

Article

Sustainable Animal Production in Denmark: Anthropological Interventions

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Abstract: In 2020, Denmark passed a new Climate Act. Labelled one of the world's most ambitious, the law explicitly obliges the country to be a global frontrunner in the green transition. Zooming in on the large Danish animal production sector, this article analyzes how ambitious climate goals are addressed by industrial, political, and scientific stakeholders in the sector. Based on the method of anthropological fieldwork, and theoretically informed by relational and performative approaches, as well as science and technology studies, the article explores how sustainability features in documents, policies, strategies, research presentations, and other outputs on Danish livestock, with the aim of understanding how an intensified animal production sector aligns itself with the green agenda. Accordingly, the article describes the *work* of sustainability and finds that a sustainable livestock industry is commonly articulated by making some units of animal production visible as central while ignoring or downplaying others. The analysis shows a Danish livestock sector that appears to consist of particular entities that science, industry, and politics can intervene in, manage, connect, and disconnect in specific selective ways. Altogether, the paper argues that this caters to a relative sustainability—a production sector seen as greener than others (per unit produced)—which, in turn, allows for it to ignore local responsibilities for planetary boundaries, even as Danish animal production is posited as a common, natural, and global good. The anthropological mode of analysis is an intervention that qualifies how such naturalization plays out.

Keywords: agriculture; greenhouse gas emissions; climate change; livestock; planetary boundaries; relative sustainability; transparency; global market; technological solutions; Denmark



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1. Introduction

During a seminar about cattle research at the Department of Veterinary and Animal Sciences at the University of Copenhagen in 2019, one session was entitled “Sustainability and the cattle sector”. In one of the presentations, professor Michael Hauschild from the Technical University of Denmark argued

“that an absolute sustainability perspective is needed to guide decisions about future food production systems and food products, to allow them to stay within their share of the environmental space, as it is set by global climate change targets, planetary boundaries that define a safe operating space for our civilization, or carrying capacities of regional ecosystems. The focus must shift from eco-efficiency to eco-effectiveness, from ‘better’ to ‘good enough’” [1]

To us, participating in the seminar as part of our anthropological fieldwork on green transition within the Danish animal production sector, the quoted presentation proved to be an unexpected gift. In Hauschild's thought-provoking talk, and its implicit relation to the other presentations in the session, we were presented with a tension in the scientific community that addresses the environmental and climate impact of Danish food production. There were (at least) two clearly conflicting ideas about how to conceptualize and

measure sustainability around targeting ‘better’ and ‘good enough’ solutions, respectively. This is in itself not surprising. However, since the seminar, the friction between relative and absolute ideas about sustainability has been an excellent guide for our ethnographic studies of the livestock sector in Denmark. Not because it allows us to arrive at a more precise characterization or critique of any concept of sustainability—our ambition is neither definitional nor universalizing—but because the suggested rift in different scientifically informed ideas about sustainability has encouraged us to follow and interrogate the complex work of sustainability as it is invoked in discussions and situations within the field of Danish animal production [2]. Accordingly, in this article we report on particular and situated fieldwork in the Danish livestock sector in order to take sustainability—including the divergent versions noted above—as the central analytical object and describe its workings, for good or bad [3].

Our research unfolds against a particular national political background. Danish society has agreed on an ambitious green transition as a national goal. The Climate Act from 2020 obliges Denmark to reduce greenhouse gas (GHG) emissions by 70% in 2030 compared to 1990 levels and stipulates that the country must become carbon neutral by 2050 [4]. Denmark is also intensely agriculturalized and has a very large animal production sector known for its space-consuming need for feed and harmful impact on climate, biodiversity, and biogeochemical flows [5–8]. To be more precise, according to 2018 figures, 55% of the land in Denmark is devoted to intensive agriculture and 8% to extensive agricultural land use [9] (p. 40), out of which 81% is used for the production of feed for animals [10] (p. 10). The agricultural sector is responsible for 22% of all GHG emissions in Denmark [11] (p. 14), and out of these, 90% of emissions are related to animal production [12]. As a consequence, Danish livestock production is repeatedly highlighted as central in the green transition. This means that stakeholders from all across the livestock sector, including industrial, political, and scientific actors, are currently engaged in intense efforts at making animal production more sustainable.

Since sustainability is always on the agenda for all involved, there is clearly interesting analytical work to be done in analyzing more precisely how an intensified livestock industry aligns itself with the current green transition. This implies asking in what ways decision-makers in the Danish animal production sector specifically subscribe to the sustainability agenda. Since the so-called Brundtland Report—the UN’s take on sustainable development—from 1987, it has been commonplace to think of sustainability as consisting of three pillars: an environmental, a social, and an economic dimension [13]. This was meant as a holistic approach that heeded the diverse and composite challenges facing people in the developing world. It was rightly argued that a narrow focus on any of the pillars was insufficient for understanding living conditions for many people in what was then called the Third World. However, in the 21st century, and in light of the imminent global ecological crisis, we find the focus on these three pillars problematic. Firstly, because it implies an idea that these three dimensions are universally distinct and jointly add to a complete whole, thereby still neglecting how such dimensions precondition and shape each other. Secondly, and more importantly, because the three pillars are too easily invoked to compete against each other—often as an argument that economic concerns are more important than environmental concerns to ordinary people, and that politicians need to heed this prioritization. This argument is seemingly persuasive when considering the globalized and highly competitive agro-food industry, characterized by volatile markets, resulting, for instance, in the estimate that 20–25% of all Danish full time farmers are on the verge of bankruptcy [14] (p. 18). The point is that environmental sustainability risks being seen as a luxury at odds with economic and social sustainability. On both accounts, then, thinking of sustainability in terms of a concept that is divided into different, universalized categories misses how it may work—and not work—messily across different settings. As anthropologist Anna Tsing has noted:

“‘Sustainability’ is the dream of passing a livable earth to future generations, human and nonhuman. The term is also used to cover up destructive practices, and this use has

become so prevalent that the word most often makes me laugh and cry. Still, there is reason to dream—and to object—and to fight for alternatives” [3] (p. 51)

The issue, as we see it, is not to ‘fill in’ a threefold concept by identifying separate dimensions of different weight, but to allow for sustainability to remain a troublesome idea that is variously invoked by industrial, political, and scientific stakeholders alike. Hence, based on anthropological fieldwork and guided by ideas of absolutely versus relatively sustainable solutions, the objective of this article is to analyze how sustainability features among different decision-makers at Danish livestock production’s structural, political and organizational levels, and to engage this analysis as a set of anthropological interventions that point to alternatives to the status quo. To be sure, our findings have implications beyond the Danish context; settling for ‘better’ instead of ‘good enough’ seems to be the reason for the frustrating lack of sufficient political and collective action, as summed up by the “Blah blah blah” by climate activist Greta Thunberg in her response to the result of the recent UN COP26 climate summit in Glasgow in 2021 [15].

2. Materials and Methods

Methodologically, we work through anthropological (or ethnographic—here we use these two words as synonyms) fieldwork, which essentially implies that we take cues, discussions, and situations from the field, and, from there, unfold, interrogate, and relate the practices, ideas, socialities, aspirations, and logics at play [16–21]. The field, as we employ it in this article, is not one specific and defined geographical location as might otherwise be implied in the notion of the field. Rather, in the following, it is simply constituted by pressing concerns with sustainable animal production, wherever these play out and in whatever format. Such an always emergent character of the field—and the implied selection of materials by the fieldworker—is part and parcel of working ethnographically. In more practical terms, the field of this article consists primarily of selected textual sources from industrial partners, public documents and policies, and research presentations, all of which we then process as fieldworkers through direct in situ discussion as well as interpretive readings. Accordingly, fieldwork can both imply face to face to encounters and document analysis, as both practices enact reality and thus bring our field into being [22–24]. Anthropological fieldwork of any kind is first and foremost an established qualitative, locally embedded, and specifically situated method that neither tests hypotheses nor aims at general representativity [25]. Further, the version of fieldwork we employ here is explicitly collaborative and generative [2,26,27]. First, our fieldwork is collaborative in that it works from within the field of livestock production to analyze, critique, and contribute to discussions that are relevant to actors there. In other words, the analysis of sustainability unfolds along with the fieldwork and through ongoing conversation; it does not, e.g., externally assess whether a given solution is or is not sustainable. Rather, the point is to collaboratively address sustainability while letting differences remain. We are thus interested in understanding, discussing, and challenging concerns with sustainability as they are articulated by different decision-makers within Danish livestock production. Second, fieldwork is generative in the sense that we do not work from an already defined concept of sustainability. Rather, the fieldwork interrogates ideas about sustainable animal production as different means of relating livestock production in Denmark to green transition. It does so in an open-ended manner, conducted explicitly as an ongoing discussion with different stakeholders, ourselves included. To illustrate, the researchers who have provided quotes that we take from published sources as empirical material have been sent a draft of the article, allowing them to comment—which some of them have. We have then taken these comments into consideration when finalizing the article as a part of an ongoing discussion about sustainability. The aim was never to attack individuals, but to enable a more qualified discussion of relevant systemic features between all involved, including ourselves and our own interdisciplinary research team, representing the fields of veterinary science, anthropology, animal science, and cultural history. As such, we are not seeing

ourselves as distant neutral observers, but as active participants in the field, committed as we are to sustainable transition.

Theoretically, and following from our chosen method described above, we build on insights from science and technology studies (STS) and performative approaches, which here mainly imply a commitment to always treating any scientific or knowledge claim as specifically situated [25,28–30]. This theoretical stance does not indicate skepticism towards the natural sciences that have traditionally dominated environmental and climate research, but it does highlight the specificity of any perspective on sustainability, whether that of an anthropologist, animal scientist, farmer, or other. In light of these theoretical and methodological considerations, the empirical material for our study can only be dynamic, particular, and provisional. In research that proceeds iteratively like this, there can be no externally established yardstick for collecting data or identifying a fixed dataset. The materials, then, are also an effect of fieldwork, which directed us to particular documents, seminars, statements, strategies, research projects, newsletters, and other outputs from or about the Danish livestock sector of special relevance for discussions of sustainability.

To structure the analysis and to organize our empirical material and analytical results, we focus on four elements that are repeatedly highlighted in the public–scientific discourse as central requirements if green transition in animal production is to succeed, namely, (1) developing innovative technological solutions, (2) obtaining sound data, (3) understanding global challenges, and (4) ensuring transparency. Organized thematically around this set of frequently proposed preconditions for green transition, we examine how sustainability is continuously and problematically invoked in the structuring of the Danish livestock sector and show, in turn, how an anthropological mode of analysis can help us better understand such sustainability work and its effects in a specific industrial setting—with the implicit point of exploring alternatives.

3. Results and Discussion

In this section, and structured according to the four themes noted above, we present our analytical results with a discussion integrated along the way.

3.1. Developing Innovative Technological Solutions: Small Units, Great Effects

In a recent edition of *LandbrugsAvisen*—a widely read agricultural newspaper published by the influential Danish Agriculture & Food Council business organization—an article on the reduction of methane emissions from cows opens by quoting a professor in animal science for saying “This is world class!” [31]. The scientist’s enthusiasm concerns a newly inaugurated hi-tech experimental facility for cows. In the facility, located in a part of Aarhus University in Jutland, Denmark, researchers can conduct controlled experiments to calculate cows’ methane production, caused by the enteric fermentation that enables them to digest cellulose and, ultimately, to produce milk. The facility provides an opportunity to test and monitor individual live cows and the effects of different feed additives, which are currently being developed to lower the level of strong GHG emitted from the cow. The article in the agricultural paper goes on to assert that the experimental facility is probably unique in the world and provides the best setup for finding “solutions to the cow’s methane problem”, as the headline frames it [31]. In other words, the world-class facility, along with experimental cows, feed additives, and researchers, are exactly what is needed to tackle climate change—and to meet the national reduction goal of 70% GHG emissions by 2030. In arguing thus, the professor aligns with the Minister of Food, Agriculture, and Fisheries, who emphasizes the need for technical solutions in order to keep up today’s level of production without downscaling, all while lowering climate impact per produced unit of meat and milk. When presenting input for a long-awaited new political Agreement on green transition in Danish agriculture (more on this Agreement below), seven principles were formulated, mirroring the Climate Act, the first one being:

“We need to develop, not diminish. The green transition of agriculture must be smart, for example through new technologies and solutions. The goal is not to produce less, but to

produce smarter. Denmark should export green food products and solutions—and not just transfer emissions and jobs to other countries” [32]

One of these ‘smarter solutions’, as often stated by both scientists and politicians, is feed additives that seemingly delete—or at least significantly reduce—the problem of methane emissions.

Ministers and professors do not stand alone. Strong collaborative and tightly knit relations between politicians, researchers, and industrial partners are often highlighted as a particular Danish hallmark of the agro-food complex, allowing Denmark to claim a supremely ‘knowledge-based’ industry. Alliances between science, authorities, industrial stakeholders, and practitioners, and the production efficiency that these alliances engender, have deep historical roots, tapping back into the development of cooperative creameries and dairy technology in the late 19th century [33–36]. Indeed, some argue, these close (historical) relations across sectors in agricultural Denmark are exactly what makes the Danish agroindustry world class and fit to compete on a global market, despite high labour and production costs and strict regulations within the country [37]. The collaborative infrastructure for agricultural expertise is also nurtured by an education system built on only a few schools for training professionals for the livestock sector [37]. In other words, professionals engaged in the animal production sector in Denmark, whether as industrial strategists, civil servants in state institutions, agricultural consultants, or other, are often educated within the same tradition and institutions, thus forming a network with long reach.

The head of the cattle section of SEGES Innovation, the leading agricultural knowledge and innovation centre in Denmark, continues the collaborative spirit. Like the professor and minister quoted above, she also points directly at the challenge of the cows’ emissions and asserts that technical solutions can resolve this. In a speech given at the annual Cattle Congress organized by the Danish Agriculture & Food Council, she thus stated: “Methane is the problem—not the cow. And this is really important, because we can actually do something about the cow’s emissions of methane, all while retaining the many positive qualities of the cow” [38]. What interests us here is the emphasis on the possibility—almost obligation—of human intervention into the rumen of the cow in order to preserve and utilize the positive characteristics of the cow (a point we will return to later). Thereby, the quote supports the researchers’ efforts in the hi-tech facility mentioned above. Indeed, “the cow’s methane problem” is an opportunity to summon human ingenuity and resolve. Perhaps even more interestingly, in the quest for finding solutions, the importance of separating the cow and the tiny organisms—archaea—producing methane in its rumen is stressed. This division is worth exploring in more detail, because it shows a particular conceptualization of the elements that are seen to constitute the Danish cattle landscape. What strikes us is the straightforwardness with which a cow and its symbionts are separated as different entities, and in doing so, how the human factor is orchestrated: on the one hand, humans are the agents who fix ‘problems’ with rumination by sorting out potential symbiotic relations and identifying units to intervene in—for the sake of sustainability. On the other hand, human intervention is completely occluded as that which has caused a problem with methane to begin with through the intensification and growth of cattle production and other resource practices that undoubtedly disturb the climate and environment. When breaking down the problem of the cow’s climate impact into discrete units with attendant promises of hi-tech solutions, the systemic features of production as a whole easily fade from view.

What we see here, then, is that scientific, political, and industrial representatives articulate sustainability in Danish animal production by means of detaching relations between entities that make up production animals, in this case, cows, microbes, and methane. Such decoupling amounts to a technology that makes sustainability into an issue of (selective) human agency and efficiency, and not an issue of absolute measurements and finite resources. In addition to separating cows from their breath, what is further striking is that the individual cow is also detached from the some 1.5 million fellow members of the

total Danish cattle population [39]. Efforts at sustainability target microbial activity in the individual cow, which then becomes a singular, yet up-scalable unit. The point here is that such the making and separation of particular sustainable units (a methane-reduced cow) allows for ignoring the overarching issue of the cattle production landscape as a whole—as if milking cows have no relation to wider ecological, global, historical, and cultural features of society. In recent years, much work within anthropology and related disciplines has gone into exploring more-than-human worlds, starting from the premise that humans are not an exceptional sovereign species, but always also part of and dependent on ecological collaborations—as are all other species, too [19,21–40]. In light of such relational insights, we would claim that there is no way to single out either archaea producing methane or, indeed, the cows as the roots of the problem. Instead, human production practices—and indeed the scale of these—are the crux of the matter and should take centre stage in discussions about the climate impact of cattle; such discussion is necessarily also about our entanglements with ecologies and the survival of species other than ourselves. However, as we have seen in the above, the ambitions of both natural science, industrial stakeholders, and members of the government are to develop and optimize, for example, by attending to microbial units as those with the greatest potential effect for reducing GHG emissions.

3.2. Obtaining Sound Data: What Counts?

“New data confirms: Arla farmers are among the world’s most climate efficient” [41]. In April 2021, this statement headlined a press release published on the webpage of Arla—the largest Danish cooperative dairy owned by producers in seven Northern European countries. The website continues as follows:

“The first results of Arla’ Climate Check show that Arla’s owners produce milk with one of the lowest CO₂ footprints in the world. The Climate Check is one of the largest datasets for milk production and clearly indicates what it takes to reduce emissions of greenhouse gasses from the farms even further in the course of the next ten years” [41]

The news story is about the introduction and first results of the so-called Arla Climate Check—a standardized tool for milk producers in the dairy cooperative to measure their climate impact on farm level. The dataset from the Climate Check became “one of the world’s biggest datasets for milk production” by having 7986 farmer-owners each respond to 203 questions, thereby ensuring both a great level of detail and that the regional differences between conditions in the seven owner countries were represented [42]. This vast number of farm level responses has then been aggregated and processed, after which Arla could safely conclude on their webpage that, on average, each kilogram of milk produced by an Arla farmer had an average footprint of 1.15 kg CO₂e, and that this result makes Arla’s milk producers among the world’s most climate-efficient. What interests us here is not this ranking, which is confirmed by other sources as well [43], and at stake is not whether the number that reports on the milk producers’ climate impact is correct [44]. We have no reason to doubt the calculations nor, indeed, do we have the ability to assess the aggregated results. What we do want to point to, though, is a particular practice of making the land of milk production ‘legible’ [45,46], and legible in certain ways. One immediate feature that stands out is that the unit for measuring the climate efficiency is the end product, i.e., a kilogram of milk. One might ask what it would mean to measure efficiency, e.g., in terms of hectares occupied locally and globally? After all, land is a scarce resource if an overarching concern is to feed the world’s increasing population. We are not implying that this would be more (or less) accurate, but we point to the fact that modelling and simplifying a diverse and enormous set of factors and indicators into a totaled result implies choices that tend to mirror the interests and perspectives of the designers of the models. In the words of Höhler and Ziegler, accounting for natural features through numbers often implies that “unruly nature is straightened for economic, political and scientific purposes” [45]. This is not meant as a controversial thing to say. Rather, to us, it invites an analysis of how such numbers work and what they articulate about the ongoing work for sustainability or reduction of GHG emissions in the Danish livestock sector. Interestingly, the Climate Check’s qualities

as both one of the world's biggest datasets and as a tool that heeds regional specificity all the way down to farm level are readily combined; the dataset at once enables the one totaled at a number of 1.15, which is world class, and a great level of regionally different details. Explaining the intentions, Arla notes: *"Our objective has been to create the best tool to support our farmer owners in reducing their emissions further in the most effective way. This is why we have gone quite far in designing a tool that ensures accurate calculations for our specific regional parameters"* [47]. The tool, then, simultaneously presents Arla's milk producers as among the most climate-efficient in the world and works as a climate action plan on the farm level.

The idea that the production of 'data', obtained by standardized tools, can in itself work as a pathway to improve climate efficiency is widespread. Arla refers to this more broadly as "Data-driven climate action" [48], and this stance was recently echoed in the newspaper *LandbrugsAvisen*. The chair of Danish Agriculture & Food Council's cattle division puts it as follows:

"Data is everything. The more efficient we are, the more climate-friendly the production becomes. Therefore we must do everything we can to use resources optimally (. . .) We simply need to harvest data where we can, so that we can learn to do it as efficiently as possible and see where the money leaks out of the holds" [49]

What interests us here is that the very act of obtaining data is linked to efficiency, and not least cost-efficiency, and that data are out there to be harvested, i.e., given by the natural conditions themselves. Similarly, commenting on SEGES Innovation's strategy for the cattle sector for the years 2021–2023, the chair mentions that one of the strategic milestones towards meeting the goal of carbon neutrality by 2050 is this: *"Every cattle producer must know his/her climate impact, calculated at farm level according to the same principles and based on existing data. We will also be able to quantify the cow's contribution to nature and biodiversity"* [50]. Again, what is interesting is that the uniformity of the calculations is highlighted, as is the very act of quantifying—in the clear expectation, it seems, that the result will be world class and thus mitigating the climate crisis.

To sum up on this section, what we see is that obtaining and comparing data are acts that are seen on their own to support green transition, even if such data only shows ways to improve the relative climate efficiency. Sustainability, then, features as an effect of data—and as an aggregate and uniform tool for a gradually cleaner production. It seems that data, preferably brought about by standardized procedures, in itself counts as work for sustainability, in part through being detached from the particular climate impact the data captures—as long as it points to possibilities for relative improvement.

3.3. Understanding Global Challenges: What and Where Is the Problem?

One of the foundational principles of the Danish Climate Act is the assertion that climate challenges are global. For this reason, it is further stated, Denmark has to be a frontrunner in international climate efforts, inspiring and influencing the rest of the world. Denmark, the Act says, has a historic and moral responsibility for moving first. In this section, we analyze some ways in which such frontrunning is articulated and performed in politics, industry, and science, thereby showing how 'the global' is ambiguously put to work for a sustainable animal production sector.

Research on animal production at the University of Copenhagen is presented through research platforms for each of the animal species of cattle, pigs, poultry, and mink. Altogether, the four species-specific scientific groups point to a wish for "expanding, gathering and making visible" the research in livestock production and health performed at the university, as written on its homepages. Further, the websites note that the platforms seek "to strengthen collaboration with business, the public sector, universities and others, nationally and internationally" [51]. Part of this strategy is to have an annual public seminar where invited guests present state-of-the-art research on each species and occasional discussion panels with broader scopes. The Copenhagen Pig seminar, held in January 2022, was an online event, and in his welcoming speech, the organizer listed a number of countries across the globe from where people had registered for the event. With around 30,000,000 pigs

being exported each year (half as live animals and half as meat; 2020 numbers [52]), Danish pig production is indeed a global endeavor and therefore of interest beyond Denmark. Under the heading “Climate impact of pig production” the first session was kicked off with a keynote talk, entitled “The climate impact of the cultivation of pig feed” [53]. The talk was partly based on a recent life cycle assessment (LCA) study on the environmental impact of Danish pork at the slaughterhouse gate [54] and on a previous study on the carbon footprint of cattle feed [55]. The talk, like Hauschild’s at the cattle seminar mentioned above, opened by showing Rockströms et al.’s renowned model of the nine planetary boundaries [56]. Then followed a slide with a cartoon drawing of a sunlit planet uncomfortably squared into a greenhouse, together with another image of sunrays shining on a part of the globe and the statement that the greenhouse effect is important for life on earth. The problem is that GHGs are out of balance, the talk continued: carbon dioxide from fossil fuels, methane from enteric fermentation, and nitrous oxide from manure are all part of this imbalance. It then showed a slide with different nations’ emissions related to food consumption and waste, followed by a slide with a model from the UN that pointed to how these emissions could be reduced by different strategies. The slide was called “mitigation in diet and agricultural production” and featured different colored columns. The first red column named, “reduce growth in demand for food and other agricultural products”, showed the reductions to be reached by changing human diets, reducing food waste, and phasing out biofuels. Clearly, the biggest reduction potentials relative to all other strategies in the whole model would come from shifting diets and reducing food waste. Another column in blue, entitled “Reduce GHG emissions from agricultural production”, showed that the biggest reduction potential here was to be found by reducing enteric fermentation. Energy emissions within the agricultural sector, together with manure and nitrogen use efficiency, also had a relatively high potential for improvement. In addition to making visible that the biggest reduction in emissions could be enabled by changing diets, the slide also introduced a curious separation between production and consumption that was further developed in the talk. Whereas consumption (i.e., dietary habits) should be changed by reducing demand and decreasing the proportion of animal-based food consumed, the actual food production should be further optimized with better management and technologies—one realm needs to downscale, the other to intensify. As one can also read in one of the articles backing the keynote, continuous optimization in the production system leads to sustainability—a relative perspective where a ‘better than’ logic is given preference over the absolute aim of ‘good enough’ [54] (p. 10). During the keynote, a curious possibility emerged, namely that changing diets, which by far had the biggest reduction potential, could be readily supplemented with an even more optimized animal production. Through the Zoom chat function, and implicitly addressing the elephant in the room—the issue of downscaling animal production to match a smaller intake of meat and dairy products—we asked if a changing diet should be met with a concomitant change in animal production. Interestingly, the keynote speaker answered by pointing to yet another separation, namely between Denmark and the rest of the world. Even though a shift in diet among Danes is needed, the demand for pig meat is increasing globally. What interests us here is that no relation between local consumption—a reduced animal diet in Denmark—and production—a change or reduction in pigs for export—was established. Admittedly, a shift in Danish diets would only be a drop in the ocean compared to the huge export of animal products. Without addressing the export economy in pig production directly, the often-heard argument of ‘leakage’ loomed.

The concept of leakage has been addressed by economic advisers, who pointed out that governmental tools to reduce GHG emissions could take the form of a CO₂ tax in Denmark. However, they cautioned, such ‘climate demands’ might cause climate footprints to simply transfer—or leak—to other places with less ambitious GHG regulations. As long as there is a global demand for a given product, envisioning reduction or degrowth in any Danish production system will be difficult, the leakage argument went. It would just lead to an increase in similar production systems elsewhere. Especially in the livestock sector,

the idea of ‘similarity’ has become central and contested. For instance, as observed by Dorca-Preda et al. [54], Danish livestock production is so optimized and well-managed that producers are already “achieving sustainability” [54] (p. 10). Such relative sustainability, however, is only to be found in certain parts of the world, as the researchers continue:

However, emission intensities and production profiles vary widely at the global level (Gerber et al., 2013), and thus specific management strategies need to be designed for different geographical regions. According to Mottet et al., (2017), productivity was greatly improved at the system level in European production systems and additional marginal gains can thus be achieved through precision livestock farming or the development of feed additives (. . .) In regions characterized by high animal densities, but low animal productivity such as Latin America, South Asia, or East Africa, it is expected that the implementation of the options identified in the present study will lead to important benefits (Gerber et al., 2013). Relevant management strategies in these areas could include improving feed and herd productivity, better manure management, and energy-saving technologies. [54] (p. 10)

The point here is that, by comparison, production efficiency becomes a hallmark of the Danish pig industry, which comes across as better—more sustainable—than “similar” productions elsewhere. In other words, sustainability is a competitive measure that apparently can be used to compare different production systems in order to decide who is most entitled to produce. Calculations about the percentage of the leakage effect have thus been central to the negotiations leading up to the Agreement on green transition in Danish agriculture from 2021. Estimating the (future) leakage effect becomes a matter of striking the right balance—both for the Danish economy and global emissions. Thus, a particular Danish and global perspective become intermingled in interesting ways. A fierce critic of a CO₂ tax, Martin Ågerup from the neoliberal Danish think tank Cepos, puts it like this: “[it is] vital that we stop thinking about climate politics as a national affair. This will be very expensive for the Danes, and it will have little impact on the climate” [57]. Prior to the negotiations on the agricultural Agreement, the economic advisers had published a report showing the leakage effect according to different scenarios. In the press release accompanying the report, one particular scenario with a 75% leakage effect took center stage—a choice that later made the head of the economic advisors regret the process, as was later reported in a Danish newspaper:

‘It was therefore remarkable when Lars Gårn Hansen [economic advisor] later admitted to having been ‘too pessimistic’ in his communication. The 75% was just one scenario, where the EU countries were the only ones to meet the goal in the Paris Agreement of limiting global warming to 1.5 degrees. In a different scenario, where all countries except USA, Russia, China and India met the Paris Agreement, the leakage effect was as low as 30%, and the Danish contribution to mitigation significantly larger. Nonetheless, the economic advisors consistently emphasized the 75% in their press release on the report, sent out to the public and cited in several media. And this was a mistake, Lars Gårn Hansen acknowledged (. . .). Even though the 75% structured the debate, the advisors had no grounds for stating that this number was more correct than 30%, Hansen explained. Today, he regrets the limited focus in the public debate: ‘In hindsight, we were complicit to this, when we communicated the 75% leakage as the central scenario, he says.’ [57]

In a later assessment, the economic advisers updated their model and found that the leakage effect could be even lower, in response to which the industrial stakeholders apparently stopped trusting their assessments, which had previously come in handy.

What we have shown here is that ‘the global’ is very present in discussions about sustainability and animal production—in interestingly selective ways. We find it striking that the global is mainly articulated either as an insatiable market (whether for animal products or innovative solutions) on which Denmark needs to compete for shares, or as an indiscriminate ‘elsewhere’ that does not live up to the climate efficiency of Danish animal

production, hence the leakage argument. It rarely features, say, as a planetary ecosystem with particular limits to resource use and waste. So, on the one hand, Denmark is cast as a global and highly ambitious frontrunner with an obligation to inspire—or feed—others by continuing the present, supremely efficient animal production. On the other hand, changing diet matters very little in relation to what Denmark does, given the minute size of the country’s population vis-à-vis a global population in want of animal-based protein. Importantly, both of these portrayals refer to sustainability as the motivation and are often voiced by the same people. What varies are ideas about where to locate—and solve—the problem of animal production’s climate footprints.

3.4. Ensuring Transparency: Sportsmanship and Societal Contracts

During a conference on Research and Green transition, organized in May 2021 by two members of the Danish Parliament, representing the Social Democrats and the Conservative Party, an Aarhus University professor in animal science started her presentation by saying that it is necessary “to keep the eyes on the ball”. To the animal scientist, this means to acknowledge that the problem with cattle production is methane emissions, not the cow as such, as also discussed above. If people only knew how to properly identify the problem with cattle production, it is indicated, they would also know that microbiological research like her own promises to reduce methane emissions by 50% in the not-too-distant future. The “ball” in this is what happens in the gut of the cow. What we see here is the familiar image of a promised techno-fix—the optimistic stance that natural science can help us solve the climate crisis by fixing obstacles to our ever-increasing appetite and wishes for material goods. However, what we want to highlight is something different, namely, a set of other features that are related to cows in Denmark. In her presentation, the professor went on to say: “One thing is that we can provide solutions; but another thing is that cows ‘make sense’. Ruminants deliver important services to society in a circular bioeconomy” [58]. These important services are that cows convert otherwise non-digestible (for humans) biomass into high quality protein, they ensure biodiversity, and they create jobs. Furthermore, and not least, the cows are an opportunity for promoting “potent Danish ingredients”, making for an enormous export potential. Going beyond the microbial scale, these qualities go with cattle—and simply make sense. Our point here is that, in addition to the now familiar ambition of (green) growth through technology and innovation, as also stipulated in the Climate Act, what we see is a particular articulation of ‘sportsmanship’. On the one hand, the public is urged to keep their eyes on the ball by limiting the discussion of cows’ negative climate impact to the microbial scale; viewing it differently would amount to foul play. On the other, there is a clear appeal to recognizing the beneficial qualities of cattle on a societal level—most people would be hard-pressed to claim that protein, biodiversity, and jobs do not make valid arguments for production. Being a team player implies that one subscribes to the ‘sense it makes’ to have, develop, and sustain cattle production in Denmark at its current level, all while properly identifying the problem of such production—by cutting it down to (microbial) size.

What we suggest is that the Danish animal production sector collectivizes the work for sustainability in highly interesting ways that make some units (e.g., archaea in the rumen and a sensible national team) appear and others disappear (e.g., an overheated production system at times implying ecological disasters up- and downstream). This scientifically backed idea of a broadly founded team spirit, implying a view of Danish cattle production as a practice that makes immediate sense, also plays out on the political level and in the industry. Indeed, consensus is repeatedly emphasized as a quality that supports sustainability. In the fall of 2021, a broad coalition of parties in the Danish parliament signed an Agreement on how to achieve a green transition in Danish agriculture, in terms of both environmental and climate impact. The Agreement is designed to operationalize parts of the so-called Climate Act mentioned previously, and the two documents build on the same principles, as also noted above. In the course of the Agreement’s 15 pages, it is emphasized again and again that Danish agriculture must be developed rather than

diminished, as captured in an often-repeated pun on the two Danish words for each of these ('udviklet' and 'afviklet'), as if only these two extremes exist. Accordingly, all through the Agreement, reductions in GHG emissions are balanced against a particular list of other political and societal concerns: economic viability of the agricultural industry, Danish competitive capacity, public budgets, export, employment, social cohesion, and regional development. Green transition, it seems from the Agreement, must be kept in check by these other vital priorities so that it does not affect the productivity of the agricultural sector, nor compromise the strong welfare state or the Danish reputation as an excellent food-producing country. In other words, so that the production simply 'makes sense'. What is further interesting here is that one of the perceived strengths of the Agreement is exactly its wide circle of signatories—all but one political party agreed to the deal, much to the joy of the chairperson in the Danish Agriculture & Food Council, Søren Søndergaard. In his annual speech at the end of 2021, he highlighted that *"A unified agricultural industry made the politicians listen (. . .) We stood side by side, as we have done for centuries"* [59]. Further, he lauded the fact that the agreement was a collaboration between left and right. The chair extended a personal and comradely thanks to the Minister for Food, Agriculture, and Fisheries, Rasmus Prehn:

"A special thanks to you, Rasmus, for a good and honest collaboration. I recognize that this has not been the easiest task—but you have listened. And I must say that personally, I have great respect for the assignment you have had to struggle with. You could have chosen a faster—and maybe more politically accessible—track. But you chose the right way. In the end, you chose the broad collaboration" [59]

What is striking in this quote is that Søndergaard articulates an interesting mix of having ensured that agricultural industrial interests were heard on the one hand, and highlighting the benefits of a broad coalition as being the 'right way', on the other hand. Thereby, we suggest, the pending problems of climate change and the reasons for even making the Agreement in the first place appear almost as secondary—decoupled from the day-to-day 'honest' negotiations of industrial–political collaboration to the benefit of all. Our point is that there is no mention of ecological crisis as the ultimate motivation for the Agreement—the important thing seems to be the broad agreement in itself.

Interestingly, there also seems to be a widespread idea that transparency and a stronger sense of connection and mutuality between the general public and farmers are necessary for ensuring such collaborative action. This is, in part, a response to the agricultural sector feeling that it is unfairly singled out as a scapegoat for climate change, all while lacking recognition for the positive contributions they work so hard to deliver. This has lead SEGES Innovation to formulate part of their 2021–2023 strategy as a matter of achieving a "strong societal contract". The published strategy reads:

"Danish cattle production plays an important role in society, and we want to strengthen our societal contract. A strong societal contract is a mutual and equal relationship between Danish cattle farmers and the wider society of which we are part. Danish cattle producers create meaningful jobs with a strong purpose, employment across the country, and income for Danish welfare (. . .) A strong societal contract requires that we actively engage in local, national, and international problems, and that we are proactive, and openly communicate our goals and challenges. We will do this by getting involved and entering binding collaboration with organizations and companies in and around agriculture. By making visible our efforts for a more sustainable and economically attractive cattle production, based on balances between people, animals, and nature, we will improve the image of cattle farming and the farmer's sense of pride in the trade" [50]

Here we want to highlight that climate change is seemingly made out as a communication issue and an image problem. To counter that, openness and transparency are key. Interestingly, there seems to be a confidence that all parties are interested in agreeing to such reciprocal contractual relations. What we see here, then, is that a "mutual and equal" relation between animal production and the public is cast as a natural and given

good. Alternative visions, to the contrary, are by implication portrayed as an effect of lack of knowledge about agriculture or openness about farming—the cure being more transparency and knowledge about the production conditions. As anthropologist Veronica Strang has noted, “*Western societies have, at this stage, so thoroughly globalized capitalist ideologies of growth that it is now extremely difficult for alternative ideas, such as those promoting ‘Degrowth Economics’, to get a hearing at all*” [60] (p. 210). Sportsmanship, it seems, is to enable Danish animal producers to take pride in their—consensually sustainable—trade and turn the rest of the population into supporters or even beneficiaries.

4. Conclusions: Anthropological Interventions

When more efficient coal-powered steam engines were invented in the course of the 19th century, British economist William Jevons noticed that, against intuition, this technological progress did not lead to a reduction in fuel consumption. To the contrary, it led to a massive increase in the demand for fuel that eventually kickstarted the Industrial Revolution [61]. This rebound effect, where what is saved or gained via technological progress and optimization leads to increased production, is referred to as the Jevons paradox. As we have seen, even though sustainability of the Danish livestock sector is constantly repeated and sought by all stakeholders and decision-makers, setting absolute limits on animal production is very rarely a part of the equation, even in a rich country with ambitious climate goals such as Denmark. Sustainability in the field we have explored most often works differently—relatively. Accordingly, we may say that the Jevons paradox has been with us throughout the article in our exploration of how a massive interest in sustainability in the field of Danish animal production combines with continued development, new solutions, and production at current or increasing levels. However, rather than writing the relative articulations of sustainability off as misunderstandings of the concept, we are inspired by Tsing’s idea of working by addition rather than subtraction [62]; that is, we want to see what sustainability also entails, even if incommensurable and messy applications emerge. Such differences work as an opportunity to ‘stay with the trouble’, as philosopher of science Donna Haraway frames it [63]. In this way, working anthropologically by way of addition does not imply ‘adding up’, but instead holding on to divergence as an indication of something worth debating. Accordingly, instead of patrolling what sustainability can be allowed to mean, this article has explored the articulations, by business spokespersons, politicians, and applied scientists alike, through which some units pertaining to animal production become visible as discrete entities that can then be related to or separated from other units. What appears, then, is a livestock sector consisting of particular modules that science, industry, and politics can model, balance, and manage in specific ways—all with the aim of development rather than downscaling. Such identification and making of particular units are simply what allow for technologies that support a particular Danish, world class alliance that champions climate-efficient animal production.

By our anthropological interventions into some of the central elements that underpin this articulation of sustainability, we want to make a case for making visible and reconnecting strategically severed environmental relations in order to promote work for sustainability measures that heed planetary boundaries [64,65]. As Strang has argued, the problem is that industrialized capitalist societies have come to see the material world as a service function for humans. This leads to a managerial fantasy, which summons the world around us into an up-for-grabs inventory of controllable units. Strang continues: “*Such a superior anthropocentric view naturally encourages the assumption that the needs and interests of other species and ecosystems are intrinsically secondary and can be sacrificed to short-term human interests. It is this central flaw that an anthropology of sustainability needs to address, by providing new theories that can generate new practices*” [60] (p. 212). In the above, we have shown how this flaw emerges in Danish livestock production—with dire implications.

Although the continuous articulation of ruminant qualities, GHGs, nations, numbers, and political agreement, among others, are mainly presented here as discursive, it is important to acknowledge that these articulations are highly consequential for efforts at

sustainability. One very real and material effect, it appears, is that the trope of a world class intensive, technologically advanced, and relatively big Danish animal production is mostly unchallenged politically, which, in turn, becomes an argument for continuing production at current levels. This, we argue, is where a fieldwork-based anthropological mode of analysis can come in: Pointing out more exactly how this ‘naturalization’ is articulated, and from there formulating dreams of alternatives.

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