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Expanding recognition and inclusion of animal-free organic agriculture in the sustainable agriculture movement

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Animal-free organic agriculture resides at the margins of sustainable agriculture discourse, practice, and imaginaries, which center animal-based forms of farming. However, the concerns and goals of sustainable agriculture are overwhelmingly consistent with those of many forms of animal-free organic agriculture (AFOA), described as organic farming sans animal production, labor, and byproducts. Despite this sidelining, AFOA has great potential to contribute to a more robust sustainable agriculture movement. In order to emphasize the continuities between animal-based and animal-free sustainable agriculture, this Perspective identifies a number of key similarities between animal-free and animal-based sustainable farming, including mutual foci on soil health and shared opposition to intensive animal agriculture. It contends that beyond being compatible with sustainable agriculture, AFOA holds answers to some of the difficult questions currently and potentially confronting animal-based agriculture, such as projected impacts of climate change on animal agriculture and stability of supply chains for animal-based soil amendments. Barriers to greater inclusion of AFOA into the sustainable agriculture movement exist as well; this piece suggests potential ways to address some of these challenges, including the integration of AFOA into formal sustainable agriculture education.

KEYWORDS

sustainable agriculture, animal-free agriculture, stockfree organic, biocyclic vegan, vegan organic, veganic

1 Introduction

Calls for agriculture to abate the climate crisis, conserve natural resources, reduce agricultural pollution, ensure access to healthy affordable food, improve farmer livelihoods, and generally respond to the deleterious ecological and social impacts of industrial agriculture, are answered by a diversity of forms of sustainable agriculture. Agroecology, organic agriculture, regenerative agriculture, permaculture, conservation agriculture, and sustainable intensification are among these forms, in their concerns for environmental, social, and economic viability (Gomiero et al., 2011; Oberč and Arroyo Schnell, 2020; Kassam A. and Kassam L., 2021). While there are both key similarities and marked differences between these and additional sustainable agriculture approaches, one notable commonality is the normativity of domesticated or farmed animals. Farmed animals are enmeshed in sustainable farming systems in a multiplicity of ways, including as food animals (e.g., dairy cows and broiler chickens); as sources of fiber and skin (e.g., goose down and sheep wool); as sources of fertility for crops (e.g., manure and feather meal); as providers of ecosystem services (e.g., sheep and cattle in rotational grazing systems); as labor (e.g., oxen and draft horses); as attractions (e.g., heritage livestock breeds in agritourism

experiences); and as consumers of farm products (e.g., straw bedding and corn-based feed).

Forms of animal-based agriculture are centered in sustainable agriculture discourse and practice. Meanwhile, approaches to sustainable agriculture that are exclusive of farmed animals sit at the margins of conversations about sustainable agriculture futures—despite their actual and potential roles in sustainable agrifood systems (Hagemann and Potthast, 2015; Kassam L. and Kassam A., 2021; Hirth, 2022). Nobari (2021) recently observed that “From First-World urban gardening enthusiasts to indigenous movements, the push for a more sustainable way of growing food—one that works with ecosystems instead of against them—comes from a diverse set of voices. Within this diversity, one common denominator is the validation of small-scale, traditional forms of animal agriculture. This ranges from implicit to explicit. Even where not a central focus, animal husbandry is usually accepted as default in a sustainable agricultural system” (p. 381). They further assert that, “As awareness spreads that industrialized corporate agriculture is the problem, so does the notion that animal-based agriculture is the only possible alternative. When presented with the idea of veganic [an approach to organic agriculture that involves no farmed animals or animal byproducts], it’s like it can’t possibly be done” (p. 382). The status of animal-based agriculture as an unquestioned or a vital component of sustainable agrifood alternatives to industrial agriculture likely stems from a combination of factors, including European colonial legacies; community norms around animal husbandry; societal norms around meat and animal product consumption; the “logic of the larder;” and a general lack of knowledge around alternatives to animal-based fertility (Arcari, 2017; Weis and Ellis, 2020; Nobari, 2021).

Despite the marginal position of animal-free agriculture in sustainable agriculture discourse, practice, and imaginaries, animal-free organic agriculture (AFOA) is a set of approaches that evinces clear alignment with sustainable agriculture, and that is positioned to contribute meaningfully to the broader sustainable agriculture movement. As used in this piece, AFOA refers to organic plant agriculture systems that exclude domesticated or farmed animal bodies and byproducts (e.g., manure, blood meal, bedding litter) from the production of food, fiber, and fuel, instead using plant- and rock-based materials to enhance soil fertility. Three forms of AFOA have been codified as agricultural standards. In the following section, the Stockfree Organic Standards (based in the United Kingdom), the Biocyclic Vegan Standard (based in Germany), and the Veganic Standard (based in Canada) are used as touchstones for brief observations about continuities between AFOA and animal-based sustainable agriculture. Next, the piece outlines some of the challenges that animal-based agriculture may face in the near and midterm future, to which AFOA can respond. Finally, I identify some possible paths to effecting a more wholesale inclusion of AFOA in the sustainable agriculture movement. The intent of this Perspective is to draw greater attention to the existence and value of AFOA, with an eye to strengthening the sustainable agriculture movement.

2 Similarities between AFOA and animal-based sustainable agriculture

The three codified approaches to AFOA share numerous values, practices, and perspectives with forms of animal-based sustainable

agriculture. Acknowledging similarities that span the animal-based/animal-free divide is a useful way to counteract a narrow and divisive focus on the outstanding difference of the place of animals and animal byproducts in the respective forms of sustainable agriculture. The continuities outlined below are illustrative, not exhaustive.

A deep concern for soil health is perhaps the most fundamental shared value, even as this may manifest through different sets of practices (i.e., relative to the use of animals and animal byproducts). For instance, the Veganic Standard recognizes soils as “the essence of all life,” and emphasizes the importance of monitoring and building soil organic matter (NAVCS, n.d.), as does organic agriculture (Rodale Institute, n.d.-a). Improved soil health is foundational to the Biocyclic Vegan Standard, given that “... soil fertility is the basis of any sustainable and successful economic activity. All production techniques used in agriculture should therefore serve the aim of creation and maintenance of a diverse and active soil life ...” (Adolph Hoops Society, 2020), just as it is the most common desired outcome among regenerative agriculture practitioner organizations (Newton et al., 2020). Viewing agriculture as an instrument of climate change mitigation is another common value. The Biocyclic Vegan Standard, for instance, emphasizes the possibility for transformation of farmland into carbon sinks based in the application of carbon-heavy humus soil (Adolph Hoops Society, 2020). Meanwhile, over two-thirds of regenerative agriculture practitioner organizations view increased carbon sequestration as a desirable outcome of regenerative agriculture (Newton et al., 2020).

Practically speaking, commitments to growing without chemicals and genetically modified organisms (GMOs) articulated in the three sets of AFOA standards (Adolph Hoops Society, 2020; NAVCS, n.d.; Stockfree Organic Services, n.d.-a) are also common to many forms of animal-based sustainable agriculture. Cover cropping, minimal tillage, and crop rotations are other techniques implemented by some animal-free and some animal-based sustainable agriculture forms. Green manure application, an integral part of the Stockfree Organic and Biocyclic Vegan Standards, is a notable commonality, with animal-based plant agriculture also often implementing this plant-based technique to improve the soil. The United States Department of Agriculture (USDA) guidelines for organic crop producers, for instance, discuss green manuring as one of the primary soil-building activities on certified organic farms (Coleman, 2012). The integration or creation of natural landscape elements in and around farm ecosystems is another practice common across the animal-free/animal-based sustainable farming spectrum. Hall and Tolhurst (2007) detail numerous landscape design techniques that Stockfree Organic-certified farmers can implement to enhance biodiversity; attract predatory insects and mammals; and reduce wind speed and erosion. Similarly, Wezel et al. (2014) describe the agroecological practice of (re)integrating elements like vegetation strips and hedges as conferring benefits including habitat for pollinators; protection against erosion; and biodiversity conservation.

Finally, the problematization of intensive livestock production is common across almost all animal-free and animal-based sustainable agriculture approaches, though of course ultimately the proposed solutions differ. Intensive livestock farming is recognized in the Biocyclic Vegan Standard as a leading cause of greenhouse gas emissions (Adolph Hoops Society, 2020). While materials associated with the Stockfree Organic Standards tend not to focus on intensive production in particular, charges such as livestock production’s contributions to food

insecurity, greenhouse gas emissions, fossil fuel dependence, and waterway pollution apply (e.g., Hall and Tolhurst, 2007; Stockfree Organic Services, n.d.-b). From an agroecological perspective, Gliessman (2007) emphasizes that conventional animal husbandry techniques contribute heavily to the unsustainability of conventional agriculture, including via air and water pollution from confined animal feeding operations; monopolization of arable land by feed production; and risks to human health from zoonotic diseases and diets high in animal fat. The Soil Association connects intensive production of various types of livestock to animal welfare violations, antibiotics resistance, farmworker health, and ecological challenges (e.g., Soil Association, n.d.-a,n.d.-b).

These similarities are perhaps not surprising, given the importance of organic and/or regenerative agriculture as bases for the three AFOA standards. They demonstrate that in many important ways, AFOA and animal-based sustainable agriculture proponents are “on the same team.” They also offer common ground on which deeper understandings of AFOA could be built, as a step toward greater acceptance of AFOA approaches in the broader sustainable agriculture community, which would be to its benefit.

3 AFOA as an asset to the broader sustainable agriculture movement

AFOA is positioned to make a key contribution to the sustainable agriculture movement, in offering a more diversified path forward in the face of numerous environmental, scientific, and social shifts that could present substantial challenges to animal-based plant agriculture and animal agriculture (both industrial and alternative varieties) at various sites and scales. The developments described below suggest the vulnerabilities of a heavily or exclusively animal-based sustainable agriculture movement. In the worst cases, they may entail steep challenges to obtaining animal-based fertility for crops, and may render animal husbandry untenable or undesirable.

Animal-based approaches to plant agriculture rely on soil amendments such as manures, blood meals, and feather meals. These wastes and waste products originate from sources including industrial animal agriculture, small local farms, and on-site in mixed crop-livestock operations. As various threats to animal agriculture arise and escalate, including those outlined below, there is reason to expect that the reliability of access to animal-based inputs will destabilize.

The intensification of climate change is expected to yield considerable impacts on livestock production. Reduced and variable feed quantity and quality; diminishing water availability; shifting disease dynamics; and the effects of heat stress on animal reproduction, health, and mortality are among the ways in which climate change is expected to increasingly affect animal agriculture (Nardone et al., 2010; Rojas-Downing et al., 2017; Bernabucci, 2019). Livestock producers may need to prepare to implement appropriate adaptation strategies or to consider alternative livelihoods, and the scaling down or termination of vulnerable operations will have implications for growers dependent upon animal wastes or waste products from those sources.

The numerous environmental and social impacts of animal agriculture and animal-based foods have led to a growing scientific consensus that the production and consumption of animal-based foods must be substantially reduced. Impacts including the contribution of livestock production to global greenhouse gas

emissions; the vast resource requirements of livestock production, including land and water; and the relationship between intensive animal agriculture and potential zoonotic pandemics are oft-cited in these discussions (e.g., IPCC, 2019; Willett et al., 2019; Ripple et al., 2020). Relatedly, food security strategies that rely heavily on plant-based foods are emerging in discussion and design, typically with an eye either to peak meat production or to scaling back animal agriculture (e.g., Day, 2013; Sabaté and Soret, 2014; Jimenez-Lopez et al., 2020). These discourses all put pressure on livestock-based industries and animal farmers, raising serious questions about the environmental and social sustainability of animal agriculture. Farmer transitions out of animal production due to these developments will likely have downstream impacts on animal byproduct supplies.

The market for animal-based food products is changing, sometimes in ways unfavorable to animal agriculture. For instance, per-capita cow’s milk consumption has been declining in the United States for decades, and consumer demand for plant-based milks is now a contributor to the decline in sales of cow’s milk in the U.S. (Stewart et al., 2020). Cellular agriculture is another sector to consider. If lab-based animal agriculture scales up in coming years, production costs will drop, consumer interest in multiple “traditionally-produced” animal products may decrease, and challenges may arise for feed producers and “traditional” livestock and dairy producers (Burton, 2019; Saavoss, 2019; Newton and Blaustein-Rejto, 2021). As these pressures lead to some farmers exiting the meat, dairy, and other industries, operations that once fed the animal agricultural byproduct supply chain will cease to do so.

These and additional factors that threaten animal husbandry will not manifest uniformly around the world, and the degree to which they impact animal agriculture in any given region or place will be dependent upon complex configurations of industry, climate, geography, culture, and policy. As they do emerge or intensify, though, a trickle-down effect of diminished supplies of animal-based soil amendments might be expected to result from altered and reduced livestock production. The degradation of animal byproduct supply chains would create instability for growers reliant on inputs from impacted regions and economies. Sustainability-minded farmers will need to be aware of and open to animal-free avenues in the face of potential shortages of animal agricultural byproducts.^{1,2}

There is also the question of the desirability of animal-based fertility sources, in addition to that of availability. Recognition of the potential transfer of pathogens from animal waste materials to organic plants such as berries and vegetables drives concerns about food safety in animal-based organic crop production systems (Sorensen and Thorup-Kristensen, 2011; Alsanus et al., 2019). In Europe, the place in organic agriculture of animal-based inputs specifically from

1 The organic transition in some parts of Europe similarly necessitated implementation of plant-based fertility systems, particularly in certain arable regions that were managed sans livestock and thus lacked access to animal manure (Hall and Tolhurst, 2007; Løes et al., 2011). This situation eventually informed the development of the Stockfree Organic Standards in the United Kingdom.

2 Of course, some farmers may opt to use synthetic fertilizers to replace animal-based fertilizers; this would be consistent with approaches such as conservation agriculture.

conventional agriculture has been a topic of ongoing discussion (Schmutz et al., 2020). For instance, the decision that Danish organic farmers must eliminate conventional manures and straw from their systems was made to better align organic agriculture with the ideal of an agricultural system with minimal negative effects on environment, animals, and society; and in order to prevent importing manures containing residue from GMO feeds (Oelofse et al., 2013). In addition to calling into question the desirability of animal-based inputs, these considerations serve as a reminder that farming practices are to some degree constrained by regulations and standards, which can shift toward limiting animal inputs into plant agriculture. AFOA represents a way around contamination concerns as well as tightened regulations.

Furthermore, as previously noted, the climatic, environmental, social and marketing challenges to animal agriculture described above may entice or force livestock farmers to consider alternative means of supporting themselves. These farmers may consider paths including leaving agriculture altogether, diversifying their household incomes or their farming operations, or making a full transition to plant agriculture. AFOA approaches represent a promising alternative for farmers wishing to pursue partial or full transitions to plant agriculture, in their ability to circumvent potential shortages in animal-based soil amendments that may transpire. Additionally, difficult emotions related to acknowledgment of animal sentience and concern about the environmental impacts of livestock production can lead to changes of heart about animal production among farmers and ranchers (Hirth, 2021; Salliou, 2023). AFOA approaches allow growers to avoid reliance on products from livestock industries or operations that they find environmentally irresponsible or morally reprehensible.³

AFOA, including and beyond the three codified approaches introduced above, is a viable (e.g., Pimentel et al., 2005; Cormack, 2006; Eisenbach et al., 2019; Kakabouki et al., 2021; Kaniszewski et al., 2021; Hefner et al., 2022; Niether et al., 2023), less resource-intensive (Hirth, 2022) path forward in the face of numerous changes that may make animal-based plant agriculture and animal agriculture more tenuous or less enticing enterprises. The AFOA standards provide sets of agricultural principles and practices that sidestep these issues, particularly including methods for building soil fertility that do not rely on animal inputs. Other AFOA-compatible approaches, such as Shumei Natural Agriculture and the Grow Biointensive method, similarly offer soil-building techniques with no or minimal animal-based amendments. As such, they are valuable assets to a heavily animal-based sustainable agriculture movement. How, then, to move forward, toward a sustainable agriculture movement more inclusive to AFOA?

4 Toward fuller inclusion of AFOA in the sustainable agriculture movement

An embrace of AFOA faces numerous barriers. Firstly, AFOA will face challenges similar to some of those identified above for animal agriculture, which may invite skepticism. For instance, climate change threatens not only livestock production but also crop yields in some regions (Kang et al., 2009; Lobell and Gourdji, 2012), and animal-free

sustainable farming is not a silver bullet for this. Supply chain disruptions for plant-based inputs such as soybean meal could feasibly arise due to phenomena such as major weather events and shifting trade agreements, creating a parallel situation to that suggested for animal-based plant agriculture. These and other limitations do not diminish the overall value of AFOA to the sustainable agriculture movement, though. AFOA approaches are simply several of many forms of sustainable agriculture, optimal in some contexts and not in others. Indeed, neither animal-based nor animal-free approaches are appropriate for every circumstance, and neither should be recommended or defaulted to without consideration of relevant conditions, from the macro (e.g., climate) to the micro (e.g., a farmer's financial resources).

The fundamental difference in position on animal production, byproducts, and labor is another glaring barrier. Proponents of animal-based sustainable agriculture may hold deep-seated beliefs about the value and necessity of livestock to sustainable agriculture, be members of communities in which animal husbandry is a normal and desirable practice, and lack familiarity with animal-free sustainable methods (Weis and Ellis, 2020; Nobari, 2021). AFOA challenges these cultural beliefs and community norms, and information about animal-free organic farming systems is not nearly as widely available as is information about animal-based systems. One way in which this scarcity of information manifests is in the inadequacy of resources available to farmers who might wish to implement AFOA. There is support available on behalf of the organizations offering the three agricultural standards for AFOA, as well as from other grassroots actors. However, in the US for instance, there appear to be no opportunities for students enrolled in sustainable agriculture majors, minors, graduate degree programs, certificate programs, and farmer training programs to learn the principles and practices associated with various forms of animal-free farming (Seymour and Utter, 2021). The situation is likely similar in other world regions. New and experienced farmers interested in adopting AFOA must seek out information and instruction, sometimes internationally, from grassroots organizations and other farmers; this can be time-consuming and burdensome. This is a practical issue that absolutely must be resolved in order for AFOA to become a viable approach for more farmers, and for AFOA to be taken more seriously by the movement. There are a number of actions that may be taken in response to the knowledge-based and cultural barriers to lay a foundation for a broader sustainable agriculture movement.

First and foremost, better support for AFOA will be critical for expanding acceptance of AFOA in the sustainable agriculture movement and for rendering AFOA a more realistic pursuit for new and transitioning farmers. The integration of animal-free organic approaches into formal sustainable agriculture education is one key path forward. Expanding the agricultural curricula of two- and four-year colleges and universities, as well as of education-oriented agricultural non-profit organizations, to include AFOA would entail structural or programmatic changes that might be hard-won and challenging to implement. Cultivating institutional will and easing the burden of implementation might require investment on behalf of grassroots AFOA organizations, perhaps in terms of building relationships with sustainable agriculture program faculty and administrators, or even supplying funding or instruction for pilot courses. Some precedent for this exists. Glyndwr (now Wrexham) University in Wales once integrated the Stockfree Organic Standards into its organic horticulture management degree with involvement of the Vegan Organic Network (VON), the originator

³ Seymour and Utter (2021) report on a wider range of additional reasons for farmer adoption of AFOA.

of the standards (VON, 2010). Generally though, this sort of work is difficult to suggest, given the limited resources of even the most prominent AFOA-oriented organizations. Challenges aside, this would be a deeply meaningful shift, in providing platforms for raising awareness about the existence and viability of AFOA approaches in the minds of future sustainable agriculture practitioners and leaders, and in giving them the practical tools to farm animal-free.

Another productive form of support for AFOA is expanded research, particularly into soil fertility systems. While there is a small research literature on plant-based fertility, more extensive coverage of fertilizers, crops, and soil types would facilitate more comprehensive and precise formal education on AFOA. It would also assist farmers who are starting out or transitioning outside of the support offered by AFOA certifying organizations, as there is reportedly a strong element of experimentation with soil fertility as part of the AFOA learning curve (Seymour and Utter, 2021). An interesting research example, focused on a variety of management practices and outcomes including and beyond fertility, is the US-based Rodale Institute's Farming Systems Trial (FST). The FST incorporates both organic manure systems, fertilized by leguminous cover crops and composted manure, and organic legume systems, fertilized only by leguminous cover crops (Rodale Institute, n.d.-b). The FST is conceptually significant in its positioning of sustainable animal-based and animal-free systems contra a conventional, synthetically-fertilized system. In doing so, it points to some of the common ground between animal-based and animal-free agriculture, and is perhaps a model for research that could increase collaboration and understanding across the animal-based / animal-free divide. It is also significant that the Rodale Institute, a respected organization in organic agriculture, has incorporated AFOA into its FST; this is an important signal of the value of AFOA to the sustainable agriculture movement.

Events designed to bring together animal-based and animal-free practitioners and advocates can raise the visibility of AFOA to animal-based communities of practice and offer opportunities to identify and discuss common ground in practices, values, critiques, and goals. An example of this occurred in 2022, when the UK-based charity Viva! organized a panel of experts to speak to the question "Is the future of sustainable farming animal-free?" Animal agriculture supporters and vegan farming advocates engaged in a respectful discussion on the topic, identifying meaningful similarities and differences between animal-based and animal-free agriculture as they spoke to their respective concerns, goals, experiences, and visions for agrifood futures (Viva!, 2022). Conferences can be fruitful grounds for exchanges as well. For instance, Soil Not Oil, an annual grassroots gathering in the US around organic, regenerative, and agroecological farming, has been welcoming veganic agriculture activists, academics, and practitioners. This has allowed AFOA proponents valuable opportunities to both inform and learn from conference participants who align with animal-based production yet share the larger goal of a sustainable agrifood system.

Finally, highlighting the financial prospects for organic produce grown without animal byproducts may enhance acceptance of AFOA in the sustainable agriculture movement. Vegan and vegetarian consumers in Germany, for instance, have been found to express interest in stockfree organic products based on animal welfare attitudes (Jürkenbeck and Spiller, 2020), and US veganic farmers have reported enthusiastic responses to their produce from vegan customers (Seymour and Utter, 2021). This suggests that there may be nearly-untapped marketing opportunities for farmers who decide to adopt AFOA.

5 Conclusion

Though AFOA is indisputably aligned with sustainable agriculture and shares many practical similarities, values, and goals with animal-based forms of sustainable agriculture, it resides on the sidelines of the sustainable agriculture movement. Approaches to animal-free organic plant agriculture represent opportunities to address how farmers and other stakeholders might navigate in a sustainable manner the range of challenges that may affect livestock farming, mixed crop-livestock farming, and animal-based plant agriculture now and in the coming decades. A more prominent position in the array of sustainable agriculture approaches is therefore suitable for AFOA, and its current marginal status is a disservice to the strength and future of sustainable agriculture. As McGreevy et al. (2022) recently observed, "We no longer have the luxury of ignoring viable, successful options when it comes to agrifood system sustainability .. While there might be strong positions held for or against certain types of solutions, the challenges of sustainability in general and agrifood systems sustainability in particular are so complex and urgent that all types of solutions with real potential .. are needed" (p. 1015). Indeed, it is time to open discursive and material spaces in the sustainable agriculture movement to a currently-marginal(ized) set of perspectives, practices, and participants, and to think beyond normative practices, values, and visions relative to farmed animals in order to work earnestly and vigorously toward sustainable agrifood systems.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

MS: Conceptualization, Writing – original draft, Writing – review & editing.

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