



Ways of (un)knowing landscapes: Tracing more-than-human relations in regenerative agriculture

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ABSTRACT

In the face of diverse socio-ecological crises, regenerative agriculture promises to enliven rural landscapes by positioning farmers as key actors in mitigating the ‘carbon problem’ on the one hand, and adapting to it on the other. This article troubles ways of knowing regenerative agriculture through soil-and-carbon centered representational knowledge practices. Conceptually, we build on relational scholarship and use the concept of *(un)knowing landscapes* to suggest that agricultural landscapes both become, and become (un)known in and through diverse more-than-human relations. Empirically, we draw from ethnographic fieldwork independently conducted at farms in Finland, Norway and Italy practicing diversified regenerative agriculture. By focusing specifically on the practices of composting and processes of decomposition, we show how farmers come to know and reciprocate the aliveness of their landscapes through both proximate and distant relational dynamics: balancing between control and cohabitation, caring for and taking care of, and attending to multiple rhythms of (re)production. We argue that placing a deeper focus on soils — even when representing them differently — not only risks making proximate relations in diversified regenerative agricultural landscapes *unknown*, but also permits these landscapes to become *known* primarily through relations of distance. This, in turn, enables the commensurability of regenerative agricultural landscapes into tradable units for carbon markets. We conclude that transformation towards ecological livelihoods requires a radical reevaluation of, and accounting for, diverse more-than-human landscape relations.

1. Entry point

Finland, November 2021: “Oh, look at that lovely landscape of fields”, exclaimed my mother-in-law as we were driving through a typical Finnish landscape, where [mildly sloped] agricultural fields extend for tens of hectares eventually stopping at woodland fences that we call forests. It was late fall and all of the crops had been harvested. As I gazed out from the driver’s seat at the brown, bare landscape seeping into my consciousness, I privately returned to Ulrika’s farm, standing barefoot in the middle of a transpiring forest garden that used to be a plain field. What I saw from the window went against everything that I had learned during the past two years — through walking barefoot, smelling flowers, touching soils, plants and animals, and listening to heartwarming and

heartbreaking stories in diverse landscapes — making it appear anything but lovely. I began to imagine the extensive clear cuts and sustained, recurrent monocropping and use of chemicals that must have been undertaken to produce this desertified landscape. I could hear tractors driving back and forth, plowing the soil and turning it into dirt.¹ I could smell gasoline and dust. I sensed the wind beginning to spiral the dry dirt, and envisioned how rain packed into muddy pools, how sunlight dried the surface of the fields into stone hard chunks, forming ‘picturesque’ geometrical shapes. I saw excel-sheets confirming tons of harvest. Looking at the landscape passing by, I sensed survival, not life. (Kallio, field diary).

Italy, June 2018: After being picked up from the train station, we drove the ‘scenic route’ overlooking the wine-making valley that had

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¹ Puig Puig de la Bellacasa and María, 2015, 2019) uses the term ‘dirt’ to refer to soil without life. Drawing on Elaine Ingham’s online lectures she writes: “[Ingham] popularizes a ‘biological’ notion of soil among practitioners: soil is not ‘dirt’ — dirt is soil without life, she affirms.” (ibid. 2015, 15). See also e.g. Montgomery (2007).

recently been designated as a UNESCO World Heritage site. The steep hill opened out into an expansive view of the valley. A river ran through the bottom, towns collected along it, small villages dotted the tops of the cascading hills above, and forested hilltops extended into the horizon. Andre, who had driven us this way specifically for the view, said with a sigh “I don’t understand why they give such a designation to a place filled with monocultures”. Funny. I’m being taken to see this historic wine-making valley while Andre scoffs at its UNESCO designation because it’s filled with wine-grape monocultures. Most people would be in perfect admiration of this idyllic Italian countryside view, as I had been. Although the area was historically a wine making region, Andre told me, the visual presence of grape monocultures had significantly increased along with the global reputation of the region’s wine. Small and diversified family farms had sold their land to large wine-making operations who grew only grape monocultures, slowly re-shaping the makeup of the countryside, ecologically, visually and more. By the time we finally arrived at the farm, I felt I could never really enjoy the monocultural countryside again. (LaFleur, field diary).

The vignettes above reveal moments of interruption and change in our ways of knowing in and of rural landscapes. They suggest that close, sensuous attention to more-than-human relations can reveal how agricultural landscapes are made, shaped and inhabited (Barua, 2014; Heley and Jones, 2012; Ingold, 2013; Tsing, 2005) — and ultimately become known.

In this article, we draw on theoretical discussions of ‘landscape’ and our ethnographic work to evoke a concept of ‘(un)knowing landscapes’² that goes beyond the dominant scientific and art-historical visual representation of landscape (Ingold, 2012; Olwig, 2008). This notion is made possible by thinking of knowledge not as an object, but as being composed of the ways of knowing that constitute processual knowledge that is always socioecological, economic, political and grounded in sensuous, practical and ongoing activity with/in landscapes (Harris, 2007; Lounela et al., 2019; Vergunst et al., 2012). Bringing this work into conversation with our ethnographies, we aim to show how landscapes both become and become (un)known, in and through diverse more-than-human relations. This suggests that ‘knowing’ is not merely a matter of producing representational knowledge of or about the constituents of agricultural landscapes as *isolated interacting objects* (e.g. soils, microbes, plants, compost, insects, infrastructures, etc.), but that agricultural landscapes, including their “weather-world” (Ingold 2011: 132), become known through multiplicities of ongoing relations, and correspondences that sustain or erode these relations. Through empirical examination of the more-than-human relations that comprise the myriad ways of knowing in regenerative agriculture, we bring forth a relational understanding of agricultural landscapes as *alive*, transpiring through meshworks of lively and deadly relations that exceed their representational characterizations. From this approach, agricultural landscapes can be recognised as being at once socioecological,

economic, and political sites for the making of “ecological livelihoods”³ (Miller and Gibson-Graham, 2020). In positing this, we situate the concept of ‘(un)knowing landscapes’ alongside a growing number of scholars who have sought to trouble representational ways of knowing landscapes that prevail in entangled spheres of science, policy and industry (Baptista, 2018; Carolan, 2008; Plessis, 2022; Ingold, 2000, 2011; Lyons, 2020; Marsden and Sonnino, 2008; Tsing, 2015; Kimmerer, 2013).

The article foregrounds a conception of knowledge *not* as something that is ‘objective’, ‘complete’ or can be ‘possessed’, but as composed of *ways of knowing* that evolve in and through time, and manifest in ways of moving, sensing, doing, and practicing in the making of relations (Darnhofer et al., 2019; Grasseni, 2010; Harris, 2007; Maslen, 2015). Drawing on ethnographic fieldwork conducted in diverse landscapes of regenerative agriculture in Finland, Norway and Italy⁴ and on sensory and practice-based analysis (Gherardi, 2012; MacIntyre, 2007; Pink, 2015; Räsänen, 2009), we identify three kinds of dynamics that permeate more-than-human relations: i) balancing between control and cohabitation, ii) caring for and taking care of, and iii) attending to rhythms of (re)production. Through describing these intricate dynamics, the article joins a number of scholars in challenging the dominance of distant, decontextualized, and hi-tech mediated representational knowledge practices that inform policy, analysis and decision-making structures in rural areas (Marsden and Sonnino, 2008; Siebert et al., 2008; Tsing, 2005), and that help maintain and reproduce power relations through “representational relations of distance” (Baptista, 2018: 401). We contribute empirical findings and insist, in line with Ingold (2011) Baptista (2018), Barua (2014), Kimmerer (2013), Miller and Gibson-Graham (2020) and Tsing (2005, 2015), that such forms of representational knowledge of agricultural landscapes tend to disclose a world of static interacting objects that can — or must — be manipulated from the ‘outside’ of agricultural landscapes (i.e. at a distance), while simultaneously being unable to account for the diverse more-than-human relations that ongoingly unfold in their making.⁵ It is critical, we argue, to account for the proximate, more-than-human relationalities and diverse ways of knowing in agricultural landscapes precisely because such relations are how landscapes ultimately *transpire*, and sustain rural ecological livelihoods.

We conclude with two main points. First, we argue that landscape relations are *not* reducible to soil-relations or representations of soil health/aliveness. Doing so in the context of the ‘carbon problem’ risks devaluing proximate relations of regeneration, and becoming *unknown* in ways that cede control of landscapes to technoscientific-backed corporate interests. Second, we argue that a relational approach to research and analysis is ideal for disclosing economic and political incursions that might otherwise be invisible. This is because a relational approach can better account for the complexity of more-than-human

² The notion of ‘(un)knowing landscapes’ refers in part to a phenomenon understood by Indigenous peoples and peasant communities through antiquity, sometimes referred to by Western scholars as ‘animist’, ‘spiritual’ or ‘religious’. Our specific use of the term is a synthesis of our ethnographic work with farmers, and Anderson’s (2000) notion of ‘sentient ecology’, which refers to ways of knowing “based in feeling, consisting in the skills, sensitivities and orientations that have developed through long experience of conducting one’s life in a particular environment” (Ingold, 2000: 25, citing Anderson). We add the “(un)-” as a way to denote how representations of landscapes contribute to knowing them less through proximate, sensuous relations, and more through universalizing knowledge practices and technologies. See also the work of e.g. Cruikshank, 2005; Ingold and Simonetti (2022); Kimmerer (2013); LeVasseur et al., (2016); Tsing (2005), 2015.

³ Miller and Gibson-Graham describe ecological livelihoods as indicating “a diversity of activity, a variety of skills and knowledges, a plethora of possible sites of action, and multiple configurations of ever-changing relations and processes that cannot be captured by a generality” (2020: 321).

⁴ Galina has conducted ethnographic fieldwork in Finland and Norway at 16 different farms since 2019; Will conducted ethnographic fieldwork in Italy in 2018 (3 months), and Finland in 2021 (4 months), including multiple follow-up visits.

⁵ While we appreciate that scientific and policy experts that deal in relations of distance would surely acknowledge that the aliveness of more-than-human relational ecologies (e.g. landscapes, soils, insects, forests, etc.) are important aspects of understanding the polycrises we face, our critique is aimed rather at the objects of knowledge that such actors produce through modeling, mapping or quantification, and which necessarily cut out more-than-human relationalities in the process of their representation. As elite forms of power make decisions and take action according to such representational objects of knowledge, the fact that more-than-human relationalities are missing from them is highly consequential.

relations and lived experiences in rural, regenerative agricultural landscapes and beyond (Heley and Jones, 2012; West et al., 2020).

2. Background: the promise of regenerative agriculture

Agriculture has been identified as a significant source of global warming and biodiversity loss (IPBES, 2019; IPCC, 2019). In the past few years the concept of regenerative agriculture, introduced by the Rodale Institute (2020) in the 1980s, has emerged as a prominent solution in mitigating climate change on the one hand, and adapting to it on the other (EASAC, 2022; EMAF, 2019; Rhodes, 2012, 2017). Rodale and similar organizations that advocate for regenerative agriculture emphasize a range of potential benefits: improved soil health, biodiversity and ecosystem resilience, lowered energy use, better nutrient cycling, reductions in pesticide and fertilizer applications, and carbon sequestration potential. From these ecological benefits would flow others, such as increased yield productivity, keeping more money in farmer's hands, and creating more jobs, thereby enlivening rural areas and positioning farmers as key actors in remedying the most urgent global ills (WEF, 2020; RAA, 2022). According to a recent report, transnational agrifood companies have also become prominent advocates, and the biggest investors, in regenerative agriculture (IDS and IPES-Food, 2022). These actors (e.g. General Mills, Coca-cola, Nestle, Unilever, Arla Foods) also emphasize ecological benefits, but notably, their interpretation of socio-ecological benefits tends to position farmers merely as carbon offsetting agents.

Alongside these industry actors, scientists, policy-makers and non-governmental funders increasingly tout the potential of soils to act as carbon sinks (IDS and IPES-Food, 2022; Schreefel et al., 2020), singling out soils — which only partially constitute agricultural landscapes — as sites of experimentation for the application of technoscientific knowledge (Gordon et al., 2021; Kearnes and Rickards, 2020).⁷ The knowledge produced about regenerative agricultural soils has, since the 1980's, occurred primarily through Rodale Institute's farming system trials (IDS and IPES-Food, 2022). Fueled by interest and speculation in industrial and policy spheres however, this knowledge has rather recently taken on new forms. It has come to be represented not through long-term experimental trials but predominantly through laboratory tests of soil samples, satellite images, microscopic observations, carbon measurements, modeling exercises and balance sheets.

These ways of knowing agricultural landscapes — which ultimately rely on vision for their apprehension (e.g. *looking* at maps, analyzing numbers and graphs of quantified things, peering through microscopes) — contrast sharply with the ways agricultural and other rural landscapes have historically become, and still are known i.e. by those who inhabit them. That is, through locally situated and multisensory practices: slash and burn, foraging of foods and medicines, plowing, sowing, and harvesting crops, hunting and fishing, practices of agroforestry, pastoralism and grazing animals, or even walking, hiking or other forms of recreation (Grasseni 2007; Ingold, 2004; Lee, 2007; Siebert et al., 2008;

Suzman, 2020). In fact, only in the last two centuries have agricultural practices come to be defined by representational relationalities that proceed via globalized technoscience, focused in particular on soils and their market-oriented productive capacities (Baranski, 2022; Marchesi, 2020; Stone, 2022). This phenomenon has helped to reduce relations of regeneration to various representations of knowledge *about* the supposed discrete objects and subjects of landscapes (e.g. soils), and how they can better be made productive through, for example, synthetic fertilization, crop yields, nutrients, microbes or non-human labor (Lyons, 2020).⁸

As the role of science-based ecological knowledge in transforming agricultural landscapes and their soils has become a critical concern in the midst of multiple ecological crises (IPCC, 2019; IPBES, 2019), there is a tendency to pursue 'more' and 'better' knowledge in the search for ecologically viable solutions (Stengers, 2016) — regenerative agriculture being one key example. Yet pursuing 'more' and 'better' knowledge in particular ways (e.g. modeling carbon cycles, measuring productivity) shouldn't automatically mean that such knowledges are universally 'appropriate' or 'good'. This is because the sorts of representational knowledges pursued by powerful actors are vulnerable to manipulation or control from a distance (Baptista, 2018; Tsing, 2005), and in turn run the risk of marginalizing the situated, sensuous and more-than-representational⁹ ways of knowing that unfold in the making of agricultural landscapes. This marginalization extends, of course, particularly to those who derive their livelihoods from these ways of knowing: small farmers and peasants, Indigenous peoples, and other groups with limited power relative to transnational corporations.

Considering that (a particular notion of) regenerative agriculture is said to be an important key to the 'carbon problem', both the ways of knowing that are enacted and types of knowledges that are produced in pursuit of it warrant critical examination. There are some important considerations here. In practice, as we will show, those who practice what they termed 'regenerative agriculture' comprise far more diversity than the mainstream notion has come to stand for. Next, as a fundamental gaseous element that suffuses the atmosphere and earth, and all life in these domains, carbon requires 'capturing' in order to be accounted for — that is, it must be turned into a discrete, measurable object. While such a practice is relatively straightforward in terms of atmospheric measurement, measuring soil carbon presents certain problems. While it is well-known that soils can contain large amounts of carbon, it is a rather inconvenient (and yet under-discussed) fact that soil carbon is extremely volatile, especially in agricultural soils, and therefore appears increasingly *impossible to consistently or accurately measure* — even within the same field that is growing the same crop (Kallio and Houtbeckers, 2023; Powlson et al., 2011; Stanley et al., 2023; Vekuri et al., 2023). Yet *despite* this fact, the push for regenerative agriculture — and the prospective carbon markets it could open — continues, led by some of the world's biggest polluters and bolstered by recent legislative policy interventions in the U.S. and E.U.¹⁰ encouraging carbon trading for regenerative agriculture (IDS and IPES-Food, 2022; Kearnes and Rickards, 2020; Shiva 2022).

As this state of affairs is currently unfolding, and because these

⁶ Although the explicit concept of regenerative agriculture was launched by the Rodale Institute, many of the principles and practices of regeneration are not new per se, but have been practiced by Indigenous people and peasants around the world for millennia (Carlisle, 2022). Moreover, the ecological knowledges and ways of knowing entailed in Indigenous or peasant notions of regeneration differ, often significantly, from modernist and technoscientific ones (see, e.g., Dahlberg, 1994; King, 2004 [1911]; Suzman, 2020; Yunkaporta, 2019).

⁷ As the potentialities and importance of soil is a key foci for (but not only) regenerative agriculture, our usage of soil and landscape can at times appear to be interchangeable in this text. However, we stress that while soils are indeed a major constituent of landscapes when thinking of them in relation to regenerative agriculture, our point is rather that in regenerative agriculture discourses, soils tend become objects isolated from landscapes, instead of one thread in the meshwork of which landscapes are composed.

⁸ Baptista (2018: 406) shows that in the (neo)colonial production of knowledge, attending to and privileging knowledge *about* something — the referential instead of the actual referent — becomes inherently superior to the proximate and sensuous direct knowledge that comes from lived experience.

⁹ We prefer the term "more-than-representational" instead of "non-representational" for the same reasons as Carolan (2008), Hayes-Conroy and Hayes-Conroy (2010) and Lorimer (2005).

¹⁰ The U.S. signed the *Growing Climate Solutions* Act in law in 2021, while the E.U. is currently considering the *Carbon Removal Certification Framework*. Furthermore, the Executive Secretariat of the international "4 per 1000" Initiative was launched in 2015 during COP 21. While not exactly the same, these interventions have, or aim to, open agriculture to carbon trading schemes.

market dynamics began to become visible in our ethnographic work, there arose a need to take a closer look at landscape relations, and how they transpire at farms practicing regenerative agriculture in diverse ways. Next, we outline the literatures that have informed our critical approach to regenerative agricultural landscapes.

3. Conceptualizing relational approaches to agricultural landscapes

3.1. Landscapes as objects

Landscapes in modernity (and coloniality) are typically represented as objects of thought and visual perception ‘out there’: painterly scenes and cartographic prospectus that can be viewed, admired or imagined, but are disconnected from the activity of everyday life (Ingold, 2022; Ranciere, 2022; Saito, 2017). Yet, knowing landscapes this way is the result of the development of a *particular type of relation* with them. Specifically, this relation is predicated on the emergence of ‘landscape’ as a “specific object of thought” which embedded, in modern Western thought, “the experience of a form of unity in sensible diversity capable of changing the configuration of modes of perception and objects of thought that had existed until then” (Ranciere, 2022: x). Prior to this, the word landscape referred to a more-than-representational relationality, indicated by the terms’ Old English etymological origins, in which landscape literally meant “a land shaped” (Ingold, 2012: 198) through one’s dwelling, or “doing” (Olwig, 2008).

Nonetheless, the representational importance of landscapes that prevails across academic disciplines, industry, governance, and everyday life, is indebted to this legacy of 17th and 18th century elite male, European thought. This legacy projects landscapes as the static host for subjects and objects that might be controlled, manipulated and extracted based on their perceived socio-economic value — an effect of locating value in the (static) properties of an object rather than the actions/relations that give rise to them (Graeber, 2001). Soils, as implied objects of landscapes, are increasingly caught up in just such a conceptualization as they become key objects of both concern and opportunity for scientists, policy makers and investors. In these spheres, knowledge *about* soils — cut out from the wider landscapes relations that give rise to them — are reduced to essentialized, often visual, virtual or numerical forms, becoming the static representational foundations on which consequential political and economic decisions are made. Ingold (2012) describes this process succinctly:

“[In] the optical ‘scapes’ generated by the scopic regimes of modernity ... light, sound and feeling are reduced to vectors for the projection of final forms, cut out from the processes that give rise to them. These scapes can be viewed, studied, analyzed, interpreted. But they cannot be inhabited.” (207)

The fact that representations cannot be ‘inhabited’ is critical. As Ingold shows elsewhere, the kind of aliveness implied in Western biology rests on the assumption — through the doctrine of genetic preformation — that every organisms has a prespecified nature “*prior* to its entry into the life process”. This assumption necessarily leads to an understanding of life “as the reaction of organisms, bound by their separate natures, to the given conditions of their environment” (2000: 61–62, emphasis original). This is the key to understanding why modern science can recognize the aliveness of landscapes while at the same time reify them as mere representations to be occupied, manipulated, and extracted from. The projection of final forms (e.g. an agricultural landscape) simultaneously depoliticizes the making of landscapes (and thus aesthetic and scientific knowledge produced about them) as they are rendered universal, commensurable objects of thought that can be neatly represented. Thus, turning landscapes into objects obscures the historical, socio-ecological, economic, and political relationalities through which they ongoingly emerge.

To reject the idea of reducing complex relationalities into static

objects is to reject the dominant knowledge practices of modernity/coloniality itself (Baptista 2018; Ingold 2000, 2011; Kimmerer, 2013). It requires nothing less than collapsing the world of subjects and objects, allowing them to disperse into ‘fluid space’ (Ingold 2011; see also Mol and Law, 1994). Yet if we reject the idea that landscapes and their co-constituents are made up of discrete objects (or subjects), how should agricultural landscapes be understood differently?

3.2. Landscapes as relations

As several scholars have shown, landscapes come into being through more-than-human relations (e.g. pastoralists with their herds, farmers with their plows), and diverse movement and activity such as digging, damming or building with the landscapes’ materials, and in accordance with the landscapes’ weather and terrain (Baptista 2018; Barua, 2014; Ingold, 2000, 2011; Lyons, 2020; Kimmerer 2013; Tsing, 2005, 2015; Suzman, 2020). But equally, and especially in the modern era, rural landscapes have been shaped through processes external to them (Baptista, 2018; Tsing, 2005), as a result of policy making and city planning, ‘capitalocentric’ market orders (Gibson-Graham, 2006) or unevenly distributed land ownership (Shiva, 2016; Suzman, 2020). Moving towards an understanding of landscapes as unfolding materializations of more-than-human relations then, as Tsing puts it, is a means to exploring how “[l]andscapes are simultaneously natural and social, and [they] shift and turn in the interplay of human and nonhuman practices.” (Tsing 2005, 29).

One of the central features of a relational approach to landscapes is, as indicated above, the acknowledgement of their *aliveness*: that landscapes and the materials and species that inhabit them are ongoingly living and dying, birthing and decaying, exploiting and reciprocating (Ingold 2000; Kimmerer 2013; Lyons 2020; Tsing 2015). This aliveness becomes known to humans through various relational forms, for example, with glaciers (Cruikshank, 2005) or with soils, where the recognition of aliveness has emphasized human-soil relationalities. Puig de la Bellacasa, 2012, 2015) has pointed out that seeing soils as an inert or passive object that can be manipulated for technoscientific futures has led to exploitative ways of knowing and treating soils. In arguing for “reanimating soils” she has sought to make visible “*soil-as-living*, a relational entity of which humans are part” (ibid. 2014, 1, emphasis original). Krzywoszynska (Krzywoszynska, 2016, 2019; Krzywoszynska and Marchesi, 2020) has argued that more attention to place-based knowledge might cultivate a more sustainable approach to soils. Both Puig de la Bellacasa and Krzywoszynska foreground care as a central concern in their work on soils, suggesting that the making of ethical, caring relationships depends on embodied and emplaced¹¹ relations with soil (Krzywoszynska and Marchesi, 2020; Pink, 2011, 2015; Puig de la Bellacasa, 2012) and seeing such experience as a way of becoming attuned to the temporal rhythms of more-than-human worlds (Puig de la Bellacasa, 2014). While we broadly agree with both authors and follow their leads, instead of reducing landscape relations to soils per se, we find it rather important to bring forth an understanding of soils that is not separate from landscapes, but *are part of landscapes*.

Empirical ethnographic research has also been critical in showing and recognizing the aliveness of landscapes. Several authors have traced how local ways of knowing landscapes are entangled with global power structures — colonial, scientific, capitalist — that are ‘external’ to them. For instance, more-than-human relationalities have been examined in the matsutake mushroom trade (Tsing, 2015), the struggles of Indonesian forest communities in the face of development policies (Tsing, 2005), amongst animals, hunters and pastoralists (Ingold, 1994), with plant ecologies (Kimmerer, 2013), human-elephant relations in

¹¹ The concept of emplacement as developed by Pink (2011, 2015) brings a sense of place to the notion of embodiment such that embodiment is always inflected with the socio-ecological, economic and political.

post-colonial India (Barua, 2014) and metabolic relationalities of earthworms, soils and scientists (Bertoni, 2013). Baptista (2018) has most explicitly addressed the issue that universalizing, colonial knowledge works through relations of distance, while local knowledges are necessarily formed through relations of proximity. What all of these authors have in common is a commitment to landscapes as the ongoing “dwelt achievements” (Barua, 2014: 916) of people, animals, plants, materials, and weather. In approaching landscapes in this way, they have excelled in showing the entangled relationalities of how various groups procure their livelihoods amidst the ongoingness of life, while simultaneously attending to the global structures that set the trajectories and possibilities for doing so.

A particularly important aspect of approaching landscapes this way is through Kimmerer’s (2013) notion of reciprocity. Kimmerer depicts landscape relations through the storying of plant relations. In these accounts, Kimmerer illustrates the notion of ‘knowing landscapes’ by invoking the concept of reciprocity as a form of relating. She shows this through the practice of gifting, for example, with wild strawberries. Through close attention to the plant’s behavior it appears, as she explains, as though the plant is offering up a gift, to which the only reply is to eat them: “No person taught us this — the strawberries showed us. Because they had given us a gift, an ongoing relationship opened between us” (Kimmerer, 2013: 25).

Combining the insights from the authors above with our own ethnographic work, we aim to show that the complexity and significance of relations that also sustain regenerative farms is reduced through the imposition of relations of distance, and that when it comes to relations of proximity — that is, everyday experiential, sensuous encounters with/in landscapes — the simplistic relationalities that are afforded by distance become far more complex. By tracing relations in agricultural landscapes, we wish to focus attention to the ways that landscapes materialize, and become known from the ‘inside’ of everyday practices with more-than-human others (Ingold 2017, 2021; c. f. Grasseni, 2010), as well as how social, economic and political ‘outsides’ are inflected through the power of representational practices (Baptista, 2018). As well as adding further empirical weight to the literature discussed above, the relational approach developed here also contributes to the development and articulation of the so-called “relational turn” (e.g. West et al., 2020) in humanities, social and sustainability sciences broadly, including rural studies (Darnhofer et al., 2016; Heley and Jones, 2012; Lee, 2007), and more-than-representational theory-methodologies (Anderson and Harrison, 2012; Thrift, 2008; Vannini, 2020) concerned with critically reassessing the ways of knowing implicated in the production of academic knowledge.

4. Situating fieldwork: context, method and analysis

We have explored a heterogeneous mix of agricultural practices that comprise what has been termed “regenerative agriculture” (Newton et al., 2020; Schreefel et al., 2020). In our cases, regenerative agriculture appears as a far more diverse field than its mainstream notion has come to stand for. However, we preclude from our definition of regenerative agriculture conventional farms that are transitioning to or borrowing a selection of ‘regenerative’ practices (c.f. Giller et al., 2021; Leitheiser et al., 2022). We refer rather to farms in which we have conducted fieldwork: those which have previously undergone transformation into applying primarily regenerative practices, as well as those which began in the first place from such practices. These included farming strategies variously labeled as diversified organic, biodynamic, agroecological, permaculture, market gardening, agroforestry and forest gardening, as well as farms acting as experimentation sites for carbon farming (see e.g. Carbon Action Network, 2022).

Landscapes configurations were reflected through the practices that the farmers undertook on the farms: composting, plowing, cultivating under or cover-crops, reducing or eliminating tillage, maintaining grazing animals, building permanent and temporary structures for

human, animal or plant shelters, using and maintaining heavy and light farm equipment, and even labor coordination. Ostensibly, a farmer might seek out and learn (about) regenerative agriculture through YouTube videos, Instagram, books, from an online course (e.g. Elaine Ingham’s Soil Food Web courses) or in-person course (e.g. Richard Perkins’ 4-day Market Gardening) and selectively apply the learnings in their farming practice. But as we learned, farmers’ practices ranged widely as they were picking and choosing from various farming alternatives, thus largely resisting homogeneity in their work on regeneration. This heterogeneity is precisely what we wish to emphasize, as it stands out from the more homogenous conception promoted by corporate actors (IDS and IPES-Food, 2022).

We situate our approach within a practice-based onto-epistemology (Gherardi, 2012) that attends to sensuous relations in more-than-representational ways (Caffyn, 2021; Ingold, 2000: 243-287; Howes, 1991, 2005; Pink, 2015). This inductive approach means that our conceptualizations have derived from the ethnographic fieldwork we have undertaken, independently, at regenerative farms in Finland, Norway, and Italy. Since 2019, Galina has been a participant-observer in 15 different farms practicing regenerative agriculture in Southern and Eastern Finland and in one regenerative farm in Norway located some 100 km from Oslo. These have included periodic visits, field trips lasting for several days, as well as single-day observation trips. Will has undertaken participant observation at two regenerative farms in Italy and Finland in 2018 and 2021 over continuous three and four month periods, respectively, and including multiple short-term follow up visits. In addition, one farm in Finland served as a field site for both authors, albeit at different times. Both researchers participated in and observed everyday work at the farms throughout different seasons and conducted interviews with farmers and farm volunteer workers.

In seeking to understand more-than-human relations we have focused on analyzing how they occur in everyday work practices (Gherardi, 2012) amidst the fluxes and flows of movement and growth in and with landscapes. Building on the framework of practical activity (FPA) (Räsänen, 2009; Kallio and Houtbeckers, 2020), the first stage of the analysis included producing a ‘thick description’ (Geertz, 1973) with a particular focus on identifying working practices at different farms (tactical/operational aspects); practitioners’ aims and aspirations (political aspects); conceptions of “good” farming (moral aspects); and roles of different subjects/actors (identity aspects) (Kallio, 2022).

In the second stage we used dialogue as a method of bringing two ethnographies together (Kallio and Houtbeckers, 2020) in order to share the practices and stories from the fields. These discussions consisted of an analysis in which we (re)examined fieldwork material — notes, photos, videos, interview transcripts — and reflected explicitly on our own sensuous experiences through storytelling dialogs (Pink, 2015; Howes and Classen, 1991). These discussions provided insights into the ‘ways of knowing’ we observed of others and underwent ourselves, and the nature of the relations that unfolded from them. This process helped us to further become knowledgeable of the diversity of ‘regenerative landscapes’, and provided insights about the deep convergences in practices, even when farming styles (biodynamic, permaculture, etc.) indicated differences. The sensuous analysis constituted, in itself, “a way of knowing engaged in by the researcher(s) during the research” (Pink 2015: 143), helping us to “imagine and feel [our] way back into the research encounter” (146). For example, the vignettes that opened this article arose from this process, and we produced them specifically because they show key moments in the acquisition of “skilled visions”¹² (Grasseni 2010) (as well as other sensuous enskilment) that aided our

¹² Though focused on the sense of vision, Grasseni’s concept emphasizes the fact that ways of sensing are never isolated from each other (i.e. always multisensory) and are not given apriori, but are “situated, contested, politically fraught” and ongoingly made in “complex relation with the sociotechnical network” (Grasseni, 2010: 1–2). See also Ingold, 2000: 243-287.

“arts of noticing” (Tsing, 2012) in attending to landscapes and living beings that inhabit them. Although we do not analyze our own processes of sensory enskiling per se, it is these instances of learning and experience that led us to engage in analyzing landscape relations in regenerative agriculture.

We placed particular attention on human-soil relations, relationships between humans, animals and other living beings (fungi, insects, plants, etc.), and relations with and amongst farm workers. Through this iterative process we identified certain dynamics that cut across the everyday work practices at farms, namely dynamics of ‘control’, ‘care’, and ‘rhythms’. We made use of extensive material including visual (photos, video recordings), audio (recording of sounds), field notes and interview transcripts, together with social media data generated by the farmers themselves (Instagram, Facebook). This material was independently analyzed and served as the fodder for our storytelling dialogs, and helped crystallize our analytical categories focused on the relational dynamics of control, care and rhythms.

We weave our stories here together into a ‘collage-tale’, which we term vignette. The vignette works to both specify both individual author’s experiences, while also showing the extensive overlaps in our fieldwork experiences despite working independently from one another and in different countries. At the same time, the vignette showcases the diversity of regenerative practices that exist beyond what the mainstream term has come to refer to. In the narrative, we forgo the use of “I” and adopt third-person and plurals (Galina, Will, she, he, they, we) to indicate difference, repetition, and convergence in our experiences. Overall, the vignette is an attempt to evocatively bring the reader closer to the landscapes that changed us even as we participated in changing them.

5. Regenerating landscapes: tales from the fields

In the process of telling our stories it became clear that we shared a variety of resonant experiences. While all the farms that we visited identified themselves at least partly within the framework of regenerative agriculture, their landscapes differed greatly from each other. Yet it was not the diversity of the agricultural landscapes which surprised us, but rather the range and complexity of relations through which the landscapes came into being. The ways we came to know and experience landscapes was decidedly not as visual objects for the gaze, but as lively, multisensory ecologies of movement, growth and contingency. The impossibility of representing all aspects of these experiences led us to compare our experiences, collate our tales from the fields and focus on producing one overarching vignette that could trace, specifically, the practices of composting and processes of decomposing.

Compost, as we came to observe, held an essential role as a fertilizer of the soils at all but three farms that we visited. Composting practices, then, were critical for augmenting soil health — a ‘matter of care’ in regenerative agriculture (Puig de la Bellacasa, 2019) that unfolded through relations that emerged in the making, procurement, processing and distribution of compost. These relations cut across the whole spectrum of everyday work at regenerative farms, deeply shaping the ways of sensing and knowing that farmers and workers experienced in their everyday practices (with) their regenerative landscapes. With this ‘collage-tale’ vignette, we aim to show the instances of sensory enskiling and ways of knowing that comprise the meshwork of more-than-human relations that composting practices entail, highlighting moments of insight, disruption and change in how we began to relate with regenerative work and agricultural landscapes.

5.1. Composting and decomposing life and death

Galina is only 15 minutes late but her sense of urgency is high. She promised to be at the farm at nine to feed the cows. Ahti, the farmer, calls and inquires about their arrival: “The cows are getting loud”, he says. Galina arrives, and hastens to the cow house through a snowy path.

She takes a pile of hay and before she manages to find her way to the crib, the eastern Finncattle start ripping the hay out of her hands. “They produce valuable stuff”, Ahti asserts. At Ahti’s farm, typical of biodynamic farms generally, the number of cows kept accorded with the number of cultivated hectares. This is done in order to form a closed loop: allocating sufficient pasture land and winter fodder for the cows, who, in their turn, generate enough manure for making compost for farming purposes. During winter, cows, oftentimes together with other animals such as chicken and sheep, live in the old stone and wood cow houses, ranging outdoors only a few times. In the summer the farmers manage the animals by rotating them through the different pastures, which the farmers periodically monitor. Galina stands in the chilly farmhouse and observes how warm air evaporates through the rhythmic ‘*crunch*’ of the hungry cows, as Ahti breaks the ‘silence’: “unlike production cows, these [cows] live long. The oldest was 23 when she died of old age. There’s a lot of work, but doing otherwise would be impossible”.

It can indeed be a lot of work to make the compost. It’s mid-July and four volunteers work with Jesus at a northern Italian farm. Some wear cotton towels over their face to subdue the strong odor of manure that is getting pushed into a pile by a very old tractor. Will, together with other volunteers, rakes out the manure which cakes around their shoes and boots, making foot movement heavy and clumsy. Jesus tosses out bits of this and that onto the manure: grain husks, ground stone, straw, a sweet but funky smelling fermented liquid. They rake the muck out and make sure it’s evenly mixed into the cow dung. “Tomorrow it might rain and this compost must be created while it’s dry”, Jesus explains. At midnight they cover the long, dense mound with a sheet of plastic to protect it from the coming rain and to create ideal conditions for the start of the microbial work to begin — anaerobic fermentation. After five days, the plastic cover is removed and the long mound gets covered with dried straw clippings from the wheat field. Jesus encourages everyone to stick their hand into an opening he’s made. “Oooh! It’s burning hot!” yells Will.

Not everyone, though, were sticking their hands periodically into compost to follow the process of decomposition. At another farm, back in Finland, we both observe how the anaerobic fermentation is constantly monitored by a long thermometer sticking out of the pile and the farmer making quick visual checks when passing by the compost pile to make sure the microbes are at the right temperature for doing their work. Will considers the absence of any thermometer in the compost at the Italian farm.

Alongside cow manure farmers might also use animal manure from sheep, horses, pigs and chickens to make a compost. Jesus explains to Will that each animal’s manure has different properties, and can be used to address certain imbalances in soils. In addition to manure-based composts we come to observe how farmers fertilize the soils with plant-based compost made from weeds, grass clippings and rotten vegetables, putrid-smelling earthworm ‘vermicompost’, ‘green-manure’, and add chicken egg shells directly to soils and composts.

At some farms we walk on wood chip paths that have been hauled by volunteers to line garden walkways, both guiding walkers and preventing soil compression. While walking along them, fruiting mushrooms and white tufts of fungal mycelia can be glimpsed here and there, and blasts of earthy aroma might envelop you unexpectedly, especially after a good rain. “Decomposition is so fascinating, but an incredibly complex and understudied phenomenon”, states the permaculture farmer as they walk with Galina on wood chip paths to observe the compost pile. At this same farm, and contrary to what Galina had encountered before, Will observes later in the summer how vegetables that seemed perfectly fine end up in a compost: three large and perfectly edible zucchini he had harvested the day before; several kilos of garlic, apparently deemed unfit for sale, dumped onto the pile becoming a vegetative compost. After finding the large majority of this garlic to be in perfectly edible condition — but showing signs of a relatively short shelf-life — Will salvages nearly four kilos of it, taking it home to ferment in a salt brine for long-term storage.

For many farmers, we learn, an essential aspect of their work is to follow the processes of decomposition closely. While walking through the fields, Iris was explaining to Galina how “cows process the grass which humans can’t and turn it into this *black gold* that we then use to grow food for the local community”. Galina and Iris stop at the compost pile, which, deposited with a tractor the previous autumn, lay in the middle of the fields extending some 20 meters in length and nearly 1 meter high. Iris stuffs her hand deep inside it, pulling out a handful of dark soil-like matter right to her nose: “Ahh, just smell it”. Iris invites a group of school kids visiting and volunteering at the farm to gather around and start inhaling. It smells sweet, warm, and soil-like, and the farmer begins making remarks to describe its ‘sweetness’ and ‘earthiness’. With the dark and moist composted manure in their hands they start laughing and joking how the situation reminds them vividly of wine tastings.

Both of us find ourselves digging into the soils at several farms. Will is taken into a production field to dig a hole and pull out a chunk of earth to observe the processes of decomposition: are roots penetrating the annual layers of compost and finding their way into the soils below? Galina is directed to stick her hand in the soil at a farm in Norway and pick up a chunk of it: “Can you see these tiny white grains, that’s carbon that the roots have stored”, explains Nate, a soil expert visiting the farm. At yet another farm in Finland, Galina is transplanting celery into beds covered with compost. They sink smoothly into the soil. “Based on the soil analysis we shouldn’t be getting any harvest out of these fields”, exclaims the farmer, and continues: “but the harvest is of amazing quality, and more and more abundant each year — even with these extreme weather conditions for the last three years that we’ve experienced! It truly shows that as this compost has been used here for decades now, the soils are in an amazing condition.”

Following and participating in the yearly cycles of making composts allows us also to observe the birth of new animals in the spring. The turn of the winter can be deceitful, though. Galina enters the chicken house to change the water that was frozen during the night. Joonas, the farmer, guides her to check for eggs, as “chickens are very good at hiding them. But I don’t want to allow them to hatch quite yet as it’s still so cold for the newborns”. Birth also means that someone has to make space for the newcomers. Standing at Ahti’s farmyard together with other farm workers, Galina shivers when she hears the gunshot she knew to expect. A cow called Blacknose falls down immediately, making a red pond in the snow. She is reminded of another farmer, engaged in egg production, whose words echo in her head: “They have one great life and one bad day”.

At yet another farm in southern Finland, where composts of various sorts are being made, volunteer worker Jordan says that for him the ideal would be to make vegan compost. This makes us think of what we’ve learned about a compost being, as several farmers often stated, a living organism: all those worms and insects that live in and literally make the compost by ‘shitting’ the vegetative material out in the form of compost. If made, how would one then end up defining a vegan compost? Borders are not so clear, yet borders are nonetheless being made by compost regulations. As Iris says, their compost can no longer be brought into the field to be put in contact with the soil. The regulation requires that a concrete platform be built, and that the compost be deposited onto the platform so that it is not in direct contact with the soil. Iris and her husband overcome this by applying for ‘a temporary transition permit’ for the compost, allowing them to deposit it into the field for ‘temporary storage’. “Contact with the soil is so important, and now with this new regulation they’re requiring us to put this living organism on a concrete barrier, separating it from the soil”, laments Iris.

6. Becoming known: analysis of landscape relations in regenerative agriculture

The practices of composting made visible not only the nature of landscape relations at farms that we worked at, but also the ways in

which farm workers both came to know, and became knowledgeable of their landscapes. Working on and with the land required farmers, market and forest gardeners and other soil workers to design their fields in ways that enabled them to produce food for themselves and for the surrounding (more-than-human) communities. In practice this meant that farmers were altering and shaping their landscapes — altering and shaping their landscape *relations* — in various ways: when preparing the soils for growth; when sowing seeds in soil-compost; nurturing the growth of seedlings and farm animals; when building fences, greenhouses, sheds, or biotope pastures. Following practices of making and using compost revealed interesting dynamics in how farmers lived in continuous negotiation about how to live in, use and regenerate the landscapes.

Drawing from more-than-human relations emerging through practices of composting and the processes of decomposition shown in the vignette, we next move to an analysis of how different ways of knowing are (re)produced in and through regenerative farming practices. In what follows, we analyze how farmers and farm workers come to know their landscapes — soils, animals, plants, (other) living organisms and materials — through the dynamics of balancing between control and cohabitation, of caring for and taking care of, and of attending to multiple, entwined and conflicting rhythms of (re)production. While we describe these dynamics separately here for analytical purposes, it is critical to point out that they are of course indissolubly entangled in practice. As Krzywoszynska (2016: 295) notes, “[t]emporality emerges as an important element for understanding how to care [for plants]”, suggesting the interweaving of care and rhythmicity (see also Puig de la Bellacasa, 2015). But equally, in everyday life care tends to converge with forms of trust and cohabiting, control and domination (Ingold, 1994; Puig de la Bellacasa, 2019). Below, we attempt to show how these dynamics are interwoven throughout the myriad practices undertaken with composting and decomposing.

6.1. Balancing between control and cohabitation

Transitioning to techno-industrial agriculture has been an attempt at taking agricultural landscapes and their constituent relations under exclusively human control (Shiva, 2016; Suzman, 2020; see also Tsing, 2012). This is true to the extent that certain practices such as patenting seeds (Shiva, 2016) and regulations like subsidizing centralized monocultural production (Kallio and Joonas, 2021) have been undertaken in attempts to ensure controllable landscapes. Practices of composting and decomposing provide an insightful route to examining the complex and often ambiguous landscape relations that suffused regenerative practices: how farmers sought to foster cohabitation with their landscapes; how they were sometimes forced to yield control, or else sought to place aspects of their landscapes under control.

Composting was one of the key sites of cohabitation.¹³ As we depicted in the vignette, a significant amount of human labor and organization went into making compost at the farm. This ranged from the preparation of compost from farm-based biomass, to living with and caring for diverse animals and regulating the number of manure-producing animals relative to field size. Such practices and processes, we suggest, are rooted in the openness of cohabitation, while simultaneously enrolled in forms of control that came from *the inside of the*

¹³ Site of cohabitation refers both to compost as a living organism, a term commonly used by the farmers, as well as being analytical, derived from non-verbal experiences working in different farms and with farmers, as well as connecting with Ingold’s various discussions, following Heidegger’s ‘dwelling’, on the difference between ‘occupying’ and ‘inhabiting’ — or what he has lately come to term ‘Correspondence’ (Ingold 2021) — where the landscape is not “prepared in advance for creatures to occupy” (2000: 193), but is forged through the ongoing cohabitation of organisms and materials enrolled in the life process.

regenerative practices themselves.

For example, the size of a cow herd that would produce manure could be increased or reduced in accordance with dynamics of pasture size, pasture health (which relates also to the weather), the health or (unwanted) behavior of individual cattle, the number and labor capacity of able-bodied people to participate with pasturing, feeding, and other factors. Such decisions were undertaken through pragmatic, purposeful and sensuous everyday engagement within the relationalities of the particular farming landscapes in which they occurred. These landscape relations, moreover, were a fluid composition of attempts at controlling (e.g. when and where animals go to pasture, what and when animals eat during the winter time, how many can afford to live) that which is wont to cohabit: bringing animals into the pasture (re)enables a cohabitation that both maintains pasture biodiversity and reduces unwanted ‘pests’, and enables the eventual production of manure that will be transformed into a microbially alive compost that ‘cohabits’ with soils and seeds.

Decisions arising from within the practical everyday activity of farming and sensuously proximate landscape relationalities inherited ways of knowing that were radically different from those that occurred at distance, imposed from the ‘outside’ — through the employment of agricultural policies, hi-tech mediation devices and their representations in legal dictates — as a form of control (Baptista 2018). Decisions regarding life and death were an extreme example of this tension. At farms that we worked at, decisions to kill animals, or to allow them to reproduce — both primarily under human control — were founded in questions of livelihoods, health and wellbeing of humans, non-human animals and soils, value(s) (Kallio, 2020), and nutritional considerations. At the same time, farmers needed to balance with the existing organic, biodynamic and food safety regulations, as well as with agricultural subsidies, which imposed allowances and restrictions on the number of animals, and ways of caretaking, breeding, killing, and processing them. Oftentimes these were at odds with the needs and know-how of the farmers.

Indeed, it is instructive to examine legal regulations like the one that required the installation of a concrete slab on which to deposit manure. This particular regulation was written to prevent the placement of *raw* manure directly onto the ground, where it will eventually leach phosphorous and nitrogen. Not yet being *decomposed* enough for the soil to incorporate, the leaching of these nutrients runs-off into waterways and causes eutrophication. What the regulation does not accommodate, however, is the possibility to put *composted* manure directly onto the ground field. Allowing manure to decompose and transform into a state in which soils can readily incorporate the nutrients without fear of run-off required farmers to draw on their situated knowledge. Hence, for farmers with the time, space, and know-how, this regulation simply imposed a bureaucratic hurdle that sapped time and energy from their practice of farming, and potentially money if they had succumbed and had a concrete slab installed.

It highlights an instance of attempting to control landscapes from the *outside* of the farming practice. That is, the concrete barrier was a legal-material intervention that required the farmer to act to control their landscape in accord with a particular way of world-making that was at odds with the farmers’. The logic of the regulation falls in line with the world-making projects of modernity such as “hard-surfacing”, in which the world is build to *contain* life and the cohabitation of organisms by blocking “the very intermingling of substances with the medium that is essential to life, growth and habitation” (Ingold, 2011:124). The concrete — a structure that might contain — was a material manifestation of a particular conception of how non-human relations should be patterned. It manifests a mode of control which, ironically, does in fact appear to recognize the aliveness of soils and landscapes, but in this recognition, assumes that life, death and cohabitation can be controlled and contained (Kallio, 2020). In navigating a way around the regulation, the farmer was able to avoid a landscape manifestation that would have prevented the lives of microbes, worms, insects, and other beings from entering into relations with the soiled landscape.

While concrete was one way of attempting to control unruly life-forms — microbes, insects, fungi, non-human animals — from cohabiting, we found a similar but contrasting landscape intervention in the wood chips. Whereas wood chips also created a kind of barrier — to stop weed growth, to protect against soil compaction, to structure where people could and could not walk — their permeability was revealed in their allowance of fungal mycelia to decompose it, of birds to alter its intended boundary-making, and the particular aromas that it absorbed or else gave off when wet or harboring mycelia (concrete also has a ‘smell’ when wet, but one that is rather different than wood and fungal mycelia). Wood chips, perhaps due to their permeability, do not of course figure into the legal regulation (yet), but they are used by farmers as a way of managing or controlling how cohabitation unfolds. And crucially, they are a common intervention in regenerative agricultural landscapes like the ones we worked in, having arisen precisely from proximate ways of knowing landscapes.

6.2. Caring for and taking care of

We came to learn that care unfolded through complex, intimate relations of ‘caring for’ and ‘taking care of’ myriad “matters of care” (Puig de la Bellacasa, 2019). ‘Taking care of’ in our research contexts implied action referring to matters that need to be “dealt with” or solved as part of the farming work. This was, however, an activity characterized not merely as making rational choices, but rather accorded to the pragmatic orientation (Räsänen, 2009) of farmers who, in the course of producing food needed to resolve and “make do” (de Certeau, 2013) with different matters they faced in their everyday farming lives. In understanding care as a form of relating rather than as an emotion (Puig de la Bellacasa, 2019; Krzywoszynska, 2016) we found that forms of ‘caring for’ was revealed most strongly in the “metabolic relations” (Bertoni, 2013) of (multispecies) *feeding* — feeding the compost with organic matter, feeding earthworms organic matter in the (making of) compost, feeding screaming cows and other animals whose manure was essential for the compost, feeding the soils with compost which fed the plants, which ultimately would feed people. Even in cases such as the composted zucchini and the salvaged garlic — in which a clash of expectations and rhythms between markets, plant growth, and shelf life resounded — for farmers, ‘feeding’ the compost was simply the next best thing to do.

Through these kinds of metabolic processes of decomposition, farmers came to know their soils in particular ways, generating materially-bound and embedded relations. Allowing organic matter to decompose and feeding soils with farm-made compost,¹⁴ preparing fermented liquid sprays, carefully calculating nutrient fertilizers, and piling organic matter into raised beds illuminated how allowing for and encouraging processes of decomposition were ways of caring for soils. Yet these feeding processes pointed to the complexity that ‘caring for’ entailed in the agricultural context—a complexity which, in the Western worldview, is reduced to uniquely human pursuits by making use of natural resources (Suzman, 2020).

The complex dimensions of care became particularly visible in farms that kept animals. The prevailing practice in most agriculture is to keep animals for turning them into a product that can be sold and consumed.

¹⁴ Only three of the farms that we visited used compost or fertilizers sourced from outside the farm, these being made from residue of municipal sewage waste, side-streams of the forestry industry, or household biowaste. In these cases as well, farmers familiarized themselves with the processes of decomposition and gained knowledge about the quality of the composts through their usage. While not having a chance to follow decomposition, they nonetheless came to know compost in the ways it worked in the fields. What its consistency was, if it contained plastic bits, or if it burned the plants, as one farmer described. Such information was unattainable from searching webpages, watching youtube videos, or reading scientific articles, but could be shared on peer-to-peer encounters.

In the farms we visited, animals could indeed supply meat for consumption by humans, but not only humans; wool for textiles, but also for insulative mulch to care for plants; eggs for consumption, and their shells for compost to care for soils and plants. Thus, while the practices and processes of rearing animals are ostensibly dominated by market-oriented relations of production, a closer inspection shows that far more complex relations of care were being continuously cultivated — and for reasons that far exceed their direct market value.

Yet, when associated with market-oriented relations of production, all other kinds of relations tend to be subjugated. This can be challenged: while the cow whose death Galina witnessed was subsequently transformed into meat for consumption, this relation (killing an animal) was merely one, and at this particular farm, a relatively rare one amongst others. The other relations — balancing the number of animals so as to be able to manage pastures sustainably, make compost, properly care for newborns, cultivate biodiversity and act as companions — were far more important than meat within that farming context. Focusing not only on this multiplicity of relations, but also on those relations which were primarily implicated in the life of organisms and materials, helps to clarify how these relations were “foregrounded in order to achieve something” (Bertoni, 2013: 81). That is, by attending to the relations that are considered most important or prominent in the life of some-thing, it becomes possible to ask “for whom are they important, and to what ends?”. In doing so, we not only found various relations of care being practiced, but this also allowed us to understand the kinds of “external goods” (MacIntyre 2007) — institutional expectations and requirements — that continuously shape and influence the “internal goods” (ibid.), that is, relations that occur ‘within’ the practices of regeneration, and intend to affect the non-market-oriented ways of knowing landscapes.

Considering the statement by one farmer, Iris, allows us to take a step further into considering relations of care. Iris asserted that “cows process the grass which humans can’t and turn it into this *black gold* that we then use to grow food for the local community”. Here, Iris foregrounds a set of relations that are put in motion to achieve some-thing (and not another thing) in particular: the ability of animals to pasture, eat and digest grass. Foregrounding these relations allows us to see animals as *care-takers* of the soils, turning meadows into traditional biotopes, feeding the soils with valuable nutrients, and ‘cleaning’ beds from unwanted pests. Ultimately, we came to understand that for the farmers, relationships of care with animals were not merely instrumental, but — as Kimmerer (2013) has shown with plants — reciprocal: animals also provided care for their caretakers.

Essentially, composting was both an embodiment and a reflection of love and care: what the animals ate ended up directly in the compost, in the soils, in the plants that were grown in those soils, and in the beings who ate the plants. Knowing both soils and plants through composting included not only knowing — and caring about — what went into the compost, but also the ability to identify its quality through making and using the compost, and following the processes of decomposition and plant growth. As an act of care, compost that was added to soils was intended to feed the soils with nutrients to augment robust soils. For the farmers with whom we worked, healthy soils meant a high content of bacterial life and penetrable soil structure that could be observed when sowing, transplanting, digging and ‘opening up’ the soils, but also, and equally when eating the food. Earthworms, spiders, and other insects, colors of different layers as well as long and strong roots were signs of good soils; feeding this ‘invisible’ food web (Ingham and Slaughter 2004) enabled building organic matter, which, for some farmers, as we came to learn, increasingly meant that carbon was being sequestered.

Finally, care, as we experienced it ethnographically, was not easy: it was demanding, laborious, tiresome, and exhausting (see also Puig de la Bellacasa, 2019). Having animals meant being tied to their caretaking every single day, year-round; using self-made compost for the plants meant a lot of work and dedication, it meant budgeting to pay others to help with that work, or else finding volunteers who wanted to help,

which in turn required yet more care work.

6.3. Attending to rhythms of (re)production

Agricultural landscapes are places of myriad temporalities that can materialize in short, medium, and long term (Ingold, 1993). Regenerating and maintaining healthy soils, planting trees, tending to animal, plant and human needs, and responding to both market demands and legal regulations brought together multiple rhythms that were in constant tension, and often not aligned (Kallio and Houtbeekers, 2020). These discordant meshworks facilitated possibilities of knowing that were both generated from within the agricultural landscapes and by external forces such as market demands and legal requirements. Our fieldwork with/in regenerative agricultural landscapes revealed how, in the words of Puig de la Bellacasa (2015: 691) “the dominant drive to understand soils has been the pacing of their fertility with intensified rhythms of production”. We observed that the pacing of soil fertility was more often than not in friction with seasonalities and reproductive rhythms of more-than-human beings, and these frictions came to define temporalities of the landscapes.

The practice of composting allowed us to see how multiple different rhythms — those of the animals, soils, plants, weather, farm workers, hygiene and safety regulations, the markets — came together in agricultural landscapes to form a foundational cycle. For example, the salvaged garlic gives a sense of this clash of multiple rhythms in tension. The garlic had been harvested the previous year, saved for seed, planted with compost, weeded and watered, grown and harvested. In the end, some garlic was considered unfit for sale, usually because some bulbs or cloves had begun showing rot, meaning it couldn’t be stored for the longer term. It was thus diverted from its path as a commodity to a new path as fodder for microbial decomposition in the compost, which would support the growth of new crops in the following year. This example shows a complex interplay of rhythms and relations: the shelflife of vegetables in their raw and processed forms and the process of growing vegetables over a season, as well as what is considered ‘edible’ and by whom. The farmer’s notion of edible differed from Will’s notion, both of which differed in relation to hygiene and food safety regulations that required (processed) goods to come with expiration dates. On one hand, handling garlic in the farm was a thoroughly sensuous process, while on the other hand expiration dates that are determined by regulations can often seem to be at odds with sensory analysis of a product, or knowledge of a products shelf life after processing in a certain way.

The making of the compost was one cycle of rhythms patterning work at farms. It took one year to make a good compost with animal manure. During winter time, animals produced manure, which, mixed with litter, was emptied in the spring time into a big pile to decompose until the next year. Thus, compost that had been made the previous year was spread into the fields in the spring. It was here, through engaging in the making of compost, where the reproductive cycles of animals — cycles of life and death — became sensible to us, engendering particular ways of knowing: smelling the pungency of decomposition in the air, or the sweet earthy scent of compost ready for the fields; developing relations with the animals sent to butcher houses in the spring, while shoveling their manure for fertilizer in the fields the next year.

Although there was continuous attention to both plants and animals, attending to the needs of the plants and animals differed, at times radically, especially between those farmers who focused primarily on production for the markets and those focusing on enhancing the reproductive capacities of their multispecies community. For instance, we learned that in Finland, chickens don’t lay eggs during the winter time due to the lack of daylight and nutrients that they usually receive from the pastures. In order to accommodate the expectations that market rhythms have generated, farmers used artificial lights and added protein to the fodder of the chickens to encourage egg production and maintain it through the winter time. Such rhythms of production for the markets don’t typically make space for chickens or other animals to go through

with their biologically reproductive cycles.

Similarly with plants, reproductive cycles are rarely reached in conventional farms as farmers growing vegetables typically purchase brand new seed each year, often from subsidiaries of global seed companies. In our experiences however, we observed that the production of annual crops (as well as perennials) was paced to the yearly cycles of farmers' (re)productive processes, which included the making of compost. Farmers needed to save, select, process, and store the seeds to use and acclimatize them year after year, or else find seeds from various networks of growers and community seed banks. If using multiple types of animal manure, they would need to understand which kinds of compost would suit certain types of plants. In these processes, the farmers developed a sense and an understanding not only of the reproductive capacities of the plants but also of their characters — in ways quite similar to how [Kimmerer \(2013\)](#) described her reciprocity with wild strawberries. This extended also to soils over time, for instance, the farmer who observed his soils to produce abundant harvests despite the increasingly extreme weather (one cold and wet year, followed by two hot and dry years) and the results of the soil nutrient analysis. The farmer whose crop growth appeared anomalous with the extreme weather and the soil analyses had been farming his land for 10 years. But prior to this the farm had operated as the first biodynamic farm in Finland for 30 years, using, as the farmer expressed “the same compost” to feed the soils with.

One of the most fascinating temporalities present in the farms was related to the emergent focus on regenerative farms working as carbon sequestering landscapes. While [Puig de la Bellacasa \(2014\)](#) reminds us that the pace of soil care is a long-term game, the pressure of becoming the so-called carbon farmer was palpable in that some farmers appeared eager to ‘know’ how carbon was becoming sensible in their soils. Although carbon was not immediately available for sense perception, farmers were keen to look for traces or signs in the soil that carbon might be present. For farmers it was critically important to know the quality of their soils, but knowing carbon was a brand-new relationality, influenced by scientific and policy discourses external to the farm, that was guiding regenerative farmers' attention and thus starting to influence their relations and ways of knowing their landscapes.

7. Landscape relations: becoming (un)known

This article has been motivated by an understanding that landscape, in both its practical and metaphorical uses, is an important analytical and political concept. Regenerative agriculture, as something being pursued by both global corporate empires and small farmers hoping to radically transform food systems, is an ideal context to understand how different relationalities emerge, for whom, and toward what ends. Recognizing the significance of regenerative agricultural landscapes in rural planning, policymaking and everyday life, we have sought to better understand multiple ways of knowing landscapes by following three relational dynamics that we came to “notice” (see [Tsing 2015: 17–26](#)) in the course of fieldwork, and which led us to analyze the multiplicity of relations that constitute regenerative agricultural landscapes. In what follows we wish to discuss 1) representations as a particular form of relating and the implications of (un)knowing regenerative agricultural landscapes through representations 2) the multiplicity of relations that proximate and emplaced ways of knowing generate and why these matter, and 3) acknowledging reciprocal relationalities (à la [Kimmerer, 2013](#)) as a way of reorienting the practices, policies and science of regenerative agriculture. In doing so, we situate our analysis in a way that aims to trouble techno-scientific representational knowledges in the context of regenerative agricultural landscapes, and how they become (un)known in relation to the most prescient question in the scientific and intergovernmental spheres, namely, the ‘carbon problem’.

An implicit assumption embedded in the knowledge practices of Science, as [Baptista \(2018\)](#) points out in the case of ecology, is the idea

that “[i]n order to achieve legitimacy, knowledge has to represent” ([Baptista, 2018: 399](#), see also [Latour, 2004](#); [Stengers, 2016](#)). At the same time, Baptista reminds, “representing and representations are a form of relating” (Baptista, p. 399, our emphasis). Indeed, our ethnographic work led us to be concerned that even when placing a deeper focus on soils — even when *representing* them differently ([Kearnes and Rickards, 2020](#); [Krzywoszyńska and Marchesi, 2020](#); [Puig de la Bellacasa, 2019](#)) — there is a danger of (re)producing ways of knowing that are detached from farmers' proximate, emplaced relationalities, and thus threaten to marginalize and endanger the particular sensuous ways of knowing that unfold in the practices of regenerative agriculture in which we participated.

This point is illustrated through our focus on composting practices. While the procurement, making, and use of compost is ostensibly only one aspect of a farms' operations, our vignette and analysis reveals the relational extent to which composting practices and processes of decomposition figure into nearly every aspect of regenerative farming. As soon as any of these practices are cut out from the relations that give rise to them and turned into ‘data’, that which is *inhabited* becomes reduced to static “optical scapes” ([Ingold 2012: 207](#)) rendering the multiplicity of landscape relations invisible. As Puig [Puig de la Bellacasa, 2012, 2](#)) states, “the very category of data exposes that something [else] is ‘not data’”, such that other, non-datafied relations become a mere ‘residue’ which is excluded from knowledge and made invisible. This erasure of relations appears to be the case with the carbon farming push, and especially the imposition of carbon markets upon the practices of regenerative agriculture.

From the understandings we have generated through tracing more-than-human relations in regenerative agriculture there is an essential point to be raised. At its core, the corporate-backed promotion of carbon farming is primarily focused on *transitioning* conventional agriculture towards regenerative, carbon capturing agriculture ([IDS and IPES-Food, 2022](#)). Rather than any radical transformation of the food system towards food sovereignty, self-reliant and post-capitalist food economies,¹⁵ this proposed transition toward regenerative carbon farming not only enables the maintenance of the existing and increasingly extractive power-dynamics in the industrial agri-food complex ([Chagnon et al., 2022](#); [Shiva 2016, 2022](#); [Ye et al., 2020](#)), but also — and not unrelatedly — threatens to radically reshape the relations that many regenerative farmers currently orient themselves towards: polycropping, seed-saving, making one's own compost fertilizers, investing in community building, organizing direct sales and community supported agriculture (CSA), and keeping diverse animals or tending to plants for reasons that exceed their market value.

Interestingly, though not surprisingly, when looking into the relational dynamics of control and cohabitation, of caring for and taking care of, and of attending to multiple rhythms of (re)production, we found that the measurement of soil carbon — or closely following soil nutrient analyses, or generating satellite images that could indicate photosynthesis of the crops — was not intrinsic, or even relevant for skillfully accomplishing the everyday work in regenerative farming. Rather, instances in which farmers mentioned carbon sequestration or looked for signs of carbon in their soils invariably justified their actions as being related to the (geo)political ‘carbon problem’. Such modes of emplaced practice encouraged farmers to ‘gaze’ at their own practice by taking a view from above — from the *outside* of their own practice — as an “ex-habitant” of a landscape occupied by soils rather than as “inhabitants” of the weather-world where “there is no distinct surface separating earth and sky” ([Ingold 2008: 1804](#)). Indeed, just as we have made visible with compost “[l]ife is rather lived in a zone in which substance and medium are brought together in the constitution of beings

¹⁵ For food sovereignty, see [Patel \(2009\)](#); for self-reliant food economies see e.g. [Kallio and Houtbeekers 2020, 2022](#); for post-capitalist economies see e.g. [Gibson-Graham \(2006\)](#); [Leitheiser et al., \(2022\)](#); [Nelson and Edwards \(2021\)](#).

which, in their activity, participate in weaving the textures of the land” (Ingold 2008: 1804; see also Latour 2018).

At a time when countless scholars¹⁶ have argued that modern humanity’s extractivist relation to the world prevents the sustainability of anything, it merits asking: what becomes (un)known — in sensory experience, in ways of ecological knowing and relating — by encouraging farmers to primarily attend to carbon in their soil? What becomes (un)known when farmers are encouraged to farm via representations of farming, to rely on ‘the data’ instead of long emplaced experience in the field? If we consider that it is only the reproduction of practices that enables them to continue, which ways of knowing or relating might become *unpracticed*? We argue that the devaluation — through reducing landscapes to soils, and soils to carbon — of emplaced, sentient ecological knowledge practices allows regenerative agricultural landscapes to become *unknown* in these critically important ways.

Having argued this, our aim is not to suggest that ‘proximate’ knowing is by definition better (or worse) than ‘knowing at a distance’, but rather to argue that *the nature of the relations through which knowing emerges matters*. Our conceptualization of landscapes as materializations of more-than-human relations has been to acknowledge their *aliveness*, but while differentiating it from especially technoscientific approaches to aliveness that require the stasis and reduction of landscapes to categorized representations. Instead, we have sought to evoke a form of aliveness that is embedded in a sentient ecology that requires reciprocal relations which, as Kimmerer (2013) elegantly urges, recognize the ability of living beings to reciprocate. If reciprocity is assumed to operate on the basis of working ‘with nature’ rather than against it, it merits to ask: what, in the context of regenerative agriculture, is being reciprocated and how? As we came to realize, composting suggests one form of reciprocity, as does feeding and attending to the reproductive cycles of plants and animals. Thus, when thinking of landscape relations in terms of reciprocity one faces questions of how to engage with plants, animals, soils and other materials and living beings: whose needs are being reciprocated and how? On whose terms, and for the benefit of whom? These are questions that we have attempted to address in this article.

Lastly, the critique and arguments we have brought forth would be remiss without indicating what alternative pathways might lie beyond the realms of representation. Fortunately many authors have already begun blazing a trail. While there is not space to pursue this further here, we do wish to point readers to some academic work that has attempted to address the more-than-human beyond standard scientific representational practices, and has begun working to legitimate forms of knowledge production that have long been excluded from the scope of Western scientific theories of knowledge — particularly the kinds of knowing generated through arts-based practices (Heinrichs, 2019; Heinrichs and Kagan, 2019). A more-than-human approach to agricultural landscapes would attempt moving beyond (though not abandoning) language and articulation (Barad, 2007; Krzywoszynska, 2019), attending to the politics of visceral experience¹⁷ (Hayes-Conroy and Hayes-Conroy, 2008, 2010) and inquiring, as we have done here, after practices of *correspondence* (Ingold, 2021) with more-than-human landscapes in the process of their generation. Alternative representations might include radical images of soil life (Puig de la Bellacasa, 2019), video, sound and other multisensory installations (Pink, 2015), ethnographic fiction (Jacobson and Larsen 2014), storying landscape relations (LaFleur, 2023), seed mandalas, or poetry (Williams, 2022). At the very least, it is clear that representations derived from distant ways

of knowing, and which command the lion’s share of scientific authority and legitimacy, do not deserve to go unquestioned.

Author contributions

This article builds on the work of Galina Kallio on landscape aesthetics in regenerative agriculture published in Finnish (Kallio 2022). In this article, the conceptualizations, data sets, methodologies, and analysis are new and, as well as the writing and administration for this article, were undertaken equally by both authors.

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Declaration of competing interest

None.

Data availability

The data that has been used is confidential.

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¹⁶ See for example, Durante et al., (2021); Ingold and Simonetti., 2022; Plumwood (2003); Rosa (2019)..

¹⁷ Hayes-Conroy and Hayes-Conroy describe visceral politics as “a move towards a radically relational view of the world, in which structural modes of critique are brought together with an appreciation of chaotic, unstructured ways in which bodily intensities unfold in the production of everyday life”.

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