

## ARTICLE

# Milk from the farm, the factory and the future: An ecofeminist reflection on Aotearoa New Zealand's dairy sector

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## Abstract

In this article, I explore the topic of dairy transitions in Aotearoa New Zealand through an ecofeminist lens. This perspective challenges existing power dynamics and calls for greater consideration of ethical and political dimensions for food system transitions. I draw from reflections from doctoral fieldwork conducted in the South Island of Aotearoa New Zealand in 2022, which included visits to 13 dairy farms, a milk processing facility, and a precision fermentation laboratory. Guided by ecofeminist ethics and critiques of feminised protein production, the paper advocates for more ethical engagement with the complex relations within dairy food systems and explores the cultural and the material realities of shifting away from animal-based dairy towards abstracted protein production. These reflections highlight the importance of critical place-based inquiry, researcher reflexivity, and situated knowledges in shaping understandings of just and sustainable agri-food transitions more broadly.

## KEYWORDS

Aotearoa New Zealand, cows, dairy, ecofeminism, precision fermentation

## 1 | INTRODUCTION

There is growing recognition that contemporary food systems need to transition to achieve climate action and sustainability goals (Tribaldos & Kortetmäki, 2022). Drawing from the field of just transitions scholarship (McCauley & Heffron, 2018), an emerging field of just food transitions has called for greater recognition of the more-than-human world towards achieving food system sustainability (Tribaldos & Kortetmäki, 2022). This paper provides an ecofeminist response to such calls, recognising the interdependencies of humans and ecosystems for mutual flourishing (Adams & Gruen, 2014; Held, 2006; Kheel, 1985; Plumwood, 2000, 2012; Puig de la Bellacasa, 2017; Twine, 2017). Animal-based dairy production is often associated with significant environmental challenges, including emissions, biodiversity loss and water pollution (Bojovic & McGregor, 2022). Shifting from traditional animal dairy production towards milk production

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without animal bodies, either as plant-based or precision fermentation protein, offers pathways towards sustainable food transitions. Precision fermentation involves the genetic modification of microorganisms to generate desired traits and commodities, such as animal milk proteins, without the need for animals (Augustin et al., 2024).

Transitioning to novel dairy protein production regimes requires innovative approaches to address both cultural and material obstacles for just and sustainable food transitions. If such transitions are not properly understood and managed, they risk reinforcing existing inequalities, affecting people, animals and environments unevenly. Ecofeminist scholars who engage with questions of cow livelihoods highlight that such inequalities stem from human exceptionalism in dairy farming, which is perpetuated by education and traditions rooted in settler-colonial violence, the appropriation of Indigenous lands, as well as themes of hypermasculinity (Gillespie, 2018; Narayanan, 2023). These are relevant considerations for the study of dairy futures in Aotearoa, given the colonial history of European settlement (Ginn, 2008).

This paper explores ecofeminist perspectives on the future of Aotearoa's dairy industry. Drawing on my fieldwork experience as a researcher, I reflect on my place-based insights gathered throughout fieldwork in June–July 2022 and November–December 2022. During this time, I visited 13 dairy farms across the Canterbury and Southland regions, one of Aotearoa's largest dairy milk processing plants, and a precision fermentation laboratory. I draw from the intersections of critical feminist perspectives to the fields of transition studies and food justice (for examples, see Adams, 2010; Bell et al., 2020; Bouzarovski, 2022; Cock, 2018; Gaard, 2015; Giacomini, 2020; Gruen, 2015; Houtbeckers & Gaziulusoy, 2019; Mallory, 2013; Salleh, 2021), as well as Haraway's (1988) call for situated-knowledges that engage with epistemologies of location and positionality, informing relational understandings of the world, facilitated through being in-place. As applied to the study of dairy, these perspectives challenge human exceptionalism, beckoning more critical engagement with the more-than-human relations that inform present and future dairy production. This aligns with my own positionality as a long-time advocate for animals and environments through the practices of veganism. My own feminist politics and ethics in this regard are inspired by ecofeminist critiques about animals in food systems, particularly dairy industries as inherently exploitative of female bodies, with parallels drawn between women's socially reproductive labour and the reproductive capacities of female cows (Aavik et al., 2024).

In what follows, I provide a brief overview of the literature to situate my perspectives, weaving together themes of social justice, interspecies ethics, and environmental concerns. I then provide my critical reflections from encounters at sites of milk production, moving from interactions with most cows to the least, highlighting the abstraction and distance from animal bodies, labour and land in novel protein production. I conclude each section with reflections of how my place-based observations bring to light both the omnipresence and absence of cow livelihoods. I question whether this presents a meaningful advancement in sustainable dairy systems or a mere replication of existing exploitative production dynamics.

## 2 | AN ECOFEMINIST METHODOLOGY

Ecofeminist perspectives engage in relational ontologies that focus on connectedness and wholeness, moving beyond the 'famous male urge for limitless knowledge, omniscience and omnipotence' (Mies & Shiva, 1993, p. 51). Through this relational ontology, ecofeminists insist on a vision of the world as an active subject, made possible through situated knowledges (Haraway, 1988). In focusing on a relational approach, I consider Tuck and McKenzie's (2015) 'critical place enquiry' as a methodological opening to both observe and engage in a relational ethics of accountability to people and place(s). Adopting critical place enquiry brings attentiveness to the 'intersection of elements' in ways that evoke multisensory and embodied experiences to empirical material (Tuck & McKenzie, 2015, p. 634). This invites a focus on affect, emotions and situated knowledges, to make meaningful connections and understanding of relations across physical spaces but also within 'the layers of cultural, historical, social, and ecological relationships that intertwine to form the unique eco-social locations' (Mallory, 2013, p. 178). This aligns with classic ecofeminist perspectives such as Gruen (2015), who calls for 'entangled empathy', to guide moral attention towards our interconnections particularly in relation to other species (in this case, cows) that inform a relational ethic of care and embodied awareness. Traditional masculinist scientific research has often downplayed such approaches; thus, the feminist project of challenging dualisms such as the 'reason/emotion dichotomy' (Giraud, 2013, p. 60) presents opportunities to support dialogues that critically engage with care and empathy. These dialogues challenge notions of 'value free research', and invite a 'conscious partiality', which can be achieved through empathy and partial identification with the research objects (Mies & Shiva, 1993, p. 38). This carries with it certain ethical-political significance, such as greater understanding of the roots of oppression by examining real-life situations, in turn providing a basis to make life better for those who are oppressed (Gaard, 2013).

This paper draws from my own encounters, observations and interactions through a critical ecofeminist lens as researcher in the field(s). The theme of encounters draws from critical animal geographies which explores the spatial, political and ethical dimensions of animals' lived experience and human–animal encounters (Gillespie & Collard, 2015). This perspective also sheds light on how social and interspecies inequities are embedded in animal food systems (Clay & Yurco, 2020). With each place I encountered, I made notes about my observations, discussions with participants, took photos and engaged in self-reflection after the fact, documenting how both my emotional responses and thinking evolved. The approach of being *in place* provided the benefit of multisensory cues to articulate and build understanding of places or practices, especially in the context of on-farm engagement (Thomas et al., 2019). This is ecofeminism in practice—the use of place-based empirical research to explore the intersections of social justice, interspecies ethics and environmental concerns (Bell et al., 2020).

Walking through paddocks was a practical way of engaging with and observing opportunities and barriers to transitions at the farm level. This provided a nuanced, empirical basis from which an empathetic place-based understanding can be utilised to inform bottom-up food transitions' planning and practice. As Griffins (2014) contends, such observations can produce novel prospects for new modes of representation and expression within academic settings. While researching dairy futures, Gillespie's (2018) book about the difficult, lived experience of dairy cows in the USA helped me navigate my own research, especially in light of Griffins's (2014) assertion that for methods to cohere with critical theories of power, we must integrate research-situated dynamics, such as the context, relationships, and power structures firmly into data analysis. Gillespie's book prompted me to notice and reflect upon the behaviours of cows in paddocks and examine the way places and spaces are configured to support socio-cultural power relations, especially in terms of gendered labour and the domination of non-humans. To navigate any tensions between myself as a researcher and participants' different perspectives, I practiced a 'tactical withholding' (Johnson et al., 2021) of my own politics and ethics to better understand farmers and producers' perspectives, which ultimately led to more candid and open conversations.

### 3 | ENCOUNTERING DAIRY FARMS

Dairy farms are much less homogenous than the milk they produce. From afar, everything looks the same but through situated encounters, the nuances of dairy production, reflecting differences in environments, farmer identities and animal livelihoods were revealed. It helped that farmers were forthcoming with information about their farm management practices and their perspectives on political, economic and ethical issues of dairy farming. I visited a variety of farm types, from smaller-scale farms, with an average herd size of 200–350 cows, to a large-scale barn operation of 5000 cows, shown in Figure 1.

I noticed a pattern—the larger the farm, the less farmers connected with their animals. I attributed this to the fact that farming at larger scales requires more reliance on technologies and mechanised labour. At the large-scale farm, I watched on as rotating bristles scratched a cows back. Meanwhile, at the smaller farms, farmers walked up to their favourite cows and gave them a scratch themselves. These differences forged a particular set of relations between humans and non-humans, informed by what I would consider a complicated ethic of care. One explanation of my observations of care was the way dairy farmers described cow bodies as economic units for production and profit, highlighting the instrumental value of such animals, rather than their intrinsic value.

An encounter embodying these reflections happened while I was standing with a dairy farmer on a rocky paddock in South Canterbury, staring out at a herd of pregnant cows (Figure 2).

When I asked the farmer about his relationship to the herd, he stated:

Cows are shareholders in our business ... They just have no voting rights

(Dairy farmer, 2022).

Despite being stated in jest, the comment reflected Porcher and Schmitt's (2012, p. 41) observations that dominant social representations of livestock animals take on the status of *de facto* workers; the animals must do 'their job'. I thought back to Gillespie's (2018) reflections of her own research and visits to dairy farms and found solace that I was not the only one problematising these spaces. I reflected on the logics of domination and obsession with 'feminised proteins', which Adams (2010) defines as the abuse of the reproductive cycle of living female animals, whose reproductive capacity is manipulated for human needs.





**FIGURE 1** Dairy cows housed in large-scale barns, Southland, Aotearoa. *Source:* Photo by Milena Bojovic.

In further exploring these logics, I also immersed myself in understanding the life cycle of cattle, having the opportunity to assist in feeding newborn calves (Figure 3).

I instigated conversation about the death economy (Sneegas, 2022) with regards to cows sent away for slaughter, commonly referred to as ‘cull cows’ and ‘bobby calves’. I was curious to learn from dairy farmers how they navigated their own emotional responses to the realities of farming and being complicit in the killing of ‘lively commodities’ (Collard & Dempsey, 2013), knowing that for myself, this is a difficult and confronting topic. Most often responses from dairy farmers reflected a degree of cognitive dissonance which I understood to be a necessity in an industry that instrumentalises animals. One farmer shared that bobby calf death is ‘humane and quick ... Most humans would be happy to go out as a farm animal goes out!’ (dairy farmer, 2022). These instrumental ontologies were also present in approaches to environmental stewardship. For example, on another dairy farm, I visited winter grazing paddocks where I asked the farmer about soils and crop rotations to better understand how seasonal changes and year-round pasture systems functioned (Figure 4).

While standing in the paddock, the farmer reflected on a cultural shift and changing expectations of environmental stewardship for the rural sector, stating:

20years ago, if you were a farmer concerned with the environment you were branded as a ‘tree hugger’. Nowadays you have to have an interest in the environment.

(Dairy farmer, 2022)

Discussions about environmental stewardship with other farmers often led to reflections about how good environmental management was synonymous with profitability. This was akin to how good ‘care’ of dairy cows also translated





**FIGURE 2** Pregnant dairy cows grazing on pasture, Canterbury, Aotearoa. *Source:* Photo by Milena Bojovic.

to better profits. After visiting the farms, I reflected on these encounters, especially as they related to my reading of Gillespie's (2018) research on dairy farms:

As I research key feminist thinkers in the field of human-animal relations in dairying, I can't help but hold back tears reading their experiences of encounters with cows and also the descriptors of what happens to these creatures on farms. I am reminded of the many cows I myself encountered while on fieldwork: cows grazing next to the road, cows moving through paddocks, cows in the milking shed, cows in the rain, cows in the mud and the calves freshly out of the womb. I am affected by these experiences in ways that evoke a sense of empathy and sadness because I know the extent of suffering experienced by these animals in farmed conditions. When I would pose the question of animal wellbeing to farmers, most if not all farmers remarked on the fact their cows loved their life and had a good life. But how is this measured? Written reflection by Milena Bojovic, taken from field notes journal.

From an ecofeminist perspective, my own emotional responses reflect Gruen's (2015) notion of 'entangled empathy' as a strategy for reminding humans of our interconnections across species and food production systems. For me, such an embodied awareness aligns with calls for more-than-human justice and recognition of animal livelihoods in food systems





FIGURE 3 Dairy farmer feeding newborn calves, Canterbury, Aotearoa. *Source:* Photo by Milena Bojovic.



FIGURE 4 Cows grazing on winter crops, Southland, Aotearoa. *Source:* Photo by Milena Bojovic.



transitions (Tribaldos & Kortetmäki, 2022). My own awareness and empathy builds from feminist approaches to research and reflexivity, particularly England's (1994) contention that part of the feminist project is to actively dismantle neopositivist research impartiality and objectivist neutrality. In this way, acknowledging feelings and emotions does not imply the exclusion of reason (Kheel, 1985). Instead, through such emotions, new value systems that account for the subjective epistemologies of lived experience can transpire.

## 4 | ENCOUNTERING THE MILK PROCESSING PLANT

When driving through the countryside around the lower South Island of Aotearoa, the concrete castles and steel towers of large milk processing plants stood out against the backdrop of rolling hills and the flatline of pastures. In November 2022, I organised a tour of one of Aotearoa's largest milk processing plants, which took me on a sensory journey. Upon arrival, the scent of raw milk enveloped the surroundings, including the open air where milk trucks were unloading. I turned to my tour guide to ask if the smell bothered him, to which he responded, 'yeah it's strong but you get used to it!'. I had trouble acclimatising, at one point even covering my face as the strong smell of cow milk overwhelmed me, despite the absence of any visible milking sheds or animals.

To enter the factory floor, we donned safety gear to avoid cross contamination in the highly sanitised production line. I was shown to the changing rooms and given a boiler suit, safety glasses, a hairnet, and rather large gumboots. The building that housed the steel processing vats was six storeys high—each floor covered a different aspect of the single vat that processed thousands of litres of fresh milk daily. During this encounter, three key observations (apart from the smell) stuck out to me. The first was being up close to the steel vats and attempting to comprehend their vastness (Figure 5).

Throughout my doctoral research, many participants remarked on the sheer amount of steel needed for the nation's dairy export industry to function. I was never able to fully comprehend the story of steel and milk until I was this close to it. From the perspective of critical place enquiry (Tuck & McKenzie, 2015), this closeness brought to light the relationalities between people, production and place and how one extractive industry (production of steel) is so closely intertwined with another extractive industry (production of milk). These extractive industries reminded me of Salleh's (2021) statement that mineral extraction displaces people from afar and requires heavy energy drawdowns for manufacture, which is fundamentally informed by a 'tacitly masculinist response to the crises of globalisation is innovation'.

The second key observation, particularly in the context of thinking about extractivism, was the absence of people across the factory floor. Everything was mechanised, from the operations of the vat on every level of the six-storey building, to the factory production line on the ground floor. I watched in awe as robots processed and packaged milk powder, labelling, sealing and pushing bag after bag down the production line. At one point, I even watched on in disbelief as an automated forklift reverse-parked itself perfectly in its designated parking spot.

The final observation was encountering the warehouse full of milk powder ready for export (Figure 6).

I stood from a distance and tried to comprehend the 74,000 tonnes of brown paper bags ready to be exported to any one of the 130 countries (DCANZ, 2021) that import Aotearoa-made milk powder. The presence of cow milk, without a single cow being present, highlighted how dairy industries and our commodity culture deliberately distance us from the subjectivity of non-human animals (Griffins, 2014). In terms of what was seen and not seen from my 'partial views' (Ream, 2021), both humans and animals were absent on the factory floor. Yet the labour of humans and non-humans filled the warehouse shelves, in turn obscuring relations between people, place, environments and animals.

## 5 | ENCOUNTERING THE LABORATORY

In July 2022, I visited a precision fermentation laboratory in Auckland. Prior to my visit, there was a discussion about protecting intellectual property (IP) as the team deliberated whether I should sign a non-disclosure agreement or if they should cover all the labels on equipment before I arrived. I was uncomfortable in terms of feeling a lack of trust as I experienced the complete opposite from my visits to dairy farms where knowledge-sharing was the norm. The lab, however, existed in a different food production regime, one which was futuristic, bound in highly innovative, microscopic technologies enmeshed with hyper-competitive market logics. At the time of my visit, there were only a handful of start-ups around the world engaged in the research and development of lab-grown animal proteins, so protecting IP was tantamount to the viability and funding for new discoveries.



**FIGURE 5** Outside the milk processing plant, Canterbury, Aotearoa. *Source:* Photo by Milena Bojovic.





**FIGURE 6** Inside the warehouse of milk processing plant. *Source:* Photo by Milena Bojovic.

As a social scientist, it was an exciting experience to enter this lab, getting a firsthand look at food science set to have significant impacts on future food systems. I was permitted to look through (carefully concealed) equipment, beakers of chemicals and machines that ran 24 h a day mixing anonymous liquids (Figure 7).

During this encounter, I remember thinking to myself, this is sustainability under the microscope. While farmers attempted to address the challenges of intensive dairy through larger scales such as better herd management strategies or irrigation systems, the scientists in the lab were creating dairy with no need for pastures or animals.

Encounters with food are part of encounters with place, beckoning a practice of ‘embodied awareness’ (Mallory, 2013). I compared my experiences between the lab and being on farm—the lab was sanitised, clinical, nestled on a university campus away from the countryside. The farms, however, were much more involved, from the feeling of my gumboots squelching in the paddock, to the scent of manure across the fields and sounds of cows mooing in the distance. On one hand, it was exciting to see science and technology come together to fundamentally reshape how humans create and consume proteins. On the other hand, I began to reflect on how these advances raise underlying tensions about our relationship with non-human others in these spaces, and the creation of a ‘post-animal bioeconomy’ (Jönsson et al., 2019). From an ecofeminist perspective, Adams’ (2010) critiques of feminised proteins in the food system (e.g., eggs, dairy) demonstrates how gendered power dynamics persist in shaping even the most technologically advanced forms of food production.

In further comparing the two encounters, I thought about how the absence of cows in future milk production may translate to the future absence of farmers, land and animals all together. The engineering of food through synthetic biology could have undesired and unpredictable ecological and social implications, particularly in terms of patents (such as my own encounters with IP) that can contribute to deepening inequalities and ecological crisis, which are felt most severely by women (Mies & Shiva, 1993). A just food transition from this perspective brings into

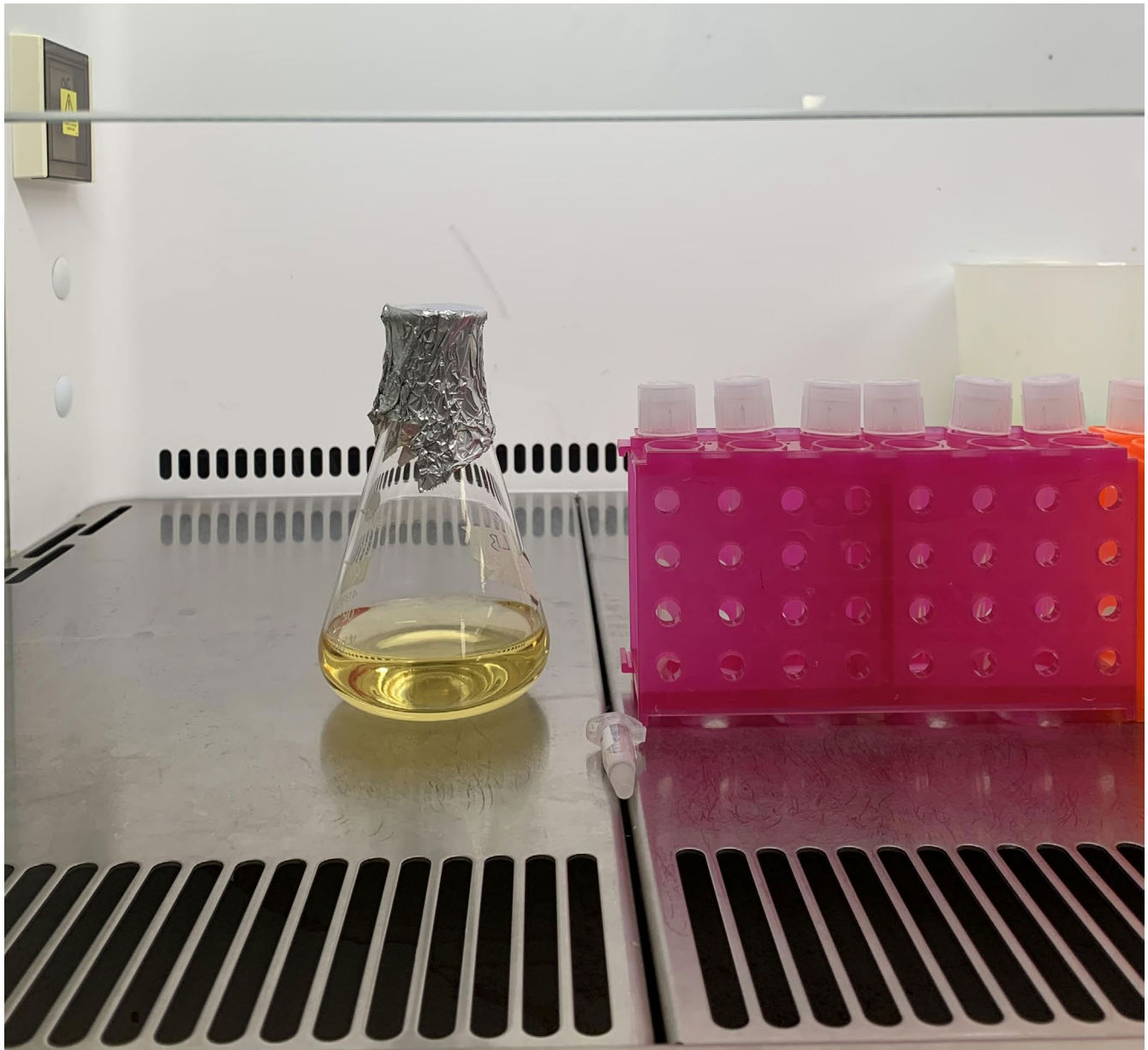


FIGURE 7 Photo from inside precision fermentation laboratory. *Source:* Photo by Milena Bojovic.

question established socio-political value systems that drive science and food technology innovations. From ecofeminist perspective, these innovations should be challenged and shaped in ways that can ensure support for social, environmental and animal justice outcomes.

## 6 | ECOFEMINISM, ENCOUNTERS AND FUTURE DIRECTIONS

I have sought to develop a more relational and place-based approach to the study of food system transitions that engages with ecofeminist perspectives to consider ethical and political implications for the livelihoods and flourishing of humans and non-humans in the pursuit of more sustainable dairy production. In adopting a relational ethics of accountability to people and place (Tuck & McKenzie, 2015), my reflections are situated within a larger geographical context of Aotearoa where a systemic multi-species extension (specifically dairy cattle) of colonial space has occurred (Ginn, 2008). The grounded reflections from my fieldwork encounters offer context-specific insights that contribute to broader debates about just and sustainable food systems transitions.



Bringing ecofeminist perspectives to the study of dairy transitions invites other scholars in this field to critically examine the type of 'milk regimes' (Mylan et al., 2019) for the future: What values should inform novel protein development? What does this say about our ontological relations to non-human others? To navigate such questions, I align with Giacomini's (2020, p. 203) contention that 'a truly just transition involves transformative actions guided by ecofeminism', where those most exploited by capitalism are both recognised and prioritised in the planning and process of transitions. While my reflections are shaped by my own 'partial view' as a researcher (Mies & Shiva, 1993; Ream, 2021), I argue that this partiality is not a limitation but a strength. As Haraway (1988) notes, 'the knowing self is partial in all its guises, never finished, whole, simply there and original' (pp. 585–6), and it is through embracing this partiality that I contribute new perspectives to longstanding, dualistic debates. By combining ecofeminist ethics with place-based, reflexive research, this article offers critiques about emerging dairy technologies in ways that challenge existing power dynamics and call for greater consideration of ethical and political dimensions for food system transitions.

The common theme across all the fieldwork sites is the cow – both her omnipresence and her absence. The material conditions for more 'sustainable' food systems, such as precision fermentation, are still underpinned by a particular set of ethical-political conditions. Such conditions include a sense of domineering speciesism (Acampora, 2014), involving deeply entrenched ideals about the supremacy of feminised animal-derived proteins. Yet, in the future imaginations of these ideals, the corporeal is absent, foreshadowing an animal food system without animals. These configurations of highly mechanised and disembodied bodily presence and the practicalities of labour raise challenges in terms of material and cultural conditions of dairy production if we truly face the end of the death economy (Sneegas, 2022) and the extent to which technological innovations are the death of the rural economy. Addressing these concerns from the ecofeminist perspective invites researchers to engage in greater consideration of the future labour and livelihoods of animals, people and environments in food system transitions.

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Research data are not shared.

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