute to the emergence of more ecological and more materially sustainable modes of production (Bennett, 2010, p. ix).

New materialism is thus also a political project that encourages "more intelligent and sustainable engagements with vibrant matter and lively things" (Bennett 2010:viii). As such it is linked to a critical reengagement with political economy, a new exploration of the nature of and relationship between the material details of everyday life and broader geopolitical and socioeconomic structures (Coole & Frost, 2010, p. 7).

In this context, new materialism may allow to build a bridge to Indigenous cosmologies. For example Bawaka Country et al. (2016) show an indigenous-led understanding of place which emphasizes the agency of the land, its co-constitution with and as human. Similarly, Puig de la Bellacasa (2019) explores how altering the imaginaries of soils – as being alive rather than as inert matter subjected to human use – may allow to develop a sense of earthy connectedness and shared aliveness, and thus help overcome the human-centred productionist ethos.

Ferguson et al. (2016) use new materialism to argue that soil not only shapes farmers' choices and possible actions, it can also be an important ally in shaping a just and sustainable food system. Indeed, if human agency is deeply interdependent with the

material world, how the soil acts on and with humans becomes relevant. The soil is thus understood as constitutive, as generating possibilities for the agency of farmers. If farmers improve soil health, the soil can improve plant health, thus altering the material property of food, and enable novel relations with consumers.

Cornips and van den Hengel (2021) highlight how human-cow relations are usually deeply instrumentalized and commodified, and most research is done within the framework of their use as 'livestock' for human consumption. Yet, dairy cows have distinct personalities, have complex cognitive, emotional, and social abilities and when given the opportunity form strongly bonded social groups. Understanding cows – or fungi (see Sheldrake, 2020) – on their own terms may allow to build new relations with them, to appreciate their agency, and to overcome assumptions of human exceptionalism and species hierarchy.

3.4. Relational sociology

Relational sociology builds among other on Gabriel Tarde, Georg Simmel, Marcel Mauss, and Norbert Elias (Guy & Selg, 2019). Some of their ideas have been taken up and developed by authors who developed different approaches within relational sociology, e.g. Nick Crossley (2010), Andrew Abbott (2016), Scott Eacott (2018), François Dépelteau (2018), and Pierpaolo Donati (2021). What these various schools of thought have in common is a focus on the interdependency between interactants, i.e. they focus on the relations between entities rather than on the entities themselves. They thus move away from co-deterministic distinctions between agency and structure, micro- and macro-level, individuals and society, and give more weight to social relations as the engine of production of social phenomena (Dépelteau, 2018). They thus propose alternatives to both methodological individualism (where 'society' disappears and is replaced by aggregated individual action) and methodological holism (where the individual agent disappears and humans are mostly understood as acting out cultural norms, following the dictates of social structures).

Differences between the various schools of thoughts within relational sociology lie in the way social relations are defined, the kind of reality attributed to them, and how change is conceived. To illustrate some differences, I briefly sketch two approaches, the one by Pierpaolo Donati, which builds on critical realism, and the one by François Dépelteau, which builds on process-relational philosophy.

Donati has developed a 'relational realist' theory of society, where the basic idea is that society is not a space 'containing' relations, rather relations are the very stuff of what we call 'the social', i.e. "society '*is* relation' and does not 'have relations'" (Donati, 2015, p. 87, italics in original). The theory focuses on how the morphogenesis of society comes about through social relations, which are the connectors that mediate between agency and social structure (Donati, 2015). He thus builds on Margaret Archer's (1995) 'morphogenetic approach'[8]. As such social and cultural structures are inherently transformable, but this transformation is historical. For Donati (2015), social relations are emergent effects of morphogenetic processes, i.e. the structural, cultural, and agential dimensions of morphogenesis are intertwined within a social relation. Donati (2015, p. 89) illustrates this by using the example of a leader: the leader does not exist only because there are followers, but also because of the charismatic qualities of that person, as well as

[8] Morphogenesis argues that the genesis of agents occurs within structures, and these structures change as a result of the activities and choices of individuals, i.e. the intended and unintended consequences of their activities. Morphogenesis agrees with Giddens' structuration that action and structure presuppose one another; however they differ in how they conceptualize it and how they theorize the structuring of social systems, not least how they integrate time (Archer, 1982).

contextual factors within and outside of the relational network. The aim is thus to understand the complex intertwinement of factors that cause specific relations to emerge. These social relations are invisible but real entities, with their own qualities and causal powers. Building on the notion of 'Wechselwirkung' by Georg Simmel, Donati (2021, p. 3) does not treat social relations as a 'thing', since they are a peculiar effect of mutuality or reciprocity between the terms that they links. A social relation is thus the emergent effect of reciprocal actions (interactions) between social actors; which can be reiterated or changed over time. Social relations – a term used to refer to both process and outcome – are thus proper to human beings, and different from nonhuman relations (Donati, 2015, p. 88).

For Dépelteau (2008, 2017b), approaches such as the one proposed by Donati retain some modernist-substantialist commitments, since the human actors are pre-given and then subsequently engage in relations. The focus is still on an entity (the human actor), even if the relations in which it is embedded is affecting and influencing it, and thus essential to understand it. Dépelteau, building on Emirbayer (1997), proposes a relational sociology which fully adopts a process-relational philosophy. Here, the entities themselves are constituted by relations. There are no discrete, pregiven entities as starting points for analysis, as the character of any entity is constituted within various relational settings. They have no inherent meaning or function but derive them from the relational setting.

To illustrate this process-relational approach, Lenco (2018) builds on the example provided by Deleuze and Guattari (1987, pp. 352-3) and compares two board games: chess and Go. Chess is defined by structural rules governing distinct and finite pieces: one has only so many knights, and knights have inherent characteristics or capabilities. A knight has these characteristics even when it is not in play. In Go, the stones are functionally the same: they have no inherent characteristics. The character they take during play is derived solely from their relations to other stones. When they are not at play, they have no characteristics at all. Lenco (2018, p. 154) points out that "a more Go-inspired relational sociology would disavow any reliance on pre-given entities, focusing rather on the relational, often chaotic, aspects that in fact constitute fluid, purely relational characteristics." The aim is thus to understand phenomena through the relations among the pieces and not through the characteristics of the pieces themselves. As another classical illustration goes: a hammer is a hammer because it is used to drive nails into wood, not because of its shape and weight.

Social phenomena such as social classes, the economy, pressure groups, culture, or gender are thus not the causal effects of 'social things', as these social phenomena cannot act, enable, or constrain, they are not solid 'structures' (Dépelteau, 2008). While they are clearly important, they cannot act on humans, and individuals cannot interact with these totalities: there is no abstract 'structure' that 'is' there and 'determines' action. Rather, social phenomena are understood as fluid social processes emerging, changing, disappearing through contextualized relations between various interdependent actors (Dépelteau, 2017). As such a social actor is not determined by an 'external' social structure, as this 'structure' is understood as the more or less stable effect of relations between interdependent actors (Dépelteau, 2008).

Social reality is thus not understood as made up of 'substances' but understood as an open system of relations; the focus is not on things, facts, and states of affairs, but on

the interrelations of entities in complex, dynamic, evolving, interdependent processes[9]. As Vandenberghe (2018, p. 636) puts it, this approach in relational sociology is "defined relationally in its opposition to categorical, essentialist, substantialist, atomist and fixist approaches, like rational choice, normative functionalism, and positivist variable analysis, which conceive of the world as a hapless conglomerate of contingently related, free-standing entities."

The challenge is thus to understand the world as built on processes, rather than a collection of pre-given objects that may be in a web of relationships. This process is often conceptualised as interaction, i.e. as material or energy flow (e.g. in social ecology), and can be extended to non-material dimensions such as social, cultural, power, knowledge relations (see Lejano, 2019). Indeed, relationality also focuses on meaning – i.e. how the meaning or identity of something depends on others it is in relation with (Lejano, 2019).

Importantly, these relations are not substances, they are not static; they are processes, i.e. constantly unfolding. Moreover the 'elements', the entities, are themselves but processes, they have no inherent existence outside these relations and processes. The focus is thus on dynamicity, development, change, becoming. Phenomena are understood as changing all the time, and it takes much work, by heterogenous agents, to stabilize them. The approach also foregrounds time, since interactions at time T1 are always somehow connected to various past experiences through dynamic, heterogeneous memories, knowledge, views, involving long chains of interactions (Dépelteau, 2015, p. 14).

While I am not aware of empirical applications of relational sociology in the context of farming, it offers interesting openings to conceptualise the various social relationships in farming, be it within the farming family, in knowledge networks, or the relations with agricultural policy.

[9] This understanding can be traced back to Heraclitus, who viewed reality not as a constellation of things but as one of processes; thus the river is not an object but a changing flow, an understanding which foregrounds activity and change (see Rescher, 1996, p. 10, quoted in Langley et al., 2013).

4. Contributions

Pour ce qui est de l'avenir, il ne s'agit pas de le prévoir, mais de le rendre possible.
As for the future, the aim is not to predict it, but to enable it.

Antoine de Saint Exupéry, Citadelle, 1948

4.1. Elements of a process-relational approach to farming

The dominant understanding of farms, as often enacted by agronomists, livestock scientists, and agricultural engineers, frames farming as mechanistically following the laws of biology that underly crop production and animal husbandry. Agricultural economists tend to understand farmers as autonomous rational agents and to take a normative approach to farm management, which 'should' be guided by economic reasoning. Rural sociologists have amply pointed out that farmers' activities are guided by technical, economic, *and* social considerations. They have highlighted the role of culture and language, as well as the social construction of reality, as shaped by beliefs, attitudes, values, preferences. Yet, empirical studies of farming within rural sociology often maintain binaries such as society/nature and mind/matter, and with them the implicit notion of the farm as a collection of passive 'things', and farming – within the confines of the laws of nature – as shaped by the human will of the farmer.

This points towards the role of science in stabilizing and defending the modernist farm (see Campbell, 2020). Indeed, as researchers, we are active participants in the world we are studying; we thus play a role in enacting modernist farming, or in disrupting it (Campbell, 2020, p. 28). I see my work towards a process-relational approach to farming as a contribution to disrupt this image of the farm in the modern world, this 'scientifically knowable farm' (Campbell, 2020, p. 181), this farm that is shaped by mechanistic relations, that is technically defined, which obeys laws of cause, where future developments can be predicted, where the metrologies of farm accounting make processes economically knowable and controllable. Indeed, a process-relational approach questions many of these assumptions underlying the 'scientifically knowable farm.' In doing so, it reignites the sociological imagination, it highlights multiplicities, it foregrounds that different futures are possible, that it could always be otherwise.

A process-relational approach draws together a number of conceptual openings, thereby answering the research questions that guided this thesis. It builds on four theories which share similar ontological commitments: on ANT and assemblage thinking which deny totalities, highlighting on-going assembling processes; it integrates elements of new materialism which sees nonhumans as vibrant and understands agency as distributed; and is inspired by process-relational sociology, which understands all entities as constituted by ever-unfolding relations.

A process-relational approach reconceptualises farming in three closely intertwined moves. It overcomes binaries such as social/natural or mind/matter, thereby reconceptualising the farmer as a posthuman subject and restoring the agency of nonhumans. It foregrounds relations, understood as processes, thereby overcoming a conception of the world as made of static substances. It emphasises change as ubiquitous, as an emergent unfolding, thereby highlighting the future as open, if ever uncertain and unpredictable. I will briefly summarize these three conceptual moves.

First, the farmer is reconceptualised as a posthuman subject and matter as agentic. Casting aside the mind/matter binary, the farmer is not understood as primarily a rational-cognitive mind, but as embodied, i.e. the materiality of the human body matters. It builds on the notion of posthuman subjects, which Braidotti (2019b, p. 46) defines as neither unitary nor autonomous, but as "embodied and embedded, relational and affective collaborative entities". Taking the human body seriously implies that lived experience matters, it highlights the role of senses, and affect becomes a key concept. As Braidotti (2019b, p. 45) clarifies "the capacity to affect and be affected is not to be confused with individualized emotions, as meaningful expression of psychological states and lived experiences. Affect needs to be de-psychologized, and to be de-linked from individualism in order to match the complexity of our human and non-human relational universe."

Casting aside the social/natural or human/nonhuman binary – and implied hierarchy – invites us to move on from the notion that the world is separate from us, that it is docile, that we can transform it to suit our ends, without it affecting us. Building on the new materialist conception of matter as having agential qualities (Coole & Frost, 2010, p. 7), farming becomes a collaborative endeavour. Farming is an entanglement, a collaboration of people, critters, and automatons (see Haraway, 2016). Humans are understood as 'acting-with' (Pickering, 2021). The farmer thus *acts with* the farm, as much as the farm *acts with* the farmer. The farmer is not autonomous, is not separate from, but intertwined with the farm, i.e. she does not exist outside of the connections she makes with the various nonhumans populating the farm (see Hultman & Lenz Taguchi, 2010). Subjectivity is thus relational, i.e. "in constant negotiation with multiple others and immersed in the conditions that it is trying to understand and modify" (Braidotti, 2019, p. 42). All the concepts such as thinking, reflecting, intention, will, which are so strongly related to the individual subject, are actually *distributed* in the farming assemblage (see Bennett, 2005). In other words: "'Human' agency is *itself* always a radically collective, multi-specied endeavor effect" (Bennett, 2015, p. 86, italics in original).

Second, farming is about unfolding processes, not fixed entities or static relations. Relations are conceptualised not as stable 'things', but as processes that require on-going work, they are a doing, they need to be actualized, composed, enacted, assembled. Things and materials are themselves not inert and passive, but active, agentic, dynamic (Herman, 2016; Pyyhtinen, 2016). By giving "matter its due as an active participant in the world's becoming" (Barad, 2007:136), the image of a farm, of crops, animals, buildings, machines as passive 'things' shaped by human will shifts towards farming as a lively assemblage of heterogeneous and interacting processes. This invites a shift from understanding matter in terms of what it is, towards examining its potentialities and the ways in which it makes possible, mediates, supports, prevents, resists our actions (Latour, 2004). It invites us to think matter differently, in "non-essential terms, that is, not as an essence of substance, but as something whose properties are defined by its relations and thus susceptible to change" (Pyyhtinen, 2016, p. 67). This processual understanding highlights that a farm is not a fixed entity, is not a totality with inherent properties, but an ever-provisory assemblage: as relations change, properties and capacities change. It is not about what 'is', but how processes unfold, which becomings are enabled.

Third, processes are understood as emergent, as an open becoming. The shift away from conceptualising relations as static things, of matter as passive, and of humans as the only ones with agency, implies liveliness that makes change ubiquitous. Thus, much of what seems stable is only apparently so (see Langley et al., 2013), nothing endures

unchanged, it is but a question of time scale and whether our sensibility, our sensitivity enables us to notice the on-going change.

Moreover, the outcomes of these change processes cannot be understood as the result of human will or of 'laws of nature', conceptualisations that emphasise predictability and controllability based on stable causal relations. Processes are never isolated, there is always a web of relations which may be composed of natural, technical, social, political, affective, psychic, and physiological processes. By highlighting the "effervescence with which things actually take place" (Vannini, 2015b, p. 7), processes are understood as unfolding without an overarching principle of determination. Any situation is thus the ever-provisory result of a multitude of interacting human and nonhuman agencies, which are caught in a "constant flow of mutual imbrication" (Braidotti, 2019b, p. 53).

The ubiquity of change and its emergent quality highlight contingency, highlight the uncertainty and unpredictability of unfolding change. Reality is thus understood as complex, fluid, indeterminate, multiple, fractional (Law, 2004). Indeed, we may need to acknowledge that "we live in a lively world that we cannot control and that we therefore have to learn to get along with" (Pickering, 2021, p. 1). This uncontrollability becomes apparent, when "things don't just come out any way we'd like them to… there is a sense in which 'the world kicks back'" (Barad, 2007, p. 215). This echoes Haraway (1988) who invites us to understand the world as a witty agent, a coding trickster with whom we must learn to converse.

While this highlights that change is uncertain and unpredictable, it also highlights multiplicity and possibility. Indeed, the "present is not a static bloc, but a continuous flow, pointing in different directions at once" (Braidotti, 2019b, p. 64). If farming is understood as an assemblage of processes that is constantly actualized, composed, enacted, assembled, it can always be actualized and assembled differently. Farming is then not sameness and repetition, determined by underlying structures; it is an active and creative engagement with an ever-changing situation, rife with surprises, fraught with unexpected unfoldings. A process-relational approach to farming, while pointing out the limits of human intentional and wilful agency, thus foregrounds ever-present possibilities for change. Foregrounding these is key, as "the possibility that things could be otherwise (…) is a precondition for any deliberate attempt, large- or small-scale, to make them such" (Bennett, 2015, p. 84).

Specific aspect of these three conceptual moves are explored in more detail in the papers that form the core of this thesis. They are briefly summarized in the next sections, and can be found in full-text in Part II of the thesis.

4.2. Paper I: Farming from a process-relational perspective

Darnhofer, I. (2020). Farming from a process-relational perspective: Making openings for change visible. *Sociologia Ruralis* 60: 505–528.

In this paper, I explore the implications of conceptualising farming from a process-relational perspective. This implies questioning farmers as humanist subjects, i.e. as autonomous individuals engaged in rational choices, thereby privileging reason and reflexivity; questioning the focus on structural constraints, as many studies highlight the limitations of farmer's agency in the face of social norms, technological progress, agricultural policies, or the power of market actors. I also question the conceptualisation

of the farm as passive, as open to its social construction and as a pliable resource for material agricultural production. I also review some of the methodological challenges and opportunities, calling for more awareness of the performativity of research practice.

To reconceptualise farming as a dynamic socio-material process, I integrate insights from new materialism to refine the conceptualisation of the agency of nature and of 'things' more generally; I integrate insights from non-representationalism to consider the role of embodied experiences, and I build on Deleuzian philosophy to emphasise that the world is always becoming, an on-going differentiation not a collection of static relations.

The farmer is thus someone who thinks and senses, her actions are seen as guided by mind as well as body, senses, emotions, affect. Farmers are thus not just deliberative minds, but have bodies, and thus more attention needs to be given to precognitive triggers, practical skills, affective intensities, and sensuous dispositions. Moreover, the farmer is not separate from her surroundings, but co-evolves in a complex and dynamic world. She is interdependent with the various nonhumans that populate farming, including tools, machines, animals, trees, crops, texts, images, chemicals. Each of these has different agentic capacities and affective intensities. The attention thus shifts towards the micropolitics of local interactions and collaborative efforts by humans and nonhumans.

Reconceptualising the farm requires us to re-imagine our methods, allowing us to decentre the human, both the farmer and the researcher. We may want to give more attention to bodily sensations, and acknowledge the constitutive force of matter by finding ways to show who nonhumans shape, constrain, and affect the farmer. Another challenge is going past describing what 'is' towards capturing the fluidity of processes, the unpredictability of change, the presence of diverse possible futures. But it also requires us to acknowledge that our bodymind engages and interferes with the data, and how the data is a co-constitutive force working with and upon us as researchers. It also challenges us to highlight diversity and multiplicity, and that our choice of the story we convey in our publications is a political act, where we emphasize possibilities or inevitabilities, that we contribute to make openings visible or invisible, and what kind of worlds we make thinkable.

4.3. Paper II: Farming resilience: from states to change processes

Darnhofer, I. (2021). Farming resilience: From maintaining states towards shaping transformative change processes. *Sustainability* 13(6): 3387.

In this paper, I compare and contrast the approach to resilience of farms, which conceptualises farms as a stable material entity, with one that conceptualises farming as an open process of becoming. I contrast the underlying assumptions as well as the typical application of the concepts in empirical studies of resilience. I argue that the concepts and methods used affect our ability to effectively capture change, so that an ontological shift needs to be accompanied by more creative empirical methods.

The conceptions of resilience at the farm level often focus on the ability of farms to maintain the status quo. They tend to be rooted in a substantialist, mechanistic worldview, which conceives the world as in equilibrium, even if a somewhat dynamic one. Farms are thus treated as if they were static and independent objects, whose attributes can be measured. Empirical work seeks to identify the attributes or

characteristics of farms that are correlated with their ability to buffer shocks and implement incremental changes. Much effort is thus invested to develop standardized tools, which are to be used to assess resilience using compound indicators. The emphasis is usually to enable the current farming system to function as well as possible, not to transform it. Studies in this worldview take a variety of inflections, including a positivist approach focusing on farm structure, mix of activities, allocation of land, labour and capital; or an interpretivist approach focusing on the individual meaning, interpretations, motivations and values of farmers, as well as cultural influences. Overall these approaches usually convey that resilience is linked to the attributes a farm and/or a farmer has, allowing to derive normative recommendations on how farms should be or what farmers should do, to 'be' resilient.

A process-relational approach focuses on relations that are understood as constantly worked on, as ever-changing. Farming is thus conceptualised as a shifting bundle of processes, where structures are only apparently stable as they can always be actualized differently. The focus is on foregrounding these always-already-there openings for change. This would highlight the ability to take advantage of unpredictable dynamics as windows of opportunity to engage in transformative change. Farming resilience thus emerges out of the configuration of tangible and intangible relations. In other words, a farm 'is' not resilient, but farming resilience is continuously made and re-made. Farming resilience is thus understood as a doing, a response-ability. It is guided by the ability to engage in or disengage from various relations, to incline propensities, to nudge open-ended processes in a promising direction, to influence unfolding processes, to constitute relations differently, opening new possibilities, new becomings. The question is no longer how to maintain a farm despite external pressures or how to adapt; but how a farmer can engage with on-going, often unpredictable, changes to address needs, how to be responsive while benefitting from these changes.

I illustrate the conceptual argument using an empirical example, which is approached through both approaches. I argue that the dominant, substantialist, worldview is well aligned with the accountability culture which values clear and unequivocal evidence-based recommendations. However, it has a tendency to create fixities by conveying that the future will, by and large, unfold in a predictable manner, along the current trajectory. Yet, amidst the climate emergency, the mounting ecological and social crises, we might need to put more emphasis on enabling transformative change. A process-relational approach and methodological experimentations could contribute to open up what has been foreclosed and simplified, to highlight openings for change.

4.4. Paper III: A relational perspective on the development of the organic sector

Darnhofer, I., S. D'Amico, E. Fouilleux (2019). A relational perspective on the dynamics of the organic sector in Austria, Italy, and France. *Journal of Rural Studies* 68: 200–212.

In this paper we argue that a relational perspective allows a more nuanced understanding of the dynamics of the organic sector, referring to all the actors linked to agriculture and food, including organic farmers, farmer's associations, advocacy groups, processors, consumers, policy makers. We argue that while the influence of various factors identified in previous studies (i.e. the role of policies granting direct payments to farmers, of legally binding standards, of the broader agrifood discourses, of marketing chains, of consumer preferences) on the development of organic farming is real, its

explanatory power is limited as their specific effects are context specific, i.e. can only be understood in a particular constellation, in light of past experiences and present opportunities, as well as taking into account the impact of unexpected events such as food scares, such as the anti-GMO-stance in Austria or the BSE-crisis in Italy.

The focus is thus on unravelling context-specific processes that emerge from interactions between social actors, showing how over time these relations unfold unpredictably, highlighting the complexity and fluidity of real life. The organic sector thus does not exist 'as such', it has no pre-relational 'essence.' It emerges through the relations, relations that it co-produces rather than being determined by them. Indeed, relations are always reciprocal, as each party adjusts its actions to the actions of the other, and no party has complete control. To understand the trajectory of the organic sector, it is thus important to understand what relations were built, why they were maintained in a particular way, how the relations were redefined, weakened, rebuilt or threatened by competing relations.

Thus for example, in Austria the direct payments to farmers were successful because of the many other relations that were successfully tied to organic farming, such as it being a way to maintain traditional farming and thus the cultural landscape in the Alps which is valued by Austrians as well as by tourists; organic food being tied to 'consumer patriotism' in the context of EU accession; and organic food being the only one that could guarantee a 'GMO-free' status. The direct payments were thus a visible indicator of a much wider network of meaningful relations that were built and strengthened over time.

The dynamics of the organic sectors in the three countries over four decades show that there is no determinism in their development, the events did not unfold along an inevitable path, where the impact of an individual action or event could have been predicted. Rather, the dynamics were tied to economic, material, technological, cultural, moral and emotional relations that were built, maintained changed, severed, reshaped by various actors within the agrifood system. The 'politics of possibility' are thus heavily influenced by actors' ability to engage in fluid social processes, to recognize windows of opportunity, explore new ways to make sense of a situation and to reframe the meaning of organic farming to address a salient issue. As such it highlights that the agrifood system is not a field of invariant logics and automatic unfoldings.

This paper also shows that while the focus of my research is on-farm as this enables a closer analysis of the processes involving nonhumans, the process-relational approach also offers a way to look at broader social processes. Moreover, it highlights the importance of these broader processes, not least of which those linked to agricultural policies, since they shape the possibilities and opportunities for farming.

5. In lieu of a conclusion: future openings

Le seul véritable voyage, le seul bain de Jouvence,
ce ne serait pas d'aller vers de nouveaux paysages, mais d'avoir d'autres yeux…

The only real journey, the only rejuvenation,
would not be to seek new landscapes, but to have other eyes…

Marcel Proust, La Prisonnière, 1923

This thesis explores a process-relational approach as one way to question a conceptualisation of farming based on an ontology that has its roots in the Enlightenment. It is but an initial foray into a different way to conceptualise farmers, farms, farming. Yet, the three papers show that this approach is promising, that it may well merit to be pursued further, refined conceptually, and deepened through empirical studies.

When considering the farmer, a process-relational approach shifts the focus from human will, cognitive processes, states of mind, and attitudinal accounts of farmers, towards the role of intuition, of bodily sensations, urges and passions, of the body's capacity to be moved and affected, as well as its ability to move and affect others. A process-relational approach also strives to capture a wider range of agencies, acknowledging the co-constituting role of nonhumans in farming. It questions human exceptionalism and understands nonhuman animals as agential, and matter as vibrant. It focuses on the entanglement of actors, be they human, nonhuman, animals, plants, organic matter, material objects, policies. The farm is thus no longer a collection of docile and passive 'things' upon which the farmer imposes her will. Rather, it is pulled and pushed in different directions by the agencies, propensities, and affordances of various humans and nonhumans involved in the heterogeneous process of farming.

By focusing on processes, the approach highlights the on-going changes underlying apparent stability, the activities of building and maintaining relations, of (re-)assembling differently. This loosens the conceptual grip of the multitude of variables and influencing factors that are often understood as 'determining' farmer's choices. By highlighting the contingency of interventions, it foregrounds emergences and unfoldings. It thus provides an alternative to approaches which emphasize order, structures, predictability. It invites to deemphasize sameness, routine, repetition, enabling us to see difference, creativity, possibility, open-ended processes.

The challenge in my future research is not only to refine the conceptual framework, but also to experiment with methods to capture and render these unfolding processes and the agential capacities of matter. It encourages me to be less worried about accurately re-presenting a truth that farmers may have tried to communicate in interviews. It shifts the aim of my research towards participating in making different worlds possible, visible.

If I want to encourage farmers to express their creativity more openly, clearly I, as a researcher, should do too. As an author, I will strive to achieve this by evoking something in my readers, by inviting them to experiment with new ways of thinking, sensing, doing. And I will try to inspire by highlighting possibilities, showing over and over that it could be otherwise. Following a process-relational approach is thus a call to be experimental and daring. It is about change, movement, surprise; about affecting, enacting, doing; about a vibrant, vital, ever-unfinished becoming.

6. References

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Part II: Publications

Paper I

Darnhofer, I. (2020). Farming from a process-relational perspective: Making openings for change visible. *Sociologia Ruralis* 60: 505–528 . doi: 10.1111/soru.12294

Farming from a Process-Relational Perspective: Making Openings for Change Visible

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Abstract

The theoretical debates in sociology have highlighted the strengths, but also the limitations of perspectives building on, anthropocentrism, essentialism, or structural determinism. One school of thought that strives to overcome such limitations is relational sociology. The aim of this article is to explore how a process-relational perspective can offer a new conceptual framework for farm-level studies in rural sociology. It is an invitation to view the world as a tissue of interactions, of dynamic and often unpredictable processes. By injecting a dose of new materialism and thereby extending agency to nonhumans, the liveliness of nature and technology is also taken into account. Yet, reconceptualising farming in relational terms is not just a theoretical but also a political project: it spurs different imaginations, making other worlds thinkable. This would enable to show ever-present openings for more socially just and environmentally friendly farming practices.

Keywords

farmer decision-making, post-humanism, new materialism, relational sociology

Introduction

Farm-level studies in rural sociology tend to focus on understanding why farmers do what they do, i.e., how and why they make the farming choices that they make, in particular identifying why farmers (do not) engage in economically profitable, socially inclusive or environmentally friendly practices. While it is hard to do justice to the wide diversity of theoretical approaches to conceptualising the farmer in rural sociology, many build on a humanistic understanding, where the farmer is active, making choices that shape the farm, while the farm itself is seen as passive (e.g., Hendrickson and James 2005; Dessein and Nevens 2007; Marr and Howley 2019; Milone and Ventura 2019). Certainly, provisions are made for the fact that the farmer cannot make the farm as she would wish, for her plans tend to be unsettled by unruly

Sociologia Ruralis, Vol 60, Number 2, April 2020 DOI: 10.1111/soru.12294

plants, diseases appearing against her will, machines breaking down despite careful maintenance, or the need to take into account financial implications (e.g., Stock and Forney 2014; Schewe and Stuart 2015; Suess-Reyes and Fuetsch 2016). Provisions are also made for the fact that while it may be labelled 'farmer decision-making', choices may be less the result of one individual's rational reflection, but of deliberations between various family members (e.g., Danes and Lee 2004; Price and Evans 2006; Seuneke and Bock 2015; Contzen and Forney 2017; Chiswell 2018). And many studies point out how a broad range of societal structures constrain farmer agency, be it traditions and social norms that define the characteristics of a 'good farmer', the power of supermarkets or the food processing industry to impose certain practices, or the incentives offered by agricultural policies (e.g., Duram 2000; Morgan and Murdoch 2000; Burton 2004; Vanclay and Enticott 2011).

However, the humanistic assumptions underlying these understandings have been questioned by what has been termed the 'ontological turn' in sociology, which among other has held to questioning the usefulness of the social/natural dichotomy and whether humans are the only ones having agency, whether human choices are primarily guided by cognitive processes, and what role unpredictability plays in the unfolding of events. The turn has triggered alternate theoretical perspectives in a number of agro-food studies (see Goodman 2009; Carolan 2013; Le Heron *et al.* 2016; Sarmiento 2017), arguing e.g., for a focus on difference rather than dominance (e.g., Wilson 2013; Beacham 2018), for the usefulness to understand Alternative Food Networks as multiple and emergent, as performative orderings, always in the making, rather than already constituted systemic entities (e.g., Whatmore and Thorne 1997; Stock *et al.* 2015; Le Velly 2019); for taking into account more-than-human agency (e.g., Dwiartama and Rosin 2014; Phillips 2016; Dwiartama 2017), or for analysing the expansive webs of relations through assemblage theory (e.g., Jones *et al.* 2019). These conceptual developments are instrumental in rethinking the significance of alternative food networks, in understanding their dynamics as unpredictable, and their nature as heterogeneous, i.e., as extending from social relations through material artefacts, to bodies, subjectivities, talk and knowledge.

These alternate theoretical perspectives have strengthened agro-food studies, and they could also enliven work done at farm-level (see e.g., Carolan 2005, 2016; Higgins 2006; Ferguson *et al.* 2016; Herman 2016). Indeed, much research effort goes into understanding what enables family farms to persist, how and why farmers select production practices that may be more environmentally sustainable, or how they perceive options to respond to changing social demands such as the increasing concern for animal welfare or climate change. How these issues are discussed and what insights are generated depends not least on the theoretical and methodological choices made by researchers. Many conventional sociological approaches tend to focus on how powerful social forces constrain farmers, preventing change. While they acknowledge that some farmers resist these pressures, that they change their on-farm practices or engage in collective initiatives, analyses tend to point out that these changes are limited in their impact, or that they tend to be co-opted by the powers-that-be.

However, while the overwhelming dominance of powerful forces would suggest a reduction of diversity and standardisation, in most regions farming is neither homogeneous nor progressing along a stable trajectory. The question then is, whether

conventional research approaches conceal openings for change, whether they are ill-suited to capture dynamics and ever-evolving diversity. As it is the theories that guide how we define research questions, what data we collect, and what we look for in this empirical data, new insights might be gained from building on theories that conceptualise farming as a dynamic and relational phenomenon, rather than the farmer and the farm as fairly stable and discrete things-in-themselves. If change is ubiquitous and the world a tapestry of fluid relations, such theories may enable us to better capture it.

In this article I focus on opportunities to reconceptualise farm-level studies in a way that would allow to better capture the manifold sources of activity and change, first by questioning farmers as autonomous individuals engaged in rational choices, and understanding them as always-already enmeshed in relations of interdependency with their material and social environment; and second by questioning the passivity of the farm and understanding it as having agentic capacities, as being lively and affective. To ground the theoretical discussion, I start by clarifying the characteristics of conventional sociological approaches used in farm-level studies. I then briefly present the processual-relational perspective, which proposes an anti-essentialist and anti-determinist approach[1] and explore how it can enliven farm-level research. Focusing on farming as the unfolding of underdetermined relational processes allows new conceptual openings, in particular a re-focusing on the ever-present possibility of change. Moreover, taking into account the agency of nonhumans, highlights how the interactions with both nature and technology affect human subjectivities and how they contribute to the unpredictable dynamics of becoming. In the last section, I draw out some methodological challenges and opportunities, for a processual-relational approach also involves an awareness of the performativity of research practice. I conclude by pointing out how a process-relational perspective, by emphasising that the potential for change is ubiquitous, can contribute to alternative world constructions.

The conventional conceptualisations: Farmer and farm in the ontological turn

To remain brief in the characterisation of concepts underlying many conventional theories (Table 1), I necessarily take a broad-brush approach that does not do justice to the many nuanced approaches and conceptualisations. While this risks to be caricatural, I hope to capture some essential aspects, as a good caricature would.

Firstly, regarding the farmer, studies in rural sociology have amply shown that the image of the utility maximising individual – which usually underlies studies in agricultural economics, and is implicit in recommendations derived from plant production or animal husbandry (see Edwards-Jones 2006; Galt 2013) – tends to be tampered by personal values, attitudes, perceptions, interpretations, as well as social norms. This has led to work done from a constructionist point of view, highlighting the representations and meanings farmers give to e.g., soil protection practices (e.g., Schneider *et al.* 2010) or farm succession (e.g., Fischer and Burton 2014). In these conventional approaches in rural sociology, the farmer is conceptualised as a humanistic subject, thus privileging reason and reflexivity, assuming farmers to be knowing, rational, stable, unified, and coherent (see St. Pierre 2004, 2008). This allows for

Table 1: *Various ontological and epistemological positions and alternate conceptualisations that have resulted from the various 'turns' in sociology*

Traditional sociological perspectives	Implications	Limitations, critiques	Alternate conceptualisations
Essentialism	Things have a fixed, stable essence, which is more fundamental than any variation	The world is not predetermined from the real; there is no essence independent of context and of interaction with other things	Anti-essentialism: reality does not have an inherent essence, is not stable, is always becoming; the world as emergent, engaged in ongoing differentiation
Anthropocentrism, human exceptionalism	Only humans are seen as having agency; focus is on humans because only they have cognitive abilities, intentionality, and can initiate action	Matter is not passive but 'lively', 'affective'; matter is not an inert substance subject to predictable causal forces	Post-humanism: production of the real through manifold relations linking human and nonhuman agents; New materialism: attention to materiality through practices, relations, embodiment, performance
Dualism	World as tidily segregated in binaries, e.g., subject/object, nature/culture, mind/matter, science/practice, modern/traditional, rational/emotional	Creates strong separations and clear distinctions; often one pole of a binary opposition is privileged at the expense of the other	Hybridity challenges the purity of categories; rejects the *a priori categorisation of things; focus is on hybrid socio-material assemblages*
Determinism/ reductionism	Search for universal (causal) mechanisms; focus on social structures such as norms and roles; Search for a principle of determination, e.g., genes, capital, institutions	Overemphasis on social continuities and stability; builds on the Western dream of an ordered and rational society	Complexity: the world as contingent, uneven, ephemeral; relations develop in unpredictable ways around actions and events

(Continues)

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Table 1: *(Continued)*

Traditional socio-logical perspectives	Implications	Limitations, critiques	Alternate conceptualisations
Constructivism	Highlights the role of human interpretation and meaning-making, and the impacts of those meanings	One-sided emphasis on discourse; does not account for the agency of nonhumans	Post-constructivism: Things matter, as do the relations between the biophysical and the social/cultural
Representationalism	Claims correspondence between concept and object; language is a reflection of the conscious mind, represents the world in a more or less transparent manner; privileges reason and reflexivity	Interview subjects are not passively and dutifully re-presenting their world; ignores the role of social construction, and the influence of context	Nonrepresentational theory: focus on embodied experience; attention to doings, practices, performances, rather than discourse and re-presentation; explore the affective and performative ways of sense making

methods that build on the assumption that a farmer can provide an accurate account of why he has made specific choices, such as adopting agro-environmental measures (e.g., Burton *et al*. 2008) or investing in a milking robot (e.g., Butler and Holloway 2015). Farmers are also assumed to be fairly stable in their preferences, due to e.g., the influence of their habitus. Yet, these conventional conceptualisations have been questioned, as humans are known to be ambivalent and contradictory (e.g., Smelser 1998; Berliner *et al*. 2016), thus focusing on the cognitive dimension of choices may underplay the influence of emotions and embodiment (e.g., Carolan 2008; Pile 2010; Castro 2018).

Secondly, conventional sociology tends to focus on culture, social norms, power, discourse, and language as shaping the farmer's choices. This tends to neglect the materiality of the farm (see Escobar 2010, p. 97). Indeed, the farm is mostly seen as a pliable resource for material agricultural production or for its social construction (see Alaimo and Hekman 2008, p. 4). This is partly linked to the boundaries that are foundational for mainstream sociology, i.e., the clear distinction between social/natural, with sociology focusing on the social and cultural aspects, leaving nature and matter to natural sciences (Goodman 1999; Fox and Alldred 2018). As a result, many conventional sociological perspectives take humans, human meaning-making, and social structures as the sole constitutive force, neglecting the nonhuman forces at play in our world (Hultman and Lenz Taguchi 2010, p. 539). Approaches such as Actor Network Theory and new materialism have established the notion that nonhumans have agency. Yet, although farming is fundamentally situated at the interface between society and nature, between humans and technology, the materiality of the farm is rarely taken into account. To understand farming fully, it might then be important to find ways to combine social construction with an understanding of the agency of the material world (see e.g., Ferguson *et al*. 2016; Herman 2016; Phillips 2016; Legun and Henry 2017). This would allow to link farming to a wide variety of forces, including physical interactions, biological processes, social encounters, reflective thoughts, revisited memories, emotional desires, and bodily feelings (see Alaimo and Hekman 2008; Anderson and Harrison 2010; Fox and Alldred 2018).

Thirdly, many accounts in rural sociology emphasise continuity over change, predictability over surprise, constraints over possibility. This is partly tied to an implicit essentialism. Traces of essentialism can be identified in studies that look for specific attributes of a farmer (age, gender, education, part-time occupation, attitude) or a farm (size, crops, types of animal rearing) and use these as indicators of some essence, some characteristic that determines how likely this type of farmer is to behave in a certain way (e.g., Andrade 2015; Milone and Ventura 2019). The essential characteristics can be used to define typologies and to make distinctions, allowing to convey clarity in an analysis. Yet, studies have been keen to expose the limitations of binary oppositions such as old/young farmer, modern/traditional, small/large farms, conventional/organic, pointing out hybridities and fluidity (Whatmore and Thorne 1997; Burton 2006; Rosin and Campbell 2009; Sutherland and Darnhofer 2012; Lamine 2015; Le Velly and Dufeu 2016; Lamine *et al*. 2019; Lehtimäki 2019). These studies point out that distinctions between types of farmers or types of farms may be less clear-cut at any point in time. Replacing sociological dualisms and the superficial

clarity of typologies with multiplicities would acknowledge the emergent character of the world and all the possibilities this implies.

The emphasis on continuity over change is also partly tied to a focus on structural constraints. Indeed, many studies highlight the limitations of farmers' agency, e.g., in the face of social norms or the power of market actors. For example in the debate around the conventionalisation thesis, market forces were held to systematically undermine the alterity of organic farming practices (Guthman 2004). Such top-down, determinist conceptualisations of social structure and of power strive to identify causal social mechanisms, enabling predictability and allowing to derive policy recommendations. Yet, they also tend to overemphasise social continuities and stability at the expense of flux and possibility (Fox and Alldred 2018). Alternative approaches have argued that patterns of connection are not reducible to interests lying outside or above them, that they are performative rather than structural. Any pattern is thus uncertain, a contested process, the result of on-going work. It is stabilised – and can be destabilised – through the creative, collective practice of the intentionalities of many and diverse inter-dependent actors (Whatmore and Thorne 1997).

Conventional approaches in sociology clearly have strengths, and have been used to provide a rich characterisation of a wide variety of phenomena. Yet, alternative conceptualisations may allow for different insights into farming, by going beyond a humanistic view of actors, taking into account the agency of nonhumans, and emphasising the possibility of novelty over continuity in a set trajectory. Such conceptualisations have been taken up by a range of disciplines, with specific sensibilities in response to different empirical and theoretical problems. They include non-representational theory (Thrift 2000; Anderson and Harrison 2010), (new) materialist feminism (Barad 2003; Alaimo and Hekman 2008; Coole and Frost 2010; Dolphijn and van der Tuin 2012), feminist post-humanism (Åsberg and Braidotti 2018), and assemblage theory (McFarlane 2009; DeLanda 2016; Le Heron *et al*. 2016; Jones *et al*. 2019). Each of these conceptual efforts are diversifying as work on them is on-going, a continual process of rethinking the human, the nonhuman, the material, and emphasising fluidity, relations, processes. It would seem useful to explore how the insights they have generated can be integrated and applied to generate a new conceptualisation of farmers and of farms.

A process-relational perspective – a different worldview

Relational sociology is an umbrella term for a disparate and loosely connected body of thought which shares common concerns but has a diverse intellectual history and includes a multitude of perspectives.[2] What they have in common is that they prioritise relations over the entities, thus emphasising interdependence (Emirbayer 1997; Dépelteau 2018a). For some perspectives, relations are concrete network ties between individuals or groups, thus the focus is on the interactions between pre-existing entities. For others, all social phenomena are constituted through relations, thus individuals are not pre-existing subjects, but themselves configurations of relations (Powell 2013; Burkitt 2015; Dépelteau 2018a).

I build primarily on the latter perspective, specifically a 'radical relationalism' (Powell 2013) or 'process-relational' perspective (Dépelteau 2018b). Dépelteau (2018b, p. 510) defined process-relational sociology as focusing on 'the analysis of the emergence, the transformation and the disappearance of multiple smaller and larger dynamic social fields happening through interactions between human and non-human interactants'. The process-relational perspective thus strives to move beyond social (co-)determinism, which explains human action as the effect of causal powers by external social forces (e.g. social structures, culture, institutions), or as the interactions between these social forces and the agency of actors. It thus recognises only one 'level' of social reality: the interaction between interactants, and as such is based on a 'flat' ontology (Dépelteau 2018b, p. 516). For example, in the process-relational perspective, agricultural policy has no causal power over a farmer, since the farmer cannot interact with it. Indeed, agricultural policy does not exist as a 'substance', it is a social process, i.e. an effect of relations between many human and nonhuman interactants.

A process-relational perspective implies a move away from seemingly solid, stable or permanent things, facts and structures, towards concepts such as relations, associations, assemblages, networks, interactions, transactions (Dépelteau 2018a). While these concepts are all nouns, they should not be mistaken for something that 'is', static and unchanging (Elias 1978; Carolan 2013). Rather, a relation, a network, an association, an assemblage requires constant work to be maintained, a work that can be done by humans, animals, plants, or objects (Powell 2013). It would thus be more accurate to use verbs: relating, associating, assembling, networking, interacting, communicating, transforming, practicing, farming.

The focus on work, on processes, gives analytic priority to what human and nonhuman actors do, how they make, maintain, or restrain space for change (see Carolan 2013). In this perspective, the world is not made of states and things; there is no unchanging essence, no stable society. Social phenomena are the products of interactions between multiple interdependent humans and nonhumans. They all contribute to produce, change, destroy or maintain social patterns, and are themselves changed through the interaction. Everything is evolving, moving, becoming, often precariously. This leads to ubiquitous dynamics, marked by complexity, i.e., the unpredictable effects of interactions. Indeed, process-relational sociology takes seriously that the world we live in is complex (Cilliers 2005; Urry 2006; Pyyhtinen 2017). As we do not control the outcomes of our actions, we can expect unwanted, unpredictable chains of interactions, as well as the inevitable unintended consequences. Yet, at the same time, this relational instability also creates openings for new doings (see Gibson-Graham 2008). These openings can enlarge what is perceived as 'possible' and 'doable': new doings, an altered routine can lead down a path where the once un-thought becomes thinkable (Carolan 2013). Herman (2015) uses the notion of enchanting agriculture to convey the notion that a brief rupture might provoke a farmer to re-evaluate the known and the everyday, allowing her to imagine a different world, one in which she can flourish.

There is thus no structure that stands behind and determines action (Dépelteau 2008). Similar to Actor Network Theory, process-relational sociology rejects any sense of social forces or structures working 'behind the scenes', replacing these

entirely with localised, short-lived interactions or associations (see Latour 2005, p. 65–6). Ruling out any recourse to overarching 'social structures' or 'systems' or underlying 'mechanisms' as explanations of continuity or change means that the task of sociological inquiry is no longer to reveal the hidden social forces at work in farming, agronomic research, agro-food value chains or elsewhere. Rather the analysis of relations, of power and resistance, focuses on the immanent, relational micropolitics of events, activities and interactions themselves (Fox and Alldred 2018, p. 320–21). Doing away with structures does not mean that there are no durable orders, but that the resulting orders are open, provisional achievements. Indeed, these orderings are multiplicities, composed of complex and shifting relations (Whatmore and Thorne 1997; Anderson and Harrison 2010).

A process-relational perspective thus offers a different worldview and allows to reconceptualise farming as a dynamic socio-material process. Given the important role of nonhumans in farming and to refine the conceptualisation of the agency of nature and of 'things' more generally, I integrate insights of new materialism and post-humanism (Latour 2005; Barad 2007; Haraway 2016). To take into account the role of embodied experiences in understanding farming practices, I integrate insights of non-representationalism (Thrift 2000; Anderson and Harrison 2010). And to emphasise that the world is always becoming, an on-going differentiation, not a collection of static relations, I integrate elements of Deleuzian philosophy (Deleuze and Guattari 1987).

Reconceptualising the farmer and the farm

A process-relational perspective allows reconceptualising the farmer as an individual beyond the body/mind duality and as interdependent with her environment, thus integrating insights of anti-essentialist, post-humanist, post-constructivist, and nonrepresentational positions (see Table 1). It also allows reconceptualising the farm from a new materialist understanding, as being lively and affective.

The farmer is reconceptualised in two moves. The first move is to overcome the body/mind duality. Thus, the cognitive is not understood as primary, as emotions and the materiality of the body are taken seriously, i.e. the farmer is understood as a being who thinks *and* senses. Farmers are certainly understood as having conscious aims and intentions, but these processes are influenced by a broad range of 'background' interactions, which we do not consciously notice (Anderson and Harrison 2010).[3] Indeed, much of the time, we engage in actions without thinking about them, and if asked about, we may struggle to explain. For example, many farmers will carefully observe the plants and animals they care for (see e.g., Singleton and Law 2013). They could not say what they are looking for, yet, they would feel if something is 'off' with an animal, finding it difficult to explain why it is 'off'. Yet, if much of everyday life is unreflexive and not necessarily amenable to introspection, then our understanding of farmer decision-making needs to be reconceptualised. Building on the insights from nonrepresentational theory, the root of action is not conceived primarily in terms of willpower, rational thought, conscious deliberation, or cognitive processes, even if we allow for these to be influenced by values and assigned meanings. Rather, the farmer's actions are seen as guided by mind as well as body, senses, emotions, affect; they

are influenced by past experiences and revisited memories, by embodied experience tied to various farming practices in a specific place (see Thrift 2000; Carolan 2008; Anderson and Harrison 2010). In short, farmers are not just deliberative minds, but have bodies, thus much more attention needs to be given to the influence of embodied movements, precognitive triggers, practical skills, affective intensities, enduring urges, sensuous dispositions (see Lorimer 2005; Maclaren 2019).

The second move is to no longer see the farmer as separate from her surroundings, which she tries to influence in a somewhat unidirectional way. Rather the farmer acts in an external world, but is also acted upon, is in constant relations of modification and reciprocity with her environment. For example Herman (2015) proposes to see farms as complex moral economies, where the social entangles human and nonhuman actants in dynamic and contextual webs of power and responsibility. As a consequence, action is not understood as a one-way street running from the actor to the acted upon, from mind to matter, but as relational phenomena, i.e., all action is interaction (Anderson and Harrison 2010, p. 7; Dépelteau 2018a, p. 18). Thus the farmer is not an independent being who engages in voluntary action, based on known cause-and-effect relations, leading to a fairly predictable outcome. Rather, the farmer is involved in a diverse and changing set of dynamic relationships with a host of human and nonhuman entities, whose responses are often uncertain, leading to outcomes which always have unexpected (side-)effects. Indeed, the farmer co-evolves in a complex, dynamic world: extreme weather events, new diseases or pests becoming more prevalent due to climate change, machinery becoming 'smart', internet-based technology enabling new forms of cooperation, marketing partners desisting, her body growing old, family composition changing, ambiguous regulations being reinterpreted, a new venture with untried partners, memories being revisited in light of new developments, unripe ideas evolving, and conflicts with neighbours are all part of everyday life. A farmers never acts in a vacuum, she is clearly not free. Rather, the farmer, an interdependent being, is only comprehensible in this unstable tapestry of fluid relations, past and present (Mitchell 1988 in Dépelteau 2018a).

The farm too is reconceptualised. Building on insights from new materialism, agency no longer privileges human action (Latour 2005; Higgins 2006; Barad 2007; Bennett 2010), and the farm is understood has having agentic capacities. The humanistic notion of agency is replaced by 'affect', where all matter is 'affective – it possesses a "capacity to affect and be affected"' (Deleuze and Guattari 1987 in Fox and Alldred 2018, p. 318). Thoburn (2007, p. 84) defines affect as 'an experience of intensity – of joy, fear, love, sorrow, pity, pride, anger – that changes the state of a body, that has concrete effects on individual and social practice'. Pile (2010, p. 8) distinguishes emotions from affect, and points out that affect is 'beyond cognition and always interpersonal'. Being pre-cognitive and pre-conscious, it is inexpressible, i.e. unable to be brought into representation. It refers to the capacity of a body to modify another in some way, as such affect connects bodies, it circulates, it matters. This implies a radical openness of a body to other bodies, human and nonhuman. Everything takes-part, everything acts, everything is involved in the co-fabrication of worlds.

The material bodies of the farm take many forms, including tools, machines, animals, trees, crops, texts, images, chemicals. Of course, these different bodies have different agentic capacities, affect differently. They have different styles of

becoming, depending on the qualities by which they actively differentiate themselves (Colebrook 2002, p. 84). For example the soil, which is part of the relational web that produces the 'farm', is not an inert matter, but dynamic and lively (Schneider *et al*. 2010; Ferguson *et al*. 2016), it will affect the farmer and be affected by him. Thus, what looks like a stable farm emerges out of multiple, disparate, and often divergent events. Understanding the farm as dynamic allows us to investigate conditions of possibility, de-essentialising phenomena, treating them as contingencies to be explained, as expression of human and nonhuman agency, as relations that can be investigated historically (Powell 2013). Importantly, the farmer's desires and plans are not the only things active in the world, but rather the farmer, the soil, the animals, the machinery are understood as being equally affective, involved in their on-going becoming (see Anderson and Harrison 2010, p. 11).

Farming as relational: conceptual openings

Conceptualising the farmer as constituted through relations and as intra-acting with the world, conceptualising the farm as being lively and affective, and conceptualising the farmer and the farm as intertwined in an open process of becoming, invites a shift towards farming as a hybrid relational process. Farming can thus be studied in terms of the constitutive processes and relations – biological, material, social, cultural, political, discursive – that go into its making. Farming is understood as situated action, as a series of events that take place in particular contexts and unfold in time (see Whatmore and Thorne 1997; Alaimo and Hekman 2008, p. 7; Vanderberghe 2018). From a processual-relational perspective, it is solely the various affects within individual events that promote or constrain farming, and the processes are continually challenged by new relations and affects that may de-stabilise practices and introduce different patterns of interactions (see Fox and Alldred 2018).

Recognising that much of farming is a response to expected as well as unexpected phenomena, farming is reframed not so much as invariable routine and continuity, but as a series of events that never repeat themselves in exactly the same way. Farming does not exist unaltered over time or outside of the connections made, it is always reassembling in different ways. Routines are processes, i.e., they are not understood as sameness and simple repetition, but as dynamic and requiring on-going work (Feldman *et al*. 2016). Farming is thus a fluid, vibrant, and evolving process, a precarious effect of relations, emerging from and transformed by manifold interactions, contingent and ephemeral (see Barad 2007; Coole and Frost 2010). Farming emerges from the micropolitical forces deriving from interactions within events. As the outcome of these events is never guaranteed in advance, assemblages of relations develop in unpredictable ways, leading to an emphasis on becoming, a radical openness to change.

If farming is not seen as a fixed 'thing' but a set of constituent practices which are bundled in different ways through time, then three aspects come to the fore and deserve additional research attention when striving to understand farming practices and orderings. The first aspect is the ever-present opening for change given the contingency of any ordering. The second and third aspects are linked to the integrated view of the agency of humans and nonhumans, i.e. the agency of nature, which are

fundamental in farming, and how technology both expresses and stabilises modes of ordering.

First, rather than looking at what 'is', the conceptual and analytical focus shifts onto processes, onto the manifold interactions, seeking to understand how orderings are maintained and why and how they are changed. The emphasis on the contingency of order is linked to an explicit concern with the new, with the ever-present opportunities for creativity, for relating differently. Indeed, the primacy of process shifts the central attention to the question of change: how are orders disrupted, how do orders fail, how are new orders coming into being, if only momentarily? (Anderson and Harrison 2010). The assumption is thus no longer that farmers are constrained by some form of overpowering structure (e.g., social norms in agriculture, agricultural policy incentives, technological progress, market pressures, the power of supermarkets), and that to achieve change, we need to identify ways to resist, contest, change these structures. While the influence of such orderings and stabilised relations should not be underestimated, the emphasis is on how relations are being stabilised and on opportunities for change. Thus any 'structure' that seems permanent is understood as a momentary crystallisation, which is subject to change with little notice or predictability.

The focus then shifts from seemingly static and overpowering structures towards events, towards the micropolitics of local interactions. Each event is a new beginning, and brings with it new potentialities for being, doing, thinking (Anderson and Harrison 2010). Each event potentially leads to a surprise that breaks the specific configuration of a social-material assemblage. The question is: how to extend the potential that an event opens up, the sense of promise that it may hold? (Anderson and Harrison 2010; Carolan 2016). How to create turning points in the here and now? How to explore possibilities to function differently? How do interdependent human and nonhuman actors attempt to shape various and fluid social processes (Dépelteau 2015)? How are differences made (in)visible and how are alternative imaginings of the possible strengthened or foreclosed (Legun and Henry 2017)?

Importantly, the complex interactions underlying change make it unpredictable. This questions the notion of a pre-set trajectory, of a directed development or any seeming imperative inherent to modernity (e.g., the 'get big or get out' dictum in agriculture). Rather, given that the 'world could always be otherwise' (Law 2004, p. 152), empirical diversity and the plurality of approaches to farming is here to stay (van der Ploeg 2017; van der Ploeg *et al.* 2019). This approach highlights the flexibility of farmers (Cheshire *et al.* 2013), the range of experiments farmers engage in to adapt their farming to address their own needs (Brédart and Stassart 2017), and how they 'tinker' with technology to respond to societal demands (Higgins *et al.* 2017). It would also draw attention to the impact of diversity and difference, which might be looked at over time, e.g., how farming changed and what enabled these changes; or in space, e.g., to understand the interrelations between the diversity of practices within a territory and what they enable (Lamine *et al.* 2019).

Second, relational sociology encourages a re-conceptualisation of human-nature relations, towards an integrated view of the agency of humans and nonhumans. Although modernisation aimed at controlling biological processes, farming may be better conceptualised as a collaborative effort where farmers and the local agroecology shape and are shaped by interactions. Indeed, a process-relational perspective is

much more than a call for studying relations between humans and Nature 'out there'. It is a worldview insisting on our interdependency, on the web of interrelated process of which humans are part (Dépelteau 2018a). It would follow Escobar's (2018) call to overcome the duality of a dynamic culture that manipulates an inert nature, by tuning into the radical interdependence of all life, a dynamic mesh of relations involved in world making, or as Haraway (2008) put it, the 'lively knottings' between humans and nonhumans. In this effort, a process-relational approach to farming could learn from the worldviews of indigenous societies, such as Andean cosmology where both humans and nonhumans are 'earth beings' engaged in mutual relationships of care (de la Cadena 2010); Aborigine cosmology, where reality is not prior, but interactively remade and enacted (Law 2004); or Inuit knowledge systems and how they approach the complexity of environmental processes (Berkes and Berkes 2009).

Third, a process-relational perspective can enable different insights on the role and influence of technology, e.g., in the context of robots, 'internet of things', but also of social technologies such as standards. It undermines a view of technological determinism as well as one of human control over hapless things (Higgins 2006). Indeed, while humans transform matter, matter is also granted active agency in transforming farming practices and human subjectivities (see Alaimo and Hekman 2008; Coole and Frost 2010; Hultman and Lenz Taguchi 2010). Technological materialities are seen as actors alongside humans, with vitalities irreducible to the meanings, intentions, or symbolic values humans invest in them (Bennett 2010). For example Rosin *et al*. (2017, p. 90) show how metrics have agency in the agro-food system, in that they 'initiate change beyond the expectations, intent and control of humans'. A process-relational perspective on farming not only gives agential qualities to humans, animals, plants, diseases, but also to buildings, machinery, and regulations. It points towards the affective intensities and agential capacities of objects. It draws attention to questions such as how objects under analysis establish conditions of action, how humans incorporate and improvise with objects, what imaginaries objects rely on and establish, how objects may enable to escape normalising discourses and habituated acts, opening new conditions of possibility (see Lupton 2018).

Methodological considerations

While in theory an emphasis on relations and taking into account the agency of nonhumans is well debated and engaged with, Dowling *et al*. (2017) point out that in research praxis the implications are not always carried through. We need new sociological imaginations, not only to develop new perspectives, but also to re-imagine our methods (Law and Urry 2004; Pyhhtinen 2016; St. Pierre *et al*. 2016). And indeed, the process-relational perspective presents a range of methodological challenges, which are also opportunities to innovate. The challenge is to shift the analytical attention from nodes, objects, and subjects, to events, work by humans, affects by nonhumans, highlighting how relations are made, maintained, transformed, abandoned. In doing so it is important to challenge the anthropocentric view on subjectivity and interpretation, by de-emphasising subjective human traits such as reason, meaning making, and imagination (Cresswell 2012).

The question is to what extend we can address these concerns within established methods such as interviews, which are the primary mode of data collection in many farm-level studies. In conventional methodological practice, work with interview-based data tends to be based on the assumption that voice makes present the truth, and reflects the meaning of an experience (St. Pierre 2008). The underlying assumption is that interview data is an interpretation of the real, is the 'truth' of the farmer, a faithful re-presentation of why he chose a particular course of action. Conventional interpretation thus risks to fall into the representational trap of trying to figure out what the interviewee really means (Jackson and Mazzei 2012), as well as risks to fall into the structuralist trap of trying to figure out which overpowering forces constrains the farmer, whether or not he perceives them.

In a process-relational perspective, the farmer is neither conceptualised as just a self-aware conscious subject, nor is action conceptualised primarily as the result of deliberate reflection and sense-making. Rather than being a disembodied rational decision-maker, the farmer is understood as influenced by non-conscious affective processes. Thus, more attention is given to emotional expressions as well as to affective experiences stemming from relations, to bodies affecting and being affected by each other (Lenz Taguchi 2012; Buser 2014). More attention is also given to bodily sensations, which may arise from the manifold relations in which the farmer is entangled, as well as from her interactions with machinery, animals, nature. As Carolan (2008) showed, farmers can experience the tractor as an extension of their body. It implies an exploration of the affective, emotional and embodied relationships between farmer and farm, the processes through which people come to care for the land, for the animals, for the plants, for the machines (see Singleton and Law 2013).

Moreover, by de-centring the human, the data can be reimagined through a more-than-human lens. Rather than privileging the anthropocentric point of view, the focus is on the interdependence and co-existence of bodies in the world (Lenz Taguchi 2012). This would highlight the reciprocal relations on the farm, the entanglement of human and nonhumans, showing how nonhumans have the very real capacity to shape and constrain the farmer by affecting her. In an interview about soil management practices, this might be expressed in how the farmer felt the urge to engage in a certain action as a result of how the smell and look of the soil affected her. This action might be an opportunity to revisit a routine, be an opening to imagine a different way of doing, thus leading to unexpected outcomes. Rather than focusing on human agency, and on interpersonal interactions, the aim is to look for, identify, and acknowledge the constitutive force of matter (Barad 2003; Law 2004). This allows to show how meaning and action emerges not in the isolated mind of the farmer, but from manifold interactions between humans and nonhumans. By highlighting the agency of animals, plants, machines, and rules, we can pay attention to entanglements, and raise questions about human control. The relational perspective thus discourages the tendency to think of humans as elementary units of analysis, and encourages us to look at farmers within the broader constellation of relations with other humans and nonhumans in which they are imbricated (Powell 2013; Buser 2014).

The emphasis on processes within relational sociology also means paying particular attention to terms that convey 'lively and energetic imaginaries such as fluidity, contingency or instability' in the stories told (Buser 2014, p. 234). More attention

should be paid to ambiguities and contradictions, as an indication of various imbricated processes, of co-evolution, of multiplicities, of struggle between different relations, of multiple orderings of reality (see Berliner *et al.* 2016). Indeed, farming is conceptualised as an ongoing and open process of transformation, involving manifold humans and nonhumans who are themselves conceptualised as processes connected to other processes. The aim is thus to identify and better understand how relations and constellations enable or impair transformation and change, how these relations are constantly made and remade, stabilised or undone. It allows to shed light on the shifting relationships, on the movements between bodies and objects, on a quasi-autonomous dynamic that 'emerges from and is constructed by relational encounters between human and non-human bodies' (Buser 2014, p. 234).

Beyond interview-based data, new methods need to be developed that are better able to capture relations difficult to express in words. The challenge is to think otherwise, away from rigid methodological norms, by opening up to new encounters and engagements (Hayes-Conroy 2010; Lenz Taguchi 2012; St. Pierre *et al.* 2016). It is an invitation to move away from the formulaic, to risk, to experiment and be creative, with greater regard for the particularities of the specific context. Whatmore (2006, p. 606) called it the 'experimental imperative', i.e., the urgent need to supplement the familiar repertoire of humanistic methods that rely on generating talk, with experimental practices that amplify other sensory, bodily, affective registers.[4] Indeed, there tends to be a one-sided focus on textual presentations by research participants. Yet, while it can be argued that we think through words, we do not feel through words, and there 'is always more than what we can put into mere words' (Gunder 2011, p. 201). These engagements may enable to go past a focus on what 'is' towards understanding the fluidity of processes, the unpredictability of change, the presence of diverse possible futures. This methodological experimentation might take many forms. For example Stirling (2011) has been advocating the use of methods that make differences visible. Darnhofer (2018) explored the use of comics, as a form of visual data that is open to interpretation and involves the viewer emotionally, enabling participants to discuss the differences in their feelings, experiences, understandings, associations, visions. Van Oudehoven and Haider (2015) have experimented with using a recipe book and photographs as a way to capture and value farmers' embodied knowledge about cultural biodiversity and heirloom varieties.

Importantly, the methodological challenge is not limited to finding better ways to capture the processes and relations that make up farming as the topic of research. It extends to the researchers themselves, inviting us to make explicit our own implication in the contents of scientific accounts of the world (Powell 2013). It has been a while that Donna Haraway (1988, p. 581) has denounced 'the god trick of seeing everything from nowhere', where researchers position themselves as the knower of classic positivist empiricism. STS scholars and Actor-Network theorists such as Bruno Latour, Michel Callon, John Law, Annemarie Mol have amply shown how scientific accounts emerge through interactions, negotiations, struggles between scientists and their nonhuman objects of study. The knowledge that emerges from such struggles is neither the pure projection of a disembodied consciousness onto a passive world, nor the pure reflection of a human-independent world on the passive mirror of human consciousness (Powell 2013).

The need for reflexivity is widely recognised, inviting researchers to acknowledge that they are part of the production of data and of its analysis (Popa *et al.* 2015). However, it is rarely acknowledged that data analysis is a process in which the body-mind of the researcher engages and interferes with the data (Alaimo 2008). Thus, rare are reports such as the one by Hultman and Lenz Taguchi (2010) who present the analysis of visual data as a relational encounter between a researcher and data. Similarly, Lenz Taguchi (2012) proposes an embodied engagement with the materiality of research data. In this she encourages researchers to go beyond the idea of reflexivity and interpretation as mental activities, where the mind of the researcher is understood as separate from her own body and from the data. Instead of asking 'what does this text mean?', she asks 'what does it produce?' on its own, but also when 'plugged into' other texts (Lenz Taguchi 2012, p. 268). The researcher thus allows the data to affect her, is attentive to pressure, tension, excitement that emerge when she engages with data. In this process of becoming-with the data, the data are understood as a co-constitutive force working with and upon the researcher. This challenges sociologists to do sociology differently, by not just analysing data 'from a distance' but by acknowledging how they engage, imagine, sense, perform.

The challenge of acknowledging what it is that researchers really do when they analyse data are directly linked to the challenge of appropriately (re)presenting research results. Here sociological imaginations face several challenges. The first is common with other perspectives in rural sociology, i.e. the need to find ways to report results beyond the norms of classic positivist empiricism. The practice is still dominant in many farm-level studies, possibly because disciplinary or institutional pressures entice researchers to present their results as if they are 'objective knowledge', framed in such a way as to be useful for policy makers (see Lowe 2010). This ideal of objectivity, asks of us researchers to erase 'from all accounts of our research, our subjectivities and our bodies along with the messy trial-and-error adequation of actual scientific practice' (Powell 2013, p. 206).

The second is how to appropriately re-present relations, including feelings, emotions, affects, materialities (Hayes-Conroy 2010; Maclaren 2019). This may be explored by using other media than words, e.g., in the form of a photo essay such as Swanton (2012); or by writing in ways that 'decenter human authority' (Dowling *et al.* 2017, p. 827). This includes giving a voice to nonhumans, and conveying the thickness and dense multiplicity of intra-activities that any event constitutes (Lenz Taguchi 2012; Jackson and Mazzei 2012). Highlighting diversity and multiplicity implies going beyond giving one answer in our writings, offering multiple perspectives, diverse possibilities, understanding that none is primary.

It also implies openly acknowledging in our writings that the aim is not to uncover the essence or truth of the data, as that there are always multiple interpretations possible. This is linked to reconceptualising the role of sociologists, which should not be reduced to 'the position of "interpreters" between concerned publics and natural scientists' (Whatmore 2006, p. 606). The purpose of research is then not to bring forth *the* story as may be intended by the interviewee, but *a* story that helps bring about a different viewpoint (Lenz Taguchi 2012; Byrne 2017). As such, our choice of the stories we convey is a political act, and we need to explore what we bring forth, and what

difference it makes, i.e. whether we emphasise possibilities or inevitabilities, what openings we contribute to making visible, which worlds we make thinkable.

Process-relational sociology thus builds on STS and post-structuralism in highlighting that knowledge contributes to making the world in profound ways (Law 2004; Latour 2005). Indeed, our choice of methods to collect and analyse data, how we choose to write, how we choose to present and communicate our results, how we choose to engage with participants or in public meetings, are all performative elements, through which we engage, participate, intervene in the world (see e.g., Campbell and Rosin 2011; Daniel 2011; Law and Singleton 2014; Popa *et al*. 2015). Our choices affect, they make differences, they enact realities, they can help bring into being what they also discover (Law and Urry 2004; Lenz Taguchi 2012). Process-relational sociology can thus contribute to escaping from dominant habits of mind, from taken-for-granted normalised thinking, and contribute to transformation and change.

Conclusion

Taking a process-relational perspective reconceptualises the farmer and the farm. It allows to go past the farmer/farm, human/nature, active/passive binaries to conceptualise farming as a relational process, as a material-discursive intra-activity, shaped by a host of human and nonhuman performative agents. By injecting insights from post-humanist and new materialist understandings, it invites us to move, ontologically, from identifying bodies as separate entities with distinct borders towards thinking in terms of processes of interdependence, of entanglement of ideas and materialities, of 'intra-action', i.e. the mutual constitution of all objects and agencies in an undivided field of existence (Barad 2007; Lenz Taguchi 2012). This reconceptualisation enables new understandings by moving from analysing how things 'are' to how they are becoming, how ever-present possibilities for different futures are enacted or current arrangements stabilised.

It proposes an anti-essentialist and anti-determinist perspective, so that the world shifts from being static, rigid, structured, controllable, predictable, to one that is dynamic, changing, unpredictable, emerging. It contributes to rethinking our world beyond clear causalities towards open processes, conceptualising farming as a dynamic socio-material formation engaged in an undetermined becoming. By highlighting the multiplicity of dynamic processes and the resulting messiness, a process-relational perspective can contribute to a more realistic representation of the world, marked by tumultuous processes of confusion, disjoint, disorganisation, rupture, failed reorganisation, anomie. The perspective highlights unpredictability. Indeed, it conceptualises the 'structures' of the social as never as stable and solid as they appear to us or as we wish them to be (Dépelteau 2018b). Rather, each moment offers an opportunity for change, for doing things differently. Many configurations do not just enable or constrain, they also provide undetermined opportunities for action, for innovative practices (Powell 2013).

Thus, rather than highlighting the many constraints faced by farmers, be it from economic rationality, power constellations, social norms, regulations, technological

change, research could highlight possibilities for other doings, emphasise diversity in farming practices, the creativity of farming emerging from the agency of humans and nonhumans involved in farming. Indeed, process-relational sociology is not just a theoretical project, it is also a political project to make other worlds possible (see Gibson-Graham 2006), to spur different imaginations, to enable a shift towards actively envisioning and contributing to alternative world constructions.

As such, a process-relational perspective is also an invitation to make visible the active role of researchers in collecting and interpreting data, and to increase the awareness of the performativity of our research practices. It is an invitation to researchers to explore new methodological practices, that might be better able to capture and to communicate the openings, the possibilities amidst the complexity and unprecedented connectivity of our modern world (Pyyhtinen 2017). It is an invitation to show the world in its 'unfinished making' (Phyyhtinen 2017, p. 306), to make visible the manifold openings for change, to highlight that it could always be otherwise.

Conflict of interest statement

The author declares that there is no conflict of interest

Funding information

The author received no financial support for the research, authorship, and/or publication of this article.

Data availability statement

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Notes

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1 I make no claim that a processual-relational perspective is the only way to address some of the limitations of conventional conceptualisations. I only argue that it does offer interesting conceptual openings. I see the processual-relational perspective as part of a larger ecosystem of theoretical perspectives in rural sociology, each of which has strengths at revealing important aspects, while obscuring others.

2 The purpose here is not to review differences between schools of thought within relational sociology (see e.g., Crossley 2010; Donati 2010; Donati and Archer 2015; Powell and Dépelteau 2013; Dépelteau 2018a; Papilloud 2018; Guy 2019), but to explore how this perspective allows to reconceptualise farming.

3 The extent to which we consciously control our thoughts and actions is also being debated in the neurosciences, given the large amount of non-conscious information processing going on in the brain, see e.g., Gazzaniga (2012).

4 The focus here is on the bodily sensations, emotions and effects of the farmer, not of the researcher, as would be the case when taking an auto-ethnographic approach, which integrates the personal experiences of the researcher.

Acknowledgements

I would like to thank the editor, Bettina Bock, and the anonymous reviewers for their thoughtful comments, which have allowed me to improve the manuscript by clarifying key points. I am grateful to Markus Schermer for his support and to Berhard Weicht for insightful suggestions on an earlier version. Last but not least, to Michael S. for inspiring examples of relational becoming.

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Paper II

Darnhofer, I. (2021). Farming resilience: From maintaining states towards shaping transformative change processes. *Sustainability* 13(6): 3387. doi:10.3390/su13063387

sustainability

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Farming Resilience: From Maintaining States towards Shaping Transformative Change Processes

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Abstract: Resilience is a concept that focuses on change: it includes the ability of a system to maintain its current state despite disturbances, its ability to adapt, and to transform. While resilience covers both stability and change, conceptual developments and empirical studies have put more emphasis on identifying what enables a farm to cope with the impact of a shock, such as a shift in markets or an extreme weather event, while remaining essentially unchanged. Much less emphasis has been put on what enables a farm to shape change, especially transformative change. I argue that this bias is partly due to the ecological roots of the concept, and partly to the use of conventional methods and their underlying substantialist worldview. A process-relational approach might be better suited to capture change. This approach shifts the conceptualization of a 'farm' as a stable material structure, to 'farming' as an open process of becoming, composed of heterogenous relations that are continuously made and remade. By exploring the differences between these two approaches to farm/farming resilience, I show how a process-relational approach displaces the presumption of structural determination and thus allows to highlight the ever-present openings for change.

Keywords: process relational; relational sociology; postmodern; postqualitative inquiry; agriculture; family farm; Europe; Austria

Citation: Darnhofer, I. Farming Resilience: From Maintaining States towards Shaping Transformative Change Processes. *Sustainability* **2021**, *13*, 3387. https://doi.org/10.3390/su13063387

Academic Editor: Giuseppe Todde

Received: 12 February 2021
Accepted: 15 March 2021
Published: 18 March 2021

1. Introduction

In times marked by rapid and often unpredictable change, there is an increasing policy attention to resilience. The European Commission has made it a cornerstone of its 'Farm to Fork Strategy', declaring that "The EU's goals are to reduce the environmental and climate footprint of the EU food system and strengthen its resilience" [1] (p. 7), the OECD [2] released a report on 'Strengthening agricultural resilience in the face of multiple risks', and the FAO is preparing its flagship State Of Agriculture and Food 2021 report on 'Building resilient food systems'. Research is thus called upon to identify ways to strengthen the resilience of farms and agro-food systems, which raises two core issues: what is resilience and how can it be assessed?

Resilience has been defined in a number of ways, but the most widely used definition may well be the one by the Resilience Alliance: "resilience is the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, and feedbacks, and therefore identity, that is, the capacity to change in order to sustain identity" [3] (p. 4). This definition includes a somewhat uneasy juxtaposition between absorbing disturbance and maintaining structure and feedbacks, i.e., 'bouncing back'; and the capacity to change, i.e., to 'bounce forward' [4,5]. In the context of natural ecosystems, the emphasis has been on maintaining biotic integrity, i.e., the function, structure, and feedbacks of the ecosystem.

However, transferring this understanding of resilience to the social realm, i.e., resilience as "fundamentally about how best to maintain the functioning of an existing system in the face of externally derived disturbance" [6] (p. 258), has been problematic. It presumes that existing social networks and institutions are fair and harmonious and

should be maintained, thus in effect serving to prop up the dominant system, which may entrench current inequities [7–10]. Given the well-documented negative social and environmental impact of the dominant intensive, modernized agro-food system [11–14], transformative change may have a more important role to play in the social realm than in the ecological realm.

As DeVerteuil and Golubchikov [10] argue, while these critiques of the use of the resilience concept need to be taken seriously, they should not prevent a further engagement with it, reconstructing it along critical lines. In the context of farming, shifting the emphasis from the ability to cope with an external shock towards the ability to transform would open new ways to conceptualize resilience. Resilience would no longer focus on 'inertial persistence', but would focus on enabling proactive changes, where everyday relations are negotiated and creatively reconstructed [10].

This shift would question 'too easy' conceptions of resilience at the farm level, especially those that explicitly or implicitly take a structural approach and focus on maintaining the status quo, on attributes or characteristics of farms that indicate the ability to buffer shocks and implement incremental changes so as to remain on the current trajectory. While this is an important aspect of resilience, it is unlikely that it will suffice to enable a farm to persist over the long-term. Farms also need to engage in transformative change, not only as a response to external drivers, but also as a creative process, to realize projects that emerge from within the farming family.

The aim of the paper is thus to explore whether a process-relational approach to farming resilience can be helpful in capturing change, conceptualizing the ever-changing processes in which farmers live and manage their farm. A process-relational approach focuses on the relations between heterogenous elements, the relations that are constantly made and remade, that could always be made differently, not least through different beliefs, values, perceptions, and expectations. The question for research is then how it can highlight these always-already-there openings for change, and how it can contribute to a context that strengthens the ability of farmers to make use of them.

I start the paper by briefly reviewing the uneasy juxtaposition within resilience thinking, between maintaining and transforming a system. I then explore the process-relational approach to farming resilience, which conceptualizes farming as an ongoing flow of transformations, an unfolding of propensities. I use an interview to illustrate the differences between a conventional to farm resilience and a process-relational approach to farming resilience, and I argue that, depending on the worldview taken, researchers might highlight fixities or openings for change. A process-relational approach to farming resilience can thus contribute to a different understanding of what enables farming to persist, not so much by 'discovering' things before the unknown, but by reconceptualizing what is already known.

2. Conceptualizing Resilience

2.1. Maintaining a System as Including Transformative Change?

In the context of agriculture, the OECD defined resilience as "the ability to prepare and plan for, absorb, recover from, and more successfully adapt and transform in response to adverse events" [2] (p. 14). Just as the definition by the Resilience Alliance [3], as well as those proposed by other major institutions such as the European Commission's Joint Research Centre [15], the IPCC [16], and the FAO [17], the definition covers the ability of a system to absorb disturbances, to adapt, and to transform. While the definitions of resilience cover all three aspects, it is not always clear how they are related conceptually [18–23]. Moreover, in the empirical use, there is a tendency for resilience to be understood as maintaining a system. There is thus a somewhat ambivalent relationship with change, especially transformative change, which—by definition—leads to a "fundamentally new system" [3] (p. 4).

Indeed, it is not even quite clear whether 'adaptive capacity' is one aspect of resilience, or whether 'resilience' and 'adaptability' are two distinct concepts that stand side-by-side. A number of publications seem to imply that they are distinct by explicitly referring to

resilience *and* adaptive capacity, as is done by, e.g., the FAO [17] (p. vi) or the IPCC [24]. Despite the implied distinction, usually both terms refer to maintaining the status quo of the system, which is understood as a dynamic equilibrium: a system should be able to cope with the impact of shocks, and adapt by adjusting responses to changing external drivers and internal processes, but only as long as the system remains within the current stability domain (see [3]).

The emphasis on understanding resilience as maintaining the system in its current stability domain is partly tied to the disciplinary context in which it has been used. For example, in disaster studies, the short-term aim is usually to enable a city or a community to 'bounce back' to the state before it was affected by, e.g., an extreme weather event (see [25]). Similarly, in ecology, the desire is to flexibly guide the management of natural resources so as to maintain the ecosystem within a basin of attraction or stability domain [3]. While some adaptive dynamics are allowed for, the ecosystem should not cross a threshold, should not engage in a regime shift, or go past a 'tipping point' that would lead it to a degraded, impoverished, undesirable state [26,27].

This dominant way to use resilience, emphasizing the ability to maintain the current state, has several implications in the context of farms. Firstly, it frames change in negative terms: change is understood as induced by 'shocks', 'stresses', 'disturbances', or 'adverse events'; it implies that stability is preferred and change—beyond a certain point—is often undesirable. Secondly, the emphasis on external drivers of change has downplayed internal drivers, implying that the system is in a dynamic equilibrium unless it is 'disturbed' by external events. Thirdly, transformative change, i.e., engaging in novel developmental pathways, is often side-lined, as new ways of thinking and operating, leading to unknown development trajectories, are not the focus of attention. Indeed, the implicit aim is usually to enable the current system to function as well as possible, not to transform it. This framing has thus impaired the study of shocks as opportunities for change, of internal drivers as essential in understanding the trajectory of a system, and a focus on transformational change as enabling a system that is more desirable than the current one. Indeed, while farmers want to maintain the function of their farm (i.e., ensuring the livelihood of the family, producing food and fiber, and maintaining the productivity of the land they manage), they might well want to do so by changing the structure, identity, and feedbacks of their farming system, e.g., by shifting from intensive production systems to low external input systems [28–30].

The question is why the concept of resilience has been applied in a rather one-sided way; why it has been tamed, despite being rooted in complexity thinking (see [31]). Why, despite the fact that in his seminal paper Holling [32] emphasized the need to 'expect the unexpected' and thus that "a management approach based on resilience (. . .) would emphasize the need to keep options open" (p. 21), current approaches seem to reduce it to another variant of risk management (see [2]). Why, despite acknowledging that "resilience is complex, context-specific and highly dynamic—all characteristics that make it hard to operationalize and measure through simple proxies" [33] (p. 6), much effort is being invested to develop standardized tools, to assess resilience using compound indicators, although these seem poorly apt at capturing the ability to take advantage of unpredictable dynamics, or the ability to engage in transformative change.

2.2. Conventional Approaches to Farm Resilience: Substantialism and Stable Entities

The answer may be found partly in its disciplinary origin, and partly in the dominant approach to conceptualize resilience, which is rooted in a substantialist, mechanistic worldview, which conceives the world as in equilibrium, even if a somewhat dynamic one. Indeed, farms are often treated as if they were static and independent objects, an approach that builds on substance ontologies that have influenced most of contemporary science (see [34–38]). Modern sciences build on René Descartes, who posited that the world is composed of physical and mental 'substances' that exist independently, and that have an unchanging essence [34]. Descartes also used a machine as a metaphor for the

human body, thereby establishing a mechanistic framework that sees the world as orderly. Newton, building on Descartes, conceived of all bodies as fundamentally inactive unless some external force is applied to them [35]. Ever since the 18th century Enlightenment, these notions have shaped how scientists view the world, i.e., mostly as filled with inert substances that may interact, but that in their essence do not change; a world that is ordered and thus predictable [34,35,39].

Transferring this worldview to farming systems also envisions them as solid, as durable social and material structures, with an immutable essence, whose attributes can be measured. Thus, when applying resilience thinking on farms, the aim is to identify those criteria, indicators, or attributes that are associated with the ability to cope with disturbances, and to adapt while maintaining their identity. Several conceptual frameworks have been advanced. While they all conceptualize farms as a social-ecological system, some tend to emphasize the ecological (e.g., [30,40,41]) and others the social side (e.g., [42–44]). While most frameworks strive to assess general resilience, some focus on specific disturbances, such as the ability to cope with the impacts of climate change (e.g., [45,46]) or shocks such as the impacts of the COVID-19 pandemic [47].

Even with these conceptual frameworks, resilience is notoriously difficult to apply empirically in a robust and meaningful manner (see [48–51]). Indeed, due to the irreducible complexity of farming systems, the assessment of resilience will always be partial and incomplete [40,52]. Yet, numerous studies have grappled with the challenge, and empirically applied resilience to understand how family farms persist in their farming activities, despite numerous disturbances. Broadly speaking, these studies can be grouped in three ontological approaches: positivist, interpretivist, and critical (see [53,54]).

For studies taking a positivist approach, the aim is objective knowledge, the search for universal causal mechanisms that explain observed associations, e.g., between farm persistence and farm structure, the mix of activities, or the allocation of resources, such as land, labor, and capital. The focus is thus on observable facts, captured through measurement, statistics, surveys. Some studies have focused on the resilience of agroecosystems (e.g., [55,56]); others have focused on farm management, using large data sets, e.g., from the Farm Accountancy Data Network (e.g., [57]) or from surveys (e.g., [58,59]); yet others have integrated the analysis of quantitative data and participatory assessments (e.g., [60,61]). Such studies have explored the relationships between the structural features of farms (e.g., type and size) and variables reflecting the farmer's agency (e.g., diversification, farm expansion, participation in agri-environmental programs), looking for correlations with some indicator of farm resilience. Such data-driven approaches are often only indirectly linked to theoretical frameworks, since they depend on the aspects of resilience that are quantifiable and the availability of large data sets (see [62]).

Some studies take an interpretivist approach, aiming to capture a subjective understanding, i.e., why farmers do what they do. The focus is on individual meaning, interpretation, motivations and values of farmers, and on taking into account contextual factors since farmers' choices are understood as being culturally situated. Such studies often use in-depth interviews to ask farmers what disturbances they have perceived in the past, and how they have coped with and adapted to changes. Some studies have compared case studies from several countries (e.g., [63–65]), whereas others focus on a specific type of farm within a region (e.g., [60,61,66–77]). Such studies have identified various 'rules of thumb' or principles that farmers use to guide their choices, such as autonomy, cooperation, or being flexible by adapting production practices, which can be linked to principles of resilience derived from theoretical frameworks (see [40,78]).

Finally, some studies take a critical approach, focusing on social justice and human emancipation, highlighting how resilience is political, i.e., how the way it is used and implemented is imbued with specific interests by specific groups. Such studies are partly based on interviews and partly on the analysis of documents, and usually focus on how the concept of resilience is framed by various groups and how this framing constrains farmers (e.g., [7,79,80]).

Overall, the conventional approaches, whether from a positivist, interpretivist, or critical leaning, implicitly convey that resilience is linked to the attributes a farm or a farmer 'has'. Although it is clear that a farm does not just 'have' a 'thing' called autonomy or diversity, in analytical practice it is often treated in much the same way. The identified attributes or indicators are therefore assessed, and used to distinguish between farms that are more or less resilient, as well as to derive normative recommendations on how farms should be to 'be' resilient.

Some empirical studies hint at transformational change; however, they do not focus on it. On the one hand this is because it is often difficult to define a clear and unambiguous boundary between adaptative and transformative change, for that requires to define when a system is 'fundamentally' different, and to operationalize it using the available data. While conceptually it is possible to distinguish between, e.g., 'input substitution' and 'system redesign' (see [81]), studies on the 'conventionalization' of organic farming have shown how challenging this is to implement empirically given contextual diversity and multiplicity (see, e.g., [82–84]). On the other hand, fundamental, transformative change is expected to occur only occasionally, so that it is not always easy to find exemplars in the sample of farms included in a particular study (see, e.g., [85]).

2.3. Farming Resilience from a Process-Relational Worldview

A relational approach is rooted in postmodern ontology, which rejects the modernist search for universal principles, and which has deconstructed various aspects underlying conventional approaches, not least by decentering the rational, autonomous subject as well as rejecting the notion that things have an inherent 'essence' or intrinsic property [54]. The relational approach is itself a diverse family of schools of thought (for a brief overview, see [86]), but what they have in common is that they do not see entities as primary, focusing instead on the relations between entities, since entities cannot be understood apart from the relations that constitute them [87,88]. Thus, while conventional approaches tend to posit discrete pre-given entities and use them as the starting point of analysis, searching for ways in which they may be linked and how they may interact, in relational approaches it is the dynamic, unfolding relations that become the primary unit of analysis [87,89].

Within this diverse family, the process-relational worldview has two specificities: firstly, relations are understood as processes, rather than as concrete ties or static networks; and secondly, all phenomena are understood as constituted through processes and dynamic relations [90], i.e., entities themselves "have no substance beyond their associations and intermeshed becomings" [91] (p. 25). To understand a relation as a process necessarily implies movement and transformation. A process is work; it changes something, it produces difference [92]. Building, maintaining, and changing relations requires ongoing effort; relations are laborious, contested, and uncertain [91,92]. Understanding relations as ongoing processes not only emphasizes that change is ubiquitous, it also highlights the ever-present potential of relations to become otherwise [93,94].

As relations are pervasive, they include both humans and nonhumans [90]. Indeed, materials are involved in every relation between humans, we cannot exist outside of the world of materials [91,95]. Overcoming the anthropocentric bias is particularly important in the context of farming, which is fundamentally an entanglement, an assemblage of humans, materials, technology, buildings, animals, and plants. Being constituted of processes, matter is not understood as inert and passive. It is dynamic, 'vibrant' [96], has the capacity to do work [92], and thus can have agentic effects [97]. Indeed, even if matter does not have cognition or intentionality, it has potentialities, can avail, make possible, support, can be effective, can prevent actions [91] (p. 67). The material aspects of a farm are thus not understood as the passive and transparent means of human action [76]. While the farmer may strive to assemble the farm in a specific way, this assemblage produces new givens, intertwining relations anew, creating new conditions of possibility. As the farmer influences but does not control processes, surprises are inevitable.

A process-relational worldview emphasizes continually unfolding relations. It implies a move away from seemingly solid, stable states or permanent 'things', ties, networks, or structures, towards dynamic, unfolding processes, towards concepts such as relating, associating, assembling, intertwining, and transforming [34,87,90,98]. This shift from 'farm' to 'farming', from nouns to verbs [37], is not innocent, for the words we use conjure images that shape how we conceptualize and thus study phenomena. Indeed, nouns connote a passive, stable, inert object, whereas verbs connote changing, transforming, becoming [37,38,99].

Relations are heterogeneous and multiple; they are biological, material, technological, social, emotional, cultural, political, symbolic, discursive; they are always and everywhere contingent, contradictory, unfinished; and they do not settle around a 'basin of attraction.' Rather, like evolution, they are open-ended, replete with novelty and unexpected changes [100]. Within this worldview, farms, farmers, and farming practices emerge from relations that are constantly made and remade. These relations produce assemblages of various duration, as some may last for a while and thus appear stable. Farming is thus conceptualized as a bundle of processes, where structures are only apparently stable as they can always be actualized differently [101]. Resilience is then not seen as a property, attribute, or essence of a 'stable' farm; it is not a substance, a 'thing' that can be measured. Rather, resilience continually emerges out of the configuration of tangible and intangible relations and the ever-changing dynamics of these processes. In other words, a farm 'is' not resilient, but farming resilience is continuously made and re-made [99].

Resilience is then not about maintaining specific functions, structures, or feedbacks, or about avoiding thresholds, it is about enabling ongoing, creative, and responsive change. Indeed, given that the aspects of a system that confer resilience depend on context [102], any one set of attributes cannot be an indicator of resilience, for that would imply a world that is orderly and predictable. Yet, if the world is an ongoing flux of change, forever shifting, the future can never be predicted well enough. The aim is then not to plan—which usually goes hand-in-hand with a 'command and control' [103] approach to implement that plan—but to take appropriate action [104]. Just like in evolution, what is 'appropriate', i.e., what 'works', cannot be known beforehand, but emerges through an ongoing process of tinkering [100].

This tinkering or bricolage can thus be contrasted to planning, which is built on an engineering approach in worldview, epistemology, and practice [105,106]. While an engineering approach assumes that the world is orderly and thus affords formal planning, specified goals, and clear strategies to achieve them, bricolage is based on an intimate knowledge of the resources available acquired over time, and the ability to make use of potentials for associations. Bricolage is "an assemblage work that goes beyond pre-established planning and leads to the production of new situated knowledges, objects and associations" [107] (p. 300); it is a continuous process of intertwining doing and making sense (see [105,108,109]). Thus, while farmers certainly have aims and goals, e.g., regarding quality of life and preferred farming practices, how these are realized remains open to opportunities as they emerge, and they may well change based on experiences and learning processes.

This process-relational approach allows to shift the emphasis from understanding resilience as being mainly about maintaining a system within a stability landscape, towards enabling ongoing change. It shifts attention from what seems solid and stable, towards the emerging preferences, interests, and needs of family members; changes in the perception of what farming practices are desirable and how the bundle of activities can be adapted to respond to some change or other; how mindsets evolve, enabling new opportunities to be recognized and seized; and how shocks redirect the trajectory, often in surprising and sometimes in transformative ways, as the various ecological, material, and social relations do not quite unfold as expected or wished for.

From a process-relational approach, farming resilience is thus understood as a doing, a response-ability; i.e., the ability to respond and to shape changes by navigating a bundle

of processes, sensing the potential within the current situation, which allows to recognize the possibilities emerging from the internal and external dynamics in which farming is entangled (see [110,111]). Resilience is then the ability to engage in or disengage from various relations, incline propensities, shaping the unfolding processes in a promising direction. It is the ability to constitute relations differently, opening new possibilities, new becomings. It is the ability to question that which had been accepted as a permanent and unchangeable 'fact', to recognize that such fixities are made and can thus be made differently. It is an engagement that enables options for change to become visible, to make new differences, to envision new relations, which may be material (i.e., production practices), social (e.g., relations with extension agents, agricultural policies, and consumers), or mental (e.g., beliefs, preferences and ways of seeing), and finding creative ways to bring them about, to realize them. Clearly, this doing, this response-ability is not a given, is never acquired once-and-for-all, can never be taken for granted, but emerges anew through each engagement.

A process-relational approach highlights the ambiguity, indeterminacy, ambivalence, and openness of real life, as well as the context-dependency and complexity of intertwined processes. Indeed, each process is "far more contingent, incomplete and contestable in both its characteristics and effects than is usually acknowledged" [112] (p. 34). A process-relational approach highlights that real life is full of unexpected, unforeseen, and disruptive events, and each measure implemented to address the impact of such an event has itself unexpected and unforeseen effects. Resilience can then not be prescribed recipe-like from the outside; it is not tied to some specific farm structure or configuration of activities, but emerges from an active engagement in the situation, guided by an understanding of the dynamics driving the farming system, the agro-ecosystem, the economic system, the social system; it is also guided by a sense of the possible that allows recognizing opportunities afforded by the ever-changing situation on- and off-farm. Clearly, the situation off-farm is important as it may afford more or less options, can be enabling or (severely) constraining [29,79,80].

From a process-relational view, the distinction between adaptive and transformative change can only be made in hindsight. Only then is it possible to assess whether a succession of marginal changes led to the 'incremental adaptation trap' [27], or whether the changes enabled a reorganization around a fundamentally different set of principles, of feedbacks, and can therefore be labelled transformative. Indeed, as change processes are open-ended, and their impact is context-dependent, it is unclear at the outset what any one change will lead to. Change may contribute to the system staying on the current trajectory, where what may appear different is little more than 'old wine in new bottles' (see [80]); or it may be transformative as it leads to a new logic, a new mindset, a new bundle of relations that guides farming.

3. Illustrating Two Understandings of Farm/Farming Resilience Based on an Interview

The aim in this section is to illustrate the implications of the two worldviews on resilience thinking: a conventional approach, which conceptualizes a farm as a solid 'thing', and a process-relational approach, which conceptualizes farming as an ongoing relational process. The aim is not to present a thorough analysis or specific findings about farm/farming resilience. The aim is only to contrast two worldviews and thereby explore the kinds of insights afforded by a process-relational approach to farming resilience, its ability to open up new ways of thinking, to encourage further conceptual and methodological explorations (see [113]). As the aim is not to present an in-depth analysis but to contrast, the presentation of both approaches will be schematic, focusing only on those characteristics that are typical for each. Like a good caricature, the aim is to capture essential aspects, rather than to explore details and nuances.

To illustrate the typical insights afforded by the two approaches, it is expedient to focus on one interview as this avoids the influence of differences in farm structures, contexts, or family composition. The interview was conducted in Salzburg, Austria, as part of a larger

project on resilience (see [114]). It was selected as the trajectory of the farm was particularly rich, and the farmer was very forthcoming with details on his understanding of why things unfolded the way they did (see full transcript in the Interview Transcript S1).

At the time of the interview in 2013, the farmer was 60 years old. He took over the dairy farm from his father in 1979 while keeping his off-farm job. He was one of the pioneers of organic farming in Salzburg, joining the organic farmer's association in the early 1980s. In 1992, he became a full-time farmer as he took over the farm of his father-in-law. As it had some crop land, he started growing root crops for direct marketing. By the time he handed the farm over to his son in 2007, it had some 30 dairy cows, 27 ha agricultural land, and 9 ha of forest.

3.1. Insights Afforded by a Conventional Approach to Farm Resilience

The interview transcript was uploaded into Atlas.ti, a qualitative research software. The transcript was coded using the 'attributes of general resilience' as proposed by the framework of Meuwissen et al. [42]. Since this framework was designed for a farming system at the regional level, the concepts were adapted to the farm level, based on [30,40,115]. This led to five general attributes of resilience: diversity (response and functional), modularity (flexibility in allocation of resources), openness (social connectivity), tightness of feedbacks (response-ability to changes in the farming system and material flows), and system reserves (i.e., natural, economic and social capital). The main themes (Table 1) summarize the codes used while coding the interview and give a succinct overview of the manifold strategies the farmer used to strengthen the resilience of his farm.

Table 1. Overview of the coding scheme, i.e., relation between the general attributes of farm resilience and how they were operationalized in the analysis. Each main theme regroups several codes.

Attributes of General Resilience	Operationalization	Main Themes
Diversity	Functional diversity	On-farm activities (cropland, grassland, animals, forest), products, marketing channels, off-farm income
	Response diversity	Skilled family labor, flexible labor allocation
Modularity	Reallocation of resources; recombination of activities	Tinkering, bricolage, activities started/stopped, innovation (new practices), careful investment (increase farm size, new cow shed)
Openness	Learning	Open to new ideas, farm visits, formal training courses, experimenting, observing, reflecting
	Collaboration, self-organization	Cooperation, organic farmers' association, shared machinery
Tightness of feedbacks	Social	Family, farmer's association (peers), direct marketing
	Natural	Closed nutrient cycles, produce own feed
System reserves, redundancy, autonomy	Maintain integrity of agroecosystem	Maintain soil fertility, organic production practices, own replacement heifers
	Economic capital	Limit reliance on credit-financing, be reasonably profitable
	Social capital	Collaboration between generations, autonomy in decision-making (knowledge), maintain 'room for maneuver' (avoid lock-in)

How the farmer structured his farm and how he implemented the various activities covered all of the attributes of general resilience. For example, the farm always had several income streams, either through a combination of off-farm and on-farm activities, or through several on-farm activities (sales of milk, root crops, wood), all of which contributed to the main function of the farm, i.e., ensure a livelihood for the family. This diversity was maintained even when the farm increased in size, through land rental, land purchases, as well as when he took over the farm of this father-in-law. While this implied investments, the farmer was careful to avoid depleting his economic capital, by avoiding credit-financing as far as possible. If credit was necessary, as when he built a new cowshed following the merging of the two farms, he limited the credit to an amount that could be paid back within a reasonable amount of time.

He maintained the farms' autonomy, e.g., by closing nutrient cycles; by using compost rather than chemical fertilizers to maintain the fertility of the grassland; by having an appropriate stocking rate, i.e., feeding animals with feed produced on his farm; by using his own calves for replacement heifers; and by relying on his own knowledge and experiences for making decisions about production practices, rather than relying on external advisors from the Chamber of Agriculture. Openness was implemented by regularly discussing experiences and observations with peers as they developed organic farming practices, and by inviting organic pioneers from Switzerland to benefit from their insights. Openness and connectivity were implemented, e.g., through joint-ownership of machinery with other farmers. While this limited his ability to use the machinery at the optimal moment for cutting grass for hay, it built connections with his peers, and it increased his profitability by reducing his fixed costs.

Analyzing the attributes that contributed to the resilience of the farm might also be linked to changes in the structure of the farm and the mix of activities over time (Figure 1). Each change enabled a different expression of the attributes of resilience, e.g., how functional diversity was expressed through shifting the mix of activities, how social capital was developed through the collaboration with other farmers in the framework of establishing direct marketing, or how economic capital was limited when he invested in a new cowshed.

Figure 1. The key changes in the structure of the farm and in the activities implemented can be presented along a timeline. This allows to see the succession of changes, which were either implemented at specific points in time, or extended over a period of time (e.g., conversion to organic farming).

Regarding the drivers of change, it is noteworthy that the farmer does not refer some of the major changes that have occurred in the socio-economic context, such as, e.g., the EU accession of Austria in 1995, which led to a radical change in agricultural policy and a much more dynamic market (see [116–118]). While these would be typical 'disturbances' that agricultural economists would focus on, the farmer, when revisiting the trajectory of his farm, linked the changes primarily to organic farming affording the opportunity to develop direct marketing, and to family dynamics that affected labor demand and availability. Thus, from the farmer's perspective, many of the changes in farming practices were driven by internal processes, e.g., his interest in organic farming and communicating with consumers. Similarly, changes in activities were mostly driven by internal 'shocks', e.g., that he was unexpectedly asked whether he would take over the farm of his father-in-law (who did not get along with his son), or the prolonged illness of family members. Changes in activities were also driven by family dynamics, e.g., his son being willing to take over the farm,

but only if he could specialize by disengaging from direct marketing. Despite the income generated by this activity, he saw it as causing a too high labor load and thus impairing the work–life balance.

3.2. Insights from a Conventional Analysis of Farm Resilience and Limitations Tied to Its Underlying Worldview

Conventional analysis is guided by the desire to find generalized stories from a causal or comparative perspective, looking for similarities and differences, either across a number of farms or in relation to the literature. This approach to qualitative data analysis builds on establishing theoretically grounded codes to analyze data, and the function of coding is in summarizing content [119]. This enables the analyst to create a coherent and interesting narrative that is bound by patterns and themes [113]. Coding using ready-made concepts implies that the themes are understood to have a fixed meaning, i.e., they can be transferred from one context to another [113,120].

The advantage of this approach is that it enables a comparison across farms and across regional case studies; and with it the accumulation of evidence on the relative importance of individual attributes, how they may be expressed, and how they impact farm resilience, especially when focusing on the ability of farms to buffer shocks and to implement adaptive change. It thus allows a standardization that fits well with the dominant audit and accountability culture that privileges an instrumental, engineering approach to social sciences. As such, the approach is well aligned with the demands for evidence-based policy recommendations.

As the example of analyzing the interview shows, the major themes (Table 1) do not come as a surprise. Even if their expression is somewhat specific to that farm, that family, at that time, in that place, this context-specificity is not understood as essential, since the aim is to identify generalizable results that may contradict, confirm, or expand the insights from previous studies. It has led some authors (e.g., [39,119,120]) to point out that much qualitative research produces little new knowledge, as researchers too seldom venture beyond cataloguing data into pre-existing concepts, and fail to question established understandings of the object of inquiry.

Indeed, in the analysis above, the focus is on identifying 'facts' (e.g., agricultural practices, farm structure, and activity mix, see Figure 1), which are seen as attributes of the farm and which can be used to assess whether or not it may be resilient. This analytical stance implies an understanding of resilience as a 'thing' a farm can have, and which is caused by other 'things', such as diversity, modularity, openness. Indeed, a farm that 'has' these attributes will be labelled resilient. These concepts are rooted in a substance ontology and in a static worldview, which orients our thinking and thus constrain the kinds of issues we can perceive [37,121].

Through presenting the results as a table (Table 1), the image conveyed is that each attribute is a discrete item. Even if its acknowledged that the principles of resilience are interdependent [78], this interdependence and its implications, e.g., trade-offs or contextual-dependence, are rarely explored conceptually; nor are the challenges that interdependence implies for the analysis of empirical data discussed in depth. Instead, the table conveys that 'diversity' and 'modularity' are clearly defined 'things' that a farm can 'have', that can be empirically assessed, measured unproblematically, possibly by operationalizing them through different indicators, which are then aggregated. These attributes can then be used to characterize and classify a farm. Ideally, if sufficient farms are analyzed, a list of attributes will enable to derive evidence-based policies, as well as a 'menu' of ready-made resilience-strategies that can be used as recommendations for farmers.

It thus seems that the expectations towards academic analysis and the writing of scientific texts leads us to distort into clarity the fuzziness, ambiguity, and indeterminacy that pervades life-as-it-is-lived [122]. Conventional scientific analysis can seem like a sleight of hand, as it tends to make ambiguity and indeterminacy invisible, thereby creating certainties, fixities.

These fixities are reinforced by a static, time-less approach, i.e., an analysis that collapses time, where there is no sense that 'history matters'. Implicitly it is clear that there is a sequence of discrete events (Figure 1), but this historical sequence is not understood as essential. This justifies analysis through a snapshot-approach, which collapses time, where the various attributes that can be identified, which have been implemented at any time, are catalogued, irrespective of combinations, sequence, and context. There is no sense that an attribute developed over time, or that this duration is of importance. The question is just whether a farm 'has' the attribute or not, the antecedents or the subsequent implications are not understood as relevant. The attributes are thus passive, static 'things', with no side-effects, unrelated to other 'things' for their existence.

The conventional analysis allows to approach farm resilience in a way that is decontextualized and ahistorical. This conveys that the attributes can (and should) be implemented on any farm, that they can be freely combined, and that this implementation is 'instantaneous'. There is no sense that it may be challenging to implement all attributes at all times, that farmers may need to carefully juggle trade-offs between them, that their implementation is an ever-dynamic process, which integrates revisited past experiences, current preferences, and future expectations.

3.3. Farming Resilience from a Process-Relational Worldview: Juggling Intertwined Processes, Ubiquitous Change, and an Ever-Uncertain Future

To implement a process-relational approach, it seems judicious to engage with postqualitative inquiry and its possibility to produce different knowledge and produce knowledge differently [39]. Postqualitative inquiry, like many 'posts', invites deconstruction, i.e., the displacement of overdetermined existing concepts, so that something different can be thought and done [120,123–125]. Rooted in postmodernism, postqualitative inquiry challenges the notion of validity as correspondence to 'truth', since 'truth' is understood as made by humans, spaces of visibility constructed by power/knowledge so as to frame our seeing [126]. The key concern is thus no longer what is the 'right' way to go about collecting and analyzing data, but what approach to inquiry allows to question the previously taken-for-granted and thus affords new insights. The focus is on what challenge our established ways of thinking, what allows us to think of resilience differently. The 'post' thus does not and cannot offer an alternative methodology, as it is itself a process of becoming, a process where 'data' from the interview, from theory, from one's immersion in a topic intermingle; where writing is just as much part of the analysis, so that theorizing–thinking–writing are intricately linked, rather than distinct steps [122,127,128].

The transcript was thus read with and through theory, to look for different narrative flows underlying the 'story' of the farm's becoming. The approach in this illustration is still 'humanist' in that the focus is on processes as perceived by the farmer. Clearly, many other processes (not least of which those driven by nonhumans) are concurrent and heavily shape, intermingle, and interfere with those recounted by the farmer, but these are not explored here to enable a closer comparison with the conventional method.

The processes can be explicit streams that explain the various 'turning points' as perceived by the farmer, such as the pivotal role of the ever-changing availability of family labor, or implicit streams, such as shifts in on-farm nutrient flows through the engagement in composting and then conversion to organic farming. The processual character is conveyed by avoiding static nouns—as far as the English language will allow—for verbs that denote activity and change. Thus, it is no longer about a farm as a static entity that 'is' large or small, or which 'has' specific attributes; it is about farming as an open process of becoming.

Through this reading of the interview, farming emerges as an intertwining of caring for the family, the land, and the animals, not least by navigating the family dynamics, adjusting for shifts in interests and labor availability by various family members, exploring composting and organic farming as an ongoing tweaking and fine-tuning, finding a balance between various activities (producing milk, growing root crops, developing direct marketing, selling wood, working off-farm), and engaging in the ever-changing demands

of cooperating with other farmers and with consumers. It is a bundle of processes of adapting, adjusting, exploring, revisiting, and learning, leading to an ongoing flow of change (Figure 2).

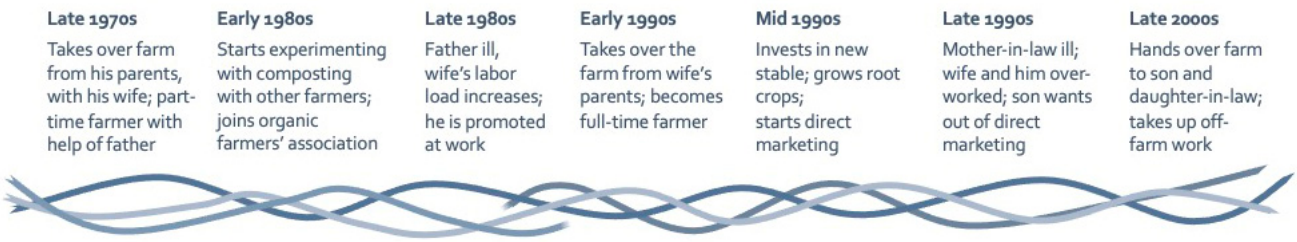

Figure 2. Overview of the flow of change in the various processes on the farm, symbolized by a braided river. The metaphor is meant to convey how various streams making up a river interact over time in changing and often unexpected ways, with individual streams (processes) being more or less prominent at various times, with some streams fading away and new ones emerging. There are no specific points in time, as individual events (e.g., taking over the farm) are understood as a somewhat arbitrary cut within a longer process, whose meaning and implications may change, e.g., when the event is revisited with the benefit of hindsight.

Ensuring intergenerational succession—which can be seen as a key indicator for the resilience of family farming as it demonstrates its persistence over time—may illustrate this ongoing becoming. While succession is often conceptualized as a point in time, i.e., the legal handing-over of the farm, on family farms it may be more accurately described as an ongoing and ever-present process that begins with having a child, raising it, passing on knowledge while involving the heir apparent in on-farm tasks, sending him (more rarely a her) to an agricultural vocational school, increasingly accommodating his/her interests and preferences in decisions, to deciding on the appropriate moment to hand over the farm, possibly before the parents have reached retirement age. Ensuring succession is thus an ongoing process that starts with early childhood socialization [129]. It is one of the processes that farmers keep in mind at all times, as it affects time availability and demands, investments, and activities established on-farm.

A process-relational approach to farming resilience also highlights the ambivalences, uncertainties, and unknowns that are inherent in farming. Indeed, each process is replete with unexpected events, and it remains unknown how each choice will actually unfold, not least as it depends on a number of other processes that are themselves indeterminate, open-ended. When the interviewed farmer decided to engage in organic farming, it was unclear whether establishing an organic dairy processing chain would be successful. When he invested in a new cowshed, it was uncertain whether the investment would pay off as it was unclear how the milk market would develop, especially after the EU accession of Austria. When he started producing root crops and collaborating with other farmers to engage in direct marketing, it was also unclear whether they could meet the emerging organic consumers' expectations. All of these activities needed to be imagined, developed tentatively, adjusted carefully, integrating the needs and preferences of various people, assessing the impact on the use of farm resources, continuously tinkered with practices, rethinking them in the face of setbacks, taking into account new opportunities as they emerged. Each of these activities also needed to be considered in relation to other activities, actual and potential, finding ways to integrate them, given that they require scarce resources, not least of which time, attention. The decision on what to do and how to adapt each activity is made based on experiences, knowledge, beliefs, and preferences, all of which change over time through discussions, learning, reflecting. Moreover, what seems feasible and desirable depends on changing social, material, economic, or policy processes in the broader context.

So certainly, resilience attributes such as 'diversity', 'modularity', and 'openness' are recognizable in the interview. However, these are analytical abstractions that can be

identified in retrospect. It is unclear if they can be identified when standing in the midst of a multitude of emerging and intertwined processes, i.e., if they are helpful guides for future-oriented decisions. As the philosopher Søren Kierkegaard put it succinctly: "Life can only be understood backwards, but it must be lived forward."

In this particular interview, the farmer looked back over the 25 years of his farming career and identified a number of principles that he kept in mind, e.g., 'invest but avoid a too high debt load', 'maintain several income streams', or 'keep in touch with what consumers want and what other farmers are doing'. However, while he broadly adhered to such principles, they did not ensure the resilience of his farming. Indeed, he overlooked the cumulative impact of diversification, especially linked to direct marketing, on the workload, which became too high as his mother-in-law became ill and required ongoing care. This led to severely straining both his wife's and his own mental health. Witnessing his parents' high workload and poor quality of life almost discouraged his son to take over the farm. Faced with this crisis, the farmer had to revisit a deeply held conviction: that the income from direct marketing was essential to secure the economic viability of the farm. Revisiting this conviction was a painful process as he had invested much energy in developing the network, and it took him a while to revise what was 'thinkable'. In hindsight, at the time of the interview, he acknowledged that accepting his son's decision and exiting direct marketing was the right choice, for it increased the wellbeing of all family members, ensured succession, and opened new possibilities.

This is not only an example of the challenges to juggle different principles for farming resilience, but also of how change processes can remain invisible for a while as they incubate and mature, before they emerge at a favorable moment, when the shifting relations are conducive and can be nudged in a way that further transforms relations between various mental, social, ecological, material, or economic processes, so that a new system is actualized in the farm structure.

As this interview shows, how each activity unfolded over time was a complex, unpredictable, multifaceted process, replete with unexpected side-effects that required ongoing adjustments. The farming trajectory was also marked by surprises, both internal (especially prolonged illnesses by family members) and external, not least the development of organic farming, and the radical changes of agricultural policies and markets following EU accession. Within the trajectory that emerged from the intertwining of the unfolding activities and the response to surprises, several turning points can be labeled transformative, as they profoundly changed the logic that guided choices, a new way of thinking and of organizing activities, and the resulting material, social, and experiential relations. The first was the conversion to organic farming, the second the shift induced by taking over the father-in-law's farm and becoming a full-time farmer, and the third the restructuring of the farm when preparing the handing-over to his son. These were a culmination of previous processes, and resulted in fundamental shifts in the structure, identity, and feedbacks underlying farming processes. They led to different flows of nutrients, experiences, knowledge, as well as different economic and social relations. Much like the family succession process, it is to some extent arbitrary to set a point in time where a transformation took place, as it is rooted in a number of earlier processes, and its unfolding is ongoing.

3.4. Insights from a Process-Relational Approach to Farming Resilience, and Openings Afforded by the Underlying Worldview

By focusing on processes, farming becomes much more fluid, changing, an ongoing tinkering, adapting, transforming, and becoming. It dissolves the image of the farm as determined by manifold social structures, economic imperatives, and externally prescribed production techniques. It dissolves the illusion of production practices as routine, as sameness and repetition, highlighting that change is present at all times, that routines are dynamic [130], that no day is exactly as the previous one. Overall, the changes that were actualized tended to proceed in bursts, in ebbs and flows, where several processes suddenly aligned, often unpredictably, creating a need for change, opening a new space of possibility, enabling a new perception of opportunities.

These ongoing change processes are not so much enabled by the farm 'having' a pre-defined set of attributes (Table 1), but these attributes emerge from being able to discern how to engage in the current situation, from being creative in finding ways to benefit from the current dynamics. It might thus be more helpful to view the attributes as emerging from processes. It is similar to riding a bicycle: the rider does not 'have' equilibrium, enabling her/him to balance on two narrow wheels. Rather, equilibrium can emerge from pedaling, from the movement, from skillfully engaging with the process, being response-able to the unevenness of the road or a dog suddenly crossing the street. Building and maintaining resilience is then less about applying the attributes or principles in a 'rational-comprehensive' way, and more about enabling an open-ended process of 'muddling through' [131] by engaging with the potentials and pitfalls of the current situation.

This means that the trajectory of a farm over time is not the implementation of a carefully planned strategy, built on the optimal use of available resources and a careful operationalization of resilience attributes. Rather, it is a bricolage, shaped by many unexpected events, some of which will require a fundamental revisiting of past relations, be it mental models or how material resources are used. Thus, no matter how carefully planned a project may be, many processes outside of the control of the farmer will influence how it will actually unfold. The key to resilience, to persistence over the long term, is then not to plan ever more carefully, but to remain response-able, to nurture the ability to engage in processes as they unfold in a creative way. Sailing might be an appropriate metaphor: the helmswoman has a goal in mind, but to reach it, she needs to engage flexibly with the wind and the current, building on and revising past experiences, knowing how her boat responds and managing her energy (see [132]). This engagement is not just a response to external processes, but an active engagement to shift propensities, to shape opportunities, to make a preferred unfolding more likely than other potential unfoldings (see [133]).

This highlights that there is no inevitability in how the farm trajectory unfolded; it could just as well have unfolded very differently. Many choices, large and small, were made, each of which could have been made differently. This does not mean that the farmer could shape relations and processes at will, since the farmer can influence processes but can never control them [92]. Yet, there is no determinism stemming from the structure of the family, of the farm, its resources, and its ecological, social, or political context. The future is indeterminate, with relations that are made and remade in an ongoing, open-ended process [34].

4. Conclusions

Resilience is a concept that focuses on the ability of a system to persist through change. As such, it foregrounds change both in the context and in the system itself. In his seminal paper, Holling [32] emphasized the unpredictable nature of these change dynamics and the need to keep options open. Yet, this uncertainty and unpredictability can be at odds with the dominant substantialist worldview, with the disciplinary norms in academia, as well as with the audit and accountability culture, all of which value clear and unequivocal evidence-based recommendations, preferably derived from the purported authority of quantitative models. This worldview has a tendency to create fixities by conveying that the future will, by and large, unfold in a predictable manner, which can be known well enough based on the past. Building on this worldview, the conceptual approaches and methods used to operationalize resilience thinking at the farm level have a tendency to focus on risk-management strategies to enable farms to cope with shocks resulting from the vagaries of markets or the impacts of climate change. By focusing on how to maintain the system within its current basin of attraction, its current trajectory, this approach implicitly sidelines—and possibly impairs—transformative change.

Yet, arguably, amidst the climate emergency, the mounting ecological, social, economic, and political crises, we might well need to put more emphasis on identifying ways towards a transformative change of the techno-scientific regimes of exploitation, focused on consumption and profitability, that characterize the Anthropocene [12,13,134]. I argue

that taking a postmodern approach to resilience thinking can be a contribution to this broader undertaking. Engaging with the ontological turn, experimenting with the tools of postqualitative inquiry may enable to foreground opportunities for transformative change in farming, not least by transforming our research practices. By opening new ways to do social inquiry, by pressing against the limits of inherited images, we might create a jolt in the habits of mind, a productive turbulence of thinking, creating conceptual openings [135]. The aim is not to shift from an overdetermined present to an equally overdetermined future, but to open possibilities for different becomings, to open the space for theoretical, empirical, and methodological experimentation, avoiding a foreclosing in predefined categories of what counts as 'research' just as much as what counts as a 'resilient' farm. The aim is to make explicit the spaces opened up when certainties are questioned, when the unthinkable becomes a possibility, when fixities are dissolved into flows, when ambiguities show that it could be otherwise. The aim is to liberate diversity, opening up a constraining structure so that something different might happen [39].

Clearly, engaging in postqualitative research is risky, as it works against the normalizing tendency of research to reduce knowledge-making to step-by-step guidelines, with clear procedures to ensure validity [126–128]. It is risky because while there are no set methodological rules, this does not mean that 'anything goes'; risky because the outcome is uncertain, so there is not guarantee that anything valuable will come of it. However, openly acknowledging the complexity of the research process might be a risk worth taking, if it allows us to think differently.

I argue that a process-relational worldview can foreground transformative change within resilience thinking. By highlighting how the trajectory of a farming system unfolds in unpredictable ways, it conveys that the future can be just as surprising, that it does not need to be a continuation of the past. This creates conceptual openings. It enables new imaginaries. It guides the analysis not only towards the heterogenous processes that converged to engender surprises in the past, but also towards the daily choices that contribute to maintain trajectories—choices that can be made differently, thus possibly opening the way for transformative change. As the future is indeterminate, there can never be a guarantee for how change will unfold, yet one might incline propensities (see [133]). Rather than starting with a preconceived plan, intent on applying willpower to inert matter, it might be more fruitful to make the most of what is, attending to the way a process unfolds, growing its potentials, detecting a configuration of relations that is favorable to the task at hand [104,133].

This shift in emphasis within resilience, from 'maintaining the system' towards shaping transformative change, is enabled by a shift in ontological commitments and the concomitant epistemological implications. Appraising farming resilience is then less about measuring the 'hard facts' of a farm, assessing whether its structure reflects a set of attributes, e.g., whether it has a pre-defined level of diversity or autonomy. It is more about identifying the mental, social, economic, and material relations that enable or impede open-ended change processes.

A process-relational worldview can contribute to open up what has been foreclosed and simplified. If farming resilience is conceptualized as emerging out of the ever-changing configurations of tangible and intangible relations, as being continuously remade, then strengthening resilience is about enabling ongoing, situated, creative, responsive change. A process-relational approach to resilience can thus contribute to expand conceptual imaginaries and encourage empirical experimentation, not least be exploring the role of material agency (see, e.g., [136–140]).

By briefly contrasting two readings of an interview, I show how our academic practices can reinforce seeming fixities and inevitabilities, by using an approach that builds on determinism, structures, order, and clarity, by assuming matter to be inert and passive, with human willpower as the only source of change. It is unsurprising that recommendations derived from such research contributes to policies that strengthen the ability of farms to buffer shocks, to remain within the current trajectory, thereby constraining transformative

change (see [80,141,142]). Contrasting the two readings shows that the worldview that guides how we operationalize concepts such as resilience are not innocent choices we make as researchers. This choice informs what we focus on when interpreting empirical data, what conclusions we draw, and what recommendations we derive from them. As Feldman et al. [130] (p. 512) point out: "if you start with an ontology that assumes stability, you can never see change, or the possibilities for change." Clearly, the choice of theoretical framing can either contribute to create fixities and maintain the status quo, or it can highlight openings for change (see [143,144]).

If we want to enable transformative change on farms and in agro-food systems more broadly, we must revisit the assumptions, beliefs, and commitments that have created the current system (see [145]). We must become critically aware of implicit ontological and epistemological assumptions in conventional approaches, and find ways to ask new questions and look at empirical material with fresh eyes.

Supplementary Materials: The following are available online at https://www.mdpi.com/2071-1050/13/6/3387/s1, Interview Transcript S1: Interview transcript.

Funding: The data was collected within the RETHINK project funded through RURAGRI, an ERA-NET supported by the European Commission (FP7, CA235175). Within RETHINK, the Austrian case study was funded by BMLFUW, grant number 100939.

Institutional Review Board Statement: Ethical review and approval were waived as at the time of the study the University of Natural Resources and Life Sciences, Vienna did not have an Ethics Committee.

Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

Data Availability Statement: The transcript of the interview analyzed in this paper is available as Supplementary Material.

Acknowledgments: I would like to thank the farmer for kindly giving his time, and to Agnes Strauss, who conducted the interview. I am grateful to the three reviewers who have generously given me insightful feedback, pointing to those areas that needed clarifications. These pointers have been very valuable to strengthen my argument and improve the manuscript. Of course, as always: all remaining weaknesses are mine alone.

Conflicts of Interest: The author declares no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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Paper III

Darnhofer, I., S. D'Amico, E. Fouilleux (2019). A relational perspective on the dynamics of the organic sector in Austria, Italy, and France. *Journal of Rural Studies* 68: 200–212. doi: 10.1016/j.jrurstud.2018.12.002

Journal of Rural Studies 68 (2019) 200–212

Contents lists available at ScienceDirect

Journal of Rural Studies

journal homepage: www.elsevier.com/locate/jrurstud

A relational perspective on the dynamics of the organic sector in Austria, Italy, and France

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ARTICLE INFO

Keywords:
Organic farming
Organic trajectory
Agrifood system
Western Europe
Relational sociology

ABSTRACT

Despite a common legal framework at EU-level, organic farming has developed differently in Member States. Previous analyses showed the influence of various factors on the development of the organic sector, including public policies, discourses, and marketing channels. Building on a relational perspective, we propose a conceptual framework that provides a situated understanding of national trajectories. We argue that the organic sector emerges based on relations between organic actors, policymakers, mainstream farmers associations, advocacy groups, and actors along the food chain. Based on these relations, we analyse the development of the organic sector in Austria, Italy, and France. We show that its dynamics result from a complex and evolving intertwining of relations over time. These dynamics are unpredictable, as they depend on whether and how actors can build and maintain relations between organic agriculture and broader issues in the agrifood system, such as the maintenance of family farms, environmental protection, gastronomic heritage, fairness in the food chain, or export promotion. The relational perspective highlights the historicity of relations, as well as the extent to which relations are influenced by the temporal and the spatial context. By framing the agrifood system as an ensemble of emergent social practices rather than a field of invariant logic and automatic unfoldings, the relational perspective emphasises the importance of seizing windows of opportunity, and the role of creativity in actions.

1. Introduction

Organic farming in Europe is a much debated issue. While it may seem to be a niche – with only 6.2% of the total Utilised Agricultural Area in the EU-28 (EC, 2016) – it is rather prominent in the public discourse. Organic farming is summoned by some to address individual issues such as food that is free of pesticide-residues, promoting animal welfare, reducing nitrate in surface and ground water, preserving biodiversity, or protecting the climate (Bellon and Penvern, 2014). For others, it is a comprehensive alternative to the modernisation of agriculture, striving for fairness in producer-consumer relationships, and enabling farmer autonomy (Lockeretz, 2007; Freyer and Bingen, 2014; Poméon et al., 2017). Of all the 'alternatives' to modernisation in agriculture, it is the only one that has a dedicated regulation at EU-level, where Action Plans were drafted by the European Commission and by Member States, and where customized measures to support its development are included in the agri-environmental programmes of many Member States. The sector continues to be dynamic, with the area under organic agriculture growing at a rate of 6% per year between 2002 and 2015 in the EU-28 (EC, 2016), and the market for organic food growing by 7% per year (IFOAM EU, 2016).

Yet, despite a common regulation since 1991, it is striking that the development of agricultural land that is certified organic varies widely among countries. This may be exemplified by the three countries at the core of this paper: in Austria the share of organic area grew strongly in the early 1990s and has had a sustained growth since then (Fig. 1). Italy has had a strong growth in the late 1990s, then plateaued in the 2000s, before growing again in the 2010s. In France the development started later, increased at a lower rate, with a stronger growth in the 2010s.

A number of studies have looked at factors that have influenced the development of organic agriculture. They highlighted the role of agri-environmental programmes, of farmers' perceptions, of legally binding regulations, of the discourses surrounding organic farming, and of the organisation of the value chain. Most studies seek to identify clear cause-effect linkages, i.e. they look for mechanisms that are universally applicable. As a result they may underestimate context-dependency, i.e.

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https://doi.org/10.1016/j.jrurstud.2018.12.002
Received 4 April 2018; Received in revised form 17 September 2018; Accepted 3 December 2018
Available online 14 December 2018
0743-0167/

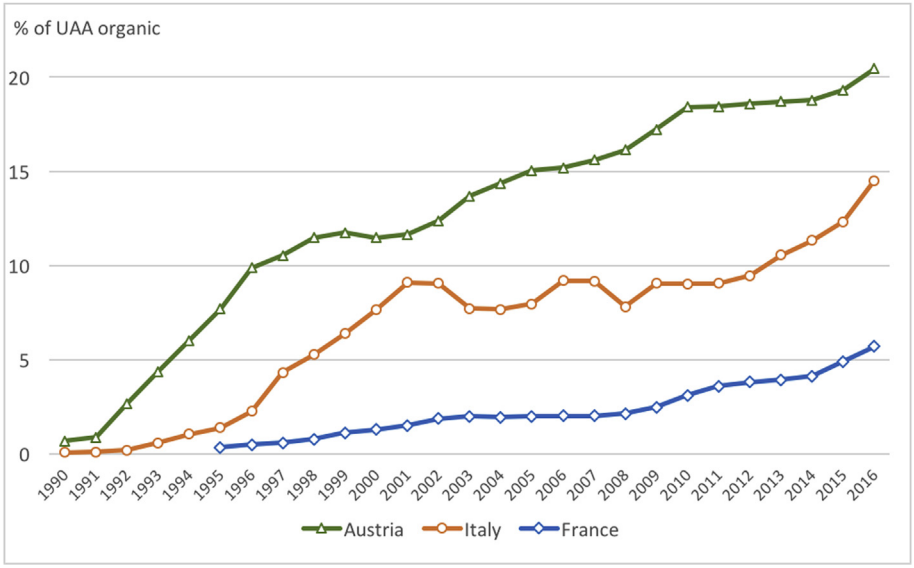

Fig. 1. Share of organic area in the total Utilised Agricultural Area (UAA), for Austria, Italy, and France. While the share of certified organic land at national level hides large variations between production types and between regions within a country, it indicates the acceptance of organic farming by farmers, policymakers, and citizen-consumers over time.
Sources: Austria: Grüner Bericht (UAA excl. alpine pastures); Italy: ISTAT and Sinab; France: Agence Bio.

the influence of the national circumstances as well as the influence of past events on later developments.

In this paper, we argue that a relational perspective allows a more nuanced understanding of dynamics in agrifood systems, as it understands change as situated, so that to make sense of events they need to be considered within their specific spatial and temporal context. Moreover, the relational perspective points out that if the temporal and spatial context matter, causal mechanisms are not universal but necessarily context-specific. As such, while the influence of a particular factor is real, its explanatory power is limited, as its specific effect can only be understood in a particular constellation. This understanding would limit the usefulness of generalized recommendations and highlight the role of the ability of actors to creatively seize emerging opportunities to induce and sustain change.

We begin the paper by briefly reviewing the literature analysing the development of the organic sector, focusing on studies in Western Europe. We then characterise the relational perspective, and propose an analytical framework that maps out relations between five sets of actors that play a central role in the dynamics of the organic sector. We illustrate the usefulness of this framework through examples from Austria, Italy, and France, as the dynamics of their organic sectors are quite different (Fig. 1), although they have been subject to the Common Agricultural Policy since at least the mid-1990s. In contrasting the three countries our aim is not to present a systematic comparison or to comprehensively analyse the dynamics in each country. Rather, we use examples from these three countries to identify the diversity of relations involved, and to highlight the context-dependency of their dynamics. We thus illustrate how various factors related to place and time shape the opportunity context of actors, and how the choices made by collective actors influence future possibilities to build lasting relations. We conclude by discussing the strengths of a relational perspective for understanding the dynamics of agrifood systems as an ensemble of emergent social practices.

2. Understanding the dynamics of the organic sector

2.1. Review of factors influencing the development the organic sector

A number of studies have looked at factors that have affected the development of the organic sector[1] in various countries. We distinguish between four bodies of literature which each highlight specific relations that have shaped the organic sector: the agricultural policies, which have provided economic incentives; the impact of relations built through specific institutions; the discursive relations built between organic farming and the dominant norms in agriculture; and finally the values attached to food and thus the relations built with consumers.

Numerous studies have analysed the role of policies that were implemented at EU-level and in individual Member States to promote organic farming. They show that EU policies, especially agri-environmental measures, have been implemented differently, which has had an impact on the relative economic attractiveness for farmers to convert to organic farming (e.g. Lampkin et al., 1999; Padel et al., 1999; Michelsen, 2001, 2009; Dabbert et al., 2004; Nicholas et al., 2006; Nieberg and Kuhnert, 2006; Kerselaers et al., 2007; Lesjak, 2008; Zander et al., 2008; Kaufmann et al., 2009; Offermann et al., 2009; Stolze and Lampkin, 2009; Läpple, 2010; Sanders et al., 2011). These studies have identified a range of factors that have influenced the share of certified organic area, including the speed at which EU policies were implemented at national level, the national funds made available for co-funding the agri-environment programme, the absolute level of payment per hectare for organic farming, the payment level for organic farming relative to other agri-environment measures, whether payments were offered only for the conversion period or also for maintenance, whether payments for organic farming were offered on the whole territory or only in designated areas, the funding of accompanying measures (e.g. for on-farm investments, extension services), as well as the consistency in the policy commitment towards organic farming in consecutive CAP programming periods. Beyond shaping the relative economic attractiveness for individual farmers, this literature also showed that policies influenced the development of the organic sector by providing (or not) financial support for organic farmers associations, for research, for awareness raising, and for increasing demand through public procurement programmes (Rech, 2003; Morgan and Sonnino, 2008). This body of literature highlights the role of economic relations for farmers when they make the decision to convert, and more broadly that building relations with policymakers enables the organic sector to access financial resources. It builds on a deterministic perspective, as it presents economic relations – such as payment rates and conditions – as the cause of action.

[1] We use the term 'organic sector' to refer to all actors linked to organic agriculture and food, including: organic farmers, farmers' associations, umbrella organisations, advocacy groups, processors, traders, certifiers, consumers, researchers, and policymakers.

A second body of literature has looked at how institutions have shaped the organic sector (Kaltoft, 1999; Michelsen, 2001; Vogl et al., 2005; Gibbon, 2008; Moschitz, 2009; Padel et al., 2009; Klein and Winickoff, 2012; Lamine, 2017; Seufert et al., 2017). This literature has pointed out the strengths but also the drawbacks of defining legally binding standards, e.g. compared to less clearly defined alternatives, such as agroecology. It has emphasised that while building relations with policymakers provides legal protection for what can be labelled 'organic', the shift away from self-regulation may lead to a loss of control over the definition of production standards. Moreover, the logic inherent in the audit culture has tended to reduce organic farming to those practices that can be easily documented, measured, and controlled, to the detriment of intangible principles and values (Allen and Kovach, 2000; Rahmann et al., 2017; Fouilleux and Loconto, 2017a). This literature has also highlighted the key role played by EU regulations in fostering the multiplication of interlocked markets for products, standards, certification, and accreditation services (Fouilleux and Loconto, 2017b). It has also enabled a reductionistic, input-substitution approach to organic production practices, which may make conversion easier for farmers (Lamine, 2011), but may also lead to a 'conventionalisation' of organic farming (Guthman, 2004; Best, 2008; Stassart and Jamar, 2008; Pratt, 2009; Darnhofer et al., 2010). To counter this trend, there is a re-differentiation, with some organic associations seeking to implement a comprehensive approach to organic farming, going beyond market relations to include relations based on values such as fairness and social justice (Home et al., 2017; Rahmann et al., 2017). Overall, this body of literature points out that the material and social relations that are understood as defining organic farming are contested. It highlights that the dynamics of the organic sector are driven by meaning-making processes. The number of actors participating in this process has been broadened when private and legal standards were defined and third party certification implemented. It also shows that dynamics are driven by unexpected side-effects, such as those that emerged from the engagement with regulatory bodies.

A third body of literature has focused on how the relation with broader agrifood discourses has influenced the dynamics of the organic sector. In Western Europe, the modernisation discourse has shaped national agricultural policies since the 1950s (Grin, 2012). This normative discourse focuses on increasing the productivity per worker, plant, and animal, which is to be achieved through enlarging, mechanising, specialising, and professionalising farms (Weis, 2010). The promise of abundant, cheap food should be achieved through industrialising food processing, and through long food supply chains dominated by large retailers (Weis, 2010). As an emerging niche, organic farming needs to engage with and position itself in relation to this broader discourse. As an alternative political project for agriculture, it is seen as a radical break from – and as a form of resistance against – the modernisation of agriculture (Morgan and Murdoch, 2000; Vos, 2000; Reed, 2001; Fouilleux, 2003; Bivar, 2018). Indeed, it builds on different material and social relations to avoid the negative environmental and social impact associated with modernisation. This body of literature contrasts the perceptions of organic farming and of modernised agriculture, not least regarding the role of the farmer, and of agriculture in society (Kaltoft, 2001; Campbell and Liepins, 2001; Kjeldsen and Ingemann, 2009; Lynggaard, 2007; Alrøe and Noe, 2008; Tomlinson, 2008). For example, De Cock et al. (2016) identified three discourses regarding organic farming in Flanders: an 'agro-industrial discourse' that discredits organic farming for its lack of efficiency, portraying organic farmers as eccentric, ideological, and unprofessional (i.e. organic farming is a luddite movement, at a time when increasing yields is necessary, given the imperatives to be competitive on international markets, and the need to 'feed the world'); a 'market discourse' where organic farming is seen as a profitable strategy that meets the demand of certain consumers, but targets only a niche market (i.e. it is not a viable model for all farmers); and an 'agro-ecological discourse' which portrays organic farming as a radical alternative to the modernisation of agriculture, which is seen as socially and environmentally unsustainable (i.e. the emphasis is on protecting soil and water, on trust-based short food chains, and on the preservation of family farms). This body of literature shows that organic farming is understood in relation to conventional farming, i.e. assessed based on whether or not it can address issues that are perceived as problematic in the dominant agrifood discourses and practices.

Finally, a fourth body of literature points to the role of marketing chains and consumer purchasing behaviour in shaping the dynamics of the organic sector. While in Western Europe organic farming initially built on direct producer-consumer relationships, the growing range of organic food found in mainstream supermarkets or specialised organic stores has facilitated access to a wider range of consumers, especially those in urban areas (Padel and Midmore, 2005; Lobley et al., 2013; Thorsøe and Noe, 2015). Engaging with processors, supermarkets, and exporters enabled larger quantities of organic food to be sold, often at a premium price, which fuelled the growth of organic area. These dynamics depend on the extent to which organic production practices, certification, and organic food are perceived as fulfilling consumer expectations (Andersen, 2011; Eden, 2011), or the ability of organic food to induce a 'change of mind' in consumers (Naspetti and Zanoli, 2014). The dynamics of the organic sector are thus also shaped by the relations between organic farmers' associations and traders, processors, retailers, exporters. Indeed, getting involved with large retailers may put pressure on organic actors regarding the type and quantities of food products to be produced (Green and Foster, 2005; Desquilbet et al., 2017). While engaging with powerful actors of the conventional food system may bear the risk of conventionalisation (Guthman, 2004; Poméon et al., 2017; Le Velly, 2017), it may also lead to a diversification of the organic sector (Campbell and Liepins, 2001; Kjeldsen and Ingemann, 2009; Rosin and Campbell, 2009; Lamine, 2017). This body of literature thus points towards reflexive social dynamics, as engagement with new opportunities brings about side-effects that are perceived as undesirable by some groups, initiating counter-strategies.

The ample literature on the development of the organic sector in Western Europe has identified a range of influencing factors. However, the differences in the organic sectors between countries indicates that the influence of these factors is not necessarily deterministic, thus making it difficult to identify generalized causal relations. To understand the dynamics of the organic sector, it might be helpful to understand the influencing factors as reflecting relations negotiated between social actors, thus focusing the analysis on why and how relations were constructed differently.

2.2. A relational perspective

While there are different strands of relational sociology, what they have in common is the aim of moving from the study of 'social things' to the study of dynamic social processes (Emirbayer, 1997; Dépelteau, 2013, 2018a; Eacott, 2018). The focus is thus not on the nodes as independent entities engaging in relation, but with the relations themselves. This implies a move away from accounts stressing the structural constraints on practices, or the agentic abilities of actors to overcome these constraints.

In this paper, we build on a 'deep' or 'process-relational' approach (Dépelteau, 2018b), which understands relations as processes, as constituted by flows of action, always dynamic and fluid (Powell and Dépelteau, 2013). A process-relational perspective does not question the relevance of the various factors influencing the dynamics of the organic sector identified in the vast body of literature. However, it points out that actions and their outcomes cannot be understood outside of their specific constellation (Dépelteau, 2015). In other words, both the action and the outcome are intimately linked to that constellation; the action is thus not in itself the cause of the outcome. For example, the direct payments offered to farmers are not the 'cause' of the conversion. Rather, the payments are an effect of relations built

around agriculture as a provider of public goods and by citizen-consumers valuing specific production practices. These various relations intermingle to create a constellation that facilitates conversion. In the process-relational perspective, there is no search for 'mechanisms' that would be universally applicable, as these assume a clear cause-effect link, irrespective of context. The aim is thus not to identify explanations based on seeming similarities between cases. Rather, the focus is on unravelling context-specific processes, that emerge from interactions between social actors, showing how over time these relations unfold unpredictably, highlighting the complexity and fluidity of real life.

A relational perspective conceptualizes the organic sector as constituted through the relations in which it is engaged. While the organic sector can be seen as a distinct 'entity', it has no pre-relational 'essence'. It does not exist 'as such', outside of specific relations. In other words: the organic sector of a country is what it is and does what it does because it interacts with specific others in specific ways (see Dépelteau, 2018b:513). Not only does the organic sector emerge through these relations, it also co-produces these relations and is thus not determined by them. Indeed, relations are always reciprocal, i.e. in a relation each party adjusts its actions to the actions of the other, and no party has complete control over the relation (Dépelteau, 2013). This reciprocity does not mean that the relations determine either or both parties, but it means that we cannot understand or explain e.g. what the members of an organic farmers association are doing without taking into account e.g. the group of conventional farmers with whom they are interacting. As such no actor is determined, and each actor is always engaged in a range of (partly competing) relation building processes.

The social context is not so much a (fixed) structure that determines options and acts causally, it is more an interactional field (Dépelteau, 2018a:16). Understanding the dynamics of organic sector in a country is thus not about identifying one or a few causal factors (e.g. payment levels, legal frameworks, or the structure of the value chain), but about the social relations that were built and understanding why they were built and maintained in that particular way. The organic sector is thus understood as emerging out of relations, which are constantly worked at, redefined, weakened, rebuilt, and threatened by competing relations. This includes the meaning of organic production practices in relation to conventional agriculture, and the meaning of organic food in relation to other alternative food qualities and to broader cultural values tied to food. It also includes the relations built to broad issues that are salient in a society at a certain point in time, such as the concern for environmental protection or for public health in the face of a food scare.

Approaching the organic sector as a vibrant and evolving social process based on ever-renegotiated relations enables a focus on fluidity and dynamics. The outcome of these ever changing relations is undetermined, as actors can influence, but not control a relation. This does not diminish the potential of actor's improvisation, virtuosity, reflexivity, creativity, and choice (Tsekeris, 2013). Indeed, this perspective shifts the attention from seemingly stable structures towards the role of actor's response to events, of their ability to recognize emerging opportunities within their specific context.

2.3. The conceptual framework

We propose to conceptualize the organic sector as emerging based on the relations that are built, i.e. how actors engage with organic farming practices, what meaning they attribute to them, how they use them to build ties with other social actors, what relations stabilize over time through on-going work, and what conflicts arise and how they are resolved (if at all). For understanding the dynamics of the organic sector at the national level, we propose to focus on relations between five sets of actors: the organic farmers associations, the State, established or mainstream farmers associations, advocacy groups engaged in politicizing the agrifood system, and various actors along the food value chain (Fig. 2). All five sets of actors may interact more or less, exchanging information, ideas, values, resources, enabling them to follow coordinated strategies or to engage in protracted conflicts. Moreover, these five sets of actors engage in relations within a broader context, especially the national cultural values which shape the discourses surrounding the agrifood system, as well as influence which issues are perceived as salient and how they are framed. The actors also have to respond to events such as food scares (see Knowles et al., 2007) which may create opportunities to weaken some relations and strengthen others, thereby affecting the organic sector.

While for analytical purposes, it is very helpful to distinguishing between these five sets of actors and to distinguish among specific relations (Fig. 2), we are aware that actors are often hybrids (Ilbery and Maye, 2005) and that the relations between them vary. For example, while we distinguish between the State and mainstream farmer unions, in many countries agricultural policy tends to be heavily influenced by the interests of these farmers union (Jordan et al., 1994), so that their interests and rhetoric might be quite similar. Fig. 3 attempts to illustrate the intricacy, complexity and hybridity of relations among actors.

Clearly, the organic sector is not constructed at will by one set of actors. While social actors may engage in action with the intention to purposefully shape the organic sector, these actions may exceed or fall short of their intentions (see Powell, 2013). No actor controls the dynamics of the organic sector on its own, no matter how unequally power is distributed. Yet, through each action, actors build and rebuild their knowledge of the field in which they are engaged, and use this knowledge to orient themselves, to refine their expectations of others' behaviour (Dépelteau, 2013).

The process of building and modifying relations is guided by an empirical and contextualized problem. The ability of the organic sector to address this problem will be shaped by how this problem is defined, i.e. what actors have successfully tied specific relations to the problem, thus defining it. These relations emerge from past conflicts, strategic alliances, dominations, and collaborations. Social actors are thus understood as renegotiating their relations with others, not least by manipulating common understandings, by re-constructing narratives (King, 2000; Eacott, 2018; Lehtimäki, 2018). Indeed, relations not only have practical materiality, they also convey meaning, a meaning that is created and renegotiated through a coevolutionary dynamic (Chia, 1999). The relations that shape the dynamics of the organic sector can thus be continually enriched with newer and novel meanings, understandings, and applications, while at the same time alternate meanings are dropped or pushed into the background.

As relations unfold over time, the historicity of relations plays a key role. This temporal context is not an external variable, rather it is embodied and embedded in activity through the perception of the actors (Eacott, 2018). Indeed, interactions at a specific time are always connected to various past experiences through dynamic and heterogeneous memories, knowledge, views, through long chains of interactions (Dépelteau, 2015: 14).

3. Comparing relations that shaped the dynamics of the organic sector in Austria, Italy, and France

3.1. Relations between organic farmers associations

While the relations between organic actors became more complex as the diversity of actors involved increased, the organic sector in the three countries emerged with the first organic farmers associations. While all pioneers of organic farming shared their opposition to the modernisation of agriculture, there were differences regarding production practices (e.g. between organic and biodynamic practices), the vision and values they attached to organic farming (e.g. relative emphasis of focus on soil health and on preserving traditional farms), and the marketing strategies deemed acceptable (e.g. only through direct marketing, or also engaging with supermarkets). Given that 'history matters', in this section we focus on the emergence of the organic sector, and thus on the relations initiated between and by organic

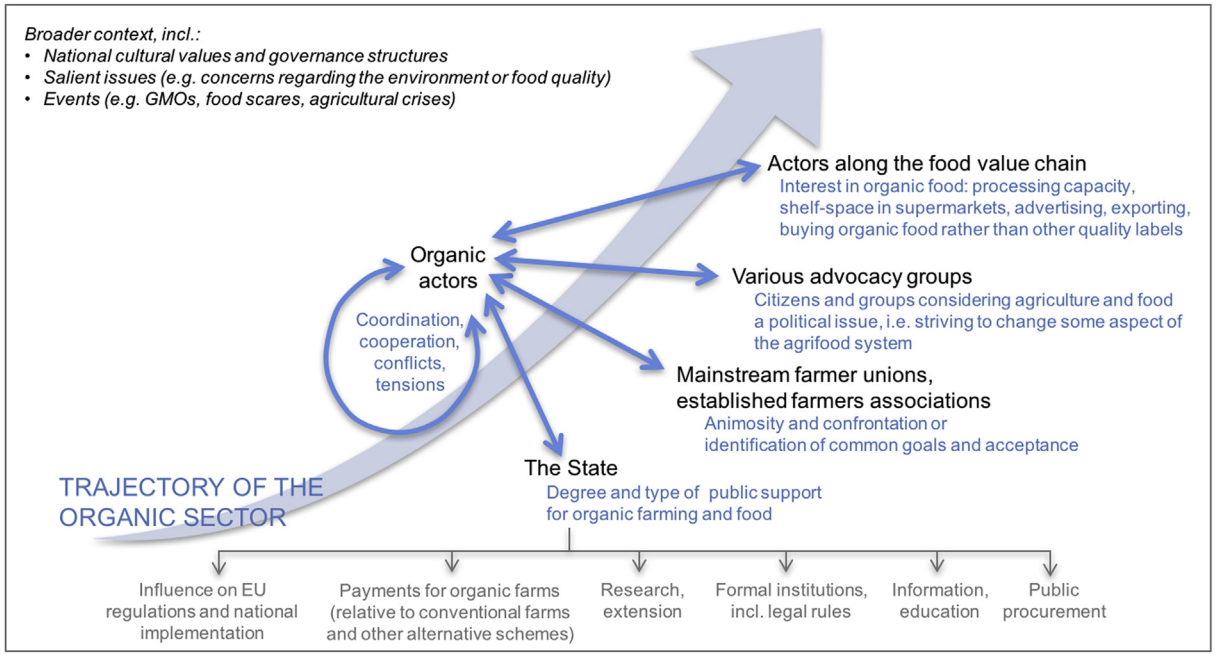

Fig. 2. The dynamic of the organic sector is shaped by the ability to actively build, define, and maintain diverse relations with diverse actors. The double-headed arrows indicate that the relations between actors are reciprocal, each actor both influences and is influenced by other actors. For the sake of clarity, we have not included arrows to indicate relations within actors, nor those between actors (e.g. between the State and established farmers unions). The order in which the actors are included along the trajectory of the organic sector is arbitrary, and it is likely that which actor plays a key role earlier or later will depend on the national context.

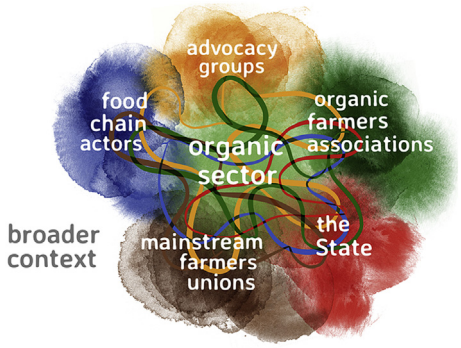

Fig. 3. The organic sector is understood as an evolving social process, as emerging from the relations built, redefined, and maintained between five sets of actors. The different shades within each set of actor indicates that they are not homogeneous groups, i.e. they have diverse objectives and intentions. All actors concurrently engage in a number of multi-directional relations. These relations unfold within a broader context, which includes national cultural values, salient issues (e.g. concerns about the environment or the quality of food), and events (e.g. anti-GMO protests, food scares, agricultural crises)

farmers associations.

In Austria, the first organic farmer associations were formed in the 1960s and by the mid-1980s there were some 12 associations (Jurtschitsch, 2010). Following demands by the associations to protect organic farmers and their products against fraud, production standards for organic crop production were included in Austrian Food Codex (chapter A8) in 1983 (standards for animal production were included in 1990). One association, active in the whole country, had by far the largest number of members: in 1991, 73% of organic farmers were members of the 'Ernte' association (Pirklhuber and Gründlinger, 1993). This dominance persisted, as in 2003, 87% of organic farmers who were member of an association (62% of all organic farmers) were with 'Bio Ernte Austria' (Schermer, 2005). The relatively strong concentration within the 'Ernte' association enabled effective action at several levels: to provide advice and support to farmers through local groups, to be a unified partner for policymakers, and to bundle the commodities from farmers to achieve the quantities needed to supply supermarkets. In 2005, under the pressure of the Ministry of Agriculture, the previously existing two umbrella organisations were merged into one, named 'Bio Austria' (Jurtschitsch, 2010). The fact that there had been one dominant association, which later also dominated the single umbrella organisation, enabled settle various contentious issues internally, and to speak with one voice with policymakers.

In Italy there was a strong regional disparity: associations in the northern and central regions (especially Emilia-Romagna and Tuscany) emerged in the 1950s and were committed to the principles of biodynamic farming, while in the southern regions (esp. Sicily and Sardinia), organic farming took roots in the 1990s with a focus on export markets (Zanoli et al., 1999; Paltrinieri and Spillare, 2015). The largest association, the Associazione Italiana per l'Agricoltura Biologica (AIAB) was founded in 1988 and includes farmers, advisors and consumers. Although some of the nine producer organisations aimed at providing extension services to organic farmers, most were merely lobbying and cultural associations (Compagnoni et al., 2000). In 1992 the Federazione Italiana per l'Agricoltura Organica (FIAO, since 2005 the Federazione Italiana Agricoltura Biologicia e Biodinamica - FederBio) was founded as an umbrella organisation, to represent the sector at a political level and to inform the public about organic farming. However, in 2007 AIAB, followed by other associations, left FederBio, among other due to conflicts over the ways to handle the coexistence with GMOs and the type of alliances that organic producers might build to develop the sector (Zanoli, 2007).

In France, the organic farmers associations have been entangled in long-lasting conflicts (Bivar, 2018). Initially the tensions were related to the ideological shift among the organic actors: until the 1950s they were mostly agrarian, reactionary and close to the extreme right, but starting in the 1960s the majority defined themselves as left-wing, anticapitalist and anticentralist (Leroux, 2011, 2015). In the 1960s there were also tensions regarding production practices. For example, 'Lemaire et Boucher' promoted its own method and emphasised one particular input which it sold, while 'Nature et Progrès' was more open and welcomed farmers who followed either organic or biodynamic

practices. 'Nature et Progrès' defined a formal standard in 1972, which was among the first in Europe, and played a key role in promoting organic farming in France throughout the 1970s. As a result, 16 organic farmers organisations were set up, often with regional particularities. Around 1980, under the umbrella of the State, the various organic farmers associations engaged in a laborious process to define a common national production standard, mired by intense conflicts between associations. The national standard was published in 1982, despite the fact that at the last minute the standard was rejected by 'Nature et Progrès' who refused third party certification. In the 1990s, the associations started to cooperate, and since 1998 the Fédération Nationale de l'Agriculture Biologique (FNAB, created in 1978) is their main representative. However, the tensions between 'Nature et Progrès' and the other associations have endured, as it criticises them for being too strongly oriented towards the industry. 'Nature et Progrès' remains a private trademark and promotes its Participatory Guarantee System. However, while Participatory Guarantee Systems are widespread outside Europe, it is currently not a legally recognized certification system in the EU (Fouilleux and Loconto, 2017; Home et al., 2017).

In the three countries a range of organic farmers associations emerged in the 1950s and 1960s, striving to develop different production relations than those promoted by the modernisation of agriculture. In the 1980s and 1990s, as the number of organic farmers grew and as the environmental impact of modernised production practices became more visible, the State started to get involved and coerced the organic farmers associations to organise and speak with one voice. This put pressure on the association to intensify and formalise their relations, by creating umbrella organisations, and – in Austria and in France – by agreeing on national standards. Differences, e.g. due to regional specificities, or commitment towards specific values or production practices were not always easy to overcome, leading to conflicts, not all of which could be resolved.

3.2. Relations with the State

To build and maintain efficient relations with policymakers, it is helpful if organic agriculture is perceived as offering a solution to a problem that is salient in the public discourse and that puts pressure on policymakers to act. In Austria these relations were built early and have remained strong, as organic farming was perceived as a way to address the social and environmental impacts of modernised agriculture. In Italy and in France these relations have been weaker, as policymakers saw organic farming primarily as a niche market rather than as a way to protect public goods, weakening the rationale for providing public funds.

In Austria, in the early 1980s, the State formally engaged with organic farming by commissioning and funding research to seek scientific evidence for the claims made by organic farmers associations (Pirklhuber and Gründlinger, 1993). In the late 1980s, with its increased presence in the public discourse, organic farming was advanced by a number of actors as one approach to simultaneously address two acute policy challenges: reduce produced quantities (and thus the budgetary burden created by the need to subsidise exports due to overproduction), and reduce the environmental impact of intensive production methods (Pirklhuber and Gründlinger, 1993; Ortmayr, 2007). Thus, when in 1987 the Minister of Agriculture introduced the 'eco-social agricultural policy', it explicitly referred to organic agriculture (Ortmayr, 2007; Schermer, 2008, 2014). This commitment as part of the new agricultural policy was followed up by providing resources to strengthen the organic sector, including funds for organic farmers associations. In 1988 a permanent post was created at the Ministry of Agriculture to coordinate issues related to organic farming. Starting in 1990, payments were offered to farmers during the conversion period, and since 1992 all organic farms have been eligible for payments, both during the conversion period and for maintenance (Groier, 2005). Moreover, with the accession to the EU becoming more likely,[2] and with the implementation of the McSharry CAP reform, organic farming was seen as one way to secure the income of mountain farmers (in addition to the compensatory payments for less-favoured areas). These mountain farms, mostly extensive dairy farms, were seen as 'almost organic anyway', not least as in the early 1990s there was no regulation for organic animal production at EU-level[3] so that the national standards would be applicable.

In Austria, this policy commitment towards organic farming has remained strong through the various CAP programming periods. In the current period (2015–2020), 37% of the funds for the agri-environment programme are ear-marked for organic farms. The Ministry of Agriculture justifies this support through the contribution that organic farming makes towards preserving biodiversity, protecting soils, surface water, ground water, and the climate (BMFULW, Bioaktionsprogram, 2015–2020). The State also funds various activities that benefit the organic sector, including research, information and awareness raising campaigns, and education in vocational agricultural schools. The commitment towards the continued development of organic farming is also expressed in the official aim of the Ministry of Agriculture to maintain Austria as 'number one in the EU' regarding the share of organic land, as documented in all Organic Action Programmes since the first one in 2001. Moreover, organic farming is perceived as a way to add value to farm products, and as strengthening the competitiveness of agricultural products from mountainous areas, thereby maintaining family farms (Sassatelli and Scott, 2001). The policy commitment towards organic farming is thus enabled by broader values around farming, which is seen as fundamentally multifunctional, i.e. as fulfilling not just economic, but also ecological and cultural functions.

In Italy there were attempts to seek State support for organic farms in the 1980s, which was advocated by environmental organisations and the Green Party, however these attempts failed (Zanoli et al., 1999). While the national government was generally supportive of EU regulations and directives, it has been reactive rather than proactive in their implementation (Sassatelli and Scott, 2001). Agriculture policy is devolved to the regional level, and the regional governments played an uneven role in promoting organic farming. In particular, Tuscany and Emilia-Romagna approved funds to promote organic farming through their agri-environment programme (Compagnoni et al., 2000). However, in 2000 the Italian government promoted demand for organic food by introducing a law that supports organic meals in schools, and the Italian case became an example of the 'school food revolution' (Morgan and Sonnino, 2008; Filippini et al., 2018). This law was implemented following demonstrations mounted by green associations, who drew attention to the food served to children in schools. They demanded that this food be of high quality, be sourced from local farmers, and be produced using fewer chemicals, which were seen as dangerous for the children's health and for the environment (Sassatelli and Scott, 2001). In 2001 a law (228/01) was passed, that defined 'quality agrifood districts' and 'rural districts' which aimed to promote multifunctionality and traditional products (Bartoli and De Rosa, 2010). While such a law did not directly promote organic farming, it created conditions which were also favourable for organic farmers. In 2005 the general support of the State for the organic sector was expressed through the publication of the first National Plan for Organic

[2] Austria joined the EU in 1995.

[3] The European standards were defined in two steps: the initial regulation (EEC) 2092/1991 covered only plant production, while standards for animal production were defined later, through Regulation (EEC) 1804/1999. Both were superseded by Regulation (EC) 834/2007 on 'organic production and labelling organic products'. The latest Regulation (EU) 2018/848 has been adopted in May 2018, and is expected to take effect in January 2021. Beyond the legal definition of organic production, Member States were given the possibility to offer direct payments to organic farmers since 1992, through 'accompanying measures' (later agri-environment measures), which were introduced though Regulation (EEC) 2078/1992.

Agriculture. Its specification of four axes shows that the State expected market actors to play an important role in developing the organic sector.

In France, the modernisation discourse has been hegemonic since the 1950s and the Ministry of Agriculture has favoured input-intensive agriculture (Muller, 2000; Fouilleux, 2003; Ansaloni, 2015). This policy is legitimized by the myth that French agriculture has a 'vocation' to export, especially cereals and wine. In this output-oriented context, organic practices are perceived as lacking as yields are lower. Moreover, the market-orientation implies that organic food needs to demonstrate its competitiveness through the market. The State has thus focused on organizing the market by giving organic production standards a legal status in 1982, enabling organic food to be differentiated from other quality labels, such as 'label rouge' and geographical indications (see Ansaloni and Fouilleux, 2008). Direct support has been marginal and intermittent. Payments to organic farmers have been offered since the introduction of the agri-environment scheme in the CAP, but only a very small budget has been allocated to it: 0.2% of total CAP support to France in 2000, and 1% in 2013. Also, support has been offered primarily for the conversion period. Support for maintenance was introduced in 2008, but in late 2017, the State announced that due to budgetary constraints, payments for organic farms would again be limited to the 3-year conversion period, starting in 2018. This sudden reorientation, the general lack of continuity, and the constant changes in the administrative procedures and programmes, has made access to direct payments challenging for farmers.

The lack of commitment of the State to organic production methods can also be illustrated by the ambitious 'agroecological project for France', which was launched in 2013 by the Ministry of Agriculture. While it included organic agriculture as one way to 'produce differently' it was listed as one among a range of agricultural models, not as an apex practice (Lamine, 2017). The poor relations with the State are also reflected in the French agronomic research policy, which for decades has not considered organic agriculture as a production method worthy of exploration (Bellon et al., 2000). This was expressed recently in a report compiled by the Institut National de la Recherche Agronomique (INRA), which compared the performance of conventional and organic agriculture (Guyomard, 2013). Some of the recommendations in this report, especially to consider the option of allowing synthetic pesticides in organic farming as a way to increase its productivity and thus its competitiveness, led to an intense controversy[4] within INRA, as well as between the organic sector, the State, and INRA (Lamine, 2017).

Regarding relations between organic agriculture and the State, there are strong differences between the three countries. While the Austrian organic sector was able to build and maintain strong relations with the State, in Italy the relations may be characterised as generally supportive but passive, while in France they are reluctant, lacking both continuity and commitment.

3.3. Relations with mainstream unions and established farmers associations

The dominant farmers' unions tend to be aligned with the modernisation paradigm which encourages large-scale, input-intensive farming. However, there are also farmers' associations that aim to maintain small farms and extensive farming practices. Building relations with such established actors may be a valuable resource for the organic sector. Indeed, in Austria and in Italy, organic actors were able to build alliances with mainstream farmers unions or associations. This was enabled by identifying a shared goal: the maintenance of family farms and traditional production methods, even if the underlying justification was different in the two countries. In France, relations were more difficult to establish, the notion of 'family farm' having been assimilated in the modernisation paradigm and seen as fully compatible with large-scale farming (see Muller, 2000). Only recently common ground is emerging with associations advocating 'peasant farming'.

In Austria the organic farmers associations joined forces with the association for mountain farmers in the early 1980s (Posch, 2013). This association carries some weight, as about 40% of Austrian farms are classified as mountain farms. The alliance helped the organic farmers association to acquire the skills needed to interact with policymakers. Importantly, the dominant organic farmers association chose a moderate position in its rhetoric to avoid antagonizing powerful actors, such as the main farmers union (the Bauernbund) or the Chambers of Agriculture. The emphasis was put on identifying a common goal: the maintenance of family farms. Indeed, while the dominant farmers organisations endorse the modernisation of agriculture, they are still committed to maintaining family farms, which are seen as the backbone of a living countryside, and as providing important services for the tourism industry. The contradiction between modernisation and traditional farming is overcome through territorial distinction: in less favoured areas, organic farming is framed as a continuation of the traditional way to farm, while in areas where intensive production practices are feasible, scale enlargement and competitiveness are promoted (Schermer, 2008). As a result, organic farming has never been framed as opposing conventional agriculture, or as a critique of it. Rather, it is 'just another' way to farm, suitable for some farms, especially those situated in areas where the modernisation of agriculture is not seen as feasible, given that productivity is constrained by steep slopes, low average temperatures, and a short growing season (Schermer, 2014). However, as the domestic demand for organic products increased and the marketing channels were well established, organic farming became attractive to a wide range of farms, and a number of large farming estates converted to organic farming. As the owners of these estates are influential, these conversions not only influenced the public rhetoric of the dominant farmers union, it also reinforced the general perception by farmers that organic farming is a production method that is suitable for a wide range of farms, i.e. not restricted to small mountain farms.

In Italy, organic farming was able to build an alliance with Coldiretti, the largest Italian farmers union, in the framework of the struggle to defend the Italian gastronomic heritage (see next section). This heritage relies on extensive production methods, local biodiversity, artisanal processing, and small manufactures. In the 2000s, Coldiretti thus abandoned the modernisation discourse and is the only Italian farmers union explicitly against GMOs. It proposed a new business model for farming, based on multifunctionality and the support for tradition, locality, and family farming (Brunori et al., 2013), principles that are well aligned with organic farming.

In France, for decades alliances between the organic farmers associations and most other farmers unions were not conceivable, because their visions were antithetical: the organic farmers denounced the modernisation paradigm defended by the others, while the unions considered organic farmers as backward-looking and sectarian. The dominant farmers' union, the Fédération Nationale des Syndicats d'Exploitants Agricoles (FNSEA) was born with the modernisation discourse and remains strongly attached to increasing productivity through the use of pesticides and mineral fertilizers. For decades the FNSEA has considered organic farming as a remnant of the past, as not productive enough. When organic farming began to develop in response to citizens' environmental concerns, the FNSEA launched the competing concept of 'Agriculture Raisonnée' ('reasoned agriculture'). This is a far less demanding standard which claims to use chemical inputs in more 'reasonable' ways, but in effect does not go beyond the legislation on good agricultural practices. Given the FNSEA's influence on policy decisions through the so-called 'cogestion' (co-management of the French agriculture sector, see Jobert and Muller, 1987; Muller, 2000), it ensured that Agriculture Raisonnée became legally recognized as a third

[4] See the INRA website „L'agriculture biologique en débat" at: http://institut.inra.fr/Missions/Eclairer-les-decisions/Etudes/Tous-les-dossiers/L-agriculture-biologique-en-debat.

party certified standard in 2002, allowing it to compete with organic farming in the eyes of the consumers.

The modernisation paradigm is so strong in France, that even the left-wing farmers union, the Confédération Paysanne, has historically been very critical of organic farmers. While it strongly opposed the FNSEA on social and economic issues, its views on production methods and technical issues were similar, as both promoted the modernisation of agriculture (Fouilleux, 2003). However, since the 2000s the situation is changing. The Confédération Paysanne has increasingly advocated a multifunctional agriculture and promoted "peasant farming". It is much more open towards organic farming, not least due to the increasing number of organic farmers among its members. Similarly – although to a lesser extent – an increasing number of farmers who are members of the FNSEA have converted to organic agriculture, so that its discourse cannot be as aggressive as it used to be. The FNSEA now argues that models should not be opposed, and that organic agriculture is a niche that can be profitable for some farmers. Services and support for organic farmers are now offered by most mainstream farmers unions, cooperatives, and Chambers of Agriculture (de Silguy, 2015; Gangneron, 2015). This reluctant support takes place in a broader context, where low world market prices for conventional products and high prices for inputs have led to intense crises in the milk, beef, and pork sectors since 2015. Reports of bankruptcies and suicides of conventional farmers have repeatedly made headlines in French newspapers. This contrasts with the reports of success stories of organic farmers selling at higher prices on local markets and securing comparatively comfortable incomes. These media reports indicate a shift in the perception of organic agriculture, and contribute to the recent increase in the number of farmers who are starting their conversion (Bouttes et al., 2019). Taking into account these recent developments, the dominant actors no longer reject organic agriculture, they now want to take part in its definition. This leads to renewed tensions with the FNAB, which seeks to remain the main interlocutor, and advocates a definition of organic agriculture close to its ethical and political origins, rather than one only based on the market.

The examples from the three countries show that the organic sector may be strengthened if organic farmers associations can build alliances with established farmers unions or farmers associations. Such relations provide strategic knowledge on how to navigate legal institutions, and strengthen the legitimacy of organic agriculture. In both Austria and Italy, relations were forged based on the shared commitment to traditional family farms. In France, the modernisation paradigm has only recently come under pressure, following protracted crises on agricultural markets. Faced with an increasing number of organic farmers in their own ranks, the dominant unions and associations have had to tone down their critique of organic agriculture, which may open opportunities for new relations.

3.4. Relations with advocacy groups

A number of advocacy groups aim their political criticism at the modernisation of agriculture, pointing out its negative impact on environment, its poor animal welfare record, its contribution to the erosion of cultural heritage, its impact on the social cohesion of rural areas, or the relation of modern agrifood systems with various public health issues. These issues may be a common ground, which can enable relations with a range of actors and strengthen the organic sector. This may be illustrated through the alliance between organic farmers associations and the anti-GMO campaign in Austria, and between organic farming and the Slow Food movement in Italy. In France such relations are only beginning to emerge.

Austrian citizens are among the most vigorous opponents of the agricultural application of biotechnology in the EU (Torgersen and Seifert, 2000; Sassatelli and Scott, 2001; Seifert, 2009). In 1996 this opposition led to a general media campaign against genetically modified food and plants, and eventually to a complete ban on GMO cultivation in Austria. Organic farmers associations kept a low profile in the public arena, mostly because they did not have the resources or skills to stage large public events. But the associations successfully built relations with Greenpeace and with various groups campaigning for food that is 'free from GMOs'. In this campaign, the protection of organic farming was a core argument to pre-empt the cultivation GM crops (Seifert, 2009). Indeed, there is a high number of organic farms and they are spread throughout the territory, so that to ensure 'coexistence', the area ineligible for GMO cultivation is vast. The campaign was so successful, that since then, no public decision-maker or official from the dominant farmer union dares speak out in favour of GMOs (Seifert, 2009).

In Italy, public opinion had turned against the modernisation of the agrifood system, especially following the BSE crisis in the mid-1990s. The general feeling was that modernised agriculture had not ensured safe food, and that standardized mass-produced food had led to a homogenization of taste. Above all, it was seen as threatening traditional and artisan products, and leading to a loss of regional identity (Murdoch and Miele, 1999; Sassatelli and Scott, 2001; Tregear et al., 2007). Subsequent activism was aimed at revaluing traditional foods and defending Italy's gastronomic heritage. This boosted support not only for traditional farming practices and artisanal processing, but also for organic agriculture (Brunori et al., 2013). In particular through their alliance with Slow Food, organic farmers gained visibility and legitimacy (Brunori et al., 2013). Organic agriculture has also been promoted by the Pesticide Action Network, as a way to ensure a glyphosate-free diet. Moreover, some organic farmers associations interact with civic movements such as Gruppi di Acquisto Solidale (Solidarity Purchasing Groups). However, these forms of Community Supported Agriculture tend to focus on food produced locally, using traditional varieties, and on fairness in producer-consumer relations, rather than specifically promoting organic production practices (Paltrinieri and Spillare, 2015).

In France, the relations between organic farmers and environmental activists have been weak historically. For example, the Fédération Nationale de l'Environnement, the main umbrella for French environmental associations, has always defended so-called 'productive' agriculture and has carefully avoided to openly oppose the FNSEA due to its powerful position (Ansaloni, 2015). Recently, the high quantities of pesticides used in France have received increased media attention, and many environmental activist organisations (e.g. Générations Futures, Greenpeace) have clearly voiced their support of organic agriculture. The rise of public debates around pesticide use may well have contributed to the recent rapid growth of organic consumption in France, which has more than doubled between 2010 and 2016 (Agence Bio, 2017). There is also a growing awareness of animal welfare issues, which until recently were absent from public debates. Associations advocating for direct relations between producers and consumers may also be potential allies. Highlighting the link between health and food, they have organized alternative food trading networks. However, so far there are few formal relations with organic agriculture. For example, production practices in the AMAP network (Association pour le Maintien d'une Agriculture Paysanne, i.e. association for the maintenance of peasant agriculture) are *de facto* organic (and a number of producers are third party certified) but many AMAPs have opted for Participatory Guarantee Systems and thus do not formally require their producers to be certified (Lamine et al., 2012). Similarly, another successful alternative food network, 'La Ruche qui dit Oui' promotes local products, but most of them are not organic (Rodet, 2014, 2017). More generally, in France 'local' is often successfully put forward by conventional agricultural actors as a way to escape the debate on production practices and pesticide use (Pahun, 2019).

The examples of the anti-GMO-campaign in Austria, or the relations with 'slow food' activists who strive to defend Italy's gastronomic heritage, show that win-win situations can be built between organic actors and other civic movements. Through such alliances, organic actors have an opportunity to convey the relevance of organic farming,

i.e. its ability to address a range of concerns citizens may have about the agrifood system. However, since the early 2000s, 'local' has been an increasingly important attribute for food, competing with 'organic' for the attention of environmentally and health conscious consumers. In Austria 'organic' was well established by the mid-2000s, and organic and local were often perceived as going together. In Italy and in France the growing importance of 'local' as an attribute at a time when 'organic' was not well established, may weaken the ability of organic actors to build relations with advocacy groups and various forms of Community Supported Agriculture.

3.5. Relations with actors along the food value chain

Going beyond direct marketing and engaging with processors, exporters, and retailers has enabled selling larger quantities of organic food, thus shaping the organic sector. In Austria organic farmers engaged in relations with conventional retailers very early. This relation enabled access to a wide and well established distribution network, as well as to benefit from the advertising power of retailers. In Italy exporters played an important role, whereas in France relations were mostly established with specialist retailers.

In Austria, the dominant organic farmers association early on decided to cooperate with a major retailer, initially to market organic fresh milk and dairy products (Schermer, 2008). While there were reservations regarding potential power differences, in the mid-1990s the relation was constructed as being of mutual benefit. Indeed, the organic farmers association was interested in securing a premium price for the rapidly growing number of organic dairy farmers, and was aware that the quantities of milk produced exceeded what could be sold through direct marketing. The retailer saw organic products as a way to ensure the loyalty of its customers, and thus as a strategy to cope with the impact of EU accession, i.e. the expected competition from foreign retailers and the flood of cheap foreign food (Schermer, 2014). As Austrian consumers were anxious that EU accession would reduce the quality of food, offering domestic organic food was a way to address the question of trust and maintain consumer confidence (Sassatelli and Scott, 2001). 'Organic' and 'produced in Austria' was thus successfully linked in the public imaginary, and was seen as a way to oppose the 'intrusion' from outside; buying organic food was thus a way for Austrians consumers to contribute to the maintenance of distinctive national values and traditions (Felt, 2015).

The unique position of organic food was reinforced in the late 1990s by addressing Austrian consumer's strong aversion of GMOs. Indeed, only organic food could certify that no GM crops were used in plant-based food, and that products of animal origin were produced without GM feed. Thus organic food was the first choice for consumers who wanted to be certain that their food was 'GMO free' (Torgersen and Seifert, 2000; Sassatelli and Scott, 2001). Given the positive response by consumers, the supermarket chain increasingly defined itself through its organic brand 'Ja!Natürlich', which is now the best known food label in Austria. Other retailers followed suit and created their own organic brands. Retailers thus created for themselves an image as guardians of consumers' interests, responding to the increasing demand for locally-produced and 'unadulterated' food through establishing organic brands, promoting them in ongoing advertising campaigns (Torgersen and Seifert, 2000). As a result, organic food has been successfully linked to 'consumer patriotism', which conveys the 'moral duty' of the consumer to support Austrian farmers, protect the environment, and ensure animal welfare (Sassatelli and Scott, 2001). The 'naturalness' of food produced domestically is conveyed not least through the media, which are replete with "visual discourses of untouched nature, happy animals, and healthy people" (Felt, 2015: 115). These imaginaries help perpetuate a vision of what makes Austria unique: it seems 'natural' to keep green biotechnology out, not least by promoting domestic organic food production. These cultural values tied to environmental protection are also expressed in the names of the two major organic brands: 'Ja!Natürlich' (Yes!Naturally) and 'Natur Pur' (Pure Nature), names that reinforce the link between organic food and pristine nature.

In Italy consumers reacted strongly in the face of food scares, which were portrayed as coming from 'outside', as being 'foreign'. This allowed to position food produced domestically as safe and natural. However, this mobilization did not focus solely on organic food, but included various iconic regional foods, traditional specialities, and well-established geographical indications (Sassatelli and Scott, 2001; Brunori et al., 2013). At the same time, organic food benefits from high trust levels, not least due to the proven ability of the Italian certification system to discover frauds (Gambelli et al., 2014). In particular, 'organic' is seen as a strong identifier for environmentally related quality (Zanoli et al., 2012). Organic food is thus widely available both through conventional supermarkets (e.g. COOP, the largest Italian food retailer having an own private label), and through specialised shops and retailer chains (e.g. EcorNaturaSì). Next to a growing domestic demand, the organic sector in Italy is strongly shaped by the relations it built with exporters. Indeed, over a third of Italian organic production is exported (Defrancesco and Rosseto, 2007). The exported products are mostly fruits and vegetables, olive oil, wine, citrus fruits, and pasta. This export-orientated production is driven by the strong demand for organic products from Southern Italy. Indeed, these cannot be produced in northern Europe, where the demand for organic products is high, and where Italian organic products enjoy a good reputation (Marchesini and Zanetti, 1995, 1997; Zanoli et al., 1999; Callieris et al., 2010).

In France, consumers are similarly committed to traditional specialities and geographical indications as in Italy (Barham and Sylvander, 2011). Organic foods thus need to position themselves against these well-established quality labels. This particularly applies to mainstream supermarkets, which have entered the organic market rather late. Organic foods are widely available through specialised organic retailers, such as Biocoop, which has been engaged in the organic sector since 1986 and is one of the largest organic supermarket chain in Europe. Biocoop promotes not only the naturalness of organic products, but also advocates for fairness in the food value chain (Dufeu and Le Velly, 2016; Lamine and Noe, 2017). Due to an increasing demand for organic products, selling organic food has become a profitable business and specialised organic shops are mushrooming, particularly in urban areas and mainstream supermarkets are constantly enlarging their offer in organic products.

The relations between the organic sector and various actors of the conventional value chains, especially supermarkets and exporters, are quite different in the three countries. The different relations between the organic sector and consumers through supermarkets is indicated by the share of organic retail shares, as in Austria supermarkets account for 78% of organic retail sales, compared to 40% in Italy, and 45% in France (IFOAM EU, 2016). But consumers do not only have different relations with organic food based on marketing channels, there are also differences in per capita spending for organic food, with 127€/capita/year in Austria, compared to 73.40€ in France, and 35.30€ in Italy (IFOAM EU, 2016). This may point to differences in the extent to which organic food has to compete with established quality food labels, such as geographical indications and traditional specialities in Italy and in France.

4. Discussion and conclusion

Agriculture in Austria, Italy, and France faced similar agricultural modernisation policies in the 1950s and 1960s, which resulted in comparable social and environmental impacts. In all three countries, organic farming was seen by some as a way to address the negative side of these impacts, leading to the emergence of an organic sector. Yet, over a 25-year period the dynamics of the organic sectors were quite different. The relational perspective highlights that the dynamics of the organic sector in each country is less attributable to one or a few causes, but rather the emergent result of situated networks of relations.

For example, the level and the continuity of direct payments offered to organic farmers in Austria doubtlessly contributed to the steady growth of its organic area (Fig. 1). However, from a relational perspective, the payments were only successful *because* of the many other relations that were successfully tied to organic farming, such as it being a way to maintain traditional farming and thus the cultural landscape in the Alps which is valued by Austrians as well as by tourists; organic food being tied to 'consumer patriotism' in the context of EU accession; and that only organic food could guarantee that it was 'GMO-free'. Thus it would be misleading to reduce the development of organic farming in Austria to one specific cause, such as the direct payments to farmers. It may be more helpful to understand these payments as a visible indicator of a much more wider network of meaningful relations. A relational perspective thus highlights the importance of the context. This concerns the temporal context, i.e. the specific issues that were salient in agriculture in the mid-1990s in Austria, such as the cost of export subsidies due to over-production and consumers' perceptions in the wake of EU-accession. But it also concerns the spatial context, i.e. the specific situation in Austria, such as the cultural values tied to agriculture and the lack of alternative food label to convey 'Austrianness'. It thus remains an empirical question whether similarly designed payments would have had the same effect in they would have been offered in Austria a decade later, or if they were offered in another country.

A relational perspective thus highlights not just that the effectiveness of an action is dependent on many other relations, but also that this causal pattern is tied to a specific time and place. Indeed, expectations, preferences, perceptions, and meanings of a set of practices will differ, depending on the context. This context will influence what shared meanings can be constructed, what relations can be built. At the same time, the meanings that are successfully established feedback and change this context. Depending on the spatial and temporal context, organic agriculture and organic food may or may not be successfully mobilized to address concerns such as the maintenance of family farms, environmental protection, animal welfare, climate change, food miles, or fairness in the food chain. And if organic farming is successfully mobilized, it impacts the dominant discourse regarding desirable agricultural practices and qualities in food.

The differences in understandings of – and imaginaries tied to – agriculture in Austria, Italy, and France have enabled different relations to be tied to organic practices. In Austria agriculture is understood as multifunctional, and thus as (also) providing a public good. This enabled organic farming associations to highlight their contribution to maintaining family farms and the cultural landscape. In contrast, in France, agriculture has been looked at primarily through its productive function and through a technicist-modernist frame, which made it more difficult for organic actors to build relations with the State and other societal actors. Similarly, while in Austria organic food was associated with 'local' and became the prime label for 'quality' in food; in Italy and in France consumers had well-established associations with traditional specialities and geographical indications, and 'local' was not tied to 'organic' in the same way as in Austria, so that it was more difficult for organic food to convey a relevant 'quality'.

The dynamics of the organic sectors in Austria, Italy, and France also show that there was no determinism in their development. The events did not unfold along an inevitable path, where the impact of an individual action or event could have been predicted. Indeed, the dynamics of the organic sector are not tied to an intrinsic quality of organic farming. Rather, the dynamics are tied to the relations that were built, maintained, changed, severed, reshaped by various organic actors. The relations that were successfully established depended on the initiative of various actors, on the opportunities afforded by the national context, and on the competing efforts by actors tied to conventional agriculture or other alternatives, such as agroecology. The dynamics thus emerged from a host of economic, material, technological, cultural, moral, and emotional relations built by a variety of actors in the agrifood system. These relations are always under construction, are always being made, always unfinished, with actors involved in an ongoing process of building, strengthening, maintaining, weakening and breaking relations, in response to new possibilities and to unfolding meanings (Chia, 1999; Kjeldsen and Ingemann, 2009; Balducci et al., 2011; Allen, 2012; Lehtimäki, 2018). Thus, from a relational perspective, the organic sector is always changing, and changing in different ways in each countries.

Depending on their history, actors may perceive more or fewer options, influenced by past conflicts as well as by collaborative relations that were successfully established. Indeed, past experiences influence present actors and present opportunities, as they influence the processual memories and thus the relations actors see as possible and promising (Dépelteau, 2018b). As a result, emerging opportunities are perceived and enacted differently in different countries. Organic actors may or may not be in a position to build relations that enable them to take advantage of events, such as the anti-GMO-stance in Austria, the BSE-crisis in Italy, or the farm-level cost-price crisis in France. Such events are not understood as a trigger in and of themselves, but as meaningful for the organic sector only if they are perceived as a 'window of opportunity' (Brédart and Stassart, 2017).

The dynamics of the organic sector show both the limits of events to promote more sustainable agricultural and food practices, but also the opportunities they may offer. Indeed, such events should not be treated as anomalies, ignored for the benefit of regularities (see Dépelteau, 2018b). The events may well be intimately tied to the complexities of a globalized world, and thus a standard feature of life in fluid modernity (Bauman, 2007). The question is then not whether such events will affect the dynamics of agrifood systems, but whether actors are able to use them to strengthen relations and build novel ones; and if yes, which actors? With whom? Based on what argument? By focusing on how such relations are built and broken, relational sociology might afford new insights into the dynamics of the organic sector as well as the wider agrifood sector, highlighting the role of tumultuous processes of confusion, disjoint, disorganization, rupture, and (failed) re-organisation (see Dépelteau, 2018b).

Through this type of analysis, a relational perspective may be able to identify some relevant temporary social patterns; yet the goal is not to predict future interactions. Indeed, a relational perspective shows that while the dynamics of an organic sector might be reconstructed in hindsight, a transformation of agrifood systems towards sustainability will be unpredictable in how it progresses, why it progresses, and what specific expression it takes in each place. A relational perspective points towards the futility of the search for universal social 'laws', i.e. 'social forces' that will have the same effect, independent of time and space, of history and context. It may not be helpful to search for the one (or a few) variables that explain a specific dynamic. It may be unduly limiting to focus on identifying similarities in patterns and identifying mechanism that may allow to reproduce these patterns. It may be more helpful to acknowledge that the social universe is "complex, dynamic and quite messy" (Dépelteau, 2018b:503).

A relational perspective understands the agrifood system as vibrant, undergoing constant change, driven by multiple social processes. Enabling the spread of sustainable agrifood systems will be influenced by what various actors perceive as desirable at a particular time and place, by the ability of actors to build and maintain relations based on alternate narratives of how current problems can be effectively addressed. But it will also be heavily influenced by the actors' flexibility when engaging in fluid social processes, their ability to recognize and use windows of opportunity, to explore new ways to make sense of a situation, to reframe and reinterpret the meaning of a sustainable production practice to address a salient issue. By emphasising dynamics and change, rather than stability and constraints, a relational perspective thus highlights the role of creativity in actions. It joins the 'politics of possibility' (Gibson-Graham, 2006) in pointing out that there are no blueprints, that change is contingent and place-based, that an agrifood system is not a field of invariant logics and automatic unfoldings.

Acknowledgements

The authors would like to thank the anonymous reviewers for their insightful comments which were instrumental in improving the manuscript. We also extend our thanks to Michael Eder, Claire Lamine, Allison Loconto, Anton Pinshoff and Raffaele Zanoli for their incisive comments on previous versions of this article. Of course, the responsibility for our interpretation of relations and dynamics remains ours alone.

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