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Applying the feminist agrifood systems theory (fast) to U.S. organic, value-added, and non-organic non-value-added farms

Katherine Dentzman[1] · Ryanne Pilgeram[2] · Falin Wilson[3]

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Abstract

The population of women farm operators continues to increase in the U.S. That growth, however, is mediated by research showing that women in agriculture experience persistent barriers to equality with men. The Feminist Agriculture Food Theory (FAST) developed by Sach et al. (The Rise of Women Farmers and Sustainable Agriculture, University of Iowa Press, Iowa City, (Sachs et al., The rise of women farmers and sustainable agriculture, University of Iowa Press, 2016) posits that in the face of these barriers, women farmers in the Northeast are engaging in six strategies to increase their success. These include (1) increasing gender equality on their farms, (2) asserting an identity as a farmer, (3) gaining greater access to resources, (4) shaping new food and farming systems, (5) negotiating roles in agricultural organizations, and (6) forming women-centered farming organizations. While researchers have applied FAST to Michigan, it has not been examined at a national level. In this paper, then, we use the 2017 Census of Agriculture Data to measure how women in agriculture in the U.S. are faring on each aspect of FAST we can measure (strategies 1–5). We compare women to men farmers across these FAST strategies and across three different farm types: Non-Organic Non-Value-Added Farms, Organic Farms, and Value-Added Farms. Our findings suggest for FAST strategies 1 and 2 there is an increase in equity and ability to identify as a farmer for women on organic and value-added farms. However, our findings also suggest that for FAST strategies that require more institutional and structural resources (I.e. strategies 3–5), inequities persist across farm types.

Keywords Feminist agrifood systems theory: FAST · Quantitative analysis · U.S. census of agriculture · Women in agriculture

Abbreviations

CoA	Census of agriculture
CSA	Community supported agriculture
FAST	Feminist agrifood systems theory
USDA	United Stated department of agriculture
U.S.	United States
NONVA	Non-organic non-value-added

✉ Katherine Dentzman
dentzman@IASTATE.EDU

Ryanne Pilgeram
rpilgeram@uidaho.edu

Falin Wilson
wilsonfalin@gmail.com

[1] Department of Sociology and Criminal Justice, Iowa State University, 510 Farm House Ln, 303d, Ames, IA 50011, USA

[2] Department of Culture, Justice, and Society, University of Idaho, 875 Perimeter Drive, MS 1110, Moscow, ID 83844, USA

[3] Department of Counselor Education, 502 East Boone, Avenue, Spokane, WA 99258-0102, USA

Introduction

In the US, women play complex and dynamic roles in agriculture, but are often unrecognized as farmers both by themselves and others (Ball 2020; Peter et al. 2000; Pini 2005; Saugeres 2002; Wright 2019). When we examine the history of farming in Western contexts, research suggests that "farm and farm work revolve around masculine bodies" because "agriculture has been historically framed around men and how the machinery is an extension of their body, technical competence, since it requires brute force/physical strength" (Sachs 2016, p. 41). Indeed, farmers—and especially those growing cash crops—are stereotypically male, and masculine language to describe farming is normalized (Ferrell 2012; Hall & Mogyorody 2007; Peter et al. 2000).

Despite male dominance of the agricultural imaginary, farmland, and profits (Ferrell 2012; Hall & Mogyorody 2007; Horst and Marion 2018; Peter et al. 2000; Pilgeram et al. 2022), studies have shown an increase in women farmers and the percentage of women-operated farms, i.e. farms where a woman was considered the principal operator (Ball 2020; Horst and Marion 2018; Sachs 2016; Wright and Annes 2019). Although this increase *may* indicate positive trends for women farmers (see Pilgeram et al. 2020 for an in-depth discussion), there are still considerable issues that women deal with in farming. Women farmers in developed countries face barriers to accessing farmland (Ball 2020; Croppenstedt et al. 2013; Pilgeram & Amos 2015), control less farmland and make lower profits than men (Ball 2020; Croppenstedt et al. 2013; Horst & Marion 2018), are left out of much agricultural programming (Ball 2020), struggle to access government funding and subsidies (Ball 2020), and are often considered secondary farm helpers even when they make substantial contributions to farm work (Hall & Mogyorody 2007; Peter et al. 2000; Pini 2005; Saugeres 2002). These patterns of gendered discrimination further intersect with race, ethnicity, and sexuality in ways that create unique challenges for farmers inhabiting these cross sections (Dentzman et al. 2021; Horst and Marion 2018; Pilgeram et al. 2022; White 2012; White 2018; Wypler 2019).

Nonetheless, women continue to participate in agriculture and, in some ways, have made serious inroads towards equality beyond a simple increase in the percentage of women-run farms. They are contesting male dominance and the masculinized space of farming (Saugeres 2002), redefining on-farm gender roles (Pini 2005), gaining greater parity in alternative farming (Hall & Mogyorody 2007; Peter et al. 2000), leveraging on-farm labor into decision-making power (Hall & Mogyorody 2007), using their motherhood capital as a tool of power in the industrial agriculture industry (Braun et al. 2019), and dominating value-added and Community Supported Agriculture (CSA) niches (Ball 2020). Sachs et al. (2016) make a particularly strong case for the rise of women farmers in sustainable agriculture, advancing their Feminist Agrifood Systems Theory (FAST) as a context for understanding the barriers women farmers face as well as their empowerment.

FAST posits that women farmers are able to actively create a more feminist agriculture in six ways: (1) creating gender equality on farms, (2) asserting an identity as a farmer, (3) gaining greater access to resources, (4) shaping new food and farming systems, (5) negotiating roles in agricultural organizations, and (6) forming women-centered farming organizations. While Sachs et al. (2016) find that women are advancing many of the elements of FAST in the Northeastern US and especially Pennsylvania, Wright and Annes' (2019) application of the FAST to Michigan found that women farmers in the state had several key differences that did not map directly onto the experiences of women farmers in the Northeast. Both studies have called for wider application of FAST including an investigation of how women are navigating farming in different regions and agricultural systems (Sachs et al. 2016; Wright & Annes 2019). A key advancement of FAST, therefore, is the identification and evaluation of different areas of relative success for women farmers across the US and in more conventional forms of farming.

We take up this question with an expansion of FAST across the broader U.S. farming population, using five constituent elements as categories of analysis to get a clearer picture of how women farmers are faring and the state of gender (in) equality on U.S. farms. Additionally, we assess how the principles of FAST apply to women farmers engaged in (1) organic farming, (2) value-added production, and (3) neither of these—what we refer to as "Non-Organic Non-Value-Added" (NONVA) farms. Our data comes from the 2017 USDA Census of Agriculture, allowing us to assess baselines for five of the six FAST elements using a representative sample of farms and farming women across the US. Due to limitations in the data, we have excluded the final element of FAST, "forming women-centered farming organizations" from this analysis. Further, while we recognize the vital importance of considering gender at the intersections of race, ethnicity, and sexuality, it is beyond the scope of this study due to the already substantial cross-analyses involved in assessing two genders, three farm types, and five FAST categories. Future research, however, should consider building on this study with a robust intersectional approach. We begin by reviewing the existing literature on the five dimensions of FAST, as outlined by Sachs et al. (2016), that our research explores.

Literature review

FAST elements 1 & 2: gender equality and identity of the farmer

Historically, women on farms have been represented in highly gendered ways. Whether as farm wives, using their motherhood capital, or pigeonholed into caring and nurturing roles, women's farm work has been tokenized as revolving around household reproduction (Ball 2020; Braun et al. 2019). Men in turn, have typically held the visible positions of power on farms. It has been historically difficult for women to own and inherit land, and in the 1920 CoA only 4.1% of farm owner/operators were women (Horst & Marion 2018). Contemporarily, US farming is dominated by white non-Hispanic men (Horst & Marion 2018).

However, there is some evidence that women are making gains in U.S. farming. It is estimated that the overall percent of women operators has steadily increased (Ball 2020; Sachs et al. 2016), with particular gains in alternative agricultural systems (Ferrell 2012; Peter et al. 2000; Trauger 2004). Indeed, women are more likely than men to operate organic farms (Ball 2020; Hall & Mogyorody 2007) and alternative agriculture provides more room for feminine gender expression (Ferrell 2012; Trauger 2004). The low-input structure has also allowed for people with fewer economic, labor, and land resources—including women—to become engaged in farming (Sachs et al. 2016).

Regardless of these trends, however, men tend to retain the final decision-making power on all types of farms (Hall & Mogyorody 2007). Additionally, studies have shown that even on organic farms there is a gendered division of labor with women taking on more household-related duties (Ball 2020; Beach 2013; Hall & Mogyorody 2007; Trauger 2004). Ball (2014) posits that agriculture may be bifurcating into lower-income lower-prestige alternative farms run by women and higher-income higher-prestige conventional farms from which women farmers are excluded.

There is also evidence that women continue to struggle to claim the farmer identity in many situations. They must constantly negotiate their gender presentation in public spaces and act to justify any non-traditional farm labor; they often do this by emphasizing their role as farm wives and mothers, downplaying their on-farm contributions, and presenting themselves as 'lady-like' (Pini 2005; Sachs et al. 2016; Saugeres 2002) although this can ultimately cause resentment among women farmers (Sachs et al. 2016). Education and government programs have pushed women away from claiming operator roles (Ball 2020; Leslie 2017; Sachs et al. 2016) and women farmers sometimes allow their male partners to claim the farmer title officially even when they are the farmer in everyday practice (Saugeres 2002). Additionally, the alternative, small-scale agriculture that allows women more access may be seen as 'hobby' farming, dismissing women on these farms as 'not real farmers' (Sachs et al. 2016).

Looking at dimensions of FAST specifically, Wright and Annes found that value-added women farmers in Michigan see themselves as farmers, but struggle to outwardly assert that identity. Sachs et al.'s (2016) study based in Pennsylvania similarly found that women who farm with husbands, partners, or even alone struggle to be taken seriously by other farmers, agribusinesses, lenders, Cooperative Extension, and their own families. As Peter et al. put it in their study of alternative farmers in Iowa, "although women play an integral role […], it is the men who most often claim, and are ascribed, the identity of 'farmer'" (2000, p. 216).

FAST element 3: resources and farming systems

There has been limited research on women's versus men's access to and use of farm resources in developed countries, with calls to address this gap (Ball 2020). In the literature that does exist, it has been shown that women face various resource access constraints in terms of land, labor, machinery, and capital (Sachs et al. 2016). This has resulted in their farms being less profitable, on average, than men's (Ball 2020; Croppenstedt et al. 2013). Women farmers are, therefore, seen as being in a low-productivity trap in which "women's lower access to resources explains their low participation in commercial or export agricultural production, which limits their ability to accumulate resources" (Croppendstedt et al. 2013).

Land is especially valuable and difficult to secure. Women are less likely to inherit farmland and own significantly less overall compared to men (Ball 2020; Horst & Marion 2018; Sachs et al. 2016; Wright & Annes 2019). Yet at the same time, women rely more on inheritance because they face serious biases and constraints on the rental market (Croppenstedt et al. 2013). When they do acquire access, it is often through a male romantic partner (Pilgeram & Amos 2015; Sachs et al. 2016). Alternatively, some women purchase farmland later in life through capital accumulated from off-farm sources or migrate to rural areas where land is more affordable (Pilgeram & Amos 2015; Pilgeram 2019). These access methods differ depending on individuals' age, marital status, and socioeconomic class as well as larger social, economic, and cultural trends—across all cases, though, women have had to be creative in securing farmland (Pilgeram & Amos 2015; Sachs et al. 2016).

Similarly, machinery is typically controlled by men, even on organic farms (Hall & Mogyorody 2007; Sachs et al. 2016) and remains ideologically men's domain (Saugeres 2002). Women's low access to cash and credit impacts their crop choice, inputs, and ability to hire additional labor (Croppenstedt et al. 2013; Hall & Mogyorody 2007). They also have lower income than men to invest back into the farm operation (Horst & Marion 2018). This is particularly problematic because women's lack of capital and access to machinery means they rely more on manual labor—which they often cannot afford to hire. They thus often work long hard hours themselves, sometimes verging on self-exploitation (Pilgeram 2011; Sachs et al. 2016).

The constraints in resource access that women farmers face have certainly been a barrier to their success; yet many women employ creative strategies and develop new and innovative farming systems to overcome these obstacles. For instance, when accessing farmland women may strategically work with a male romantic partner, farm public land, use accumulated off-farm resources to purchase land, migrate to rural areas, or find available neglected land in urban spaces (Pilgeram & Amos 2015; Sachs et al. 2016). For farm labor, women in Sachs et al.'s (2016) study in Pennsylvania recruited volunteers, interns, and apprentices—many of whom were women hoping to gain skills and break into farming. These strategies are enabled by, and enable, alternative approaches to agriculture.

As Hall and Mogyorody (2007) found, farm types with lower labor and capital needs attract more involvement from women farmers. The smaller scale, lack of mechanized labor, decreased reliance on commercial outputs, and integration of farm and household duties on alternative farms are ideal for promoting the involvement of resource-constrained women farmers (Saugeres 2002; Hall & Mogyorody 2007). Indeed, women are more likely than men to operate farms that are organic (Ball 2020) as well as those that are smaller, less mechanized, and more sustainability-oriented (Ball 2014).

In their study of FAST in Michigan, Wright and Annes (2019) found that women farmers innovated with smaller scale farms, diversified high value crops, value-added and direct-to-consumer marketing, on-farm education programs, and sustainable production. However, they also note that many of these innovations rely on traditionally feminine-coded skills and may not be as ground-breaking as they first appear. Likewise, Pilgeram's 2011 study of organic farmers in the Pacific Northwest found that educational privilege and off-farm income, often from a spouse, helped explain the ability of farmers to survive in a difficult market. Although alternative agriculture may be more accessible for women farmers, there are still highly gendered parameters, substantial resources needed, evident class privilege, and racial and ethnic dynamics that advantage white, non-Hispanic women (Horst and Marion 2018; Pilgeram et al. 2022).

FAST elements 4 & 5: navigating and creating new agricultural systems & organizations

Historically, women have been underserved by agricultural education providers and excluded from gendered agricultural spaces (Ball 2020; Croppenstedt et al. 2013; Sachs et al. 2016; Trauger 2004). The joint USDA- and Land-Grant University-administered Agriculture and Home Economics Extension Service, for instance, traditionally targeted programming for women within the home economics realm; agriculture was for men (Leslie 2017; Sachs et al. 2016). This resulted in a lack of knowledge and information resources for women farmers that persists in many ways today (Trauger 2004). Indeed, Sachs et al. (2016) found that half of the women farmers they surveyed in Pennsylvania felt unwelcome in traditional agricultural organizations. Ball (2020) additionally found that women farmers do not attend Extension programs that don't appeal to them, and Extension doesn't create many programs targeted to women farmers' specific needs. This creates a vicious cycle in which women do not receive the knowledge they need and are simultaneously seen as under-involved and not interested in Extension programming. According to Ball (2020), the lack of support and negative messages women receive from Extension "clearly affect their choice to enter farming, their satisfaction in the occupation, and their probability of success" (p. 153).

Looking at other government-supported programs, there is some history of bias towards women farmers from the USDA, particularly related to farm loans (Ball 2020; Sachs et al. 2016). Compounding this, women farmers tend to operate smaller farms that don't benefit as much from government policies favoring larger operations (Ball 2020). Likewise, commodity-specific groups historically kept women on the margins by creating women's auxiliaries focused on consumption issues, though these have recently integrated into the main commodity groups (Sachs et al. 2016).

Further exacerbating this history of marginalization, women face pressure to present themselves as lady-like farmwives in public spaces, including government offices and other agricultural organizations, in ways that might discourage them from pushing for larger loans or other resources (Pini 2005; Trauger 2004). For instance, Trauger (2004) found that women felt especially uncomfortable and out of place at feed mills, equipment dealerships, hay auctions, sales barns, and farm shows where they said they were ignored and/or cheated. For these reasons and more, women farmers tend to apply for smaller amounts of funding and other resources; they are also more likely than men to use these resources for environmental sustainability projects as opposed to production enhancement (Ball 2020).

While there are some opportunities for education, networking, and government support for women in farming, this support has generally been deemed insufficient (Ball 2020; Sachs et al. 2016; Wright & Annes 2019). For instance, while alternative farming organizations provide unique opportunities for women to take on leadership roles, meet other women farmers, and feel supported in their farmer identities, such organizations rarely directly engage with issues of gender (Hall & Mogyorody 2007; Sachs et al. 2016; Trauger 2004). Early women-specific agricultural organizations such as Women in Farm Economics (WIFE) and American Agri-Women likewise provided spaces for farm women but focused on traditional feminine farmwife roles with no critical engagement of gender issues (Sachs et al. 2016).

To remedy this, there are some new and developing networks that do directly address the specific issues women farmers face along with their unique needs. For instance, the USDA's National Institute of Food and Agriculture runs a Beginning Farmers and Ranchers Program with portions targeting women farmers specifically, and a portion of the Farm Service Agency's Guaranteed, Direct Operating, and Direct Farm Ownership loans are set aside for historically underserved farmers and ranchers including women (Farm Service Agency 2022; Sachs et al. 2016). Similarly, the Sustainable Agriculture Research and Education program supports the types of farming women tend to do, and some regions have programming directly for women (Sachs et al 2016; Sustainable Agriculture and Research Education 2018). More directly, the USDA's Risk Management Agency works together with Cooperative Extension to offer Annie's Project, a non-profit organization which supports and trains women farmers all over the U.S and has established regional women's farming networks in Pennsylvania, Vermont, and Maine (Sachs et al. 2016). Typical baseline educational topics of the program include planning for financial, human resource, legal, market, and production risks; women farmers can also take more advanced courses on business, estate, retirement, and succession planning (Annie's Project 2022). Additional national agriculture-focused women's networks include the Women Food and Ag Network and the National Women in Agriculture Association.

Yet, these alternative women's networks can only do so much. The growth of these networks, indeed, emphasizes that women farmers are clearly not getting what they need from traditional sources (Ball 2020). Substantial resources and power remain locked in traditional, male-dominated organizations. While women farmers are taking on leadership roles and forming new networks to meet their unique needs and interests, Wright and Annes (2019) also found that these networks were sometimes ineffective in transforming on-farm education to meet women's needs and can, in fact, further isolate them from the powerful, resource-rich agricultural organizations dominated by men.

Methods

We use national-level data from the USDA's 2017 Census of Agriculture to assess the current state of 5 of the 6 elements of FAST across the U.S. The CoA provides data on U.S. farms that raised and sold products over $1000, or normally would have, in a given year. The Census is conducted once every 5 years, with the most recently released data from 2017. It looks at "land use and ownership, operator characteristics, production practices, income and expenditures" (USDA National Agricultural Statistics Service 2022). We chose to use this nationally representative secondary data to shed light on the utility of the FAST model and its generalizability to the U.S., as well as for its ability to compare and contrast alternatively and conventionally managed farms. Permission to access microdata from the 2017 CoA was obtained from the USDA (for additional details on this process, we suggest the review by Pilgeram et al. 2020).

For this article, we take producers, both primary and non-primary, as our key independent variables (for a discussion of primary farmer coding and limitations, see Pilgeram et al. 2020 and Pilgeram et al. 2022). Using men as the comparison category, we assess women producers' performance on five dimensions of FAST across organic, value-added, and NONVA farms. The five dimensions include Gender Equality, Claiming the Farmer Identity, Accessing Resources, New and Innovative Farming Systems, and Navigating Agricultural Organizations. We determined that the 2017 CoA contained variables that could be used to assess each of these dimensions to some extent, but that no variables existed that could adequately measure the sixth dimension—Creating New Agricultural Organizations. Below we outline how we measure each of the 5 dimensions of FAST we analyzed. Both Sachs et al. (2016) and Wright and Annes (2019) delineated various indicators for each dimension of FAST in their assessments of FAST in the northeaster US and Michigan, respectively—we use these as a starting point to identify relevant indicators from the 2017 Census of Agriculture for each dimension of FAST.

Gender equality is the first dimension of FAST. Sachs' et al. (2016) measured this by looking at statistics on the growing number of women farmers in the Census of Agriculture, and in particular the number of women in the principal farmer role (although these statistics are not entirely straightforward to interpret; see also Pilgeram et al. 2020). They also mention women's increasingly active roles in farming that go beyond traditional 'farm wife' duties (Sachs et al. 2016). Wright and Annes (2019) qualitative assessment of FAST in Michigan measured gender equality as the increasing presence of women farmers, their varied access to farming, and the new types of farms they created. To assess gender equality using 2017 Census of Agriculture data, we focused on measuring the presence of women farmers and their involvement in farm-related decision making. We measured the proportion of women farmers in several ways. We first looked at the proportion of all counted farmers who were women. We then looked at the proportion of women listed specifically as 1st, 2nd, 3rd, and 4th farmers. Finally, we assessed whether having a woman (compared to a man) in any of the four listed farmer positions had an impact on the total number of women working on the farm. Beyond these proportions of women farmers, we also looked at their decision-making roles. Specifically, we compared the proportion of women farmers in each of the four farmer positions making different kinds of farm-related decisions to the proportion of men farmers in each of the four farmer positions making these decisions. The decision categories were binary yes/no variables related to whether each farmer made overall farm management decisions, estate decisions, record-keeping decisions, land use decisions, and livestock decisions.

The second dimension of FAST is women's farmer identity; Sachs et al. (2016) mention the increasing number of women identified as principal farmers in the CoA as evidence of growing numbers of women identifying as farmers. They additionally used survey and interview data from the northeastern US to demonstrate that "women fill multiple roles on their farms, including keeping books, developing entrepreneurial enterprises, and working on and off the farm." (Sachs et al. 2016 p. 36). Wright and Annes (2019) measured women's farmer identities by simply asking the women they interviewed whether and how they identified as a farmer. There were no questions in the 2017 CoA directly asking about farmer identities. However, we were able to use a proxy. CoA respondents were asked to indicate if any of the four listed farmers were a 'principal' operator; we additionally coded our own 'primary' farmer variable based on decision-making involvement and days worked off farm (see above). In order to assess farmer identities, we compared the overall proportion of women farmers in each of the 1st, 2nd, 3rd, and 4th farmer positions to the proportion of women in those positions who were respondent-indicated as a principal farmer and coded by us as a primary farmer. Differences in these proportions were interpreted as indicative of differences in the perceived principality of women farmers' on-farm roles compared to the more objective, coded variable related to actual farm-related decision-making and work.

In their chapter on accessing the resources needed to farm, Sachs et al. (2016) look at women farmers' unique and innovative strategies to acquire three major types of resources; land, labor, and capital. Wright and Annes (2019) measured women farmers' access to resources specifically as access to land and capital, looking at how women accessed farm land and whether they relied on any off-farm income. For our study, 'Accessing Resources' was measured by comparing the rate at which men and women primary farmers received federal agricultural payments, the size of their farms in acres, the number of farm laborers they were able to hire, and the value of their farm machinery.

In terms of innovative and alternative farming systems, the farmers that Sachs et al. (2016) studied engaged in farming at smaller scales, produced value-added products, engaged in direct marketing, and took into account the health of their land, ecosystems, and local communities. Farm success for these women was determined not only as profitability but had multiple dimensions centered around women's values such as providing health foods, maintaining good community relationships, and enhancing environmental quality. Wright and Annes (2019) looked at how women shape new agrifood systems by assessing to what degree women farmers in Michigan had smaller scale farms, diversified high-value crops, value-added products, unique marketing strategies, on-farm education, and sustainable production. We measured 'New and Innovative Systems' by comparing the number of farms run by men and women farmers that were value-added, had direct-to-market sales, were organic, and used various conservation practices (see Tables 10, 11, 12).

Sachs et al. (2016) look at the next dimension of FAST—women's navigation of agricultural organizations—through their experiences with Cooperative Extension, the American Farm Bureau, National Farmers' Union, the Grange, commodity organizations, and sustainable agriculture organizations. Wright and Annes (2019) did not specifically interview their respondents on this topic, but did nonetheless hear some stories about how they did not feel welcome in traditional agricultural organizations including Cooperative Extension and commodity groups. Unfortunately, the CoA has limited indicators for this variable. The closest approximations were questions related to participation in federal farm programs, which provided some information on how women farmers navigated the traditional agricultural organizations necessary to participate in these programs. Therefore, we measured Navigating Organizations by comparing how farms run by men and women primary farmers participate in federal farm programs. These included organic certification, federal conservation and non-conservation payments, crop insurance loans, and the Civilian Conservation Corps.

The final element of FAST—forming women-centered farming organizations, could not be assessed in any degree given available CoA data. No questions existed that asked about participation in any of the existing women-centered organizations such as the Women, Food, and Agriculture Network or Annie's Project. The other five elements, as outlined above, were assessed separately for, and compared between, organic, value-added, and NONVA farms.

We chose to assess organic farms as one category in order to parallel Sachs et al.'s analysis of sustainable and alternative farming systems in the northeastern US, as well as to address literature positing (or contesting) greater gender parity on organic farms (Hall & Mogyorody 2007; Sachs et al. 2016; Sumner & Llewelyn 2011; Trauger 2004). Additionally, the existence of a CoA question on the organic status of each farm enabled us to easily categorize farms as organic or non-organic, a clear and ready alternative to the messy and imprecise process of attempting to identify each operation as 'alternative', for which there is no direct measurement. However, we recognize that organic farming is neither a direct substitute nor an indicator for sustainable/alternative farming practices. Indeed, certified organic agriculture has sometimes been seen as conventionalized or co-opted by large agribusiness (Constance et al. 2015; DuPuis & Gillon 2009; Galvin 2011; Guthman 2002); at the same time the term 'organic' also contains a multitude of definitions, justifications, and ideals ranging from increased profit margins to environmentalism and community building (Galvin 2011; Sage & Goldberger 2012).

While we cannot claim to directly assess sustainable and alternative farming as a whole, the way the CoA asks about organic farming allows for an explicit inclusion of many types. Farms in the CoA were able to choose any combination of four different 'organic' categories; they could have (1) USDA NOP certified organic production (certified), (2) USDA NOP organic production exempt from certification (exempt production is normally less than $5000 in sales) (exempt), (3) acres transitioning into USDA NOP organic production (transitioning), (4) and/or production according to USDA NOP standards but NOT certified or exempt (other). We elected to code farms as organic if they selected at least one of these four types of production indicators. This provides the broadest definition of organic, including small-scale farms that may not have the resources to become certified, as well as farms that may have ideological reasons for not becoming certified (i.e. Constance et al. 2008).

Value-added farms were chosen as a second category in parallel with Wright and Anne's study of the FAST on value-added farms in Michigan (2019), and because the literature provides some evidence, though mixed, that value-added production promotes gender equality (Ball 2020). Farms were sorted into the value-added category if they reported on the 2017 CoA form that, during 2017, they produced and sold any processed or value-added products from their own agricultural production. Finally, farms were sorted into the NONVA category if they did not fit either of the above categories.

Our independent variables for each of the FAST dimensions, as outlined above and specified in Table 10, were all either binary 0/1 or continuous variables. Binary variables were compared for men and women farmers using cross-tabulations and chi-squared tests to determine significance. We elected to use this approach in order to directly compare proportions of men and women. Continuous variables were compared for men and women farmers using Wald tests, testing the null hypothesis that men and women farmers did not have significantly different mean values for each variable. Wald tests were used for simplicity of comparison between groups and because t-tests were not practical given the frequency weights applied to CoA data.

Limitations

While the Census of Agriculture is a powerful resource to analyze a large-scale sample of US farmers, it is far from perfect. There have been significant changes in how farmers are counted and what types of information are asked of them; this has improved data collection accuracy but created inequivalences between the data in different CoA years (for a deeper examination, see Pilgeram et al. 2020). As explained above, up to four farmers can be listed for each farm and demographic data is collected on each of these people. The difficulties in assigning a principal or primary role to one of these four farmers is briefly discussed above (and, again, more deeply in Pilgeram et al. 2020); it should be noted that our analysis defines 'women-run farms' on the basis of a woman primary farmer but does not take into account whether a second, third, or fourth farmer is also a woman.

We are further limited by the fact that the CoA asks about gender as a simple binary in which farmers are identified as either men or women. This prevents any analyses taking into account more nuanced definitions and perceptions of gender, including those that could consider transgender and non-binary farmers. These segments of the farming population are severely understudied and deserve recognition even when that recognition must be limited to a call for more and better data. For the most up-to-date information on the CoA's gender and sexuality data collection procedures and methodological experiments, see Young and Rater (2022), in which expanded gender and sexuality questions are tested with a sub-sample of US farmers to measure the impact of including these questions on response rates.

Additionally, the variables available to assess the five FAST dimensions we cover in this analysis are not always ideal representations of each dimension. We have carefully assessed the characteristics of each dimension as described and measured by Sachs et al. (2016) and Wright and Annes (2019) and attempted to choose representative variables that most closely serve as indicators of that dimension. However, it is a characteristic of translating qualitative work onto secondary quantitative data that depth of information will be lost. Our goals in assessing FAST through the CoA are to gain a baseline understanding of how women are faring within the FAST dimensions, investigate whether these can be effectively measured quantitatively and applied at a national scale, and to draw comparisons between farm types that are sometimes considered more 'woman-friendly' (I.e. organic and value-added) and those that are less (non-organic and non-value-added). The CoA data has proven to have utility in addressing these goals, but it the limitations in defining 'woman-run' farms and measuring various FAST dimensions should be taken into consideration when interpreting the results.

Results

We organize our results around the five dimensions of FAST we analyzed, with results for organic, value-added and NONVA farms reported within each dimension in order to be more easily comparable across farm types. To reiterate, we coded farms as organic if they had any organic production, including USDA NOP certified, exempt, transitioning, and un-certified production. Farms were coded as value-added if they reported that, in 2017, they had produced and sold any processed or value-added products from their own agricultural production. For clarity and ease of reporting we

Table 1 Gender equality on NONVA farms

Farmer 1							
Gender	Men = 1,743,297 (85.70%)			Women = 290,879 (14.30%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	1,660,160	1.00	1,660,175	264,875	1.00	264,877	0.811
Estate decisions	1,076,241	1.00	1,076,256	176,395	1.00	176,397	0.784
Record decisions	1,416,877	1.00	1,416,892	245,010	1.00	245,012	0.729
Land decisions	1,493,654	1.00	1,493,669	221,911	1.00	221,913	0.886
Livestock decisions	1,194,939	1.00	1,194,954	195,824	1.00	195,826	0.784
Proportion women	Average: 0.49		n: 835,964	Average: 0.80		n: 290,879	Wald test: 0.000
Farmer 2							
Gender	Men = 286,431 (26.11%)			Women = 810,600 (73.89%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	230,380	1.00	230,381	621,052	1.00	621,054	0.807
Estate decisions	117,162	1.00	117,163	443,662	1.00	443,664	0.596
Record decisions	155,674	1.00	155,675	590,714	1.00	590,716	0.595
Land decisions	215,306	1.00	215,307	442,618	1.00	442,620	0.982
Livestock decisions	156,142	1.00	156,143	435,727	1.00	435,729	0.785
Proportion women	Average: 0.45		n: 159,444	Average: 0.51		n: 810,600	Wald test: 0.000
Farmer 3							
Gender	Men = 104,752 (59.77%)			Women = 70,520 (40.23%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	75,097	0.7169	104,752	40,355	0.5722	40,355	0.000
Estate decisions	32,043	0.3059	104,752	29,136	0.4132	70,520	0.000
Record decisions	44,062	0.4206	104,752	38,611	0.5475	70,520	0.000
Land decisions	72,536	0.6925	104,752	28,892	0.4097	70,520	0.000
Livestock decisions	52,271	0.4990	104,752	27,977	0.3967	70,520	0.000
Proportion women	Average: 0.49		n: 835,964	Average: 0.80		n: 290,879	Wald test: 0.000
Farmer 4							
Gender	Men = 28,032 (42.96%)			Women = 37,222 (57.04%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	17,510	0.6246	28,032	17,958	0.4825	37,222	0.000
Estate decisions	7676	0.2738	28,032	13,727	0.3688	37,222	0.000
Record decisions	9904	0.3533	28,032	17,811	0.4785	37,222	0.000
Land decisions	16,732	0.5969	28,032	12,915	0.34700	37,222	0.000
Livestock decisions	11,624	0.4147	28,032	12,470	0.33500	37,222	0.000
Proportion women	Average: 0.37		n: 22,251	Average: 0.49		n: 37,222	Wald test: 0.000

focus on broad trends—specific statistics for each dimension and farming type are available in the detailed tables appended to this article.

Gender equality on farms

To indicate gender equality, we looked at how many women and men were represented in each farm type and each farmer position, the types of decision making they were responsible for, and how having a woman in one of the top four farmer roles impacted the overall proportion of women on the farm. These statistics are reported for NONVA farms in Table 1, organic farms in Table 2, and value-added farms in Table 3.

NONVA farms (Table 1)

In 2017, the CoA reported 2,162,512 men and 1,209,221 women on NONVA farms, meaning women accounted for

36% of all NONVA farmers. The CoA also breaks farmers down into 1st, 2nd, 3rd, and 4th listed farmers. Of 1st listed farmers, 86% were men and 14% were women. Men also dominated in 3rd listed farmers (60% men and 40% women). Women, however, dominated as 2nd listed farmers (26% men and 74% women) and 4th listed farmers (43% men and 57% women). This suggests a picture where farmers are typically listed as man/woman pairs, with the man listed first.

For each farmer position (Farmers 1, 2, 3, and 4) we compared the percentage of men and women making different kinds of decisions on the farm. The decision-related variables in the 2017 CoA were overall decisions, estate decisions, record keeping decisions, land use decisions, and livestock decisions. 100% of both men and women in the Farmer 1 and 2 roles said they made decisions in all of these categories. However, differences appeared among men and women Farmer 3's and Farmer 4's. Women in both the Farmer 3 and Farmer 4 roles were less likely than men to make overall decisions, land use decisions, and livestock decisions but more likely to make estate and record keeping decisions.

We also looked at the reported total percent of women farmers—this percent took into account ALL farmers on the farm, not just the four listed on the CoA form. We found that when women were included in any of the four listed producer positions, the farm had a greater total proportion of women farmers. When women were listed as Farmer 1, the farm had an average of 80% women farmers; when a man was listed as Farmer 1 the average was only 50%. This trend was similar, though less strong, for Farmers 2, 3, and 4. This evidence points to a greater proportion of women farmers when at least one of the four main farmers on a farm is a woman.

Organic (Table 2)

In 2017, the CoA reported 34,191 men and 22,239 women on organic farms, with women accounting for 39% of all organic farmers (3% more than on NONVA farms). Compared to conventional farmers, the 1st listed farmer on organic farms was more often a women (19% on organic farms vs. 14% on NONVA); the 2nd, 3rd, and 4th listed were either equal or lower percentages. That is, women on organic farms and NONVA farms were more or less equally represented in Farmer 2, 3, and 4 positions; only in the Farmer 1 position did organic farms have a higher proportion of women than NONVA farms.

As with NONVA farmers, Farmers 1 and 2 on organic farms were nearly always involved in every type of farm decision. For Farmers 3 and 4, again just as with NONVA farms, however, women organic farmers were less likely than men to make overall decisions, land use decisions, and livestock decisions while also being more likely to make estate or record keeping decisions. The proportion of women farmers on the farm, as a function of a woman in the 1st, 2nd, 3rd, or 4th farmer role, was also similar to that of NONVA farmers, with the presence of a woman farmer in any of these positions increasing the overall proportion of women on the farm.

Value added (Table 3)

In 2017, the CoA reported 38,781 men and 30,951 women on value-added farms, with women accounting for 44% of all value-added farmers—an additional 5% more than organic and 8% more than NONVA farmers. Compared to NONVA and organic farmers, the 1st listed farmer on value-added farms was more often a women (25% vs. 19% on organic farms and 14% on NONVA); the 2nd, 3rd, and 4th listed were comparable percentages across value-added, organic, and NONVA.

As with NONVA and organic farmers, Farmers 1 and 2 of both genders on value-added farms were nearly always involved in every type of farm decision. However, yet again, women farmers in the role of Farmer 3 and Farmer 4 were less likely to make overall decisions, land use decisions, and livestock decisions while also being more likely to make estate or record keeping decisions compared to men. For value-added farmers, the presence of a woman in one of the 4 listed farmer positions had less of an impact on the proportion of total woman farmers than it did for organic and NONVA farms.

In sum, we find that women are closer to reaching numerical parity with men on organic and value-added farms and have similar levels of decision making—less than their male counterparts—regardless of farm type.

Claiming the identity of a farmer

To measure this element of the FAST, we looked at (1) the percent of men and women farmers who were reported on the CoA form as a principal farmer and (2) the percent who we coded as a primary farmer. As explained in the methods section, "principal farmer" was a respondent-chosen designation whereas "primary farmer" was coded by the researchers to determine the primary decision-maker and on-farm worker. Differences in whether a given farmer was designated as a principal and/or a primary give us some insight into who is considered a farmer by the respondents versus who actually does a majority of the decision making and farm work. We posit that this reflects the assignation of a farmer identity, or withholding of such,

Table 2 Gender equality on organic farms

Farmer 1							
Gender	Men = 24,074 (80.89%)			Women = 5688 (19.11%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	23,117	1.0000	23,117	5397	1.0000	5397	–
Estate decisions	14,959	1.0000	14,959	3501	1.0000	3501	–
Record decisions	20,814	1.0000	20,814	5246	1.0000	5246	–
Land decisions	22,400	1.0000	22,400	5168	1.0000	5168	–
Livestock decisions	14,242	1.0000	14,242	3229	1.0000	3229	–
Proportion women	Average: 0.48		n: 14,292	Average: 0.74		n: 5688	Wald test: 0.000
Farmer 2							
Gender	Men = 6242 (31.49%)			Women = 13,580 (68.51%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	5005	1.0000	5005	10,750	1.0000	10,750	–
Estate decisions	2581	0.9996	2582	7409	1.0000	7409	0.090
Record decisions	3536	1.0000	1536	9954	1.0000	9954	–
Land decisions	4945	1.0000	4945	8150	1.0000	8150	–
Livestock decisions	2714	1.0000	2714	5974	1.0000	5974	–
Proportion women	Average: 0.45		n: 4038	Average: 0.51		n: 13,580	Wald test: 0.000
Farmer 3							
Gender	Men = 2910 (60.16%)			Women = 1927 (39.84%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	2206	0.7581	2910	1223	0.6347	1927	0.000
Estate decisions	853	0.2931	2910	708	0.3674	1927	0.000
Record decisions	1361	0.4677	2910	1064	0.5522	1927	0.000
Land decisions	2202	0.7567	2910	943	0.48940	1927	0.000
Livestock decisions	1319	0.4533	2910	570	0.29580	1927	0.000
Proportion women	Average: 0.37		n: 2282	Average: 0.51		n: 1927	Wald test: 0.000
Farmer 4							
Gender	Men = 965 (48.03%)			Women = 1044 (51.97%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	653	0.6767	965	557	0.5335	1044	0.000
Estate decisions	244	0.2528	965	383	0.3669	1044	0.000
Record decisions	369	0.3824	965	471	0.4511	1044	0.002
Land decisions	686	0.7109	965	414	0.39660	1044	0.000
Livestock decisions	379	0.3927	965	255	0.24430	1044	0.000
Proportion women	Average: 0.37		n: 796	Average: 0.50		n: 1044	Wald test: 0.000

in comparison to actual farm involvement and duties. We made this comparison for Farmer 1, Farmer 2, Farmer 3, and Farmer 4. These statistics appear for NONVA farms in Table 4, for organic farms in Table 5, and for value-added farms in Table 6.

NONVA (Table 4)

Looking at all men who were Farmer 1, 98% were respondent-designated as a principal farmer. Of the women, 96% were. We coded that 91% of men Farmer 1's and 92% of women Farmer 1's were the single most-in-charge, aka primary, farmer on their farm. Similar trends, though with lower percentages, were seen for Farmers 2 and 3; for Farmer 4 the trend was reversed. Taken together, women

Table 3 Gender equality on farms

Farmer 1							
Gender	Men = 26,393 (75.12%)			Women = 8740 (24.88%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	25,257	1.00	25,257	8435	1.00	8435	–
Estate decisions	16,469	1.00	16,469	5400	1.00	5400	–
Record decisions	21,492	1.00	21,492	8161	1.00	8161	–
Land decisions	23,786	1.00	23,786	7696	1.00	7696	–
Livestock decisions	17,412	1.00	17,412	6163	1.00	6163	–
Proportion women	Average: 0.49		n: 18,718	Average: 0.72		n: 8740	Wald test: 0.000
Farmer 2							
Gender	Men = 7936 (30.48%)			Women = 18,105 (69.52%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	6276	1.00	6276	14,978	1.00	14,978	–
Estate decisions	3359	1.00	3359	10,030	1.00	10,030	–
Record decisions	4089	1.00	4089	13,924	1.00	13,924	–
Land decisions	5969	1.00	5969	11,710	1.00	11,710	–
Livestock decisions	4122	1.00	4122	9929	1.00	9929	–
Proportion women	Average: 0.46		n: 6131	Average: 0.51		n: 18,105	Wald test: 0.000
Farmer 3							
Gender	Men = 3316 (56.93%)			Women = 2509 (43.07%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	2521	0.7603	3316	1608	0.6409	2509	0.000
Estate decisions	943	0.2844	3316	899	0.3583	2509	0.000
Record decisions	1460	0.4403	3316	1342	0.5349	2509	0.000
Land decisions	2352	0.7093	3316	1108	0.44160	2509	0.000
Livestock decisions	1506	0.4542	3316	910	0.36270	2509	0.000
Proportion women	Average: 0.39		n: 2814	Average: 0.54		n: 2509	Wald test: 0.000
Farmer 4							
Gender	Men = 1136 (41.57%)			Women = 1597 (58.43%)			P-value
	Freq	Percent	n	Freq	Percent	n	
Decision role	728	0.6408	1136	931	0.5830	1597	0.002
Estate decisions	284	0.25	1136	540	0.3381	1597	0.000
Record decisions	449	0.3952	1136	756	0.4734	1597	0.000
Land decisions	695	0.6118	1136	578	0.36190	1597	0.000
Livestock decisions	386	0.3398	1136	450	0.28180	1597	0.001
Proportion women	Average: 0.38		n: 988	Average: 0.51		n: 1597	Wald test: 0.000

farmers in all positions were less likely to be designated as a principal farmer than men with the exception of when they were listed 4th. Yet our coding indicated that within each category women were more likely to be the ones making the most on-farm decisions and working the fewest days off-farm, aka be a primary farmer (again with the exception for Farmer 4). There is a clear disconnect between who is designated a principal farmer when filling out the CoA and who is actually most responsible for the farm according to decision-making and on-farm works days, with women being less likely to be the former and more likely to be the latter.

Organic (Table 5)

Similar to NONVA farmers, women organic farmers were less likely to be designated by the respondent as a principal farmer than were men, with our coding indicating women

Table 4 Claiming the identity of a farmer on NONVA farms

	Farmer			Principal farmer			Primary farmer		
	Freq	Percent	n	Freq	Percent	n	Freq	Percent	n
Farmer 1									
Men	1,743,297	0.857	2,034,176	1,700,506	0.8592	1,979,196	1,587,561	0.8560	1,854,593
Women	290,879	0.143	2,034,176	278,690	0.1408	1,979,196	267,032	0.1440	1,854,593
Farmer 2									
Men	286,431	0.2611	1,097,031	349,454	0.7617	638,258	27,771	0.2049	135,524
Women	810,600	0.7389	1,097,031	461,146	0.7225	638,258	107,753	0.7951	135,524
Farmer 3									
Men	104,752	0.5977	175,272	48,363	0.6118	79,044	4942	0.5360	9220
Women	70,520	0.4023	175,272	30,681	0.3882	79,044	4278	0.4640	9220
Farmer 4									
Men	28,032	0.4296	65,254	10,688	0.4522	65,254	1014	0.4710	2153
Women	37,222	0.5704	65,254	12,950	0.5478	65,254	1139	0.5290	2153

Table 5 Claiming the identity of a farmer on organic farms

	Farmer			Principal farmer			Primary farmer		
	Freq	Percent	n	Freq	Percent	n	Freq	Percent	n
Farmer 1			29,762			28,774			26,404
Men	24,074	0.8089		23,314	0.8102		21,276	0.8058	
Women	5688	0.1911		5460	0.1898		5128	0.1942	
Farmer 2			19,822			11,662			2565
Men	6242	0.3149		3847	0.3299		613	0.239	
Women	13,580	0.6851		7815	0.6701		1952	0.761	
Farmer 3			4837			2035			198
Men	2910	0.6016		1288	0.6329		101	0.5101	
Women	1927	0.3984		747	0.3671		97	0.4899	
Farmer 4			2009			668			54
Men	965	0.4803		325	0.4865		30	0.5556	
Women	1044	0.5197		343	0.5135		24	0.5197	

Table 6 Claiming the identity of a farmer on value-added farms

	Farmer			Principal farmer			Primary farmer		
	Freq	Percent	n	Freq	Percent	n	Freq	Percent	n
Farmer 1									
Men	26,393	0.7512	35,133	25,163	0.7489	33,600	21,746	0.7333	29,654
Women	8740	0.2488	35,133	8437	0.2511	33,600	7908	0.2667	29,654
Farmer 2									
Men	7936	0.3048	26,041	4657	0.2786	16,717	741	0.1698	4363
Women	18,105	0.6952	26,041	12,060	0.7214	16,717	3622	0.8302	4363
Farmer 3									
Men	3316	0.5693	5825	1446	0.6117	2364	123	0.4642	265
Women	2509	0.4307	5825	918	0.3883	2364	142	0.5358	265
Farmer 4									
Men	1136	0.4157	2733	372	0.4356	854	58	0.5225	111
Women	1597	0.5843	2733	482	0.5644	854	53	0.4775	111

Table 7 Accessing resources on NONVA farms

Primary farmer					
	Men		Women		Wald test
	Average	n	Average	n	
Fed payments total	$14,480	550,576	$9305	83,722	0.000
Fed payments not CRP	$13,812	480,862	$7399	63,700	0.000
Fed payments conservation	$6801	195,640	$7480	41,143	0.000
Land operated	488.03	1,621,288	228.13	380,202	0.000
Acres owned	344.06	1,515,085	204.63	357,315	0.000
Acres rented (From)	200.02	1,621,288	61.57	380,202	0.000
Acres rented (To)	244.28	229,570	235.66	58,228	0.470
Proportion rented	0.2078	1,614,571	0.1026	372,170	0.000
Proportion owned	0.8442	1,515,085	0.9347	357,315	0.000
Value land + buildings	$1,636,021	1,117,723	$866,698	254,328	0.000
Migrants hired	17.14	17,791	13.72	1947	0.002
Hired under 150 days	3.61	307,097	2.89	58,658	0.000
Hired over 150 days	3.99	195,962	2.83	32,014	0.000
Value machinery	$149,269	1,621,009	$62,770	380,047	0.000

were nonetheless more likely to be the most-in-charge primary farmer (with the exception of Farmer 4). Interestingly, with the exception of Farmer 4, women organic and NONVA farmers were respondent-designated as a principal farmer at similar rates. Men farmers, however, were respondent-designated as the principal less often when they were organic farmers. It appears that women's confidence in their farmer identity stayed similar, but men's *decreased* on organic farms.

Value-added (Table 6)

In a reversal of the trends for both organic and NONVA farmers, women value-added farmers were more likely than men to be respondent-designated as a principal farmer when they were in the 1st or 2nd farmer position (they were less likely when in the 3rd or 4th position). As with organic and conventional, our coding indicated that women were more likely to be the most-in-charge primary farmer (with, again, the exception of Farmer 4). Value-added farms, then, contain the only farmer categories in which women farmers were both more likely to be respondent-designated as a principal farmer and be determined the primary farmer by our coding.

In sum, farm type seems to have a clear impact on how gender impacts how likely women and men are to be marked as the principal producer on their farmers. Women on NONVA and Organic farmers are more likely to be making decisions without being recognized as principal farms. On Value-Added farms there is a better match between a woman's level of decision-making and her title, suggesting women are more likely to claim the identity of a farmer on these types of farms.

Accessing resources

For this and all subsequent elements of the FAST, we switch units from 'men and women farmers' to 'farms run by men and women', that is, farms with a man or a woman primary farmer. We measured resource access in terms of federal payments, farmland, farm workers, and farm machinery. NONVA farms run by a man primary farmer earned, on average, a higher dollar amount in federal payments than farms run by a woman, with the exception of federal payments for conservation practices—in this case woman-run farms earned more. Statistics for NONVA farms are reported in Table 7, for organic farms in Table 8, and for value-added farms in Table 9.

NONVA (Table 7)

Looking at farmland, men-run farms were much larger, with 488 acres on average compared to women-run farms' 228. Men both owned and rented more acres of farmland than women. They were also able to rent a greater proportion of their land, pointing to difficulties women face in securing land lease agreements. The average value of all farmland and buildings for men-run farms was $1,636,021 compared to women-run farms' $866,698. Farms run by men were also able to hire more farm laborers. Finally, men-run farms had farm machinery averaging a value of $149,269 compared to only $62,770 for farms run by women.

Table 8 Accessing resources on organic farms

Primary farmer					
	Men = 22,020		Women = 7201		Wald test
	Average	n	Average	n	
Fed payments total	$17,122	5671	$9318	1070	0.000
Fed payments not CRP	$16,421	5438	$9238	1000	0.000
Fed payments conservation	$6191	1260	$3939	186	0.001
Land operated	458.61	22,020	120.13	7201	0.000
Acres owned	310.58	19,530	103.47	6436	0.000
Acres rented (From)	206.97	22,020	34.61	7201	0.000
Acres rented (To)	202.9	2200	90.35	680	0.000
Proportion rented	0.2527	22,016	0.165	7194	0.000
Proportion owned	0.8424	19,530	0.9334	6436	0.000
Value land + buildings	$2,475,636	16,466	$839,948	5720	0.000
Migrants hired	$40	1194	$21	175	0.000
Hired under 150 days	$13	8185	$5	2223	0.000
Hired over 150 days	$12	6616	$5	1420	0.000
Value machinery	$227,240	22,020	$74,807	7201	0.000

Table 9 Accessing resources on value-added farms

Primary farmer					
	Men		Women		Wald test
	Average	n	Average	n	
Fed payments total	$10,593	3762	$6431	1073	0.000
Fed payments not CRP	$10,369	3482	$6363	982	0.000
Fed payments conservation	$4059	923	$2923	223	0.065
Land operated	$267	22,668	$77	11,725	0.000
Acres owned	$200	20,899	$68	10,881	0.000
Acres rented (From)	$94	22,668	$18	11,725	0.000
Acres rented (To)	$104	2383	$62	990	0.000
Proportion rented	$0	22,653	$0	11,711	0.000
Proportion owned	$1	20,899	$1	10,881	0.000
Value land + buildings	$2,036,834	18,666	$868,064	9704	0.000
Migrants hired	$19	978	$8	170	0.000
Hired under 150 days	$7	7741	$0	3173	0.000
Hired over 150 days	$6	5379	$3	1690	0.000
Value machinery	$117,496	22,668	$50,604	11,725	0.000

Organic (Table 8)

Organic farms run by men outstripped those run by women in every indicator of resource access. The only indicator on which women-run farms scored higher was proportion of land owned, which may indicate a struggle with acquiring rented land.

Value added (Table 9)

Despite what appears to be greater gender equality and farmer identities for women on value-added farms, they still did not out-perform men-run farms in terms of accessing resources. Like women-run organic and NONVA farms, women-run value-added farms were on average lower than men-run on every indicator except for federal conservation payments, which were not statistically significant.

In sum, even after controlling for farm type, men outpace women in accessing farm resources of all kinds,

Table 10 New and innovative systems on NONVA farms

Primary farmer							
Gender	Men			Women			P-value
	Freq	Percent	n	Freq	Percent	n	
Direct retail	15,681	0.0097	1,621,288	3823	0.0101	380,202	0.030
Direct consumer	79,882	0.0493	1,621,288	25,592	0.6730	380,202	0.000
Intensive grazing	180,814	0.2453	737,241	40,374	0.2489	162,194	0.002
Any federal payments	444,106	0.3263	1,361,106	66,173	0.2038	324,691	0.000
CRP payments	148,701	0.1093	1,361,004	30,302	0.0933	324,691	0.000
Non-CRP federal payments	394,482	0.2898	1,361,004	52,035	0.1603	324,691	0.000
CCC loans	13,450	0.0099	1,361,004	693	0.0021	324,691	0.000
Crop insurance	275,584	0.2025	1,361,004	25,215	0.0777	324,691	0.000
		Average	n		Average	n	Wald test
Direct retail value		$358,324	15,681		$68,959	3823	0.000
Direct retail/acre		$5211	15,681		$1901	3823	0.000
Direct consumer value		$15,061	79,882		$6378	25,592	0.000
Direct consumer/acre		$589	79,882		$537	25,592	0.168
Proportion conservation easement		0.543	173,238		0.550	32,335	0.0024
Prop cover crop		0.271	128,188		0.292	16,752	0.000
Prop conservation tillage		0.493	196,328		0.428	16,564	0.000
Prop no till		0.460	251,129		0.429	28,264	0.000

including farm land, federal payments, farm labor, and farm machinery.

New and innovative systems

We assessed innovative farming systems through direct sales and use of conservation practices. Additionally, on organic farms we looked at certification status. Statistics for NONVA farms are reported in Table 10, for organic farms in Table 11, and for value-added farms in Table 12.

NONVA (Table 10)

Farms run by men and by women did not significantly differ in their direct-to-retail participation, though men made much more when they had any direct-to-retail. Women-run farms were, however, 18% more likely than men-run farms to engage in direct-to-*consumer* sales. Again, these sales made less money on women-run farms—however this appears attributable to farm size as the value-per-acre of direct-to-consumer sales was not significantly different for farms run by men and women.

In terms of conservation practices, men-run farms again outpaced women in their likelihood to have any federal payments, including those for the Conservation Reserve Program, although when women had conservation-related payments they made more money than men on average. Men-run farms were also more likely to obtain CCC loans. Finally, men-run farms used conservation tillage or no-till on a high portion of their land, but women-run farms were more likely to have conservation easements or cover crops.

Organic (Table 11)

Direct sales trends for women-run versus men-run organic farms were similar to those for NONVA farms, with the exception that women-run organic farms were more likely than men-run to have direct-to-retail sales. Women- and men-run organic farms were not significantly different in their use of conservation easements or cover crops; like NONVA farms, men-run organic farms had more land in conservation tillage or no-till.

One additional measurement of innovative farming systems for organic farms was their certification status. Organic farms run by women were much less likely to have USDA NOP certification, or be transitioning to certification, than those run by men. They were much more likely, instead, to be exempt or un-certified.

Value-added (Table 12)

Women-run value-added farms were less likely to engage in direct-to-retail or direct-to-consumer sale than men-run farms (although of course a large percent of both did so). They also made less money from these direct sales. Like the

Table 11 New and innovative systems on organic farms

Primary farmer							
Gender	Men = 22,020			Women = 7201			P-value
	Freq	Percent	n	Freq	Percent	n	
Value-added	2188	0.1072	20,416	1442	0.2065	6984	0.000
Direct retail	3770	0.1712	22,020	1477	0.2051	7201	0.000
Direct consumer	6632	0.3012	22,020	3473	0.4823	7201	0.000
Intensive grazing	5120	0.5933	8629	1204	0.5290	2276	0.000
Certified organic	15,520	0.7048	22,020	2933	0.4073	7201	0.000
Transitioning organic	3057	0.1388	22,020	781	0.1085	7201	0.000
Exempt	1747	0.0793	22,020	1340	0.1861	7201	0.000
Other	3689	0.1675	22,020	2587	0.3593	7201	0.000
		Average	n		Average	n	Wald test
Direct retail value		$615,541	3770		$89,204	1477	0.000
Direct retail/acre		$9123	3770		$2121	1477	0.001
Direct consumer value		$57,381	6632		$20,477	3473	0.000
Direct consumer/acre		$4127	6632		$1328	3473	0.218
Proportion conservation easement		0.436	2892		0.398	760	0.0093
Prop cover crop		0.281	8683		0.281	2529	0.971
Prop conservation tillage		0.304	4334		0.272	1122	0.000
Prop no till		0.283	4202		0.256	1431	0.001

Table 12 New and innovative systems on value-added farms

Primary farmer							
Gender	Men			Women			P-value
	Freq	Percent	n	Freq	Percent	n	
Direct retail	4434	0.1956	22,668	2034	0.1735	11,725	0.000
Direct consumer	14,284	0.6301	22,668	6953	0.5930	11,725	0.000
Intensive grazing	5278	0.4870	10,837	3170	0.5334	5943	0.000
Any organic	2188	0.0984	22,247	1442	0.1248	11,559	0.000
Certified organic	1224	0.5594	2188	506	0.3509	1442	0.000
Transitioning organic	251	0.1147	2188	157	0.1089	1442	0.586
Exempt	218	0.0996	2188	306	0.2122	1442	0.000
Other	649	0.2966	2188	590	0.4092	1442	0.000
Any federal payments	3762	0.1660	22,668	1073	0.0915	11,725	0.000
CRP payments	923	0.0407	22,668	223	0.0190	11,725	0.000
Non-CRP federal payments	3482	0.1536	22,668	982	0.0838	11,725	0.000
CCC loans	81	0.0036	22,668	5	0.0004	11,725	0.000
Crop insurance	3025	0.1334	22,668	605	0.0516	11,725	0.000
		Average	n		Average	n	Wald test
Direct retail value		$249,585	4434		$62,653	2034	0.000
Direct retail/acre		$3772	4434		$1764	2034	0.003
Direct consumer value		$79,105	14,284		$24,868	6953	0.000
Direct consumer/acre		$1706	14,284		$1138	6953	0.000
Proportion conservation easement		0.409	2899		0.409	1245	0.9626
Prop cover crop		0.258	5460		0.250	2192	0.222
Prop conservation tillage		0.260	2593		0.268	1028	0.384
Prop no till		0.283	3857		0.247	1602	0.000

Table 13 Navigating organizations on NONVA farms

Primary farmer							
Gender	Men			Women			P-value
	Freq	Percent	n	Freq	Percent	n	
Bureau of water	28,136	0.0207	1,362,210	5952	0.0183	325,175	0.000
		Average	n		Average	n	Wald test
CCC loans		$138,412	17,053		$91,640	889	0.000
Proportion conservation easement		0.543	173,238		0.550	32,335	0.0024
Prop cover crop		0.271	128,188		0.292	16,752	0.000
Fed payments total		$14,480	550,576		$9305	83,722	0.000
Fed payments not CRP		$13,812	480,862		$7399	63,700	0.000
Fed payments conservation		$6801	195,640		$7480	41,143	0.000

women-run organic and NONVA farms, women-run value-added farms were less likely than those run by men to get any kind of federal payments, CCC loans, or have crop insurance. While men-run value-added farms had more land in no-till, they were not statistically significantly different from women-run farms in terms of land in conservation tillage, cover crops, or conservation easements.

In sum, there were mixed results for this FAST dimension. More women were engaged in organic and value-added farming, which may indicate a tendency towards new and innovative farming systems. However, it may also be indicative of a lack of resource pushing women towards these lower-resource farming types (Ball 2014; Hall & Mogyorody 2007; Saugeres 2002). Similarly, women on all farm types we analyzed outpaced men in some of the innovations we measured but fell behind in others.

Navigating organizations

Lastly, we looked at the success of men- and women-run farms related to several government programs. Statistics for NONVA farms appear in Table 13, for organic farms in Table 14, and for value-added farms in Table 15.

NONVA (Table 13)

Men on NONVA farms were more likely to be taking advantage of many of these, including obtaining irrigation water from the Bureau of Water, getting more and higher CCC loans, and securing federal payments unrelated to conservation. Women-run farms were more likely to be participating in conservation easements and cover crops, although it is unclear if they were securing conservation-related payments from the latter. Finally, when farms run by women did get

Table 14 Navigating organizations on organic farms

Primary farmer							
Gender	Men = 22,020			Women = 7201			P-value
	Freq	Percent	n	Freq	Percent	n	
Bureau of water	923	0.0453	20,355	122	0.0176	6951	0.000
Certified organic	15,520	0.7048	22,020	2933	0.4073	7201	0.000
Transitioning organic	3057	0.1388	22,020	781	0.1085	7201	0.000
Exempt	1747	0.0793	22,020	1340	0.1861	7201	0.000
Other	3689	0.1675	22,020	2587	0.3593	7201	0.000
		Average	n		Average	n	Wald test
CCC loans		$97,548	179		$91,231	9	0.815
Proportion conservation easement		0.436	2892		0.398	760	0.0093
Prop cover crop		0.281	8683		0.281	2529	0.971
Fed payments total		$17,122	5671		$9318	1070	0.000
Fed payments not CRP		$16,421	5438		$9238	1000	0.000
Fed payments conservation		$6191	1260		$3939	186	0.001

Table 15 Navigating organizations on value-added farms

Primary farmer							
Gender	Men			Women			P-value
	Freq	Percent	n	Freq	Percent	n	
Bureau of water	559	0.0252	22,183	196	0.0170	11,547	0.000
		Average	n		Average	n	Wald test
CCC loans		(D)			(D)		
Proportion conservation easement		0.409	2899		0.409	1245	0.9626
Prop cover crop		0.258	5460		0.250	2192	0.222
Fed payments total		$10,593	3762		$6431	1073	0.000
Fed payments Not CRP		(D)			(D)		
Fed payments conservation		$4059	923		$2923	223	0.065

conservation-related government payments, they made more on average than those run by men.

Organic farms (Table 14)

Women-run organic farms, like women-run NONVA farms, were less effective at navigating various farm organizations and government programs than those run by men. Specifically, women-run organic farms were less likely than men-run organic farms to use irrigation water from the Bureau of Water, be certified organic or transitioning to such, and receive any kind of federal payments, loans, or insurance. However, there were no significant differences between the dollar amount of CCC loans when they were obtained, and women- and men-run organic farms had equal proportions of their land in cover crops.

Value added (Table 15)

The success of women-run value-added farms at navigating organizations was difficult to determine due to very low cell numbers in some categories, resulting in suppression of these values by the USDA. However, we are able to report that women-run farms were less like to get irrigation from the Bureau of Water and made less money, on average, from non-CRP federal payments than men-run farms. There were no significant differences in CRP payments, land in cover crops or conservation easements, or dollar amount of CCC loans.

In sum, there were some mixed findings in this area but overall women-run farms appeared to have greater difficulty navigating federal programs than men-run farms, with the exception of some conservation-related payments. Efforts to increase parity in navigating organization might include a focus on targeted programming or other supports for women farmers to increase the number receiving CCC loans, accessing irrigation water from the Bureau of Water, and certifying as organic.

Conclusion

Overall, our analysis suggests meaningful differences for women versus men farmers on several FAST dimensions when looking across the three farm types. There is clearly some equity in (1) numerical representation and (2) women's willingness to claim the identity of a farmer, with women more likely to be on organic and value-added farms and more likely to identify as the principal producer on those farms. However, on the other dimensions: (3) gaining greater access to resources, (4) shaping new food and farming systems, and (5) negotiating roles in agricultural organizations, our findings are less encouraging. In these FAST dimensions, women on all farm types had either clear disadvantages compared to men or mixed, inconclusive findings. These trends make intuitive sense as dimensions 3–5 are tied to deep structural inequalities that limit women farmers, while measures 1 and 2 are tied to their presence on the farm and their willingness identity as a farmer.

The first set of FAST measures we analyzed paint a hopeful picture of women's evolving roles in agriculture, with gender equality and identity indicating that women are present, involved, and reflexive about their roles as farmers in particular within alternative agricultural systems. Indeed, aligning with Sachs et al.'s (2016) argument that alternative agriculture is a place of increased gender equality in farming and that it offers women a site where they can claim the identity of a farmer, we find that women currently represent 44% of farmers on value-added farms vs. 36% on NONVA farms. Similarly, on these value-added farms, women are more likely to identify as a farmer in ways that reflect the work and the decision-making they are doing on their farms. These findings also fit with trends explained by researchers that suggest the increase in small farms and niche, value-added production has made women on these farms seen as more legitimate, making it easier for them to claim a farmer identity (Ball 2014, 2020; Sachs et al. 2016). It also supports Ball's (2020) work showing that not only are more women identifying as farmers, but that society is becoming more accepting of this identification as the binary between farmer and farm wife seems to be breaking down (Sachs et al. 2016). These trends, which are supported by our analysis of nationwide CoA data, indicate that there is at minimum some level of redefinition and growth in the realm of women farmers' roles and identities and that this may occur to a greater degree on organic and especially value-added farms compared to farms with neither of these characteristics. Furthermore, while speculative, these results suggest the final element of FAST that we were unable to analyze due to data limitation—the increasing formation of more women-centered farming organizations—likely follows similar trends as dimensions 1 and 2 since the formation of women-centered organizations occurs outside of traditional structures of access to land and other resources. Certainly, this is an area for further research.

While parity in numbers, roles, and identity formation are important advances for women in agriculture, our findings also suggest that significant inequality persists on dimensions of FAST that measure structural inequities, even after controlling for farm type. This is important because too often inequality between men and women farmers is dismissed as attributable to differences in farm size or farming method, with little basis in systemic inequalities disadvantaging women or pushing them towards farming systems requiring fewer resources. In contrast, our analysis suggests that women fare worse on dimensions of FAST that indicate structural discrimination—and which are also common determinants of farm financial success and viability. The fact that this trend holds across NONVA, organic, and value-added farms, while the more ideological dimensions of FAST differ based on farm type, suggests that there are embedded structures and systems in place that disadvantage women farmers *regardless* of progress made in the societal norms of who gets to farm and who is considered a real farmer.

These systemic inequalities are particularly evident in that women across farm types are disadvantaged when compared to their male counterparts in terms of their access to most types of resources and in navigating agricultural institutions. Whether it is quantitative indicators such as acreage or measures of status such as "certified organic," women fare worse. This reflects the perspective that women's access to farming resources and organizations might be limited by everything from historical gender norms to individual-level gender discrimination at a particular agency or in a particular place. For example, women's access to farm land is impacted by structural factors such as inheritance patterns (Ball 2020; Horst & Marion 2018; Sachs et al. 2016; Wright & Annes 2019) and rental market discrimination (Croppenstedt et al. 2013). Likewise, Ball (2020) notes there is a history of bias towards women farmers from the USDA, particularly related to farm loans, while non-governmental farm organizations such as the Farm Bureau and National Farm Union have limited roles for women and very little programming on gender issues in agriculture (Sachs et al. 2016). That inequality would persist across farm types suggests the importance of ameliorating the factors that create this inequality at an institutional and structural level.

We hope that the detailed data we have presented here will allow researchers, agricultural organizations, and policymakers to look more clearly at areas where they might specifically work towards greater gender equity for US farmers. Particularly, we encourage interested parties to look beyond ideological changes in gender equality and identity to acknowledge and address the systemic inequalities in resource access, organizational accessibility and programming, and alternative strategies to enhancing farm viability that underlay women's ability to actually enter, be successful, and remain in farming. Furthermore, we extend a call for an enhanced, intersectional analysis using FAST that considers gender, race, ethnicity, class, and/or sexuality together, given that these intersections likely complicate and exacerbate gendered trends identified in this study.

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References

Annie's Project. 2022. About us. Retrieved 4.29.22 from https://www.anniesproject.org/about-us/

Ball, Jennifer A. 2014. She works hard for the money: Women in Kansas agriculture. *Agriculture and Human Values* 31: 593–605.

Ball, Jennifer A. 2020. Women farmers in developed countries: A literature overview. *Agriculture and Human Values* 37: 147–160.

Beach, S.S. 2013. "Tractorettes" or partners? Farmers' views on women in Kansas farming households. *Rural Sociology* 78 (2): 210–228.

Braun, Jennifer, Mary Beckie, and Ken Caine. 2019. "Trust us, we feed this to our kids": women and public trust in the Canadian agri-food system. *Agriculture and Human Values* 37: 495.

Constance, Douglas H., Jin Young Choi, and Holly Lyke-Ho-Gland. 2008. Conventionalization, bifurcation, and quality of life: Certified and non-certified organic farmers in Texas. *Journal of Rural Social Sciences* 23 (1): 9.

Constance, Douglas H., Jin Young Choi, and Damian Lara. 2015. Engaging the organic conventionalization debate. In *Re-Thinking organic food and farming in a changing world*, 161–185. Dordrecht: Springer.

Croppenstedt, Andre, Markus Goldstein, and Nina Rosas. 2013. Gender and agriculture: Inefficiencies, segregation, and low productivity traps. *The World Bank Research Observer* 28 (1): 79–109.

Dentzman, Katherine, Ryanne Pilgeram, Paul Lewin, and Kelsey Conley. 2021. Queer farmers in the 2017 US Census of Agriculture. *Society & Natural Resources* 34 (2): 227–247.

DuPuis, E. Melanie., and Sean Gillon. 2009. Alternative modes of governance: Organic as civic engagement. *Agriculture and Human Values* 26 (1): 43–56.

Farm Service Agency. 2022. Minority and women farmers and ranchers. Retrieved 4.29.22 from https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/minority-and-women-farmers-and-ranchers/index

Ferrell, Ann K. 2012. Doing masculinity: Gendered challenges to replacing burley tobacco in central Kentucky. *Agriculture and Human Values* 29: 137–149.

Galvin, ShailaSeshia. 2011. Nature's market?: A review of organic certification. *Environment and Society* 2 (1): 48–67.

Guthman, Julie. 2002. Commodified meanings, meaningful commodities: Re–thinking production–consumption links through the organic system of provision. *Sociologia Ruralis* 42 (4): 295–311.

Hall, Alan, and Veronika Mogyorody. 2007. Organic farming, gender, and the labor process. *Rural Sociology* 72 (2): 289–316.

Horst, Megan, and Amy Marion. 2018. Racial, ethnic and gender inequalities in farmland ownership and farming in the U.S. *Agriculture and Human Values* 36: 1–6.

Leslie, Isaac Sohn. 2017. Queer farmers: Sexuality and the transition to sustainable agriculture. *Rural Sociology* 82 (4): 747–771.

Monica, White. 2012. Sisters of the soil: Urban gardening as resistance in Detroit. *Race/Ethnicity Multidisciplinary Global Contexts* 5 (1): 13–28.

Peter, Gregory, Michael Mayerfield Bell, Susan Jarnagin, and Donna Bauer. 2000. Coming back across the fence: Masculinity and the transition to sustainable agriculture. *Rural Sociology* 65 (2): 215–233.

Pilgeram, Ryanne. 2011. "The only thing that isn't sustainable…is the farmer": Social sustainability and the politics of class among Pacific Northwest farmers engaged in sustainable farming. *Rural Sociology* 76 (3): 375–393.

Pilgeram, Ryanne. 2019. "How much does property cost up there?": Exploring the relationship between women, sustainable farming, and rural gentrification in the US. *Society & Natural Resources* 32 (8): 911–927.

Pilgeram, Ryanne, and Bryan Amos. 2015. Beyond "inherit it or marry it": Exploring how women engaged in sustainable agriculture access farmland. *Rural Sociology* 80 (1): 16–38.

Pilgeram, Ryanne, Katherine Dentzman, Paul Lewin, and Kelsey Conley. 2020. How the USDA changed the way women farmers are counted in the census of agriculture. *Choices* 35 (1): 1–10.

Pilgeram, Ryanne, Katherine Dentzman, and Paul Lewin. 2022. Women, race and place in US agriculture. *Agriculture and Human Values* 39: 1341–1355.

Pini, Barbara. 2005. Farm women: Driving tractors and negotiating gender. *International Journal of Sociology of Agriculture and Food* 13 (1): 1–18.

Sachs, Carolyn, Mary Barbercheck, Kathryn Braiser, Nancy Ellen Kiernan, and Anna Rachel Terman. 2016. *The rise of women farmers and sustainable agriculture*. University of Iowa Press.

Sage, Jeremy L., and Jessica R. Goldberger. 2012. Decisions to direct market: Geographic influences on conventions in organic production. *Applied Geography* 34: 57–65.

Saugeres, Lise. 2002. Of tractors and men: Masculinity, technology, and power in a French farming community. *Sociologia Ruralis* 42 (2): 143–159.

Sumner, Jennifer, and Sophie Llewelyn. 2011. Organic solutions? Gender and organic farming in the age of industrial agriculture. *Capitalism Nature Socialism* 22 (1): 100–118.

Sustainable agriculture research and education. 2018. Our farms, our future podcast series: women in agriculture. Retrieved 4.29.2 from https://www.sare.org/publications/our-farms-our-future-podcast-series/women-in-agriculture/

Trauger, Amy. 2004. 'Because they can do the work': Women farmers in sustainable agriculture in Pennsylvania, USA. *Gender, Place & Culture* 11 (2): 289–307.

United States department of agriculture national agricultural statistics service. 2022. Census of agriculture. Retrieved 5.9.22 from https://www.nass.usda.gov/AgCensus/

White, Monica. 2018. *Freedom farmers: Agricultural resistance and the Black freedom movement*. Chapel Hill, NC: University of North Carolina Press Books.

Wright, Wynne, and Amexis Annes. 2019. fasting in the mid-west? A theoretical assessment of 'feminist Agrifoods systems theory". *Agriculture and Human Values*. https://doi.org/10.1007/s10460-019-09994-3.

Wypler, Jaclyn. 2019. Lesbian and queer sustainable farmer networks in the Midwest. *Society & Natural Resources* 32 (8): 947–964.

Young, Linda J., and Barbara R. Rater. 2022. The farm producer survey: Unit and item nonresponse. RDD Research Report Number RDD-22-01. National Agricultural Statistics Service, Research and Development Division, Washington, DC. Available at: https://www.nass.usda.gov/Education_and_Outreach/Reports,_Presentations_and_Conferences/reports/Farm_Producer_Survey_Initial_Resultsnew_07_22_2022.pdf

Katherine Dentzman Katherine Dentzman is an Assistant Professor of Rural Sociology and Rural Public Policy at Iowa State University. She specializes in transdisciplinary agri-food research at the intersection of environmental and social sustainability. She is renowned for her work on community-based management of pesticide resistance in agriculture and has also applied theories of good farming, place attachment, and intersectionality to study the pathways and barriers to success faced by women and LGBTQ + farmers.

Ryanne Pilgeram Ryanne Pilgeram is a Professor of Sociology who studies inequality in rural and agricultural communities. She is the author of numerous publications about gender, class, race, and sexuality in agriculture. Most recently she published, Pushed Out: Contested development and rural gentrification in the US West, a book examining the structural forces of economic inequality in the rural West.

Falin Wilson Falin Wilson is a second-year Graduate Student at Gonzaga University currently obtaining his Masters of Art in Clinical Mental Health Counseling and will graduate in May of 2023. He is currently working towards becoming a Licensed Mental Health Counselor Associate (LMHCA) so that he can provide mental health services to his community. Falin is a former University of Idaho Undergraduate Research Assistant for the "Women on the Rise In Idaho and the US Project" that conducted this research.