



Veganic farming in the United States: farmer perceptions, motivations, and experiences

Mona Seymour¹ · Alisha Utter²

Accepted: 22 May 2021 / Published online: 7 June 2021
© The Author(s), under exclusive licence to Springer Nature B.V. 2021

Abstract

Veganic agriculture, often described as farming that is free of synthetic and animal-based inputs, represents an alternative to chemical-based industrial agriculture and the prevailing alternative, organic agriculture, respectively. Despite the promise of veganic methods in diverse realms such as food safety, environmental sustainability, and animal liberation, it has a small literature base. This article draws primarily on interviews conducted in 2018 with 25 veganic farmers from 19 farms in the United States to establish some baseline empirical research on this farming community. Its qualitative perspectives illuminate farmer perceptions of and experiences with veganic growing, including definitions, knowledge acquisition, values, and challenges. Results highlight a lack of agreement about the meaning of veganic agriculture in terms of allowable inputs and scope. Participants have drawn on a wide array of veganic and non-veganic resources to ascend their veganic production learning curves, also relying on experimentation and trial-and-error. Their farming is motivated by a diversity of real and perceived benefits, most notably consistency with veganism, food safety advantages, and plant and soil health benefits. Veganic product sourcing and the dearth of veganic agriculture-specific resources present considerable challenges to farmers. The article briefly discusses possibilities for developing veganic agriculture in the United States, such as through a US-based certification system and farmers' associations, based on considerations of the trajectory of the US organic farming movement and veganic developments in Europe. Finally, the article suggests the importance of expanded research into soil health and fertility in plant-based systems to support practicing and potential veganic farmers.

Keywords Veganic · Vegan organic · Stockfree organic · Biocyclic-vegan · Sustainable agriculture

Abbreviations

CNG	Certified Naturally Grown
CSA	Community-supported agriculture
GAP	Good Agricultural Practice
GMO	Genetically modified organism
OFG	<i>Organic Farming and Gardening</i>
SARE	Sustainable Agriculture Research and Education
VAN	Veganic Agriculture Network
VON	Vegan Organic Network

Introduction

Interest in alternatives to industrial, chemical-based agriculture and its environmental and social consequences continues to mount. Organic, agroecological, and regenerative approaches are often prominent in the discussion of alternatives. While these paradigms demonstrate some key differences from one another, one of their commonalities is the centrality of farmed animals and/or animal manures and products to each. These models are therefore difficult or unfeasible for farmers whose financial or geographic circumstances preclude animal agriculture, and are unacceptable to farmers who do not envision farmed animals or their wastes and remains as part of an agricultural system. Another alternative approach which addresses all of these issues is veganic agriculture.¹ Also commonly known as

✉ Mona Seymour
mona.seymour@lmu.edu

Alisha Utter
autter@uvm.edu

¹ Department of Urban and Environmental Studies, Loyola Marymount University, 1 LMU Drive, Los Angeles, CA 90045, USA

² Department of Plant and Soil Science, University of Vermont, 63 Carrigan Drive, Burlington, VT 05405, USA

¹ Veganic farmers, advocacy organizations, researchers, journalists, and other actors currently use both “veganic” and “veganics” as shorthand for “veganic agriculture.” “Veganic” was the colloquialism of choice for farmers quoted in this article, and it is used at some points in this article outside of direct quotations.

vegan organic or stockfree organic agriculture outside of North America, veganic production excludes animal farming and the use of animal-based inputs while also eschewing synthetic inputs.

The Veganic Agriculture Network (VAN), a core promoter in North America, describes veganic agriculture as “an approach to growing plant foods that encompasses a respect for animals, the environment, and human health. ... this is a form of agriculture that goes further than organic standards, by eliminating the use of products that are derived from confined animals and by encouraging the presence of wild native animals on the farmland” (2014). The Vegan Organic Network (VON), a key supporting body based in the United Kingdom, explains that “‘Veganic’ is a combination of two words ‘vegan’ and ‘organic’. It’s a guarantee that food is grown in an organic way with only plant based fertilizers, encouraging functional biodiversity so pesticides are not necessary. No chemicals, no [genetically modified organisms (GMO)] and no animal byproducts in any part of the chain” (n.d.-a). VAN elaborates that veganic agriculture avoids animal-derived products such as manure, blood meal, feather meal, and fish emulsion. Instead, it implements plant-based fertility sources such as mulches, composts, green manures, crop rotation, and other sustainable techniques that do not rely on animal exploitation, and may also incorporate mineral supplements. Ideals also include: reducing dependence on fossil fuels; producing fertility on-site; building the soil to feed the plants and create long-term fertility; replenishing plant and animal biodiversity; and fostering the wild ecology on and around the farmland (Veganic Agriculture Network 2014, 2016).

Veganic is best regarded as a set of guiding principles for farming and gardening rather than as a distinct technique unto itself. A number of approaches to agriculture are veganic in their nature (particularly with respect to the fertility component) or quite close to it, including the Ruth Stout technique, the biointensive approach developed by John Jeavons, and Shumei Natural Agriculture (Veganic Agriculture Network n.d.). The vegan organic approach promoted by VON has been codified into a set of farming standards known as the Stockfree Organic Standards² (est. 2007) (Vegan Organic Network n.d.-b). Biocyclic vegan agriculture represents another approach to veganic cultivation and is described as “purely plant-based organic farming” which “excludes all commercial livestock farming and slaughtering of animals and does not use any inputs of animal origin.

Special emphasis is placed on the promotion of biodiversity, healthy soil life, the closure of organic cycles and on systematic humus build-up” (Adolf Hoops Society n.d.-a). The corresponding Biocyclic-Vegan Standards (est. 2017) are available to farmers worldwide (Adolf Hoops Society n.d.-a).

There are a number of other approaches that are compatible with veganic principles, but are typically not practiced veganically. These include container gardening, field-scale agriculture, no-till agriculture, and permaculture (Veganic Agriculture Network n.d.; Veganic Agriculture Network 2016). For instance, container gardeners may seek out chemical- and manure-free potting soil and make their own plant-based compost (Veganic Agriculture Network 2011a; Veganic Agriculture Network 2013a). Vegan permaculture is an approach to permaculture design that omits domesticated animals from the system, while designing with free-living animals in mind (Veganic Agriculture Network 2013b).

Veganic principles can also be observed in communities without access to synthetic inputs and animal products. For instance, some horticultural societies did not keep domesticated animals and thus had no readily available source of manure (Richerson et al. 1996; Mt. Pleasant 2011). The Mesoamerican milpa, integrating beans, corn, and squash, is an example of an indigenous cropping system historically free of chemical and domesticated animal inputs (Nobari 2021).

Academic and practitioner literature has favorably associated veganic approaches with various agronomic factors, including: yield, quality, nutrient cycling, soil nitrogen level, soil carbon storage, soil biology, soil organic matter, and energy inputs (Pimentel et al. 2005; Cormack 2006; Hepperly et al. 2006; Eisenbach et al. 2018; Matsuura et al. 2018; Eisenbach et al. 2019; Roussis et al. 2019; Rosato et al. 2020; Utter and Seymour forthcoming)³; sustainable agriculture or food systems (Hall and Tolhurst 2007; Visak 2007; Burnett 2014; Bonsall 2015; Hagemann and Potthast 2015; Hirth 2020; Kassam and Kassam 2021; Nobari 2021); food safety (O’Brien 1964; Seymour 2018a; Alsanian et al. 2019; Utter and Seymour forthcoming); diminished environmental impacts (Markussen et al. 2014; Seymour 2018a); marketing potential (Jürkenbeck et al. 2019; Jürkenbeck and Spiller 2020); and “animal-friendly” (Visak 2007) and “post-lethal” (Mann 2020) agriculture. Despite the diversity of veganic

² “Stockfree” was selected as a “more neutral technical term,” not necessarily associated with veganism (Schmutz and Foresi 2017, p. 477). The term is not entirely a neutral one, though, as it connotes that animals are not a necessary component to horticulture and diets (Schmutz and Foresi 2017).

³ Several of these references reflect field trials with a known veganic component—identified in Cormack (2006) as “truly stockless,” or verified through personal correspondence. There are a number of additional field trials around the world that Watson et al. (2006) identify as including a “stockless” rotation. The term stockless refers to farms with no livestock (or with a very low livestock to land ratio), but does not necessarily mean that those farms exclude all inputs from animals (i.e., are “stockfree”) (Schmutz and Foresi 2017).

methods and the ostensible benefits of veganic agriculture, there is relatively little scholarly literature on the topic, as has been noted by Hagemann and Potthast (2015), Schmutz and Foresi (2017), and Jürkenbeck et al. (2019). Qualitative perspectives are particularly lacking. The intention of this article is to illuminate some of the human dimensions of veganic agriculture, with attention to the practitioners, values, and experiences of veganic farming in the United States. It is guided by the following research questions: How do US veganic farmers define veganic agriculture? Why and how have they adopted veganic practices? What challenges have these farmers encountered in practicing veganic agriculture?

The article first reviews peer-reviewed qualitative literature on veganic agriculture, and then considers how scholarship on the US organic agriculture movement might shed light on the above research questions. It then explains the methods for the present study and describes research participants and their farms. The subsequent section presents results on participants' conceptualizations of veganic farming, veganic learning processes, perceived benefits of veganic farming, and veganic farming challenges. Finally, the discussion considers implications of these findings, drawing on the US organic farming experience and veganic farming in Europe; and suggests further avenues of research into veganic agriculture.

Literature review

As mentioned above, while “veganic” is the most common term in English-speaking North America, other world regions have alternative terminology, and there are also numerous methods that are veganic but not identified in name as such. With these factors in mind, a search was conducted for literature germane to farmer experiences in veganic, vegan organic, stockfree organic, and biocyclic vegan methods. A small number of sources were found that describe farmer motivations for, understandings of, and challenges of veganic growing. One case study of a veganic farm in the United States indicates that the owner-operators chose to practice veganic agriculture to align their organic-certified operation with their recent personal transition to veganism (Seymour forthcoming). Another case study of a vegan organic farm in the United Kingdom suggests that the former cattle farmers transitioned to veganic agriculture out of care and concern for animal welfare, food security, and the environmental and climate impacts of cattle production (Hirth 2020). Schmutz and Foresi reported on a small German-language study of vegan organic growers' motivations for excluding animal inputs, which found ethical, social, and ecological motives for this practice, suggesting that it is an “idealistic” approach (2017, p. 476). Another German study links farmer motivations with love for animals and

the appeal of not killing animals in a veganic system. Participants agreed that neither animal products nor livestock were part of veganic agriculture. The same study suggests a number of challenges for vegan organic farmers, including with “plant-based soil and plant nutrition, weed control, pests and diseases, soil structure and economy” as well as with ensuring good yields and developing fertilizer alternatives (Bonzheim et al. 2015).

Thus, the existing veganic literature offers little insight into farmer perceptions of and experiences with veganic agriculture. Several experienced veganic and organic farmers in and beyond this study have suggested that veganic farming in the US may currently be where the US organic movement was in the range of 30–50 years ago (Seymour, personal communications, 2017–2018). Obach writes that “In the United States of the early 1970s, organic farming was an obscure agricultural practice carried out by a small number of counterculture farmers and a smattering of commercial producers who recognized that there was something wrong with the dominant industrial food model. Few in the general public were familiar with the term organic, and fewer still had ever purchased an organic product. The small handful of scholars and university-based scientists interested in alternatives to the industrial agriculture model were marginalized by their peers. Organic practices were not recognized by the federal government, and food industry scientists dismissed organic methods as a hoax ...” (2015, p. 6). The small number of farms, low levels of consumer awareness and academic interest, and lack of federal recognition of organic agriculture approximately 50 years ago appear to parallel the status of veganic agriculture in the United States today. Thus, literature on early US organic farmers' experiences (c. late 1960s/early 1970s) may offer some general insight on present-day veganic farmers' definitions, value orientations, learning approaches, and challenges.

While a comprehensive review of that literature is beyond this paper's scope, some potentially helpful ideas emerge from key texts. For instance, Obach has noted that the meaning of organic and the particular practices defining organic have long been deliberated and contended. However, prior to a pressing need for organic certification, “defining organic was an informal dialogic process” amongst an informal network of practitioners and ideological leaders (2015, p. 44). A fundamental shared view that organic farming excluded synthetic chemicals prevailed in the mid-twentieth century. As the movement began to develop a more structured organizational form in the 1970s, and once organic advocates sought to codify and regulate their practices with an eye to developing the organic market, the challenge of formal definition arose (Obach 2015).

Motivations in the established US organic community of the 1950s and 1960s were diverse. Organic farming pioneer J.I. Rodale maintained that chemical fertilizers and poison

sprays obliterated soil life, thus leading to the production of “unhealthy plants and animals which when eaten produce unhealthy people” (Rodale 1948, p. 199). Another organic proponent, Paul Keene, linked organic agriculture to social justice, environmental protection, health, and equity (Sligh and Cierpka 2007). Novelist and organic farmer Louis Bromfield pursued “the romantic agrarian ideal of a ‘Jeffersonian Republic’: small, organic farms as ‘cells’ of a sustainable society” (Vogt 2007, p. 26). While during this time there was a commercial organic element oriented toward private profit, “Organic proponents had a mission; they sought to transform the way agriculture was done” (Obach 2015, p. 39). These farmers challenged the growing dominance of corporate and industrialized agriculture (Sligh and Cierpka 2007).

During this time period, farmers learned to build organic systems from experience and from other farmers, including their publications. The Rodale Press was a major source of practical information (Francis and Van Wart 2009). Its journal *Organic Farming and Gardening* (OFG, est. 1942), served as the primary connector of organic producers in the US for the next couple of decades and as “the central vehicle for spreading organic ideology and practice” (Obach 2015, p. 38). OFG had a small readership until it was picked up by the counterculture in the late 1960s (Belasco 2007).

In the late 1960s, a “new wave of activist farmers” entered organic farming (Reed 2010, p. 89). This “influx of countercultural radicals” who would dominate the organic movement in the coming years arrived with a variety of critiques (Obach 2015, p. 42). “Young farmers wishing not to ‘sell out’ to the industrial-military complex chose organic farming, as did those who saw no role for government in agriculture or were concerned about the growing threats of corporate agribusiness” (Sligh and Cierpka 2007, p. 33). Some sought radical social transformation via communal projects, and others looked toward “simpler agricultural existence along with a social order reminiscent of the agrarian Jeffersonian ideal,” yet common ground existed in widespread rejection of industrial technologies and embrace of “organic practices as a natural alternative to a food system increasingly dominated by corporations and dependent on synthetic pesticides and fertilizers” (Obach 2015, p. 41). As Guthman summarized, “A generation of growers entered into organic production because of deeply held political, environmental, philosophical, and/or spiritual values. Many came out of the counterculture or were influenced by environmental ideas in their college years and decided to try their luck at farming. Some followed the writings of the philosophical or practical giants in sustainable agriculture (e.g., Wes Jackson and Robert Rodale, respectively) and deliberately made the effort to put these written ideas into practice. Others were less circumspect and simply felt that organic agriculture was somehow ‘the right thing to do’. Whether they ‘always have been and always will be’ organic growers or whether

they converted to organic farming out of clear conviction ... Before the 1980s, they were virtually the only growers to populate the organic sector” (2014, p. 23).

Also during this period, some conventional farmers had begun to regard organic farming as a means to be fairly compensated in the face of low commodity prices and as a way to avoid toxic chemical exposure (Sligh and Cierpka 2007). Research on Midwestern organic grain and livestock farmers, most of whom had converted from conventional to organic methods in their commercial farming operations around 1971, suggests that concerns about chemical use were paramount (Lockeretz et al. 1981). These included the health implications of agricultural chemicals for their livestock or family, soil problems, or the ineffectiveness of chemicals. General dislike of chemicals, concern about the environment, and religious principles were among those reported less frequently as reasons for transitioning. Lockeretz et al. concluded that their sample was motivated to adopt organic farming more by pragmatic considerations than by philosophical or ideological ones (1981).

Lockeretz et al. also reported some challenges experienced by Midwestern organic converts. Most important was the difficulty in finding markets for organic products, followed by: weed problems; the low opinion of organic farming held by others; and acquiring information about organic practices (Lockeretz et al. 1981; Lockeretz and Madden 1987). Other farmers attempting organic cultivation similarly recalled the lack of university courses and of extension support: “And if you called up the extension with a question like, ‘how do you do organic raspberries?’ they would laugh at you” (Obach 2015, p. 55). Lack of organic farming knowledge resulted in the decline in the number of new countercultural communes devoted to organic farming in the early 1970s. The labor-intensity of some organic methods also emerged as a barrier to success (Belasco 2007).

Responses to challenges and deficits continued to materialize. Some collectives developed labor-saving approaches to pest control, composting, and other organic practices (Belasco 2007). Throughout the broader organic community, farmer-led experimentation and technology development improved techniques and practices (Parr et al. 1983). On-farm apprenticeship opportunities emerged as a more formal educational resource, such as that established at the University of California at Santa Cruz in 1970; this program was key in the diffusion of organic farming (Sriskandarajah et al. 2006; Guthman 2014). The organic farmers’ associations that began to develop in the 1970s effected information exchange, including via facilitating farmer-to-farmer connections for problem-solving; sponsoring meetings and field trips; and publishing newsletters (Parr et al. 1983; Obach 2015).

Though “the grand social vision of the 1960s’ radicals faded” (Obach 2015, p. 215), many organic farmers

remained committed to transforming the food system, and some joined efforts to formalize and self-regulate via the organic farmers' associations and certification programs that emerged in the early 1970s (Sligh and Cierpka 2007; Guthman 2014; Obach 2015). In the late 1970s and 1980s, developments such as increased public concern about the environmental and health effects of industrial farming, changes in food culture, and the farm crisis led to the expansion of organic production (Guthman 2014; Obach 2015). In particular, conventional-to-organic converts "with arguably more tepid motivations" swelled the ranks of organic farmers (Guthman 2014, p. 42).

The above contributions begin to shed some light on actual and possible values and experiences of veganic farmers. Small studies from the United States and Europe found that veganic farmers: may have some consensus on the basic principles of veganic agriculture; are motivated by personal ethics and social and ecological values; and face a variety of agronomic challenges and information needs. Yet the experiences of US organic farmers in the 1960s and 1970s suggest that contemporary veganic farmers may still be shaping the meaning of veganic and lack consensus on its practices. Adoption of organic farming during this period encompassed a variety of reasons, including philosophical, political, and safety-related motives; the initial absence of pervasive financial motivation for organic farming is notable. Many of the barriers faced by organic farmers related to agronomic production, public perception, marketing, labor intensity, and information deficits. Learning organic production and surmounting its challenges were addressed through independent and collaborative experimentation and innovation, as well as growers' association and University resources.

There are apparent gaps in knowledge about the US veganic farming experience. The dearth of qualitative literature that explores the human dimensions of a potentially sustainable, safe, and ethical approach to agriculture is a major impetus for this article.

Methods

Recruitment

Potential participants were identified using an online map of US veganic farms (Seymour 2018b). This resource included all veganic operations known to its author, who compiled map data via extensive web searches and communications with farmers. When recruitment began in January 2018, 56 farms were represented on the map. The study's sampling frame included farms that sold any dollar amount of produce, and omitted hydroponic farms and non-diversified farms given the study's scope; it comprised 44 farms.

Recruitment efforts began with a focus on eligible farms in "veganic hotspot" regions of the United States—the West coast and the Northeast. Over the first half of 2018, recruitment broadened to other regions and additional farms to increase participation. A total of 39 veganic farms across the country were targeted. Farmers were contacted up to three times via email, social media, and/or telephone with invitations to participate. This stage of contact included basic information about the study's purpose, goals, and survey and interview methods; and the offer of a \$25 stipend for completing the entire study. Nineteen farms completed participation in the study. Two additional farms completed the survey but did not participate in the interview.

Survey

The online platform KoBoToolbox was used to build and deploy a pre-interview survey to collect information about the farms and their owners or operators. The survey link was disseminated via email. After giving informed consent, respondents were prompted to complete around 35 questions on basic farm information (e.g., acreage, products), farm financials, and respondent demographics. Survey data were collected between February and July 2018 for 21 farms (Table 1). Of the 19 farms that completed participation in the study, all had ten acres or fewer under cultivation, and most (74%) were growing on two acres or less. A majority (84%) grossed under \$40,000 in 2017, with about half (47%) grossing under \$10,000, though six respondents indicated that these amounts were less than anticipated due to lower productivity than expected that year, personal or family health problems, or other issues. In 2018, only one of the 19 fully participating farms held a veganic certification (the Stockfree certification), about a quarter (26%) held an organic or similar certification, and over half (58%) had no certification, though two were in transition. Most (79%) of full participant farms utilized direct marketing methods, particularly community-supported agriculture (CSA) programs and farmers' markets. All farms produced at least some vegetables, which was commonly reported as the most profitable crop type, with many also growing berries, tree fruits, herbs, and/or flowers.

Interview

Interviews were conducted between March and July 2018 with 25 participants representing 19 farms. In five cases, a farm manager or co-owner/operator joined the survey respondent for the interview. In one case, the recent former owner and the new owner of the same farm were interviewed (separately). At least four respondents operated their farms with a partner who was not present at the interview. Interviews were completed in-person by

Table 1 Farm characteristics

Farm identification number and location, by US Census region—division	Year farm was established (year farm became veganic)	Land ownership, 2017	Acreage under cultivation, 2017	Seasonal v. year-round production	Certifications at time of study	Products (most profitable in bold)	Marketing channels (most profitable in bold)	Gross farm income, 2017
Farm 1 Pacific	1989 (2013)	Owned	1	Seasonal	None	Vegetables, berries , herbs	Direct marketing (farmers' market); Wholesale marketing (restaurant)	\$2,500–4,999 ^a
Farm 2 Pacific	2015 (2015)	Other (owned by non-household family member, used without a lease)	0.25	Seasonal	None	Vegetables	Direct marketing (CSA, farmers' market)	\$10,000–19,999 ^a
Farm 3 Pacific	2005 (2014)	Leased; Other (informal arrangement)	1.5 (Inclusive of multiple production sites)	Year-round	None	Vegetables , berries, tree fruits, herbs, plant starts and/or nursery plants, value-added products	Direct marketing (farmers' market)	\$20,000–29,999
Farm 4 Pacific	2011 (2011)	Owned	1	Year-round	None	Vegetables, berries, tree fruits, flowers, herbs, nuts and/or seeds, value-added products	Direct marketing (CSA, farmer's market, farm-stand or store , farm website); Wholesale marketing (retail markets)	Under \$1000 ^a
Farm 5 Pacific	2015 in current location (2015)	Owned	10	Seasonal	In transition to organic certification	Vegetables, tree fruits , nuts and/or seeds	Direct marketing (farmers' market , other); Wholesale marketing (retail markets)	\$20,000–29,999
Farm 6 Pacific	Early twentieth century, by family; reestablished 2014 (2014)	Leased (owned by non-household family members)	0.5 (inclusive of multiple production sites)	Year-round	Certified organic	Vegetables , berries, tree fruits, flowers, herbs, mushrooms, nuts and/or seeds, plant starts and/or nursery plants	Direct marketing (CSA, farmers' market, farmstand or store); Wholesale marketing (food hub or value-added producer , restaurant, retail markets)	Under \$1000 ^a

Table 1 (continued)

Farm identification number and location, by US Census region—division	Year farm was established (year farm became veganic)	Land ownership, 2017	Acreage under cultivation, 2017	Seasonal v. year-round production	Certifications at time of study	Products (most profitable in bold)	Marketing channels (most profitable in bold)	Gross farm income, 2017
Farm 7 Pacific	Not indicated (2017)	Owned	1	Year-round	Certified organic	Vegetables , berries, flowers, herbs, field crops, small grains, nuts and/or seeds, plant starts and/or nursery plants	Vertical integration with restaurant	Not indicated
Farm 8 Pacific	2017 (2017)	Leased	0.25	Seasonal	None	Vegetables , tree fruits, herbs, plant starts and/or nursery plants	Direct marketing (Farmstand or store)	Under \$1000 ^a
Farm 9 Pacific	2016 (2016)	Leased	1.25	Seasonal	Certified Stockfree, Certified Organic, Good Agricultural Practice (GAP) certified	Vegetables , flowers, herbs, plant starts and/or nursery plants	Direct marketing (CSA)	\$5000–9999
No ID ^b Pacific	2014 in current location (2014)	Owned	3	Seasonal	Certified Organic	Vegetables, tree fruits, other (Most profitable not indicated)	Wholesale marketing (restaurant, retail markets)	\$2500–4999 ^a
Farm 10 East North Central	2010 (2010)	Owned	2	Year-round	None	Vegetables , berries, tree fruits, flow-ers, herbs	Direct marketing (CSA)	\$1000–2499
Farm 11 East North Central	2009 (2011)	Leased	5	Year-round	Certified Organic, GAP certified	Vegetables , herbs	Wholesale marketing (institution, restaurant, retail markets)	\$250,000–499,999 ^c
Farm 12 East North Central	2012 (2012)	Owned	3	Year-round	Certified Naturally Grown (CNG)	Vegetables , berries, flowers, herbs, other	Direct marketing (CSA, farmers' market , other); Wholesale marketing (restaurant, retail markets)	\$30,000–39,999 ^a
Farm 13 New England	1971 (1975)	Owned	2	Not indicated	Not indicated	Not indicated	Not indicated	\$2500–4999
Farm 14 New England	Not indicated (2010)	Other (owned by non-household family member; use agreement unclear)	Not indicated	Seasonal	None	Vegetables , herbs, plant starts and/or nursery plants	Vertical integration with restaurant	Not indicated

Table 1 (continued)

Farm identification number and location, by US Census region—division	Year farm was established (year farm became veganic)	Land ownership, 2017	Acreage under cultivation, 2017	Seasonal v. year-round production	Certifications at time of study	Products (most profitable in bold)	Marketing channels (most profitable in bold)	Gross farm income, 2017
Farm 15 New England	2014 (2014)	Owned	1	Seasonal	In transition to organic certification and Stockfree certification	Vegetables, flow-ers , herbs, plant starts and/or nursery plants, value-added products	Direct marketing (farmers' market, farmstand or store , other)	\$2500–4999
No ID ^b New England	2003 (2015)	Both leased and owned	10	Year-round	None	Berries , mushrooms, value-added products	Direct marketing (Farm website, other—social media)	\$2500–4999
Farm 16 Middle Atlantic	1999 (1999)	Other (owned by non-household family member; use agreement unclear)	8	Seasonal	None	Vegetables , berries, flowers, herbs	Direct marketing (CSA); Wholesale marketing (restaurant)	\$50,000–99,999
Farm 17 South Atlantic	2007 (2007)	Owned	2	Year-round	None	Vegetables , berries, tree fruits, flow-ers, herbs, field crops, plant starts and/or nursery plants	Direct marketing (CSA, farmers' market , farm website); Wholesale marketing (food hub or value-added producer, institution)	\$20,000–29,999
Farm 18 South Atlantic	2009 (2009)	Owned	1	Year-round	In transition to organic certification	Vegetables, berries, tree fruits, herbs, field crops, forest products , value-added products	Direct marketing (CSA, farm website , other); Wholesale marketing (food hub)	\$10,000–19,999
Farm 19 South Atlantic	2010 (2010)	Owned	0.25	Year-round	None	Vegetables , berries, tree fruits, plant starts and/or nursery plants	Direct marketing (CSA, farmers' market)	\$5000–9999

^aParticipant indicated that this amount was lower than expected for 2017

^bFarm completed survey but did not participate in interview portion of study

^cFarm income reflects production that includes a 1-acre greenhouse

the more geographically proximate author, or via phone or video conference call if visits could not be arranged ($n=6$ farms). Interviews lasted between 1 and 4 h, with the average interview taking around two hours. In three cases, truncated interviews were performed due to considerations for a farmer's health or schedule.

Interviews were semi-structured and implemented using a two-part guide. The first portion concerned: farmer experiences and beliefs, with questions related to participants' history with gardening and farming and their introduction to veganic approaches; their understanding of veganic farming and the motivations and rewards they associate with it; their veganic learning process; the veganic challenges they have experienced; and their thoughts about supporting and formalizing veganic agriculture. The second part of the guide explored: farming practices, including soil health and fertility; weed, disease, and pest management; product sourcing; and marketing. The researchers also took field notes on conversations that occurred before and after the formal interviews.

Informed consent was obtained via signature for in-person interviews and verbally for remote interviews. All interviews were audio-recorded. Recordings were uploaded to Temi, an online speech-to-text transcription service, and transcripts were subsequently edited by the authors to improve accuracy. Transcripts were uploaded to Dedoose, a cloud-based application for qualitative and mixed-methods research, for coding and analysis. A codebook was developed containing deductive codes informed by interview questions and inductive codes that emerged from the data. The authors satisfactorily completed an inter-rater reliability assessment prior to commencing coding, and coded each other's interview transcripts.

Profiles for the 20 interview participants who were also survey respondents are presented in Table 2. These respondents ranged in age from 28 to 69 at the time of the study, with most (about 60%) being in their 30s and 40s. The majority of the respondents identified as male (65%) and exclusively as white (75%). Most were from non-agricultural backgrounds (80%), and most had received no formal education in agriculture (75%). Those who reported formal education related to agriculture identified a range of levels, from some community college coursework to advanced degrees. At least four respondents had completed farming internships or farmer training programs outside of academia. Eight respondents (40%) began their farming careers in a veganic system. Eleven respondents (55%) had been farming for at least 10 years at the time of the study, including five who had been farming veganically for at least 10 years.

Results

Defining veganic agriculture

When asked to offer a definition of veganic farming, several participants were uncertain and were hesitant to pose a definition. A few others alluded to the definition varying from person to person or being unclear. As Mary said, "I can tell you the definition of permaculture much like I can tell you the definition of veganic—neither of them are a legal certification, so I think they're vague." However, most participants directly asserted a definition; all identified the exclusion of animal products as the foundation of veganic farming and about a third ($n=9$) specified the nonuse of byproducts and wastes from farmed animals or livestock.

A number of participants shared further thoughts and raised questions about the types of animal products that might be allowed in a veganic system. Several volunteered that incidental waste from free-living animals—such as droppings from deer passing through their fields—would be consistent with veganic growing. Inputs including worm castings, bat guano, and manure from sanctuaried animals appeared to be ambiguous and contested. Some participants took a hard line against all deliberately-introduced animal products, some suggested the key to be whether the animals were being confined or exploited, and others indicated uncertainty or ambivalence. Participants from three farms reported knowingly incorporating bat guano and worm castings into their operations, and four farmers indicated that their bought-in composts and potting soils might contain some meat scraps, eggshells, or other animal byproducts.

While most participants offered rather brief definitions of veganic agriculture hinging on the use of animal inputs, some broader ideas about farm ecosystems emerged. Notions of "working with nature as opposed to against it," creating "a symbiotic relationship with the land you cultivate," and "that wildlife is supported as part of the entire ecosystem" were parts of the definitions offered by Jenny, Tony, and Mary respectively (see Fig. 1). Eileen specified that part of veganic is not "killing what are generally considered pests ... not harming the wildlife that may also exist in your field and in your produce, from field mice to gophers to birds...". This mirrored questions posed by other farmers about whether killing insects and promoting the deaths of "pest" animals through predation are veganic-consistent practices.

About a quarter of participants ($n=6$) explicitly referenced "organic" in their definition of veganic. For instance, Nancy framed veganic as "organic farming but then it's combined with the vegan aspect where you are not adding

Table 2 Primary interview participant demographics

Farm identification number, participant name(s), and relationship to farm ^a All names are pseudonyms	Whether farming was the household's main income source in 2017	Whether respondent grew up on a farm	Year that respondent became owner, operator and/or manager of current farm	Year that respondent began farming (year began farming organically)	Whether respondent's formal education related to farming	Respondent demographic information (gender, race, birth year, highest level of education completed)
Farm 1 Annie, farm owner, joined by Abe, farm manager-operator	No	No	1989	1989 (2013)	No	Female, American Indian or Alaskan Native, White, Not indicated, Associates or technical certification
Farm 2 Eileen, farm owner-operator	No	No	2015	2015 (2015)	No	Female, White, b.1974, Bachelors degree
Farm 3 Roald, farm owner-operator	Yes	No	2005	2005 (2014)	No	Male, White, b.1962, High school
Farm 4 Jenny, farm owner-operator	No	No	2011	2000 (2011)	No	Female, White, b.1980, Associates degree or technical certification
Farm 5 Mary, farm owner-operator, joined by Doug, co-owner-operator	Yes	Yes	2015	1990 (2007)	Yes	Female, White, b.1959, Masters degree or equivalent
Farm 6 Trent, farm owner-operator	No	Yes	2014	1997 (2014)	Yes	Male, Other, b.1979, High school
Farm 7 Dan, farm manager-operator	Not indicated	No	2017	2005 (2010)	No	Male, White, b.1982, Bachelors degree
Farm 8 Kaitlyn, farm owner-operator, joined by Steven, co-owner-operator	No	No	2017	2017 (2017)	Yes	Female, White, b.1983, Associates degree or technical certification
Farm 9 Luke, farm owner-operator during 2017 season	No	No	2016	2016 (2016)	No	Male, Asian, Native Hawaiian, or other Pacific Islander, White, b.1984, Bachelors degree
Farm 9 Tony, became owner-operator at the close of the 2017 season	N/a	No	2017	2015 (2016)	Yes	Male, Hispanic or Latino, b.1990, High school
Farm 10 Ford, farm owner-operator	No	No	2010	2010 (2010)	No	Male, White, b.1969, Masters degree or equivalent
Farm 11 Kelly, farm owner-operator	Yes	Yes	2009	2009 (2011)	No	Female, White, b.1985, High school

Table 2 (continued)

Farm identification number, participant name(s), and relationship to farm ^a All names are pseudonyms	Whether farming was the household's main income source in 2017	Whether respondent grew up on a farm	Year that respondent became owner, operator and/or manager of current farm	Year that respondent began farming veganically)	Whether respondent's formal education related to farming	Respondent demographic information (gender, race, birth year, highest level of education completed)
Farm 12 Denny, farm owner-operator, joined by Suzanne, co-owner-operator	Yes	No	2012	2006 (2009)	No	Male, White, b.1973, High school
Farm 13 Rob, farm owner-operator	No	No	1971	1971 (1975)	No	Male, White, b.1949, Bachelors degree
Farm 14 Nancy, farm owner-operator	No	Yes	2010	Not indicated (2010)	No	Female, Other, b.1979, High school
Farm 15 Caleb, farm owner-operator, joined by Catherine, co-owner-operator	No	No	2014	2014 (2014)	No	Male, White, b. 1977, Bachelors degree
Farm 16 Jason, farm manager-operator	Yes	No	2012	2002 (2002)	No	Male, White, b.1986, Less than high school
Farm 17 Joe, farm owner-operator	No	No	2007	1974 (2000)	Yes	Male, White, b.1955, Bachelors degree
Farm 18 Paul, farm owner-operator	No	No	2009	2009 (2009)	No	Male, White, b.1964, Masters degree or equivalent
Farm 19 Glenn, farm owner-operator	No	No	2010	1985 (1985)	No	Male, White, b.1954, Masters degree or equivalent

^aCases in which the survey respondent was joined in the interview by a second participant are noted. No demographic information was collected for these individuals

Fig. 1 The use of pollinator strips to attract beneficial insects. **a** In the foreground, adjacent to diverse fruit and vegetable crops, at farm 18. Photo by Alisha Utter **b** Along the base of the high tunnel housing tomatoes at farm 9. Photo by Mona Seymour



anything that is an animal byproduct.” Though not included in their definition of veganic, other participants described specific organic practices within their broader conceptualization of veganic. And other farmers used phrases such as “veganic and organic”, suggesting that they view these as separate sets of practices. Luke, for instance, expressed “the way I think of veganic is not necessarily organic ... like for

the Stockfree certification, [a separate] organic certification is required. ... I really just kind of singularly look at the animal input as what makes it veganic or not.” Some gave indications that they have not strongly considered how the two ideas relate. However, some form of organic, chemical-free, or natural farming was practiced by and clearly salient to all participants in the study.

Notably, not all participants identified strongly with the term veganic. It was new to participants from two farms, who had been calling their method “vegan”, “no kill”, or “organic” farming, but who were open to the label. Participants from four other farms mentioned that they prefer to use another term (such as “plant-based”, “biorational”, or “eco-organic”) or that they identify more closely with a method such as Shumei Natural Agriculture that is incidentally veganic.

Learning to farm veganically

Most participants entered veganic farming via two general avenues. Nine farms were established or run by farmers who had begun their farming careers veganically or had switched to veganic production within one year of beginning to farm. These respondents had been farming for between one and 33 years at the time of the study. All 12 participants attached to these farms reported having some experience with cultivation before becoming veganic farm owner-operators or managers. The majority had gardening experience (veganic, organic, and/or chemical-based), at least four had completed organic or sustainable agriculture coursework or programs, and several had interned or worked on organic or veganic farms. Seven farms were owned or managed by participants who had transitioned from organic to veganic agriculture. The length of time that these participants had farmed organically (whether certified or not) before transitioning ranged widely, from just a few years to upwards of 20 years. Five of these nine participants volunteered that they underwent a slow transition process, marked by a gradual phasing-out of animal products over several farming seasons. And, five recalled their transition from animal-based to plant-based fertility programs as being relatively easy, though not without a learning curve. Two of the remaining three farms were owned by farmers with farm-scale horticultural experience (e.g., flowers, native plants) who had changed tracks and entered veganic agriculture. One farm was owned by farmers who transitioned from conventional or chemical-based farming to veganic production.

Participants drew on three general categories of resources to varying degrees throughout their learning processes. First, veganic resources included an array of print and electronic references (veganic books, websites, magazines, farming standards, YouTube videos, and DVDs) that were typically associated with the Vegan Organic Network. Over half of the participants ($n=16$) described connecting with other veganic farmers for informational purposes, including via direct personal communication as well as through veganic Facebook groups and other online veganic communities.

Second, participants drew from a range of non-veganic resources including: agricultural research literature; agricultural experts; farming books and websites; and online

and traditional coursework and workshops on various topics including soil science, permaculture, market gardening, and sustainable agriculture. Participants described the work involved in adapting some of these resources for their own use. Kaitlyn, who was working on a certificate in sustainable agriculture through a local community college, explained “I went to school and started learning about sustainable agriculture [and] we started applying it at home, but because we’re already vegan there are things that we don’t want to use that we used at school: the blood meal, the oyster shell, whatever. ... And so, you know, we would just take the concepts we were learning at school and apply them here ... going online and saying ‘ok what’s an alternative this?’ or ‘what’s an alternative to that?’ kind of thing.” Mary remarked on the usefulness of the research literature to her own process: “So I’m always reading scientific journals ... and the articles won’t directly speak to my problems, but indirectly. So I just scoured the no till literature and scoured the cover cropping [literature], because if you can figure out how to get the nutrients out of a cover crop then, you know, there’s your plant based fertilizer.” In a few cases, participants described consulting organic or sustainable farming researchers, instructors, and mentors who were able to suggest appropriate plant-based amendments or comment on the viability of a veganic fertility program. Many farmers identified internet searches as an important initial pathway to finding answers to specific questions about soil fertility and amendments, as well as to finding more in-depth resources, whether veganic or not.

Finally, most participants ($n=19$) described an aspect of self-reliance in their veganic learning processes. This included a variety of practices such as extrapolating from accumulated farming experience, experimenting with plant-based fertility and mineral amendments, and taking a trial-and-error or learn-as-I-go tack to veganic farming. Ford, who understands veganic as “not using animal byproducts and using as little insect control as I can manage to still end up with a result”, described his insect management program as based in trial-and-error, as he learned strategic timing for planting crops to avoid insect problems. In some cases, farmer self-reliance was borne of self-confidence. Other cases stemmed from necessity, such as in response to the lack of veganic informational resources, a challenge that is discussed further below.

Veganic farming motivations, benefits, and rewards

Participants identified diverse motivations for farming veganically, with discussion encompassing why they began to farm veganically and the direct and tangential rewards and benefits of the approach. Five major themes around veganic values were identified.

The first emergent theme was the consistency of veganic agriculture with veganism. Sixteen of the 25 interview participants self-identified as vegan and all of these farmers reported some aspect of their veganism as a key reason for farming veganically. Steven, like others, observed that veganic production was a natural extension of his veganism: “When it comes to farming...[Kaitlyn and I] have just been doing vegan, just based on our lifestyle.” All but one vegan participant described a commitment to animal rights or welfare as an impetus for their veganism, and thus, many articulated further thoughts on farming veganically to reject violence toward animals or to avoid the support of animal agribusiness. Denny noted “the greater ramifications of when you get manure from a chicken factory ... What you’re doing, what you’re putting dollars toward, what you’re supporting, is a horrendous horrible atrocity.” Several vegan participants noted farming in line with their values to be rewarding because of the relationships with free-living animals that ensued, based in tolerance or enjoyment rather than lethal control.

Avoiding food safety issues was another key motivator for eliminating animal-based fertility. Participants expressed concerns about the use of manures, blood meals, bone meals, and other animal products. They cited the potential for transfer of antibiotics, growth hormones, GMOs, bacteria (particularly *E. coli* from insufficiently or incorrectly composted manures), and diseases (e.g., with reference to past outbreaks of mad cow disease) to soil, plants, and ultimately consumers. Joe recalled that “I didn’t like that idea [of using inputs from concentrated animal feeding operations] because I was reading studies that the antibiotics that were used in that system are coming right through the soil, through the composting, into the plant material itself...”. According to Tony, “The other cool thing about veganic agriculture ... is that there is a high reduction in outbreaks of cross contaminations. Like you don’t have to worry about chicken manure, you are just worrying about fermented plants, decomposed plants.” Several farmers commented that non-use of animal products diminished the time and effort required to comply with food safety rules/regulations and agricultural certifications, and Kelly remarked that it is “very rewarding to be able to tell people that ‘Hey, our product, you don’t have to worry about recalls or *E. coli* outbreaks and any of that type of stuff, because we don’t even use any of that.’”

A third theme emerged around plant and soil health. Participants discussed various drawbacks of animal-based fertility and benefits of plant-based fertility, particularly with respect to soil health, nutrient cycling, plant viability, and yield. Manure and blood meal in particular were implicated for quick release of nutrients into the soil and excessive macro-nutrient levels, leading to nutrient leaching, suboptimal environments for soil life and fruit trees, and insect pressure. Mary recalled that she “had actually realized, like

[my partner] Doug, that there were problems using manure ... I was using manures quite a bit ... and realized that we were having soil [nutrient] excesses, in especially nitrogen and phosphorus. So I decreased using manures and saw that I could get away with it. ... Ten years ago I believed that you needed to use manure to have organic production that would be sustainably competitive with conventional production and now I don’t believe that that’s true.” Veganic fertility inputs such as green waste and compost, on the other hand, were linked to soil building, healthier soil fungal webs and worm populations, and more flavorful fruit. Trent explained that “composted manure or other animal waste products ... seems like a less stable soil addition than green manures. With the animal waste, you’re ending up with more erosion, I see. And with green waste there’s more of a binder ... it doesn’t run off and it doesn’t deplete as quick...”. Other participants noted that lower nitrogen levels and/or slower nutrient release lead to fewer insect problems and lower disease susceptibility.

Observations about food safety issues and plant and soil health were often linked to goals or rewards of providing “good food” to customers. Farmers variously described their produce as healthy, pure, nutrient-dense, high-quality, medicinal-quality, flavorful, and as a contributor to community wellness. As Doug recalled, “It was the early years when I was using manure and ... getting the flavor in the fruit was what was the most important thing. It was way easier to do that with the green waste compost. The manure was tricky. It would make yield, but it wouldn’t make flavor. I don’t know. Fruit is nuances. And it was just like I got to a point where it was like, okay, I’m doing all these things and yeahhhh, this fruit is good.”

Another theme emerged from participant views of veganic agriculture as a more environmentally-friendly form of production than agriculture involving farmed animal inputs. Farmers pointed out the connections between animal agriculture and climate change, ocean deadzones, and other environmental harms; as well as between the use of animal manures and soil, air, and water pollution. Withholding financial support from the industry and avoiding its environmentally harmful waste products were important motivators for veganic approaches. Luke explained that “The logic was, it would be really really silly for us two people to go vegan, and have that be our effort to help the environment, but then we’re going to buy literally [a] ton of blood meal to spread into this field. ... if you’re buying blood meal or bone meal, you’re basically supporting the meat industry, [which] in our diet we were trying not to do, but through our business we would have spent thousands and thousands of dollars supporting them.”

Tied to this theme of environmentalism were ideas about resource use and the sustainability of veganic practices. Some participants problematized the land and water

resources required to raise the animals from whom a farmer might source fertility. Dan, a practitioner of biointensive farming, stated “I farm veganically because I know it uses less resources ... just by taking animal products out of the equation. There’s only 9000 square feet per person on the planet if you [divide] it all up fairly and give everyone a fair shot. This country [has] a lot of land and a lot of resources and we are lucky, but that’s not going to last forever, so we’re looking for those long term solutions ...”. Others pointed out the loss of nutrients through animals’ digestion of plant matter as well as through the composting process, suggesting that it is more efficient to directly apply a green manure.

A final major theme emerged around the actual and potential marketing advantages of veganic; these were framed as benefits of, rather than motivations for, growing veganically. Most participants identified the vegan community as a natural market for veganic produce. About half of the farms (47%) were using the term “veganic” in their marketing materials and labels at the time of the study, typically in order to target local vegan communities and buyers with products “uniquely marketable” to vegans. This reportedly led to “ecstatic” reactions from vegan shoppers at farmers’ markets and gains in vegan CSA members, though other customers sometimes viewed the veganic angle neutrally or with confusion about its meaning or necessity. Six of those farms reported customers being less interested in the “vegan” dimension of veganic and more interested in the “organic” aspect, whether this meant Certified Organic, CNG, non-GMO, or no pesticides. Participants from farms not incorporating “veganic” into their marketing materials usually perceived that it would not be of interest to most customers in their localities, as they lacked prominent vegan communities. However, Catherine commented on a marketing edge in the broader (non-vegan) community, saying that “I feel, honestly, in the marketplace [veganic] can only be a plus because it’s like everyone has tomatoes, [and] yours look good but they are also veganically grown. Just having that extra little thing to say to someone passing by like, ‘We grow stuff without any additives. We use green manure, so it’s good for the soil.’” Interestingly, a number of farmers (n = 9) were ambivalent about using “veganic” as a marketing tool—including some participants who were currently marketing with the term and some who were not. While they all acknowledged its potential to attract vegan customers, these farmers cited concerns about the potential for exchanges with “militant” or “judgmental” vegans who might attack them for incorporating bat guano or selling chicken eggs; the possibility that the term might be stigmatic and repel potential non-vegan customers; and the time that might be required to explain the unfamiliar term to farmers’ market patrons or “quibble with” people over the meaning.

Several minor themes, as well as numerous rationales articulated by only one or two participants, also emerged

around participant motivations and valuations. Table 3 presents these ideas to demonstrate the wide variety of values that participants perceived in veganic farming. It is perhaps noteworthy that participants who defined “veganic” as incorporating organic methods tended to reflect more narrowly on the vegan aspect of the practice, so ideas about organic agriculture did not emerge as strongly as might be expected, and appear in Table 3 instead of above.

Challenges to farming veganically

All participants mentioned facing challenges that any ecological/organic or small farm might face, such as herbivore pressure, weed and plant disease management, poor soil, and time and financial constraints. Several of the beginning farmers in the sample noted that they were struggling with the basics of learning how to farm. All but two participants described experiencing veganic-specific challenges as well.

The most pervasive veganic challenge concerned sourcing products that were animal-free as well as organic, including transplants, potting soil, compost, and fertilizers. As Eileen noted, “That’s actually one of the most challenging things that I see questions on nonstop from people who want to garden veganically or grow veganically. ‘What’s on the market that’s vegan?’ Well, there’s all these seedling mixes but no potting mixes ...”. In response, participants described starting their own plants from seed, mixing their own potting soil, and either making their own compost or buying it in, which was sometimes associated with additional difficulties. Some participants were unable to make enough of their own compost, and others raised concerns with the quality and contents of bought-in compost or with the effortful process to locate compost that was both organic and vegan. Sourcing non-GMO plant-based fertilizers was also challenging; for instance, farmers observed the difficulty of locating organic cottonseed and soybean meals. Ultimately, cost played into product acquisition atop availability, with a few participants remarking that vegan inputs were more costly than non-vegan versions.

Several farmers noted the issue of unclear or inadequate product labeling as a factor making it even more difficult to source veganic inputs, as in this exchange between Denny and Suzanne.

Denny: Most farmers don’t understand what happens when they buy a bag of peat moss, for instance. Like, every bag of peat moss, if it has a pH adjustment, has manure in it, if it’s organic.

Suzanne: And they don’t tell you that.

Denny: And so you wouldn’t know. Most of it’s not labeled that it has a charge. And you call them and say, “Does it have a charge?” And they say, “Well, it’s insignificant.” So they don’t label.

Table 3 Other motivations, benefits, and rewards of veganic farming indicated by participants

Minor themes	<p>Veganic farming is a way to farm naturally E.g., "...we could pump chicken manure juice out there and we would have bigger plants. But to me it's like this seed has this idea of expressing itself and it's going to express itself in an unnatural environment that I'm going to be providing for it. ... [Instead] I want to build the soil in a way that it's got the materials that are its own ecosystem and then I'm going to plop in a seed or a plant to grow ..." (Paul)</p> <p>Farming veganically is more economical (labor, money) than importing animal-based fertility E.g., "I find [I am] overall doing less work, because my greenwaste, and any additions to that I may need, can be produced on site." (Trent)</p> <p>E.g., "We didn't have any large animal feeding operations around there so trucking [that] material in was an enormous cost." (Joe)</p> <p>It is rewarding to pioneer veganic approaches E.g., "It was rewarding to know that we took that risk, and it did work out, and you can grow food [veganically], and so, to know that we've kind of proven it." (Luke)</p>
Other motivations and values	<p>"I practice or value veganic farming because..."</p> <p>It is instinctive/intuitive to avoid animal products</p> <p>It is rewarding to educate others about veganic agriculture and related issues</p> <p>I want to demonstrate/promote veganic agriculture</p> <p>I am concerned for human rights/welfare (e.g., slaughterhouse workers)</p> <p>I want to avoid disgusting or hazardous animal products</p> <p>It is consistent with organic objectives</p> <p>It aligns with spiritual/religious teachings or commitments</p> <p>It is consistent with a lifestyle objective of self-sufficiency</p> <p>It is a way to improve the world for humanity</p> <p>It can empower communities to grow their own food</p> <p>It can enhance food security for families who do not own livestock</p> <p>It is rewarding to share veganic produce with vegans</p> <p>It is rewarding to receive positive/supportive responses from the vegan community</p> <p>I enjoy the challenge of growing veganically</p> <p>It contributes to the continuance of a farm's veganic legacy</p> <p>Continuing to farm veganically avoids demonstrating failure</p> <p>It aligns with my partner's farming practices</p> <p>The approach is incidental/accidental</p> <p>It is a way to be a part of veganic history</p>

Another participant likened his experience of navigating fertilizers with that of navigating food labels as a vegan, noting the challenges of hidden ingredients and commonly added animal products such as blood meal.

Several farmers mentioned the difficulty of finding veganic nitrogen-rich fertilizers, given the exclusion of blood meal and fish meal, two common sources of relatively quick-release nitrogen. Particularly, finding nitrogen rapidly available to specific crops and under certain seasonal conditions was a challenge. For example, Jason expressed that "In the wings of the season, like the fall and the spring, when it's really cold ... it's really tough to get soluble nitrogen to the plants when there's not a lot of biological activity in the soil, which is [what breaks] the soybean [meal] down into plant available form. So it's, it is really tough and we have traditionally ... used some Chilean nitrate, which is not ideal, but sometimes necessary."

Some locational specificity in sourcing challenges and solutions became apparent as well. One farmer felt "a little spoiled" farming in California's Central Valley, as there were numerous companies nearby that produced plant-based amendments for the heavily agricultural region. Recreational

cannabis legalization in Oregon (2014) helped some Oregonian participants to more easily learn of and access veganic products developed for veganic cannabis production.

Access to veganic-specific knowledge emerged as a second major challenge. Figuring out fertility for crops, in terms of nutrient cycling as well as optimal nutrient sources, was described as a difficulty by many participants ($n = 10$). Mary, though an experienced veganic farmer, felt that she and her partner were just beginning to understand nutrient cycling for perennials using only plant-based materials. Others stated that they lack information on the best plant- and mineral-based sources for different nutrients such as nitrogen and magnesium, or how to use them in combination. A dearth of knowledgeable contacts appeared to be at the base of this for some participants: farmers identified extension agents, the United States Department of Agriculture, and other members of the veganic community as resources that they had consulted for assistance with veganic fertility and no-kill pest control but who were unable to field their questions. Paul recalled that "a couple of years ago, our Jerusalem artichokes came up and they just never were the big bright green vibrant ... and so we had our ag agent

Table 4 Other challenges, barriers, and limitations related to veganic farming

Minor themes	<p>Labor: veganic farming is labor intensive (particularly in the making of plant-based mulches, composts, potting soils); it is difficult to find employees/interns with interest in or knowledge about veganic approaches</p> <p>Pest management: managing insects and rodents in a veganic framework is ethically challenging/murky</p> <p>Soil fertility planning: selecting appropriate inputs is challenging; managing fertility veganically is more difficult due to the slower release of nutrients from plant-based inputs</p> <p>Response from farming community: harassment, teasing, lack of support from organic and animal farmers is challenging/disappointing</p>
--------------	---

over and he said ... ‘Oh, you just, you know, just spray it with some chicken manure.’ It’s like the conversation to get advice is very limited.” Reflecting on how lack of access to veganic-specific information might be a barrier to new veganic farmers, Abe said “It’s pretty hard for new beginners because every book you go to, you’re like ‘OK so I have a nitrogen issue’ or ‘I’ve got a this issue,’ and they go ‘Oh you bone meal this, and chicken manure that, or vermiculture this’ ...” As mentioned further above, this required many participants to “translate” non-veganic resources into applicable information.

Some minor themes around veganic challenges emerged too, as presented in Table 4.

Although all but two farmers described experiencing difficulties with farming veganically, seven participants volunteered that “veganic itself is not terribly challenging” (Jenny). These farmers perceived that they had mostly figured out their method, and faced minor veganic-specific annoyances, if any. Jenny continued, “Once you get it down, it’s good. Like I said, most of my challenges, I think, are just the normal ones you would find in regular farming. The issues that I complain about are the same ones that conventional farmers would [complain about too]. Farming itself is a pain in the butt! Veganic itself, it’s just a different method.”

Discussion

The results above are reflective of the perspectives and experiences of a sample of US veganic farmers, offering an enhanced understanding of this population. They also provide some basis on which to consider the future of veganic agriculture in the United States.

Farmers’ thoughts on how to define veganic agriculture yielded both consensus and inconsistencies. There was clear agreement that veganic farming refers to the exclusion of animal products, suggesting that for most farmers, veganic is (or at least includes) a set of fertility practices. Eileen had noted this, remarking that “the conversation around veganic [is] almost always centered around not using animal amendments.” Aside from this, several discrepancies and gray areas emerged, which point to unresolved definitional questions in the US veganic community. Are there particular animal products that might be permissible in veganic farming?

What is the relationship between veganic and organic agriculture? Is veganic agriculture a fertility program or a more holistic approach concerning aspects such as farm ecosystem care, “pest” management practices, non-renewable resource use, and use of on-farm versus bought-in resources? And, is there a philosophy or a value system underlying veganic agriculture that serves as an interpretable guide for practitioners, or is veganic a set of clear-cut practices? Resolving these questions will become important if veganic agriculture were to formalize in the United States.

The experience of the US organic movement suggests that definitional and thus, applied differences in veganic farming could persist unless and until a groundswell of interest in re-establishing a US-based veganic certification occurs. [CNG, a US-based peer-inspection certification program, offered a Certified Veganic Program for several years, circa 2008. It was suspended due to low enrollment (Veganic Agriculture Network 2011b).] As demonstrated in the US organic movement, arriving at a mutually agreeable definition and set of standards may be a lengthy, contentious process, particularly if done at the national level (e.g., DiMatteo and Gershuny 2007; Guthman 2014; Obach 2015).

Study participants identified an astounding range of practical and ideological motivations and advantages of veganic growing, including and beyond those noted in the existing literature on veganic farming and comparable in their diversity to the motivations of early organic farmers. Most participants identified a personal or political commitment to veganism as a primary reason for their veganic approach. Media coverage of veganic agriculture and discourse in the international veganic farming and gardening community often focuses on vegan motivations for veganic production as well. However, this study underscores that though some farmers grow veganically within a broader animal rights/liberation framework, veganic agriculture is not exclusive to the vegan farming community or to vegan concerns. Other commonly articulated values, such as food safety, plant and soil health, and environmental impact, demonstrate that veganic methods should be of interest to the broader sustainable agriculture community.

Absent was any evidence that participants pursued veganic farming primarily to take advantage of a price premium derived from the vegan dimension of their produce. Yet, communicating to potential veganic farmers that there

is money to be made from veganic production was identified by participants as one strategy to expand veganic agriculture. Farmers also suggested that cultivating the vegan market (such as through educating vegan consumers about the use of animal products in organic production) would be an important activity to grow veganic farming. Indeed, there is indication that once educated on veganic production methods, vegans and vegetarians tend to support stockfree organic agriculture, and thus may buy such products (Jürkenbeck and Spiller 2020). Vegans and vegetarians may purchase veganic products in a show of support for the production method, beyond doing so for ethical and environmental reasons; and may be willing to pay more for biocyclic-vegan products than for organic products (Jürkenbeck et al. 2019). Clear communication between farmers, retailers, consumers, and other actors will be an important component of market expansion. For instance, as illustrated by the UK media inaccurately describing what “vegan organic” means and why farmers grow this way (Hirth 2020), accurate messaging will be critical for cultivating public understanding and acceptance of veganic agriculture.

Participants often connected the topic of veganic certification to marketing and consumer education/awareness advantages. While only one participant farm held a veganic certification (Stockfree), most participants did express some level of interest in certification, usually for those reasons. A US-based certification, or widespread use of the Stockfree or Biocyclic-Vegan certifications in the United States, could enhance the domestic marketability of veganic produce, possibly both introducing a price premium for certified farmers and increasing the visibility of veganic to consumers. A price premium or other pull factors (e.g., rising consumer awareness of produce safety issues) may also attract price-seeking or market-seeking new farmers and veganic converts, mirroring the shifting motivations for farmer entry into the organic movement decades ago. However, expansion, formalization, and commercialization of veganic agriculture in the United States may bring corporate co-optation and the dilution of its roots or meaning (contested even now), a point that several participants broached with reference to the legacy of organic agriculture (e.g., Jaffee and Howard 2010; Guthman 2014; Obach 2015).

Despite the perceived and observed advantages of veganic farming, it is apparent that veganic farmers face some considerable challenges. These pressures include various on-farm obstacles that the broader populations of small farmers or ecological farmers are prone to, and likely also include the structural barriers set forth by the prevailing agrifood system. However, other challenges were veganic-specific, requiring a different class of effort and ingenuity. Veganic-appropriate product sourcing and access to information about veganic fertility best practices were by and far the most vexing, and are concerning not only for their impacts

on farmers' time budgets and crop viability, but also as barriers to potential new entrants into veganic production.

These challenges spotlight the dearth of veganic agriculture educational and training opportunities and resources in the United States. Several US veganic farms do offer workshops, courses, and internships (though these do not always seem to be well-publicized); as do supporting organizations throughout North America and the United Kingdom (sometimes oriented toward gardening rather than farm-scale production). However, there appear to be no US university courses or extension agents dedicated to veganic methods, reminiscent of the situation of organic agriculture several decades ago (Parr et al. 1983; Heckman 2006; Sriskandarah et al. 2006). Availability of such forms of institutional support for veganic farmers would almost certainly alleviate the challenge of acquiring technical knowledge and lower the knowledge barrier to entry by new or transitioning farmers—as well as increase awareness about the existence of veganic as a possible farming approach to pursue, as several participants suggested. In the meantime, better publicization of the Stockfree and Biocyclic-Vegan certifications in the United States could raise visibility of what are ostensibly educational resources.

Grassroots organizing is another approach to addressing the difficulties of veganic product sourcing and the lack of access to technical knowledge. A number of study participants suggested that better connectivity between farmers, such as through an online message board, a veganic farming conference, or a phone hotline, would facilitate the sharing of practices and advice. Regional farmers' associations also have potential utility; decades ago, these served as “clearinghouses for information on organic methods” for the farmers who organized them before university and government support emerged (Obach 2015, p. 56). While not a farmers' association, the Förderkreis Biozyklisch-Veganer Anbau e.V. (Association for the Promotion of Biocyclic Vegan Agriculture) provides services including information and support for farmers considering the Biocyclic Vegan Standard and consumer and retailer education on biocyclic vegan agriculture in German-speaking countries (Vegonomist 2019). The work of BNS Biocyclic Network Services Ltd. includes sublicensing the right to use the Biocyclic Vegan Quality Seal, providing agricultural consulting services, and maintaining the Green List of permissible inputs under the Biocyclic Vegan Standard (Adolf Hoops Society n.d.-b). In the United Kingdom, Stockfree Organic Services fields questions from farmers who are, or are considering, growing stockfree (Stockfree Organic Services n.d.). No such associations exist in the United States for veganic agriculture. The present density of veganic farmers—even in “hotspot” regions like the Northeast—is so low that there may not be a critical mass of farmers anywhere to organize in a regional manner and actualize member meetings,

field trips, and other forms of in-person contact. However, a national-level association could: facilitate connections between more experienced veganic growers and newer ones for knowledge transfer; assist farmers in navigating veganic inputs by maintaining supplier and product lists; support a US-based certification system or adoption of Stockfree and Biocyclic-Vegan standards; advocate for or organize veganic farmer training programs; publish online content on veganic techniques and innovations; and serve the farming community in other ways.

Conclusion

This article presents baseline empirical research on the veganic farming community in the United States. It is not without limitations. For instance, previously unidentified farms were discovered after data collection concluded (e.g., the Seventh Day Adventist community is more heavily involved in veganic farming than was apparent during recruitment); the community is evolving, with new farms emerging and at least two participant farms shuttering after data collection ended⁴; and an unknown number of farmers are growing veganically yet not self-designating as such or in a way that allowed researchers to locate them. Thus it is possible that some themes relevant to this loose-knit community's perspectives and experiences are not reflected herein.

Looking toward further research on the human dimensions of veganic agriculture, theorization of veganic stands out as an approach that would provide a deeper and more contextualized understanding of veganic agriculture in the United States and beyond. For instance, the use of social movement theories would help to explore veganic agriculture as an agrifood movement. Relatedly, a comparative study of the veganic and organic movements may illuminate some lessons for the former as it continues to develop. An enhanced understanding of the relationship between veganic agriculture and other sustainable agriculture paradigms and movements (for instance, agroecological or regenerative approaches) might shed light on compatibilities, suggesting opportunities for coalition-building.

The greatest need may be for expanded research on veganic soil health and plant-based fertility systems. As Eileen emphasized, the most important form of support for the US veganic farming community may be for “farm-centered universities to get onboard with doing the research behind fertility from a strictly plant-based standpoint.” This could include topics such as plant-based fertility inputs, soil microbial activity and carbon in plant-based cropping

systems, on-farm nutrient cycling within veganic systems (e.g., biocyclic humus soil), and anaerobic digestion using plant materials (e.g., Schmutz 2012). Expanded research would help to diminish knowledge barriers to practicing and potential veganic farmers and is a necessary step toward broadening educational and training opportunities in veganic agriculture and improving technical assistance services (e.g., University Extension). Simultaneous and subsequent to the developing research base will need to be improved funding and grant opportunities that are inclusive to veganic agriculture. For instance, development of a federal grant program for veganic research akin to the Sustainable Agriculture Research and Education (SARE) program, or dedication of SARE funds to plant-based agriculture, would be a considerable step forward. Additionally, nonprofits such as the Organic Farming Research Foundation may be well-positioned to adapt to prioritize veganic research. Actively including the insights of farmer participants to ensure the relevance of the research will be essential.

This is a particularly interesting time to expand research on veganic agriculture given changing attitudes toward animal agriculture. In the Global North, recent years have seen unprecedented criticism of the greenhouse gas contributions, resource use, and threats to food safety and security linked to industrial animal agriculture; and an intensified moral reckoning with the production and consumption of animals as food. The COVID-19 pandemic has cast a spotlight on the relationship between animal consumption and public health, as well as the labor conditions in industrial slaughterhouses. There are rapidly growing markets for plant-based milks, eggs, and meats, and expanding research and development for cultured meats. Some industries, such as dairy, are now contracting. All of this raises questions for the future availability of the dominant animal-based fertilizers, and points to an impetus for further research into veganic production methods: the practicality of having well-articulated plant-based agricultural methods ready for mass deployment.

The foundational insights presented in this article foreshadow further farmer-led advancement of veganic agriculture and highlight perspectives and opportunities for advocates, researchers, educators, and policymakers. Veganic agriculture holds great promise in realms including environmental sustainability and ethics and has much potential to grow in recognition and application as an alternative agricultural approach.

Acknowledgements We would like to thank our research participants for generously sharing their time, knowledge, and perspectives. We are grateful to our backers from the “Experiment” crowdfunding platform for supporting this project financially, and to Nassim Nobari and Seed the Commons for inspiring and encouraging this research. Alisha wishes to thank her graduate studies committee: Ernesto Méndez, Jason Parker, Daniel Tobin, Terence Bradshaw, and the late Bob Parsons. We

⁴ The farms did not close due to veganic-specific reasons, but rather due to a land tenure issue and a death.

would also like to thank the three anonymous reviewers and editor for their constructive comments.

References

- Adolf Hoops Society. n.d.-a. Home. <http://www.biocyclic-vegan.org/>. Accessed 4 Aug 2020.
- Adolf Hoops Society. n.d.-b. About us. <http://www.biocyclic-vegan.org/about-us/>. Accessed 29 Jun 2020.
- Alsanius, B.W., E. von Essen, R. Hartmann, I. Vågsholm, O. Doyle, U. Schmutz, H. Stützel, A. Fricke, and M. Dorais. 2019. The “one health”-concept and organic production of vegetables and fruits. *Acta Horticulturae*. <https://doi.org/10.17660/ActaHortic.2019.1242.1>.
- Belasco, W.J. 2007. *Appetite for change: How the counterculture took on the food industry*. Ithaca, NY: Cornell University Press.
- Bonsall, W. 2015. *Will Bonsall's essential guide to radical, self-reliant gardening*. White River Junction, VT: Chelsea Green Publishing.
- Bonzheim, A., D. Mettke, and H. Rieken. 2015. Bio-vegane Landwirtschaft in Deutschland: Definition, motive, und beratungsbedarf aus sicht der praktiker_innen. In *Am mut hängt der erfolg—rückblicke und ausblicke auf die ökologische landbewirtschaftung. Beiträge zur 13. Wissenschaftstagung Ökologischer Landbau*, ed. A.M. Häring, B. Hörning, R. Hoffmann-Bahnsen, H. Luley, V. Luthardt, J. Pape, and G. Trei. Berlin: Verlag Dr. Köst.
- Burnett, G. 2014. *The vegan book of permaculture*. East Meon: Permanent Publications.
- Cormack, W.F. 2006. Crop performance in a stockless arable organic rotation in eastern England. *Biological Agriculture & Horticulture* 24 (1): 1–20.
- DiMatteo, K., and G. Gershuny. 2007. The organic trade association. In *Organic farming: An international history*, ed. W. Lockeretz, 253–263. Wallingford, UK: CABI.
- Eisenbach, L.D., A. Folina, C. Zisi, I. Roussis, I. Tabaxi, P. Papatylianou, I. Kakabouki, A. Efthimiadou, and D.J. Bilalis. 2018. Effect of biocyclic humus soil on yield and quality parameters of sweet potato (*Ipomoea batatas* L.). *Scientific Papers. Series A. Agronomy* 61 (1): 210–217.
- Eisenbach, L.D., A. Folina, C. Zisi, I. Roussis, I. Tabaxi, P. Papatylianou, I. Kakabouki, A. Efthimiadou, and D.J. Bilalis. 2019. Effect of biocyclic humus soil on yield and quality parameters of processing tomato (*Lycopersicon esculentum* Mill.). *Bulletin UASVM Horticulture* 76 (1): 47–52.
- Francis, C., and J. Van Wart. 2009. History of organic farming and certification. In *Organic farming: The ecological system*, ed. C. Francis, 3–17. Madison, WI: American Society of Agronomy.
- Guthman, J. 2014. *Agrarian dreams: The paradox of organic farming in California*, 2nd ed. Oakland, CA: University of California Press.
- Hagemann, N., and T. Potthast. 2015. Necessary new approaches towards sustainable agriculture—Innovations for organic agriculture. In *Know your food: Food ethics and innovation*, ed. D.E. Dumitras, I.M. Jitea, and S. Aerts, 107–113. Wageningen, NL: Wageningen Academic Publishers.
- Hall, J., and I. Tolhurst. 2007. *Growing green: Animal-free organic techniques*. White River Junction, VT: Chelsea Green Publishing.
- Heckman, J. 2006. A history of organic farming: Transitions from Sir Albert Howard's “War in the Soil” to USDA National Organic Program. *Renewable Agriculture and Food Systems* 21 (3): 143–150.
- Hepperly, P.R., D. Douds Jr., and R. Seidel. 2006. The Rodale Institute Farming Systems Trial 1981 to 2005: Long-term analysis of organic and conventional maize and soybean cropping systems. In *Long-term field experiments in organic farming*, ed. J. Raupp, C. Pekrun, M. Oltmanns, and U. Köpke, 15–31. Berlin, DE: Verlag Dr. Köster.
- Hirth, S. 2020. Food that matters: Boundary work and the case for vegan food practices. *Sociologia Ruralis*. <https://doi.org/10.1111/soru.12317>.
- Jaffee, D., and P.H. Howard. 2010. Corporate cooption of organic and fair trade standards. *Agriculture and Human Values* 27: 387–399.
- Jürkenbeck, K., and A. Spiller. 2020. Consumers' evaluation of stock-free-organic agriculture—A segmentation approach. *Sustainability*. <https://doi.org/10.3390/su12104230>.
- Jürkenbeck, K., L. Schleicher, and S.G.H. Meyerding. 2019. Marketing potential for biocyclic-vegan products? A qualitative, explorative study with experts and consumers. *German Journal of Agricultural Economics* 68: 289–298.
- Kassam, L., and A. Kassam. 2021. Toward inclusive responsibility. In *Rethinking food and agriculture: New ways forward*, ed. A. Kassam and L. Kassam, 419–430. Duxford, UK: Woodhead Publishing.
- Lockeretz, W., and P. Madden. 1987. Midwestern organic farming: A ten-year follow-up. *American Journal of Alternative Agriculture* 2 (2): 57–63.
- Lockeretz, W., G. Shearer, and D.H. Kohl. 1981. Organic farming in the corn belt. *Science* 211 (4482): 540–547.
- Mann, S. 2020. Could we stop killing?—Exploring a post-lethal vegan or vegetarian agriculture. *World* 1: 124–134.
- Markussen, M.V., M. Kulak, L.G. Smith, T. Nemecek, and H. Østergård. 2014. Evaluating the sustainability of a small-scale low-input organic vegetable supply system in the United Kingdom. *Sustainability*. <https://doi.org/10.3390/su6041913>.
- Matsuura, E., M. Komatsuzaki, and R. Hashimi. 2018. Assessment of soil organic carbon storage in vegetable farms using different farming practices in the Kanto region of Japan. *Sustainability*. <https://doi.org/10.3390/su10010152>.
- Mt. Pleasant, J. 2011. The paradox of plows and productivity: An agronomic comparison of cereal grain production under Iroquois hoe culture and European plow culture in the seventeenth and eighteenth centuries. *Agricultural History* 85 (4): 460–492.
- Nobari, N. 2021. Social movements in the transformation of food and agriculture systems. In *Rethinking food and agriculture: New ways forward*, ed. A. Kassam and L. Kassam, 371–397. Duxford, UK: Woodhead Publishing.
- O'Brien, K.D. 1964. The transformation of soils by surface cultivation and vegan manuring. *Journal of the Royal Society of Arts* 112 (5090): 69–85.
- Obach, B.K. 2015. *Organic struggle: The movement for sustainable agriculture in the United States*. Cambridge, MA: The MIT Press.
- Parr, J.F., R.I. Papendick, and I.G. Youngberg. 1983. Organic farming in the United States: Principles and perspectives. *Agro-Ecosystems* 8 (3–4): 183–201.
- Pimentel, D., P. Hepperly, J. Hanson, D. Douds, and R. Seidel. 2005. Environmental, energetic, and economic comparisons of organic and conventional farming systems. *BioScience* 55 (7): 573–582.
- Reed, M. 2010. *Rebels for the soil: The rise of the global organic food and farming movement*. London, UK: Earthscan.
- Richerson, P.J., M.B. Mulder, and B.J. Vila. 1996. *Principles of human ecology*. Needham Heights, MA: Simon & Schuster.
- Rodale, J.I. 1948. *The organic front*. Emmaus, PA: Rodale Press.
- Rosato, C., H. Atthowe, and A. Stone. 2020. Woodleaf Farm soil management system. eOrganic website. <https://eorganic.org/node/14132#outcomes>. Accessed 8 Mar 2021.
- Roussis, I., I. Kakabouki, A. Folina, A. Konstantas, I. Travlos, and D. Bilalis. 2019. Effects of tomato pomace composts on yield and quality of processing tomato (*Lycopersicon esculentum* Mill.). *Bulletin UASVM Horticulture* 76 (2): 250–257.
- Schmutz, U. 2012. Plant based anaerobic digestion (vegan AD). *Growing Green International*. 29 (summer): 6–7.

- Schmutz, U., and L. Foresi. 2017. Vegan organic horticulture—Standards, challenges, socio-economics and impact on global food security. *Acta Horticulturae*. <https://doi.org/10.17660/ActaHortic.2017.1164.62>.
- Seymour, M. Forthcoming. Envisioning vegan agriculture. In *Vegan geographies: Spaces beyond violence, ethics beyond speciesism*, eds. P. Hodge, A. McGregor, S. Springer, O. Véron, and R.J. White. Brooklyn, NY: Lantern Books.
- Seymour, M. 2018a. Understanding veganic agriculture. In *Promoting biodiversity in food systems*, ed. I.W. Hawkins, 179–187. Boca Raton, FL: CRC Press.
- Seymour, M. 2018b. Map of US veganic farms. <https://arcg.is/1uOyPD>. Accessed 15 Jan 2020.
- Sligh, M., and T. Cierpka. 2007. Organic values. In *Organic farming: An international history*, ed. W. Lockeretz, 30–39. Wallingford, UK: CABI.
- Sriskandarajah, N., C. Francis, L. Salomonsson, H. Kahiluoto, G. Lieblein, T.A. Breland, U. Geber, and J. Helenius. 2006. Education and training in organic agriculture: The Nordic region and the USA. In *Organic agriculture: A global perspective*, ed. P. Kristiansen, A. Taji, and J. Reganold, 385–406. Ithaca, NY: Cornell University Press.
- Stockfree Organic Services. n.d. About. <https://stockfreeorganic.net/about/>. Accessed 29 Jun 2020.
- Utter, A. and M. Seymour. Forthcoming. Veganic agriculture in the United States: Opportunities for research, outreach, and education. *Journal of Extension*.
- Veganic Agriculture Network. 2011a. Different ways to garden veganically. <https://www.goveganic.net/article206.html>. Accessed 18 Jun 2020.
- Veganic Agriculture Network. 2011b. Certified veganic—U.S. <https://www.goveganic.net/article106.html>. Accessed 22 Jun 2020.
- Veganic Agriculture Network. 2013a. Container gardening how-to. <https://www.goveganic.net/article137.html>. Accessed 4 Jan 2019.
- Veganic Agriculture Network. 2013b. Introduction to permaculture. <https://www.goveganic.net/article68.html>. Accessed 4 Jan 2019.
- Veganic Agriculture Network. 2014. Introduction to veganics. <https://www.goveganic.net/article19.html>. Accessed 28 Dec 2018.
- Veganic Agriculture Network. 2016. Overview of veganic techniques. <https://www.goveganic.net/article129.html>. Accessed 4 Jan 2019.
- Veganic Agriculture Network. n.d. Approaches to veganic. <https://www.goveganic.net/rubrique17.html>. Accessed 4 Jan 2019.
- Vegan Organic Network. n.d.-a. Home. <http://veganorganic.net/>. Accessed 18 Feb 2020.
- Vegan Organic Network. n.d.-b. VON standards. <https://veganorganic.net/von-standards/>. Accessed 18 Jun 2020.
- Vegconomist. 2019. Association for the promotion of biocyclic vegan agriculture: “Biocyclic vegan farming has the potential to be applied worldwide.” <https://vegconomist.com/interviews/association-for-the-promotion-of-biocyclic-vegan-agriculture-biocyclic-vegan-farming-has-the-potential-to-be-applied-worldwide/>. Accessed 29 Jun 2020.
- Visak, T. 2007. Vegan agriculture: Animal-friendly and sustainable. In *Sustainable food production and ethics*, ed. W. Zollitsch, C. Winckler, S. Waiblinger, and A. Haslberger, 193–197. Wageningen, NL: Wageningen Academic Publishers.
- Vogt, G. 2007. The origins of organic farming. In *Organic farming: An international history*, ed. W. Lockeretz, 9–29. Wallingford, UK: CABI.
- Watson, C., H. Alrøe, and E.S. Kristensen. 2006. Research to support the development of organic food and farming. In *Organic agriculture: A global perspective*, ed. P. Kristiansen, A. Taji, and J. Reganold, 361–383. Ithaca, NY: Cornell University Press.

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Mona Seymour is an associate professor in the Department of Urban and Environmental Studies at Loyola Marymount University. She is broadly interested in relationships between agrifood movements and animal liberation, and her research currently focuses on veganic agriculture in the US context.

Alisha Utter is a Ph.D. Candidate at the University of Vermont (UVM) in the Department of Plant and Soil Science. She is a member of the UVM Agroecology and Livelihoods Collaborative and her research focus is on veganic agriculture in the United States. In addition to her doctoral studies, Alisha co-stewards a veganic produce farm in northwestern Vermont.