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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 heterogeneous 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



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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 heterogeneous 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 by 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.

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