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Research article

Incumbents' in/ability to drive endogenous sustainability transitions in livestock farming: Lessons from Rotenburg (Germany)

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ABSTRACT

Livestock farmers, as incumbents, face pressures to transition toward sustainability. We study these actors' role in this process, particularly their in/ability to contribute to endogenous institutional change. Our study entails an interview-based single case study with farmers based on institutional theory. We find "partaking" to be the likely form of endogenous change, as incumbents predominantly rely on routine and sensemaking agency. They externalize the locale of change to other actors whom they expect to change framework conditions. However, we find contrasting examples that may drive institutional change in livestock farming. We also discuss incumbents' ambivalent role and embedded agency in these change processes. "Strategic agency" and the ability to imagine alternatives are important aspects for perceiving agency in transitions. Hence, we recommend that regional policy-makers and change agents work with farmers to create alternative imaginations for livestock farming with the restrictive and affective power to disrupt existing practices and structures.

1. Introduction

In the literature on sustainability transitions, the role of incumbents has attracted increasing attention in recent years. Incumbents are often viewed as actors resistant to change (e.g., [Geels et al., 2016](#)) who are in charge of power and may fear losing control ([Gürtler and Herberg, 2021](#)). Initially, incumbents were defined as actors who reproduce existing practices and maintain the status quo, favoring only incremental changes ([Hockerts and Wüstenhagen, 2010](#)). This definition was first used as a contrasting example in regard to niche innovation actors favoring radical innovations and influencing the emergence of transition pathways but was later questioned ([Geels et al., 2016](#)). Rather, it has been suggested that these actors maintain an ambivalent position or have multiple positions during transitions. Incumbents are principally equipped with the resources and discursive positions needed to simultaneously drive transitions, for instance, by allowing sociotechnical innovations to diffuse or, in contrast, enabling cognitive lock-ins and technological path dependencies to arise, thereby ultimately hindering transitions (e.g., [Geels et al., 2016](#); [Lee and Hess, 2019](#); [Galeano Galvan et al., 2020](#); [Runhaar et al., 2020](#); [Turnheim and Sovacool, 2020](#); [Ampe et al., 2021](#); [van Oers et al., 2021](#); [Simoens et al., 2022](#)). In general, incumbents comprise a heterogeneous group of actors from within and outside existing regimes who can have multiple roles in

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transitions that may change over time, for example, from early resistance to change to driving change in a later stage (Turnheim and Sovacool 2020). Empirical studies from different sectors underline this supposition: Incumbents often maintain existing practices and have difficulties engaging with niches or alternatives due to their locked-in institutional settings (transport transitions: Kotilainen et al., 2019; water transitions: Quezada et al., 2016; agricultural transitions: Runhaar et al., 2020; van Oers et al., 2021). However, incumbent actors also simultaneously maintain existing practices and support the development of niches and innovations, as Galeano Galvan et al. (2020) show for the Dutch energy transition. Therefore, these studies demonstrate not only the ambivalent yet predominantly hindering roles of incumbents but also the potential that rests in their power and resources concerning transitions toward sustainability.

While many previous studies on incumbents in sustainability transitions have focused on energy, transport and water transitions (e.g., Geels et al., 2016; Quezada et al., 2016; Lockwood et al., 2017; Kotilainen et al., 2019; Lee and Hess, 2019; Galeano Galvan et al., 2020), the role of incumbents in agriculture has only recently received attention (Runhaar et al., 2020; van Oers et al., 2021). In contrast to other sectors, agriculture is particularly place-related and dependent on locally specific natural conditions (Vermunt et al., 2020). Livestock farming, as part of agriculture, constitutes an important object for studying sustainability transitions in the making. Livestock farming is responsible for environmental degradation via, for instance, the eutrophication of water bodies and whole landscapes, methane emissions that drive climate change, and high shares of land use for fodder production (e.g., Tilman and Clark, 2014; Steffen et al., 2015; Sundermann et al., 2020). Against this background, actors from civil society and an increasingly broad public are calling for sustainable changes, including dietary change, reduced livestock numbers and an area-bounded livestock system. Such calls, together with new legal frameworks, are putting increasing pressure on the system (Vogeler et al., 2019).

From a sustainability-oriented perspective, the current land-decoupled livestock system needs to undergo a transition. We understand this transition as a change in the configuration of the sociotechnical regime of livestock farming, particularly the institutions (e.g., practices, culture, technologies) that characterize this system, following Fuenfschilling and Truffer (2014, 2016)¹. As agriculture and the livestock farming systems in many European countries in particular can be described as an organizational field with a high degree of institutionalization² (for an overview of lock-ins and path dependencies in agri-food systems, see Conti et al., 2021) characterized by routine practices, norms, values, and political subventions that create very stable semiotic and extrasemiotic structures, addressing how transitions can unfold in such an environment is crucial for understanding and creating sustainability-oriented change processes.

Accordingly, our article focuses on livestock incumbents to understand the ability of these actors to contribute to transitions. By incumbents, we refer to the livestock farmers (see also Runhaar et al., 2020) who are established actors within the current regime. Together with other actors along the value chain, they are relationally embedded in regime structures, maintaining the status quo and stabilizing the system (e.g., Sutherland et al., 2012; Maes and van Passel, 2017; Burton and Farstad, 2020; Runhaar et al., 2020; Stuhr et al., 2021; van Oers et al., 2021; Vermunt et al., 2020). These stable and persisting mechanisms in agriculture result from the field's complex and entangled systems, which are dependent on the input of materials and energy as well as the processing of agricultural products and societal consumption. These stabilizing processes take place across different levels of societal organization. At the individual level, stabilizing mechanisms have been demonstrated via financial commitments based on entrepreneurial decisions that "colonize" the future; they may result in sunken costs, and consequently reduce the scope of future action (Beckert, 2013, 2016; Friedrich et al., 2022b). The current financial pressures in agriculture, e.g., high investment costs and long planning horizons, can result in limited financial capabilities of change. At the collective level, stable structures in agriculture are maintained through both cultural and discursive aspects, such as the reproduction of existing imaginations concerning the future that include cultural aspects (Friedrich et al., 2022a), potentially as a result of discursive hegemony³ (Heyen and Wolff, 2019), which can, in consequence, lead to cognitive, mental, or discursive lock-ins in sociotechnical regimes (e.g., Simoens et al., 2022) and may inhibit transitions.

Turnheim and Sovacool (2020) argue that a nuanced understanding of the role of incumbents in sustainability transitions is essential to govern and accelerate these processes. Therefore, in this paper, our aim is to study the in/ability⁴ of incumbents in these stable regime structures to contribute to endogenous sustainability changes in livestock farming. We use the term endogenous to characterize change originating from actors within the system, following Runhaar et al. (2020), in contrast to any exogenous change impacting the system (e.g., disasters, discourses, policies, actors from other organizational fields). We employ an institutional and agentic perspective (see Section 2; Emirbayer and Mische, 1998; Beckert, 1999; Dorado, 2005; Zietsma and Lawrence, 2010) and begin by defining the current livestock system in Germany as an organizational field with a high degree of institutionalization, following our above elaborations on the stabilizing mechanisms in livestock farming. From this perspective, farmers are both incumbents and institutional workers who constitute the structure of this system through material-semiotic elements and are shaped by it. Following Lawrence et al. (2011, p. 52), we define institutional work as "the practices of individual and collective actors aimed at creating,

¹ We want to note that sustainability as such is a deeply normative and ambiguous concept. This means that any restructuring of the regime may not necessarily lead to a sustainable outcome: This clearly depends upon what actors refer to as sustainable. See e.g., Schlaile et al. (2017).

² We regard the system to have a high degree of institutionalization, as it is characterized by routines in practices, values, and norms. See Zucker (1977) and Dorado (2005).

³ By discursive hegemony, we refer to the hegemonic position of specific actors in discourse. With respect to farming, an example is the farming organization "Bauernverband," which we regard as an organization that has gained hegemony in terms of structuring and shaping discourses on the future of farming.

⁴ With "in/ability," as a term, we aim to highlight the ambivalent and paradoxical situation of the actors and the gray area between the binary dualism of ability and inability.

maintaining, and disrupting institutions.” In accordance with this institutional perspective, we argue that transitions (reconfigurations of the sociotechnical regime, cf. [Fuenfschilling and Truffer, 2014](#)) occur through the institutional changes that result from a combination of the types of agency an actor can employ, an actor’s ability to mobilize resources, and perceived opportunity in the organizational field ([Dorado, 2005](#)). Hence, we operationalize the aim of our study by asking the following research question:

- What different profiles of endogenous institutional change can be found among incumbents in livestock farming?

To analyze the role of farmers, as incumbents, in driving such changes, we reveal what challenges and perceived uncertainties farmers are experiencing and what solutions they propose. Perceived challenges, uncertainties and how actors address these are important descriptors of change in institutional theories ([Beckert, 1999](#); [Dorado, 2005](#)) and with respect to individual agency (e.g., [Stuhr et al., 2021](#)).

Below, we first describe our theoretical foundations for analysis, based on institutional theory. Next, we introduce our methodological approach and case study of the German livestock system, providing empirical examples of potential endogenous institutional change. We then discuss our findings by referring to the general role of incumbents in transitions and explore how farmers can be empowered to experience agency in sustainability-oriented change processes in agriculture before we close the study by drawing our conclusions.

2. Conceptualizing institutional change in livestock farming from an agentic perspective

To examine the in/ability of livestock farmers to engage in endogenous change, we build on the concept of institutional change in institutional theory ([Dorado, 2005](#)). Institutional approaches seek to understand how institutions are formed and the actors, mechanisms, and processes by which these socially established structures (e.g., norms, technologies, practices as routines) can change. These change processes are conceptualized through the interplay of institutionalized structures and the agency of social actors, both individual and collective ([Emirbayer and Mische, 1998](#); [Beckert, 1999](#); [Dorado, 2005](#); [Battilana, 2006](#); [Zietsma and Lawrence, 2010](#)).

In this study, we follow [Dorado’s \(2005\)](#) conceptualization of institutional change. [Dorado \(2005\)](#) describes institutional change as dependent on the *agency* of social actors, *resource mobilization*, and the perception of the respective *organizational field* (see also [Beckert, 1999](#)). [Dorado \(2005\)](#) identifies these three elements as “the will and creativity to change” (agency), “the process of change” (resource mobilization) and “the locale of change” (organizational field) (*ibid.*, p. 406; [Table 1](#)). Depending on the specifications and interplay of “agency,” “resource mobilization” and “organizational field,” three different profiles of institutional change can arise, namely, *institutional entrepreneurship*, *partaking*, or *convening* ([Table 1](#)).

Building on [Dorado’s \(2005\)](#) approach, we complement the extant institutional approaches in the sustainability transition literature (e.g., [Fuenfschilling and Truffer 2014, 2016](#); [Galeano Galvan et al., 2020](#); [Löhr et al., 2022](#)). In contrast to the frequently applied institutional logics perspective (e.g., [Runhaar et al., 2020](#); [Smink et al., 2015](#)) in examining the “deep structures” of regimes—i.e., in terms of their culture and the relevance for change ([Fuenfschilling and Truffer, 2014](#)) that extends from its structures—the approach of [Dorado \(2005\)](#) has an agentic focus. That is, it centers on individual actors, who are embedded in these structures. By adopting the latter perspective, we thus complement existing theory on sustainability transitions and highlight the ambivalent and embedded role of individuals in reconfiguring existing regimes. In the agentic focus of [Dorado \(2005\)](#), the role of individual social actors, embedded in social structures to drive institutional changes, is highly related to their agency ([Emirbayer and Mische, 1998](#)), their perception of the organizational field, and their ability to leverage resources (see [Table 1](#)). Hence, we place exemplary yet special emphasis on conceptualizing agency in the following and point to [Dorado \(2005\)](#) for a more in-depth conceptualization of the two other aspects. Agency is conceptualized by [Emirbayer and Mische \(1998, p. 970\)](#) as “the temporally constructed engagement by actors of different structural environments—the temporal–relational contexts of action.” This focus⁵ leads to three forms of agency: *routine agency*,⁶ *sensemaking*⁷ *agency*, and *strategic*⁸ *agency* ([Emirbayer and Mische, 1998](#); [Dorado, 2005](#)), which are not independent and can interact, complement or overlap in specific situations. They are also characterized by the dominance of one temporal orientation at a time (routine agency: past; sensemaking agency: present; strategic agency: future). This temporal focus adds an additional dimension to the characterization of institutional change in the sustainability transition literature; it highlights the experiences, perceptions, and imaginations of individuals in restructuring sociotechnical regimes and shaping transitions. In our livestock setting, routine agency may occur when farmers rely on past experiences and habitualized routines and values, which [Friedrich et al. \(2022a\)](#) call the “preservation” of the status quo. Sensemaking agency relates to situations of uncertainty (e.g., legislative changes, market pressure) that lead farmers to make sense thereof when, e.g., feeling overwhelmed and thus protesting against new nitrate legislation. In this situation, strong normative judgments become visible. Strategic agency therefore relates to imaginations and a general, future-oriented focus; examples may be found among farmers who semiotically contrast and challenge existing values and practices

⁵ These different temporal foci align with those of [Emirbayer and Mische \(1998\)](#), whose “central contribution is to begin to reconceptualize human agency as a temporally embedded process of social engagement, informed by the past (in its habitual aspect), but also oriented toward the future (as a capacity to imagine alternative possibilities) and toward the present (as a capacity to contextualize past habits and future projects within the contingencies of the moment)” (*ibid.*, p. 963).

⁶ The theoretical roots of routine or habitual agency follow those of [Giddens \(1984\)](#).

⁷ The theoretical roots of sensemaking were developed by [Weick \(1995\)](#).

⁸ Strategic agency relates to a conceptualization by [DiMaggio \(1988\)](#).

Table 1

Profiles of institutional change according to [Dorado \(2005\)](#). These profiles all have an agentic focus, i.e., they start from the actors and their perception. All profiles of institutional change depend upon the combination of agency, organizational field and resource mobilization.

Profiles of institutional change	Resource mobilization	Agency	Perception of organizational field
Entrepreneurship	Leverage	Strategic	Opportunity opaque Opportunity transparent Opportunity hazy
Partaking	Accumulate	Routine Sensemaking	Opportunity opaque Opportunity transparent Opportunity hazy Opportunity transparent Opportunity hazy
Conveners	Convening	Strategic Strategic	Opportunity transparent Opportunity hazy

Table 2

Overview of interviewed actors.

IP	Main functions and relations to livestock farming
1	Commodity cooperative related to livestock inputs
2	Pig farm (3500 animals), arable farming, biogas
3	Pig farm currently transitioning to organic (2400 animals)
4	Pig farm (10,000 animals), arable farming
5	Earlier pig farm, yet new business model and arable farming
6	Pig farm (4200 animals), arable farming
7	Pig farm (3300 animals), arable farming, biogas
8	Extension service with regard to plant fertilization
9	Pig farm (5000 animals), arable farming, biogas
10	Bull breeding, biogas, arable farming
11	Machinery ring supplying livestock farming
12	Cow farm (milk, 120 animals), bull fattening, earlier small pig farm
13	Cow farm (milk, 70 animals), organic
14	Cattle breeding, horse stalls, arable farming
15	Pig farm (1000 animals), chicken (22,500 animals), piglet rearing, biogas, arable farming
16	Cow farm (milk, 700 animals), bull breeding, turkeys (40.000 animals), biogas, arable farming

with imaginations that shape their extrasemiotic doing, i.e., they forge new paths with regard to retail or business models.

Hence, we operationalize the aim of our research by studying the potential profiles of endogenous institutional change brought forward by incumbents. We regard the resulting three profiles of institutional change ([Table 1](#); [Dorado, 2005](#)) as the potential options for the endogenous changes driven by farmers in livestock transitions. The combination of features ([Table 1](#)) illustrates the multiplicity and ambivalence of the trajectories of institutional change that may characterize livestock system transitions according to the relational embedding of incumbents within regime structures ([Battilana, 2006](#)). Hence, incumbents, both individuals and collectives, as social actors, are always performing institutional work—whether intended or not ([Lawrence et al., 2011](#)). Whether actors' work leads to institutional changes or maintains the status quo thus depends on a combination of their perceived agency, resource mobilization, and perception of the organizational field ([Dorado, 2005](#); [Lawrence et al., 2011](#)).

3. Methods

In this study, we focus on incumbents in livestock system transitions to draw conclusions on their in/ability to contribute to endogenous sustainability changes. We empirically operationalize this focus by centering on the challenges and uncertainties that agricultural incumbents, namely, livestock actors, experience and the solutions to these challenges that they propose. By livestock incumbents, we refer to the farms and farmers that are well established in the existing regime, e.g., through historically accumulated social contacts and strengthened networks, materialized capital and ownership structures, and via routines in values and practices. Due to their position, these actors have sufficient power and resources to shape, drive, or inhibit change. Moreover, in this conceptualization of incumbents, we generally focus on farms with above average animal numbers and those that have been established for more than one generation and are thus historically grown (see [Table 2](#)). We define perceived uncertainties as subject to these actors' perception and social position ([Battilana, 2006](#)), dependent on the factors that the latter perceive to be current challenges. Accordingly, by unraveling how these perceived uncertainties in the organizational field are processed in a cognitive–discursive manner, we are able to draw conclusions on the agency the actors can employ (while unpacking their dominant temporal focus) and where these actors position the locale of change. The concept locale of change therefore enables us to obtain a perspective on the resource mobilization in and perception of the organizational field ([Dorado, 2005](#)). Moreover, the dominating temporal patterns these actors follow when processing challenges and uncertainties reveal the type of agency they can employ: sensemaking, routine, or strategic ([Emirbayer and Mische, 1998](#); [Dorado, 2005](#)).

Our study follows an iterative process according to these theoretical considerations ([Section 2](#)) and relevant empirical observations.

Our empirical approach entailed 16 problem-centered, semistructured interviews (Table 2). These interviews were conducted with a range of livestock farmers, farming representatives, and extension services personnel in Rotenburg (Wümme), Germany (Section 4.1). The topics of the interviews centered on the current challenges for livestock farmers, how they address them, and what solutions they propose. Our approach adopted the methodology of problem-centered interviews, which are used for theory generation, characterized by their focus on societally relevant topics that regard actors as experts in their practices (Witzel, 2000). In the following sections, we briefly describe our case study selection (3.1) and then detail our data collection and processing (3.2 and 3.3).

3.1. Case study selection

Our case study region is Rotenburg (Wümme), located in Lower Saxony in northwestern Germany. We chose this region because it constitutes a pragmatic case, i.e., it allows us to “highlight [the] more general characteristics of the societies in question” (Flyvberg, 2006, p. 232), specifically, livestock farming in Germany. Rotenburg (Wümme) represents a typical rural region in northwestern Germany, dominated by intensive livestock production and lower soil quality than other German regions. We chose this region because it contrasts with other regions in Northwest Germany, especially around the city of Vechta; the latter represent extreme cases dominated by intensive livestock farming, which is known for its agri-tech cluster (Tamásy, 2013)⁹.

3.2. Data collection

The aim of our interviews was to obtain a comprehensive picture of livestock farming in our case study region. We selected livestock farmers and actors who are very close to livestock farming (such as representatives and extension services personnel) as our sample. Our sampling of interview partners followed a snowball sampling approach (Reed et al., 2009; Rubin, 2021); we started the interviews with a first actor with existing, longstanding contacts, well connected in the region and aware of the topic of livestock farming, that is, a key actor. We conducted an initial scoping discussion with this actor¹⁰, who provided us with contact information of other actors, from whom we then derived further contacts. We asked these interviewees about any actors who have different views on problems and solutions or who are opening new paths to obtain a comprehensive picture of the current situation and discourse on livestock farming in the region. While we primarily aimed to interview actors in the Rotenburg (Wümme) region, we also included two actors from outside its administrative boundaries, as the relevant social boundaries do not necessarily match the administrative boundaries. Our data collection took place between January and February 2022; the interviews lasted between 39 min and 116 min and were conducted in German, and all quotes were translated into English by the authors. Due to the ongoing COVID-19 pandemic, we avoided personal meetings and conducted telephone and software-based interviews. We stopped our data collection once content saturation was reached (Rubin, 2021; Saunders et al., 2018). Content saturation was defined through the recurring arguments in the interviews. Although our empirical approach followed snowball sampling and was based on the social contacts we obtained during data collection, we experienced difficulties contacting farmers who had recently given up their farms and were experiencing severe emotions, such as frustration and anger; they were not open to scientific contact. Thus, their perspective may be lacking in this study.

3.3. Data analysis

All our interviews were recorded and fully transcribed. MAXQDA software was used for further processing. We analyzed our interview data following Kuckartz's (2014) qualitative content analysis guide and employed a deductive–inductive approach by accounting for our theoretical elaborations, which also guided us in developing our guiding questions. In our analysis, we followed the seven-step guide to “thematic qualitative text analysis” (Kuckartz, 2014). Thus, after the initial text work, we deductively coded our material based on our a priori theoretical considerations (Section 2; see Kuckartz, 2014). In the next step, we refined our category system by adding inductive subcategories and additional categories, which we derived directly from the material. We then coded all material with this coding system (Kuckartz, 2014). Table 3 describes our coding system, including our subcategories and some exemplary quotes, derived from the interviews to describe the codes.

4. Results

In the following section, we provide some basic descriptions (Section 4.1) of the case study in Rotenburg (Wümme) before we describe the challenges that livestock farmers and actors are facing and the uncertainties these reveal (Section 4.2). Second, we describe how the cognitive–discursive processing of these uncertainties indicates these actors' type of agency, perception of the organizational field, and ability to mobilize resources, thereby revealing two profiles of potential institutional change (Section 4.3).

4.1. Case study description: Livestock farming in Rotenburg (Wümme)

For our qualitative analysis, we chose the case of intensive livestock farming in Rotenburg (Wümme), Germany. In general,

⁹ In 2010, Rotenburg had 1.4 livestock units per hectare of agricultural land use, while the administrative regions Cloppenburg or Vechta had more than 2.5 livestock units per hectare of agricultural land use (LWK Niedersachsen, 2015).

¹⁰ This actor did not participate in the interviews and was only used to derive further contacts of livestock farmers in the region.

Table 3

Codes employed in analysis; each category is described with an exemplary quote from the interviews.

Deductive code	Inductive subcode	Exemplary quotes and codes
Challenges	Economic challenges	Economic challenge, e.g. with respect to price situation in agriculture: “A price situation currently exists in German agriculture. There has not been such a crisis in the last 20, 30 years” (IP 2)
	Governance challenges	Governance challenges, e.g. in relation to German building law and emissions guidelines: “In some cases, it is not even possible to convert stables into open-air runs, because the building law does not allow it. And then there are emission guidelines that prevent you from opening the walls. [...]” (IP 3)
	Discursive challenges	Discursive challenge, e.g. as acceptance of society: “A recurring challenge is the acceptance in society, [...] which we face and which we do not see negatively now. The only negative aspect [...] is that many people in the population do not accept the job we do.” (IP 16)
	Specific agricultural challenges	African Swine Fever, e.g., as specific agricultural challenge: “And first and foremost the African swine fever.” (IP 2)
	Other	Other challenges, e.g., related to sociotechnical change and digitalization: “[...] more technology. I often see young farmers using their phones to control their biogas plant. Control their pigsty, control their cowshed.” (IP 1)
Uncertainty		Uncertainty because of multiple challenges and “nervous exhaustion”: “My father and my grandfather, they worked themselves to death physically. They broke their backs. Their knees were broken. [...] Nowadays, I see it more as us farmers working ourselves to nervous exhaustion.” (IP 15)
Cognitive processing	Routine	Routine agency as waiting and continuation of existing practices: “At the moment it’s really the case that we tend to wait and see, that we clearly modernize somewhere, but we don’t take any really big steps.” (IP 9)
	Sensemaking	Sensemaking of political changes concerning the new moor strategy, being overwhelmed with the change: “Let’s take the moor strategy here in our region. [...] And if that goes according to political will in this region, there is no more agriculture. Because there is [...] no more cow husbandry possible, if all this is wetted again. For our region and other regions [...] that is the end of agriculture. [...]” (IP 2)
	Strategic	Strategic agency as ability to going new paths outside of agriculture: “Because I have many colleagues [...] who do not manage to go on vacation, [...] have broken relationships [...], I just realized, if you have such a real hamster wheel, then you have to have a permanent employee. And, when you always add it all up like that, I have the feeling that you actually don’t have anything more in your pocket. you just want to distinguish yourself from other farmers due to how great you are. [...]” (IP 5)
	Routine-sensemaking	Routine-sensemaking as being overwhelmed with the challenges (“perspective-less”) and continuing routines: “For me, though, I don’t know where to go at the moment. So I’m a bit perspective-less in this regard. [...] And that’s why, for me, it’s all about keeping the branches of the business going at the moment. To generate the operating income. And to wait and see.” (IP 15)
	Sensemaking-strategic	Sensemaking-strategic example of an actor who invested in a better run for pigs (employed a strategic decision) but received no support from downstream firms such as Aldi: “[...] Aldi, for example, issued a press release half a year ago stating that they also want to have this husbandry level in seven years. And, we had also invested in it already a year ago in the free range for pigs [...]. But, then, there was no marketer who had received one with open names. Oh, finally, you are there with your outlet pigs? [...] I would like to build an outlet, I would like to market those also. You look for a contractor who tells you, yes first build the stable and then we can see further. [...] So you go into full risk with your animal husbandry when you build a run. And you don’t really know yet what will come out.” (IP 4)
	Sensemaking-exit	Sensemaking-exit as farmers that are leaving livestock farming as to the cumulative amount of challenges: “[Interviewer:] And how do the farmers in your region deal with this situation? [Interviewee:] “That some get out of production. [Interviewer:] Do you know any farms? [Interviewee:] Yes.” (IP 11)
Solutions/discursive processing	Governance	Governance as e.g., support from politics: “In any case, much more support from politics [...]” (IP 6)
	Appreciation	Appreciation of farming, valuation of farming as a job: “I wish to get fair treatment. [...] generally, from the people here, from the fellow citizens, who then simply see what you do. And just see, what you’re already doing.” (IP 10)
	Consumers and society	Consumers as important factor: “The biggest factor is the consumer. They must be prepared to pay more. The state cannot absorb everything that the consumer demands and does not pay.” (IP 2)
	Food retailers and value chain other	Food retailers and value chain actors such as butchers and slaughterhouses: “That we have guaranteed prices [from food retailers], I would prefer surcharges that we get on top of the unification price. [...] I negotiate with a butcher because of my outlet pigs. It is quite difficult and we negotiate what I get on top of it...” (IP 4) Other solutions such as being more critical towards fellow farmers: “I do not know. Difficult. Difficult, difficult. I don’t know. I don’t have a solution at the moment. So you don’t do that you-. You actually have to be much more critical of your professional colleagues. That is, I think-.” (IP 7)

livestock farming in Germany is facing strong pressures within agri-food systems, which specify the needs for change. In addition to the environmental pressures due to climate change and exceeding planetary thresholds (Steffen et al., 2015), livestock systems face challenges such as new legal requirements (e.g., EU nitrate directive transferred to German law via the fertilizer ordinance), shrinking demand due to consumption changes and import bans from China due to African swine fever, ethical discussions on animal welfare, and rising energy prices, which have produced their own set of added pressures. While bioeconomic strategies are being discussed as potential solutions in scientific and political debates on some of these challenges, e.g., manure surplus (Friedrich et al., 2021), the systems themselves are characterized by structures with a high degree of institutionalization¹¹ and actors who maintain the status quo (Sutherland et al., 2012; Maes and van Passel, 2017; Heyen and Wolff, 2019; Burton and Farstad, 2020; Friedrich et al., 2022a) and experience low agency (Stuhr et al., 2021). This increases the regional economic path dependencies in German livestock-intense regions via the economic share of livestock farming in regional value creation or a lack of alternative productive land use opportunities due to low soil yield, which are additional stabilizing mechanisms (Tamásy, 2013; Franz et al., 2018; Franz and Schumacher, 2020), akin to the rare potential for regional distribution and the high pressure for alternatives, in contrast to existing farming practices (Tamásy, 2013).

In northwestern Germany, Rotenburg (Wümme) is one of the intensive livestock regions in which these phenomena are visible. It is characterized by groundwater values exceeding 50 mg/l nitrate (BMEL and BMU, 2020), which are being pressured to change to fulfill the EU nitrate directive (Sundermann et al., 2020). The region of Rotenburg (Wümme) can be viewed as a typical rural region in lower Saxony that lies between the metropolises of Bremen and Hamburg. It is characterized by intensive livestock farming and 70% agricultural land use (LBEG and LWK Niedersachsen, 2019). In recent decades, agricultural farms in Rotenburg (and Germany) have faced ongoing restructuring and concentration, resulting in a decrease in the social functions of agriculture (Nowack et al., 2019; 2023). In Rotenburg, this has led to a reduction in farms of more than 60% and an increase in average farm size from ca. 20 ha to almost 70 ha per farm between 1979 and 2010 (LWK Niedersachsen, 2015).

4.2. Challenges for livestock farmers and perceived uncertainties

The interviewed livestock farmers in the Rotenburg region indicated that they are experiencing a multitude of different challenges. We therefore coded our material with the following subcategories: economic challenges, discursive challenges, governance challenges, agricultural challenges, and other challenges (Table 3). Economic challenges relate to prices, market pressures, or investment planning horizons: “When we make investments, especially in animal husbandry, these are [...] usually for 20 years. And, the time or the planning security is not given at all” (IP 6). Discursive challenges relate to the perceived pressures from changed societal discourses and values, e.g., “[...] normal citizens, I do not want to say, but, like, the nonagricultural fellow citizens, they think simply differently in my eyes nowadays about agriculture than in the past” (IP 10). These discursive challenges are experienced as pressures from negative media reports and local discussions on the topic of livestock farming. Challenges that relate to the governance of livestock systems originate from legislative pressures, such as the new fertilizer ordinance, or with respect to permits for new construction projects. Agricultural challenges are related to the need for workers or geographical factors, such as those in relation to soil. Finally, more general challenges are evident in growing pressures or sociotechnical changes (e.g., digitalization), resulting in continuous adaptation requirements.

Although our interviewees had different backgrounds (Table 2), governance challenges were mentioned by all of them (Table 3). As a result, we found that their current situation is perceived to be uncertain, as demonstrated by the multiplicity of mentioned challenges and factors beyond the control of many interviewees. Some interviewees even referred directly to the term “uncertainty” in describing the situation, i.e., IP 2: “The uncertainty in agriculture is there. It’s huge. [...] The political risk is currently very high for many farmers. And, there is a price situation in German agriculture at the moment. There has not been such a crisis in the last 20 or 30 years.” This uncertainty, the interviewees argue—which relates to how their challenges are mainly a matter of governance—is a result of politics: “The biggest challenge at the moment is actually political uncertainty” (IP 12). However, economic uncertainty is also being experienced due to price and market fluctuations, as outlined by IP 2. We therefore suggest that their experienced uncertainty indicates that these actors perceive their organizational field to be rather opportunity hazy (Dorado, 2005).

4.3. Forms of potential endogenous institutional change in German livestock farming

As the following two subsections outline, actors process challenges and uncertainties in different cognitive–discursive ways. These ways reveal the agency actors can employ, how they perceive the organizational field, and how they are able to leverage resources. While there are obviously nuanced differences among the interviewees, we have found, and describe below, the dominant form of partaking as endogenous institutional change. Partaking, in contrast to institutional entrepreneurship or convening, refers to the cumulative incremental changes of autonomous actors (Dorado, 2005). In addition, we contrast this form to those of actors who are actively disrupting institutions and practices and who differ in terms of their type of agency and where they position the locale of change. Our considerations of cognitive processing are based on the categorization of agency of Emirbayer and Mische (1998) and Dorado (2005) as (1) routine, (2) sensemaking, or (3) strategic. Moreover, discursive processing relates to the proposed solutions of the interviewees, which we inductively coded with additional subcategories and concern their locale of change (cf. Dorado, 2005).

¹¹ See Footnote 2.

4.3.1. Institutional change as partaking

4.3.1.1. Cognitive processing: Revealing routine and sensemaking agency. Addressing the challenges and perceived uncertainties described in Section 4.2, the interviewees' answers show different dominating temporal foci that reveal routine agency, sensemaking agency, and combinations thereof (see Table 3). We identify a temporal focus on the present and a normative orientation toward beliefs in sensemaking agency. One example of this is IP 7's view on the nitrate directive and the fertilizer ordinance. In this example, the dominant temporal focus is on the present, and the actor makes sense of the uncertainty derived from this situation and the political changes more generally. The actor explains his doubts in the accuracy of nitrate measuring points and the law that is built on these: "[...] I also doubt the measuring points [of nitrate]¹². [...] The area around the village where I come from, somewhere within 20 kms, there is a well that is not in a good condition. Then, we'll take the village in with us. Our place. And, that is all arbitrariness and not thought through to the end at all" (IP 7). Another orientation toward beliefs is evident in the view of IP 12 on higher animal welfare standards: "Just imagine, in the supermarket, there are these typical surveys—yes, yes, I'm for more animal welfare—and, afterward, they buy the cheapest discount meat from Aldi for fifty cents a hundred gram package. That is still the reality" (IP 12). Here, the actor offers a normative explanation of why enhanced animal welfare does not make sense from the actor's view, based on a critique of consumers' choices. Another example of sensemaking is provided by IP 12, who described the current mood in agriculture as frustrated, overwhelmed by the issues and uncertainties of the present (normative judgment). This reveals a clear temporal focus on the present and a potential exit from livestock production: "[...] the mood in agriculture at the moment is not very good [...]. And, I also say, where farm transfers are imminent, and when I think of the pig fattening in the current price situation, there is also the one or the other that now says 'okay, I close the store. [...] So, I close the farm gate'" (IP 12).

We also observed how some actors maintain temporal frames that are oriented to the past and/or perform habitual practices that indicate the dominance of routine agency. This mainly relates to these actors' continuation of previous actions because of a perceived uncertainty that impedes their decision-making, as outlined by IP 9: "Yes, at the moment, it's really the case that we tend to wait and see, that we clearly modernize somewhere, but we don't take any really big steps" (IP 9). Modernization in this example thus relates to short-term decisions, such as "investments that pay off in one year" (IP 9). The contrast to sensemaking relates to absent normative judgment and a continuation of routines with no valuation of the situation.

In addition to the dominating forms of sensemaking and routine, we found forms of agency that can be viewed as combined forms of routine and sensemaking, revealing both normative beliefs and the continuation of routines: "I am ready [to change]. I am, as I said, 48. I also have a healthy business. I am also ready to change something. But, at this pace, I simply can't. And, if you have the feeling that you're powerless in the face of change and simply can't keep up with the pace, then you're better off leaving it alone. That's my attitude toward it" (IP 6). Here, we observe an instance of sensemaking via a temporal focus on the present due to being overwhelmed by ongoing pressure to change, which is combined with a maintenance of routines, leading to a lack of change, as the actor suggests that he cannot cope with the "pace" of change.

4.3.1.2. Discursive processing: Revealing the externalization of the locale of change. When asking our interviewees about the solutions they propose for their current challenges, which we call discursive processing, their responses demonstrated that these actors externalize the locale of change. This indicates a resource mobilization of accumulation, as these actors are not individually able to mobilize the resources necessary for institutional change and thus perceive the organizational field to be rather opportunity hazy. We find indications of these aspects among the inductive subcodes of our material (see Table 3), as the interviewees suggested that actors other than themselves must change or provide assistance to enable cumulative change. These inductively coded actors include food retailing and other value chain actors, consumers and society, and governance actors. Hence, the interviewees argue that these actor groups may also be combined to provide solutions to current challenges, thereby underlining the aspect of governance: "Yes, so, politically, we have to have absolute security somewhere. But, we also need to get the retail trade on board. [...] And, there has to be some kind of concept that gives us political security but also gives us the retail trade security to still be able to exist in the future" (IP 4). This actor-related proposal for solutions is combined with the experiences of a lack of appreciation of their farming practices and work across all these actor groups (which even reveals frustration), as outlined in the following example: "For years, we have only been badmouthed [...]. And, right now, we are not getting anywhere near what we should be getting for the products. We have to invest heavily to get to stage three or four of pig farming¹³. I have the feeling that we're always being taken for a ride [...]" (IP 6).

In summary, the results of our interviews show that endogenous institutional change is likely to occur as partaking (Dorado, 2005). The dominant temporal focus of these actors is on the past and present, as routine and sensemaking agency, when processing challenges and uncertainties. This analysis therefore shows that these actors externalize the locale of change, demonstrating their dependency on strategies of resource accumulation and their perception of the organizational field—as opportunity hazy. Hence, institutional changes, as partaking, occur only occasionally and through the cumulative resources and practices of autonomous actors

¹² Regarding the EU nitrate directive, measuring points are used to assess whether a region exceeds the standard 50 mg/l of nitrate in the groundwater or not. The fertilizer ordinance that refers to these values regulates manure application on fields for farms. There is ongoing discussion on the accuracy of these measuring points for indicating nitrate values in the groundwater in relation to field manure application. This discussion is mainly driven by farmers and farming organizations that question both the reliability of instruments for measuring nitrate values as well as the locations of these measuring sites.

¹³ These stages relate to the husbandry of animals and the ethical standards thereof. The higher the number is, the higher the standards with respect to space per animal and free-range farming.

in this organizational field.

4.3.2. Contrasting partaking

4.3.2.1. Cognitive processing: Revealing strategic agency. As an example of the future-dominated processing of uncertainties that we have coded and attributed to strategic agency (see Table 3), IP 5 described how strategic development and new business ideas have emerged from experiences of farming life and by observing other farmers: “[...] I have many colleagues [...] who do not manage to go on vacation, [...] have broken relationships [...]. I just realized, if you have such a real hamster wheel, then you have to have a permanent employee. And, when you always add it all up like that, I have the feeling that you actually don't have anything more in your pocket. You just want to distinguish yourself from other farmers due to how great you are. [...]” (IP 5). This example shows how the actor processes challenges via a future orientation that is based on individual experience. The ability to imagine something other (future orientation) than livestock farming has driven the actor to exit livestock farming and develop a new business idea. Another example of strategic agency (and the ability to imagine) entails the design of alternative value chains, which have made IP 14 independent of other actors, thereby reducing uncertainties and changing the configuration of structural economic dependencies: “So, everything, we produce ourselves; I have managed in the past year to market myself, whether when breeding animals or for direct marketing” (IP 14). In this way, the challenges perceived by the other actors, which have led them to experience an uncertain situation, no longer apply to IP 14.

In addition, we found a hybrid of sensemaking and strategic agency, whereby a future-oriented decision results in uncertainty, as outlined by IP 4: “[...] Aldi, for example, issued a press release half a year ago stating that they also want to have this husbandry level in seven years. And, we had also invested in it already a year ago in the free range for pigs [...]. But, then, there was no marketer who had received one with open names. Oh, finally, you are there with your outlet pigs?” (IP 4). Such uncertainty results from earlier, future-oriented decisions, based on indications from downstream actors, which have led the actor to question the process and governance of change. This reveals a combination of strategic agency and sensemaking agency, as the earlier future orientation of a decision results in a focus on the present and lead to making sense of the situation due to the uncertainty derived from that future orientation.

4.3.2.2. Discursive processing: Revealing the internalization of the locale of change. When asking our interviewees about their proposed solutions for their challenges, we found some actors discursively internalize solutions, i.e., position themselves as the locale of change, thereby indicating their ability to leverage resources and identify opportunities in the organizational field (see Table 3). IP 5 described this internalization as a contrast, as fixed in structures that do not allow one to change or the ability to think in a strategic way: “[...] I'm sorry to say that some of them [people in agriculture] are so entrenched in their structures that there's only one way to go, the way you learned at school. You have to grow or give way. [...] I think very few farmers are entrepreneurs. So, they may not even calculate it to the end because they think something is great. But, [they] just do it that way” (IP 5). We also found an instance of how this internalization effectively relates to staying informed and keeping track of new developments, as mentioned by IP 10: “I think what's important is that you just, well, stay on the ball—that you just always keep yourself—[...], top informed; that is, actually, in my eyes, the most important thing.” These examples therefore show that the interviewees do not refer to other actors with respect to challenges but rather focus on themselves (internalize the locale of change). Such discursive internalization of the locale of change is also combined with their nonexperience of a lack of appreciation by consumers or media coverage; concerning these examples of the externalization of the locale of change (Section 4.3.1), IP 5 and IP 14 did not address these during their interviews.

In sum, we have found that these two interviewees mainly process their current situation via a focus on the future and an internalization of the locale of change (which may disrupt existing institutions and practices), in contrast to the partaking activities discussed in Section 4.3.1. In general, however, few examples in our data offer forms that contrast to partaking.

5. Discussion

In this article, we have studied the role of farmers, as incumbents, in contributing to endogenous sustainability transitions in livestock farming. We have used the case of Rotenburg (Wuemme), Germany, and theoretically embedded our results by building on institutional theory with an agentic focus (Beckert, 1999; Dorado, 2005; Lawrence et al., 2011). We have found that livestock farmers are experiencing a range of novel challenges and uncertainties concerning, for example, the governance, economic situations, and discourses concerning the sustainability of livestock farming. In consequence, they process these challenges and uncertainties using dominant forms of habitualized routines and an orientation toward belief systems based on routine and sensemaking agency (Emirbayer and Mische, 1998; Dorado, 2005). We have also found that our interviewees discursively externalize the locale of change to other actors. These aspects, then, reveal that partaking is the most likely form of endogenous institutional change, if any. Institutional change, therefore, will only occur occasionally, incrementally, and as a consequence of cumulative yet autonomous actors and practices. Our interviewees' situations are exemplary of the paradox of embedded agency, which is dependent on other actors and their interplay in social structures (Emirbayer and Mische, 1998; Battilana et al., 2010; Lawrence et al., 2011). Nevertheless, we have also found that some actors are future oriented, employ strategic agency to enable them to leverage resources, and perceive the organizational field to be rather transparent. These actors are thus disrupting existing values and practices and may be important for endogenous institutional change. In the following section, we discuss these findings with regard to the general in/ability of incumbents in agriculture to contribute to change and the importance of imagination in alleviating political-economic consequences. We then briefly reflect on the limitations of this study and briefly explore the potential for future research.

5.1. Between boundary work and embedded agency: Livestock incumbents and endogenous changes

The results of our case study show that if endogenous institutional change is to take place, it will likely occur as “partaking” in the livestock system. The focus on the past and present, i.e., the routine and sensemaking agency in the cognitive processing of perceived uncertainties and challenges, indicates this profile of change, as well as the perception of the organizational field as opportunity opaque or hazy (Dorado, 2005). Transitions in livestock farming that are driven by this type of institutional change will likely be incremental reconfigurations of the values and practices that emerge from the cumulative practices of autonomous actors. Hence, farmers, as incumbents, primarily continue their habitualized practices, orient themselves toward beliefs, and externalize the locale of change to others (e.g., governance actors) whom they expect to change the framework conditions.

Although we have analyzed two cases that disrupt existing practices, the dominance of the maintenance and continuation of existing practices stands in contrast to the empirically demonstrated roles of incumbents in energy transitions (e.g., Galeano Galvan et al., 2020). In this sector, a heterogeneous set of incumbents (Turnheim and Sovacool, 2020) both maintains and disrupts institutions through, for example, the maintenance of the status quo and adoption of new practices that mark incumbents’ ambivalent positions (Lee and Hess, 2019; Galeano Galvan et al., 2020; Löhr et al., 2022). In regard to livestock farming, this ambivalence is absent from our case study; rather, there is a predominant focus on maintenance. This aligns with the cases of Quezada et al. (2016) on water transitions and Kotilainen et al. (2019) on transport transitions in terms of describing incumbents as hinderers in transitions during this stage. It also aligns with the findings of Runhaar et al. (2020) and van Oers et al. (2021), which indicate that farmers lobby for existing practices to delay cultural and practical change. In our view, this reflects how the maintenance and preservation of the status quo comprises the dominating temporal focus, in combination with the discursive hegemony that structure agricultural discourses and culture and render endogenous changes unlikely (e.g., Sutherland et al., 2012; Maes and van Passel, 2017; Heyen and Wolff, 2019; Friedrich et al., 2022a). Our study supports these findings. We mainly attribute the reasons for this to the specific characteristics of livestock farming, especially its long planning horizons and investment periods and entanglements of farmers, values, and input chains, which lead to path dependencies, for instance, intensification (e.g., Maes and van Passel, 2017; Burton and Farstad, 2020). Some additional reasons for these differences among incumbents’ roles in agriculture and transitions in other sectors may be found in the varying levels of political support for agricultural transitions and energy transitions in Germany (Heyen and Wolff, 2019); in the stages thereof (e.g., in a later transition stage, incumbents may benefit and thus support transitions; Turnheim and Sovacool, 2020); in the differences in property relations and their relevance for sustainability transitions (Grenzdörffer et al., 2022); and in the importance of geographical aspects in agriculture (Vermunt et al., 2020), such as the poor soils that are upgraded through manure application, given that economically viable land use alternatives are often difficult to develop for these marginal agricultural sites. An example of the absent political support for livestock transitions can be found in Stuhr et al. (2021), where pig farmers perceive their agency in coping with nitrogen policies to be low due to ever-changing political regulations and a lack of exchanges with actors outside their region and context.

While our case demonstrates how these aspects shape the perceptions of livestock farmers maintaining the status quo, we also want to highlight the salient “deep structures” (Fuenfschilling and Truffer, 2014) in terms of an institutional logic of growth in livestock farming, which we attribute to incumbents maintaining the status quo. Livestock farming in Germany (and in Rotenburg) has undergone decades of restructuring via reducing the number of farms while increasing farm sizes in terms of both allocated land and the number of animals (see Section 4.1, for agricultural restructuring, see Nowack et al., 2019; 2023). The farmers we interviewed can thus be regarded as profiteers of this process. For them, recent decades have comprised an era of growth. Now that the culture of “growth,” the historically institutionalized logic of livestock farming, is being questioned by legislative changes such as the new fertilizer ordinance in Germany and in media discourse, these incumbents have difficulties to escape their cultural conditioning and, consequently, defend these positions.

While the actors who are disrupting existing practices in our case may become institutional entrepreneurs¹⁴ (Dorado, 2005), we have not found any indications of convening (Dorado, 2005) as a profile of institutional change. We attribute this to competition in agriculture, not least that for land, which renders interactor cooperation for institutional change unlikely. However, it is exactly this interactor cooperation among actors who work in different organizational fields that produces “change agents” in transitions, as outlined by Strambach and Pflitsch (2020) and Bünger and Schiller (2022). In our view, then, it is critical for transitions in German livestock farming to unfold, for interactor cooperation to evolve and for knowledge exchange to take place (Bünger and Schiller, 2022), given that actors working in different organizational fields¹⁵ can potentially drive both cultural and practical change. As the case of Strambach and Pflitsch (2020) shows, this is not an easy or quick process but one that can take years and requires continuous institutional work among change agents or intermediaries and support from governance to change structural conditioning.

Moreover, we have purposely omitted actors along the value chain or in overlapping organizational fields, such as consumers, retailers, processors, or governance actors, from our sample. However, institutional change more generally can also be leveraged by

¹⁴ With institutional entrepreneur, we do not suggest “hyper-muscular agents” (Fuenfschilling and Truffer, 2016). Rather, with the term institutional entrepreneur, we follow Dorado (2005) to avoid complicating our results and relate it to the actors who are merely responsible for institutional innovation (Zietsma and Lawrence 2010). This, of course, also takes into account their embedded (and entangled) positions within the structures of the existing regime.

¹⁵ Notably, the “Borchert commission” initiative and especially the process for developing the “Recommendations of the Competence Network Farm Animal Husbandry” may have had an important effect on the shaping of actors who work in different organizational fields, as the initiative brought together actors from disparate fields (e.g., farming, food processing, retail).

new actors entering the organizational field (Gurses and Ozcan, 2015), by the boundary work¹⁶ of exogenous actors (Zietsma and Lawrence, 2010), and by the co-constitutional relationship of technologies and institutions (e.g., Fuenfschilling and Truffer, 2016). Institutional change is thus highly dependent on social positioning and embedded agency (Battilana, 2006). Concerning these aspects in terms of livestock farming in Germany, we are clearly in the midst of an institutional change that is not mainly driven endogenously (e.g., by farmers) but, more likely, by exogenous forces. Following Zietsma and Lawrence (2010) and from the perspective of boundary work and practice work, our case offers a snapshot of the process of institutional change and conflict. The dominant form of sense-making and routine agency among the interviewed livestock farmers can therefore be attributed to boundary bolstering and the defense of institutionalized practices (Zietsma and Lawrence, 2010). This relates to farmers who defend their values and practices by devaluating critiques of NGOs or media reports, as in our case. On the other hand, the actors in our example who exert strategic agency and disrupt existing practices while creating new ones challenge the institution from within. This is a common aspect of institutional innovation, which aligns with Zietsma and Lawrence (2010). By widening the focus to encompass exogenous actors outside the organizational field, one can detect that NGOs and civil society are performing both boundary and practice work that challenges the existing practices and structures of livestock farming. One example of this relates to protests by NGOs and in civil society, e.g., those that declare they “are fed up” in Germany with, among others, industrialized livestock farming (Nowack and Hoffmann, 2020). In response, livestock farmers are protesting, a form of practice work that defends their institutionalized practices and values. Examples of these include the recent protest of “Land Schafft Verbindung”¹⁷ in Germany against the new fertilizer ordinance and the farming protests in the Netherlands against new environmental legislation (Holligan, 2022). These legislative changes, such as the new fertilizer ordinance in Germany, can therefore be interpreted as a result of the boundary and practice work involving exogenous and endogenous actors in livestock farming; they have shifted and created new boundaries for how livestock farming is practiced.

Although exogenous actors are performing boundary and practice work and may ultimately provoke changes or exert pressures to change, we argue that institutional changes in agriculture remain highly dependent on incumbents. Here, aspects of ownership, property, and historic accumulation of farms and land, knowledge and values, as well as its high entrance costs, hinder new actors from entering organizational fields in agriculture (Vermunt et al., 2020). We therefore suggest that incumbents are and will be important actors in institutional changes and sustainability transitions in livestock farming. However, the question of how transitions could be governed with respect to the participation of incumbents remains open. Hence, in the next section, we briefly discuss the potential for the self-determined design of changes and the experience of a sense of self in relation to change.

5.2. Governing transitions in livestock farming: The role of imagination in self-determined change

The role of livestock farmers in transitions is contested and under dispute. If livestock numbers are to be reduced, as called for by NGOs and as a potential consequence of legislative changes, the question of rural farming identities and the political economy of this (partial) phase-out process with regard to both experienced justice and social conflict is of high relevance. We suggest observing the livestock farmers lobbying against transitions in an attempt to preserve the status quo (Friedrich et al., 2022a) and to prolong phase-out processes to avoid negative economic revenues and make the process “manageable” (van Oers et al., 2021). McDowall (2022) argues that economic diversification can reduce the negative regional political-economic consequences of phase-out processes in specific industries or regions. We extend this argument by highlighting the role of the self-determined design of changes (a sense of perceived agency) in the softening of transition processes that imply a (partial) phase-out of specific practices. In our view, livestock farming will only meet the planetary boundaries (Steffen et al., 2015) and reduce environmental degradation once livestock numbers are sufficiently reduced and/or an area-bounded livestock system is introduced. Either would definitely entail a (partial) phase-out of some livestock farms and/or a reorientation toward new business models. We argue that in the reconfiguration of livestock farming that such a transition implies, it is critical that livestock farmers experience agency¹⁸. This will help alleviate the potentially negative political-economic consequences in terms of social conflicts, rural identities and livelihoods. Our study has demonstrated the important role of strategic agency and individual farmers’ general ability to imagine real alternatives in this process. If transitions in livestock farming are to occur—e.g., reduced livestock numbers, more sustainable practices, or farm diversification—such changes will always be shaped by the imaginations of the future (Adloff and Neckel, 2019) that represent new and alternative practices for both livestock production and farmers. In our view, this aspect has thus far been overlooked in the governance of agricultural and livestock transitions. Hence, while imaginations of the future are of course inspired and shaped through past experiences, co-produced through science and society, they must disrupt and discontinue habitualized routines and beliefs to challenge institutionalized practices and embed institutional changes.

We see great potential for filling this gap among the regional policy-makers and change agents (see also Büniger and Schiller, 2022) working with livestock farmers to co-create imaginations of potential future possibilities and determine how to achieve these, thereby integrating different organizational fields. We have no potential blueprint for how to govern or design such a process; however, ideas

¹⁶ By boundary work, we refer to Zietsma and Lawrence (2011, p. 194), who define this as “actors’ efforts to establish, expand, reinforce, or undermine boundaries.”

¹⁷ Translated to English, this means “land creates connection.” This organization was created in 2019 in response to legislative changes and to farmers who felt unrepresented in the conventional lobby organizations of farming. See <https://landschaftverbindung.org/>.

¹⁸ Notably, livestock farming is also characterized by multiple externalizations, such as socioecological issues, on local and global levels. By observing how they undermine and often neglect the consequences of their farming practices and the lifestyles they have built upon these, we also note the risk that these farmers will only experience the agency to preserve instead of the agency to alter practices.

concerning the anticipatory governance of sustainability transformations (e.g., Muiderman et al., 2022) may be of relevance in building imaginative capacities among livestock farmers, akin to transformative research approaches, for example, in real-world laboratories (e.g., Bergmann et al., 2021). The starting points within agri-food systems may be alternative agricultural practices¹⁹, which can function as role models for imagining alternatives; it is also critical to underscore the relevance of actors from outside agricultural organizational fields to avoid reinforcing extant lock-ins (Conti et al., 2021). As our research shows, an individual's lack of the ability to imagine and anticipate the future will ultimately result in his or her continuation of habitualized routines. It is thus highly relevant to open the future through new ideas on sustainable livestock farming and/or alternative agricultural practices. We argue that a continuous transition in the livestock system in terms of an ongoing sociotechnical reconfiguration and decreasing number of livestock can be shaped by endogenous actors if they are supported in their practices and capacities to imagine real alternatives for their farms, their identities and their (rural) culture. Only in this way will just transitions in livestock farming be assured and negative political-economic consequences reduced.

5.3. Limitations and future research

Our research has focused on the endogenous perspectives of incumbents in livestock transitions. Similar to every empirical study, it has numerous limitations. We therefore note the necessity for future research to complement our understanding of incumbents and to add examples of both endogenous and exogenous sustainability transitions in agriculture and, in particular, livestock farming to illustrate a more comprehensive picture of the role of incumbents and their relational embedding. This topic relates to other geographies, other types of farming, and other approaches to institutional work and change; it could also entail research on new actors entering agricultural organizational fields and their role in shaping transitions. Downstream actors such as slaughterhouses and their role as incumbents in livestock transitions may provide relevant research avenues, as will a more structural understanding of path dependencies and lock-ins in agri-food systems (Conti et al., 2021) that uncovers the actors and processes by which these change and that complements our actor-focused perspective. In addition, in the attempt to support incumbents in navigating transitions, we want to underline the need for transformative research projects that integrate the perspectives and knowledge of a heterogeneous set of incumbents and other actors.

6. Conclusion

In this paper, we have explored the in/ability of incumbents to contribute to endogenous livestock transitions in Germany. Our results show that if endogenous change is to take place, it likely occurs as “partaking” (incremental changes through cumulative yet autonomous actors and practices), given that the interviewed actors dominantly and cognitively process challenges and uncertainties through routine and sensemaking agency while discursively externalizing the locale of change to other actors. We have also identified actors who are disrupting existing practices by following strategic patterns and internalizing the locale of change. These actors may be potential institutional entrepreneurs or innovators. Thus, while endogenous changes will most likely occur incrementally, as accumulations of multiple actors and actions, exogenous actors are currently and mainly driving reconfigurations of both the culture and practice of livestock farming through both boundary and practice work. While our empirical results are an *ex negativo* answer to the question on the ability of incumbents to drive endogenous sustainability transitions, they have also highlighted the role of imagination in the experience of self-determined change among livestock farmers. In our view, then, we need spaces in which we can support farmers in imagining real alternatives to their businesses and how to reach them, places to equip farmers with experienced agency and to alleviate the political-economic consequences of the partial phase-out of livestock farming. Rural change agents and political leaders should take this into account. Indeed, only through a consideration of these aspects will livestock incumbents be impelled to participate in sustainability transitions, conflicts anticipated early, a just livestock transition ensured, and environmental degradation reduced.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

Data availability

The data that has been used is confidential.

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¹⁹ With alternative agricultural practices, we refer to the actors and practices that present a contrast to industrialized livestock production. Examples may be local distribution of products independent of market pressures, community supported agriculture and many more.

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