

# **Agroecology and Women-Run Farms:**

**A case study of women farmers in the United States**

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**Abstract**

Women’s farm labor has always been an integral part of agriculture in the United States. How that labor has been understood and documented has changed over time. Today, women are on record as the primary decision-makers of more farms than ever before. This shift in leadership may have implications for natural resource management, agriculture, and food systems. Experts at the Food and Agriculture Organization of the United Nations recognize the vulnerabilities of globalized food systems in the face of climate change and call for nations to transition to agroecology. The FAO has identified women as important leaders of agroecology projects worldwide due to their roles in families and communities. This research is an exploratory mixed-methods case study that collected and analyzed data from a total of 88 participants in the United States using a web-based survey and semi-structured interviews. The findings show that the women farmers who participated in the study realize benefits around food security, nutrition, healthy ecosystems, and social cohesion for their local communities, and their practices and approaches align with the FAO’s ten elements of agroecology.

**Executive Summary**

The prevalence of women on record as farm managers in the United States has steadily risen in the past fifty years. Even though women have always been working on farms, their documented representation in farm leadership and decision-making has increased significantly. This trend relates to cultural evolution around gender roles along with changes in the Census of Agriculture methodology that expanded documentation to include multiple farm managers and principal farm managers. Between true increases in the number of women farmers and changes in how farmers were counted, women in the most recent 2017 Census were recorded as managers of over half of the farms in the United States, and represented as over a third of the principal farm managers.

This change in management demographics may have implications for food systems and agriculture. Research shows that women tend to practice farming differently than their male counterparts. Women tend to farm at smaller scales, market directly to their customers, utilize more ecological methods, and place a greater value on developing social networks.

Global experts emphasize the importance of sustainable agriculture in fighting climate change. The Food and Agriculture Organization of the United Nations (FAO) calls for nations to transition to agroecology, which they define as the science of applying ecological concepts and principles to manage interactions between plants, animals, humans and the environment for food security and nutrition. The FAO identifies women as critical leaders of agroecological projects in nations around the world, and posit that gender equity is instrumental to achieving sustainable agriculture. To operationalize agroecology for policy and programs, the FAO convened communities of experts to codify frameworks and develop assessment tools.

This Masters Project sought to describe the practices and approaches being employed by women farmers throughout the United States, and to analyze their alignment within the framework of agroecology produced by the FAO. It is a mixed-methods case study that uses a web-based survey and semi-structured interviews designed using the FAO's agroecology assessment tools. Data was collected from 88 participants across 25 states.

The major findings show that women-run farms realize benefits for food security, nutrition, healthy ecosystems, and social cohesion in local communities, and that the practices and approaches of these farmers align with the FAO's ten elements of agroecology. The indicators for these findings are the localized business models these women choose to develop, the environmental management approaches they utilize, and the education and community-building programs they incorporate. Eighty-nine percent of respondents operate diversified vegetable and livestock farms at less than 100 acres that utilize direct-to-consumer sales models such as farmers markets, CSAs, farm stands, and online platforms to market their food locally. Farms at this size were the most likely to accept government nutrition benefits and/or offer other food access programs for low-income consumers. Respondents indicated the highest scores for agroecological soil and pest management practices with mean scores of 4.8 and 4.6 on 5-point Likert scales, respectively, while scoring lowest for applying agroecological practices for water management (mean of 2.5) and input procurement (mean of 2.6). When asked about their motivations for farming, 84% of respondents indicated that they wanted to provide healthy food

for their families and/or their communities. Just over half of respondents provide programs to include young people (51%) and/or older people (53%) in the activities on their farms, and 84% indicated that they teach, train, or share farming knowledge with others. The programs they offer include food preparation workshops and events, and K-12 school or university partnerships. The aforementioned business models, natural resource management, and community engagement strategies align with the FAO's ten elements of agroecology: diversity, co-creation and sharing of knowledge, synergies, efficiency, recycling, human and social values, resilience, culture and food tradition, responsible governance, and a circular and solidarity economy.

These findings illuminate the value offered by women farmers related to food security, nutrition, healthy ecosystems, and social cohesion. The implications of these findings can inform policy and program development within the United States that target those issues. The findings can also be used to support international collaboration seeking to mitigate climate change through sustainable agriculture. The findings advance the knowledge of how women farmers throughout the United States are implementing farm models that operationalize the FAO's ten elements of agroecology.

## **Introduction**

Women have always been an integral part of agriculture in the United States. Their labor has been indispensable to running and operating farms. Prior to World War II, women were active partners in farm labor. With the rise of industrial agriculture, women's roles became more focused on feeding the family, canning and preserving, and raising children (Jellison, 1993; Scott, 1996; Neth, 1995) How that labor has been delegated, perceived, and documented has changed over time. Today, women are on record as the decision-makers in more farms than ever. This shift in leadership may have implications for land management, agriculture, and the food system as a whole. With increasing threats of climate change and the recognition of the vulnerabilities of a globalized food system, experts worldwide are calling for nations to transition from practicing agriculture to practicing agroecology. Women have been identified as critical leaders in agroecological transitions due to their roles caring for their families and communities, and stewarding natural resources. As women manage more farms in the United States, their decisions may impact the structure of food systems. Previous research has shown that women tend to farm at smaller scales with a greater emphasis on community relationships and

environmental resource management than their male counterparts. Given the steady increase in female farm leadership and the previous literature on their management approaches, this research seeks to understand how the practices of women farmers in the United States align with global principals of agroecology.

## **Background**

### A Century of Change for Agriculture and Agricultural Women in the United States

In the past century, the agricultural landscape has greatly changed along with the conception of women's roles on farms. Prior to World War II, women were active participants in the physical labor of farms such as cultivating vegetables and tending to animals. During World War II, many male farmers were sent to fight in the war, leaving a labor shortage for food production. To remedy this gap in farm labor, the government started an initiative called the Women's Land Army of America that recruited women for work on local farms to produce food for the war effort (Spring, 2017). When the war ended, the men returned and gender roles within family structures shifted to divide labor between domestic and productive activity. Technology was developing rapidly, mechanizing farm work and increasing the influence of synthetic and chemical products. (Jellison, 1993; Neth, 1995). The United States was competing for market share in a globalizing economy, and government agricultural policy reinforced this goal (Barnett, 2000). The Secretary of Agriculture Earl Butz from 1971 to 1976 famously coined the phrase, "Get big or get out." Under his administration, the USDA offered low-interest loans for farms to expand and grow commodity crops to compete in the global marketplace (Barnett, 2000). As a result, many small farms collapsed, while the remaining large farms became profitable (Risser & Anthan, 1976). These changes in culture, technology, and policy contributed to shaping the gender roles on farms. As farm wives, women assumed roles similar to suburban housewives and their labor focused on maintaining the quality of domestic life while their husbands oversaw crop production for public consumption. Women's farm labor within these farm families included caring for farm animals, bookkeeping, growing food for the family, raising children, doing housework and running errands, while the men's work involved machinery and applications of chemical products for crop production (Rosenfeld 1985).

The 1978 Census of agriculture was the first official data on women farmers in the US indicating trends in practice and approaches. At that time, 5.2% of farm operators on record were female (Kalbacher, 1985). The category defined farmers as the sole or primary operator of the farm, and only one person per household could be identified. Even though many women at the time were farming with their husbands, they were not recorded as farmers due to this criterion. The data collected indicate some trends in the practices and approaches of female farmers (Kalbacher, 1985). In comparison to their male counterparts, the female farmers tended to farm on smaller scales as measured in acreage, production, and income. Female farmers had 235 acres on average compared to male farmers who had 423 acres. The average household income of households led by female farmers was just over \$16,000 compared to \$26,000 for households led by male farmers. Female farmers tended to be older with a median age of 59 years old compared to male farmers who had a median age of 50.5 years old. Female farmers were more likely to fully own their farms (78.7%) compared to male farmers (57.5%). Female farmers were also more likely to rent out part of their farmland to other farmers (19%) than male farmers (11%). Finally, female farmers were less likely (37%) to carry debt than male farmers (58%). When female farmers carried debt, they carried a lower debt burden on average (\$45,000) than male farmers (\$84,000). Thus, these data show that female farmers operated at smaller scales to earn less income on less acreage, and also that they had higher levels of farm ownership and lower levels of farm debt. Whether by intention or circumstance, these data suggest that female farmers were making different economic decisions than male farmers.

The agriculture policies of the 1970's led to the Farm Crisis of the 1980's that impacted farm families and disrupted women's farm roles. To stay competitive in the global marketplace, farmers took advantage of the low-interest government loans during the 1970's to expand their farms. The Soviet Union was a primary purchaser of American commodity crops. The vulnerable position of the farmers became apparent when the United States entered political conflict with the Soviet Union and placed an embargo on exports. As a result of the embargo, the value of commodity exports such as corn, soybeans, and wheat fell 50% between 1981 and 1986 (Barnett, 2000). With the additional onset of drought conditions, farms went into crisis. Crop and land values plunged and interest rates rose. Farmers saw their wealth disappear. Many were forced to declare bankruptcy (Barnett, 2000). The financial crisis impacted the personal lives of farmers by



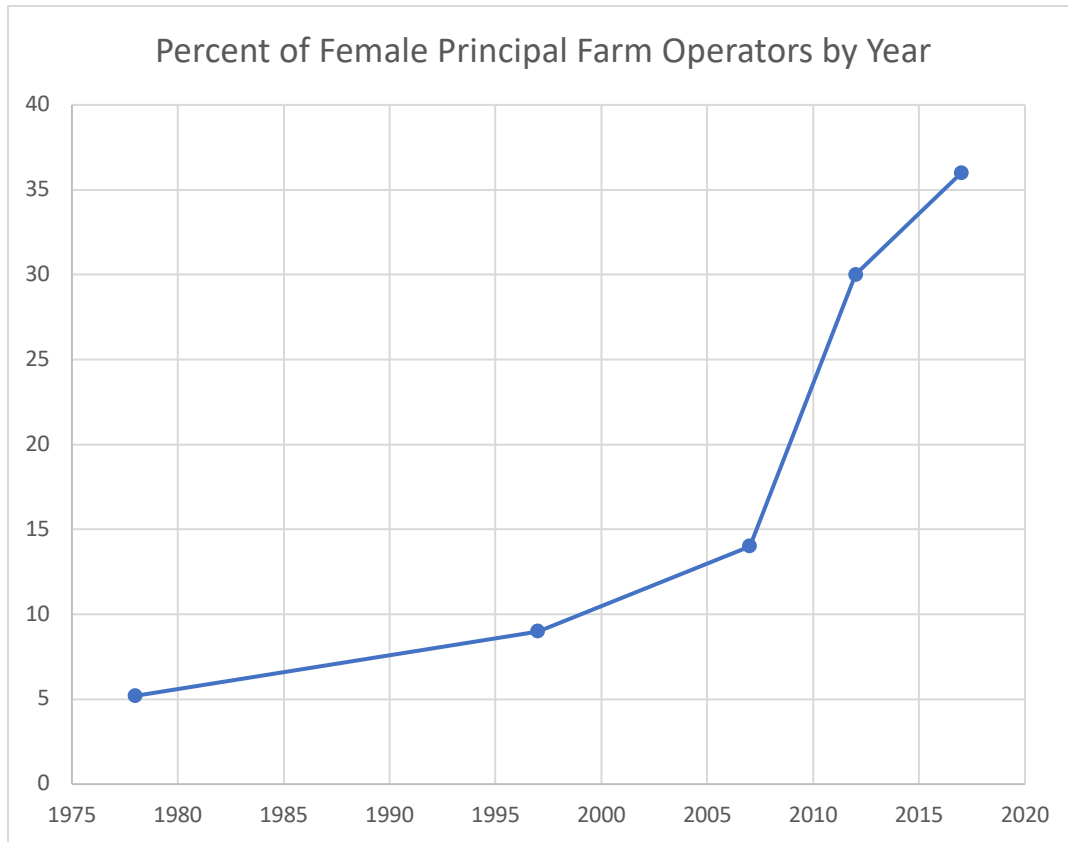
compelling women to seek off-farm employment to help support the family. Many farm families viewed this change as a necessary stop gap to save the farm and support the family (Riney-Kehrberg, 2018). Seeking financial and psychological support for their families, farm women became more politically active (Friedberger, 2003). They gave talks at community meetings, led group therapy, lobbied Congress, and spoke out in the media (Friedberger, 2003). Women who had previously devoted their labor to the private space of their farms transitioned to occupy political and public spaces from which they had been absent.

During the 1990's, the American farm landscape become increasingly globalized and industrialized, and also saw a rise in organic farming and in the representation of female producers. American agriculture was increasingly integrated into the global marketplace with rising levels of imports and exports (Dmitri et. al, 2005). Small farms continued to consolidate into large farms, and new technology enabled farmers to produce more output on less land with less labor. At the same time, conservation and organic farm practices increased. The USDA passed organic labeling and certification standards. The percentage of land dedicated to organic production doubled in the 1990s and the number of certified organic farmers increased by 40% between 1992 and 1997 (Greene, 2001). By 1997, the number of women producers had nearly doubled since 1978 and represented 9% of farmers on record (Korb, 2004).

The percentage of women on record as farm managers continued to rise through the 21<sup>st</sup> century (Figure 1), propelled largely by changes to how farmers were counted in the Census of Agriculture (White & King, 2019). Starting in 2002, the USDA changed its methodology for categorizing farm operators to allow farms to list up to three farm operators per household and indicate one principal farm operator (Pilgeram et al., 2020). A farm operator was a person in charge of day-to-day decision-making, while the principal farm operator was additionally in charge of data collection and record keeping for the Census. As of the 2007 Census, women comprised 14% of principal farm operators, and 30% by 2012. In 2017, the Census methods were changed again to allow the documentation of up to four farm operators per household and up to four principal farm operators per household (Pilgeram et al., 2020). As of the 2017 Census of Agriculture, 36% of all principal farm operators were female, and 56% of farms had at least one female farm-operator. While the number on record shows dramatic increase, much of this increase is attributable to the change in data collection methodology because many of the same

women had been serving in the same roles the entire time but had not previously been counted in official records (White & King, 2019).

*Figure 1: Percent of Female Farmers as Principal Farm Operators by Year from USDA Census Data*



Given the changes in culture and documentation, the most recent Census of Agriculture in 2017 shows that the majority of farms in the United States have at least one female decision-maker present, and that over a third of America’s principal farm operators are women. Census statistics and recent research show that women tend to make different farming decisions than men. The following section will review prior research on the practices and approaches of women farmers to develop hypotheses about the shifts that may occur in food systems and agriculture in the United States as a result of increasing representation of female decision-makers. Then, an overview of global research into sustainable agriculture through agroecology will be provided for comparison to the practices and approaches of women farmers in the United States.

#### Literature on the Approaches of Women Farmers in the United States

Studies have shown finding that women farmers in the United States are more likely to apply conservation practices, cooperate and share knowledge, develop social networks, and farm organically than their male counterparts. Previous research studies suggest that women practice farm models in alignment with civic agriculture and sustainable agriculture, and choose to scale their businesses to be small, flexible, and stable.

### *Conservation Practices and Social Networks*

Census of Agriculture data (USDA 2002; 2007; 2017) showed that women were more likely to operate small diversified farms, to certify as organic, and to produce livestock or specialty crops, while men are more likely to produce commodity crops such as corn, grain, soybeans, oilseed, hogs, and beef cattle (USDA 2007; 2017). A study conducted among 815 respondents in the Northeastern United States (Barbercheck, 2012) found that 85% belonged to at least one farmer organization, and the most common (53.5%) was sustainable/organic agriculture organizations, followed by general farming organizations (50.8%), compared to one third who belonged to commodity crop organizations. Women farmers who applied compost, crop rotation, manure integration, and organic practices were more likely to be members of sustainable/organic agriculture organizations. The study found that organizational membership provided critical networks to support the use of conservation practices. An evaluation in Iowa found that women who were part of the information-sharing network Women Land and Legacy, a collaborative initiative between USDA agencies and nonprofits, were more likely to implement conservation approaches when they learned about them and understood how the practices aligned with their long term goals for their families, communities, and land (Bregendahl & Hoffman, 2010). The findings of this evaluation concluded that networking with women farmers was an effective strategy for conservation groups and advocates to implement farm practices that steward natural resources for the long-term future.

### *Sustainable and Civic Agriculture*

Sustainable agriculture is a type of farming that serves social, environmental, and economic goals while defying industrial agriculture that prioritizes monoculture, globalization, and mechanization (Beus & Dunlap, 1999; Hassanein, 1999; Trauger 2004). It is labor-intensive and includes organic fruit and vegetable production, pastured poultry and livestock, and local

marketing. Sustainable agriculture promotes biodiversity and local food systems, and the reduction of fossil fuels and chemicals. A study of 20 women farmers in Pennsylvania found that productivist models of agriculture marginalize women as decision-makers, while sustainable agriculture models provide an empowering space that is compatible with women's gender identities (Trauger, 2004). Given the history of women's farming roles in their families, Trauger (2004) traces a logical progression into contemporary women-run farms practicing sustainable agriculture. The traditional female farm roles of producing food for their families through growing organic produce, raising pastured animal, and preparing preserved, canned, and baked goods situates women with the skills for operating sustainable agriculture farm models.

Another study among farmers in Pennsylvania (Trauger, 2010) explores women as practitioners of civic agriculture, finding that women use strategies to earn money as farmers by meeting social needs in the community. Civic agriculture is defined as “the process of building local markets through direct sales to consumers—markets which are designed to promote community social and economic development in ways that commodity agriculture cannot” (Lyson & Guptill 2004; Trauger, 2009). Civic agriculture includes models that directly connect producers and consumers like farmers markets, community-supported Agriculture (CSA), and pre-ordered bulk meat (Ross, 2006). The study found that women incorporate educational programs to add value to their farm products, make farm-based experiences a product, and foster place-based food systems.

### *Small Stable Business Models*

A study of women entrepreneurs in Quebec (Lee-Gosselin and Grise, 1990) found that women prefer to build small and stable businesses that enable them to balance work and family. Women are motivated to start their own businesses to create employment that provides them with flexibility for their economic and professional needs while also supporting them to meet the demands of their families. With access to limited resources and support, business ventures started by women tend to have slow and small beginnings. Accustomed to operating under these resource limitations, female entrepreneurs hold modest expectations about the future of the businesses. Because they are often managing the growth of their businesses with childcare responsibilities, their desire for balance in their lives shapes their expectations and desires for

their enterprises. Most female entrepreneurs shape their businesses around their values of flexible arrangements, direct professional and customer relationships, and staying “hands-on” in the work.

Trauger (2004) found that women farmers defined success in terms of providing services to their community, profit, and productivity. Census of Agriculture data from 2007 show that nearly 70% of women farmed on less than 140 acres and 80% reported sales under \$25,000 (USDA, 2007; Barbercheck, 2012), reinforcing the finding that women tend to operate farms at small scales. Using data from the Census of Ag in 2012, Fremstad and Paul (2020) found that women-run farms earn 40% less than male-run farms, and that women are disproportionately more likely to engage in sustainable agriculture practices that include direct-to-consumer sales, organic farming, or CSAs. They also found CSAs models to be the most financially equitable in that they display the lowest gender wage gap between male and female farmers.

The findings from these studies suggest that women in the United States operate farms and smaller scales for a variety of reasons and achieve some benefits that are not captured by indicators of profit or size. They suggest that women may choose to operate farms at smaller scales because they value local relationships with their community and families, that women’s choices of farm products and methods emerge from their gender histories and identities. The studies also suggest that women are receptive to learning in social networks and implementing conservation practices.

The aforementioned studies have been largely regional, focusing on women farming in the Northeast and Midwest. This study seeks to examine the practices of women farmers across the country to transcend region and identify trends. It also seeks to place women farmers in the United States in conversation with women farmers internationally through connecting with the work of the Food and Agriculture Organization of the United Nations (FAO). Over the past decade, the FAO has organized initiatives to facilitate a global transition to practice sustainable agriculture models through the lens of agroecology, which they define as the science of applying ecological concepts and principles to manage interactions between plants, animals, humans and the environment for food security and nutrition (FAO, 2021). The FAO posits that gender equity

is critical to agroecological transitions, and their experts have identified women as leaders of agroecological projects worldwide.

## Global Transitions to Agroecology

### *Agroecology*

Agroecology was first popularized as a scientific discipline to categorize the study of agricultural systems from an ecological and socio-economic perspective (Altieri, 1987). In the United States, the development of agroecology was largely a response to the presence of toxins from pesticides and a form of resistance to industrialization, globalization, homogenization, and corporate dominance. During the 1980's, agroecology was defined as “the application of ecological concepts and principles to the design and management of sustainable agroecosystems or the science of sustainable agriculture” (Altieri, 1987; Gliessman, 1990). Scholars of agroecology aimed to persuade farmers to transition from natural resource-intensive methods that relied upon chemical applications and synthetic fertilizers to use organic methods and biodiverse systems instead. During the 1990s, agroecology expanded to include social justice by addressing the roles and relationships between people in the food system (Francis et. al., 2003). The political economy was then incorporated into the discipline in recognition of its role in reinforcing, obstructing, or facilitating particular agricultural practices (Gliessman, 2007). The most recent definition of agroecology is the “integration of research, education, action and change that brings sustainability to all parts of the food system: ecological, economic, and social. It is transdisciplinary in that it values all forms of knowledge and experience in food system change. It is participatory in that it requires the involvement of stakeholders in the food system. It is action-oriented in order to confront power structures that uphold the current food system in order to implement new policies and structures. It is grounded in ecological thinking where a holistic, systems-level understanding of food system sustainability is required” (Gliessman, 2018).

### *Agroecology and the FAO*

In 2015, the member states of the United Nations adopted the sustainable development goals (SDGs) and recognized that environmental issues of equity, food security, employment,

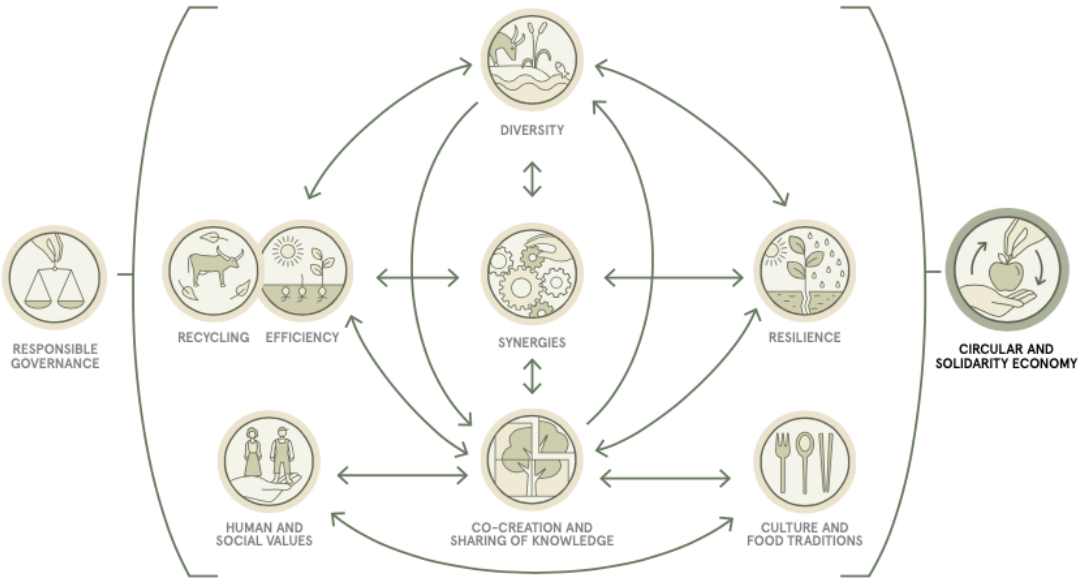
and development were intertwined, and addressing them would require comprehensive societal change (Barrios et al., 2020). Solutions to these complex problems would need to rethink entire systems rather than continuing to invest in the growth of current systems that are unsustainable. The FAO developed the Common Vision for Sustainable Food and Agriculture (FAO, 2014) that consisted of five general principles: improving efficiency in the use of resources; conserving, protecting, and enhancing natural ecosystems; protecting and improving rural livelihoods, equity and social well-being; enhancing resilience of people, communities and ecosystems; and promoting good governance of both natural and human systems. The First FAO International Symposium on Agroecology for Food Security and Nutrition in 2014 inspired the development of the Agroecology Knowledge Hub to collect information, enhance global awareness, and guide transitions around agroecology (FAO, 2015). The symposium also resulted in the development of the 10 Elements of Agroecology (Table 1) as a framework to operationalize the goals laid out in the Common Vision for Sustainable Food and Agriculture. These elements are interconnected and interdependent, as is illustrated in Figure 2.

*Table 1: The FAO's 10 Elements of Agroecology (FAO, 2019)*

<b>Diversity</b>	The integration of a variety of crops, animals, shrubs, trees, and services as part of the production system for health and resilience
<b>Co-creation and sharing of knowledge</b>	Participatory processes emerging from locality-specific resources, equitably blending scientific, traditional, indigenous, and practical knowledge
<b>Synergies</b>	The combination of biodiverse livestock-cropping systems to take advantage of their nutrients and ecological functioning for circular, efficient use of natural resources that would otherwise become waste
<b>Efficiency</b>	The ability to produce more output with less input through strategic resource utilization and management
<b>Recycling</b>	The cycling of would-be waste products through principles of natural ecosystems so that they provide sustainable nutrient sources to the production system, such as using animal waste as fertilizer or capturing waste-water for irrigation

<b>Human and Social Values</b>	Emphasizes dignity, equity, inclusion, and justice for producers and consumers as critically important to a sustainable food system
<b>Resilience</b>	The ability of the system to withstand and recover from shocks such as extreme weather events, disease outbreaks, or shifts in consumer demand
<b>Culture and Food Tradition</b>	How the culinary identity is situated in the history and geography of a region, supporting health and nutrition as well as community cohesion.
<b>Responsible Governance</b>	Captures transparent government mechanisms to encourage, support, and maintain a food system based on agroecological principles
<b>Circular and Solidarity Economy</b>	Connects producers and consumers through local markets with fair wages and prices to prioritize local economic development and local community needs

Figure 2: Interactions of the 10 Elements of Agroecology (FAO 2018)





### *The FAO's Tool for Agroecology Performance Evaluation*

The FAO generated a Tool for Agroecology Performance Evaluation (TAPE) to evaluate different nations' progress towards an agroecological model (FAO, 2019). To measure the performance of nations along the ten elements, a team of international experts identified five key dimensions relevant to sustainable food and agriculture: 1) Environment and Climate Change, 2) Health and Nutrition, 3) Society and Culture, 4) Economy, 5) Governance. These five dimensions were aligned with 60 indicators that could be used to measure performance and operationalized into survey items as part of the TAPE.

### *Women in the United States and the FAO's 10 Elements of Agroecology*

Agroecology views women as critical leaders for natural resource conservation, food security, and community organizing worldwide (van Walsum, 2015). Globally, women are nearly half of the farming workforce and they are often the nutritional leaders in their families. They determine the food that is consumed and how it is prepared. Due to social, political, and economic inequities, their contributions to their communities often go unrecognized and uncompensated (FAO, 2019). Research shows that men prioritize higher yields, income, and global market share, while women prioritize stability, feeding nutritious food to their communities, caring for their families, and stewarding biodiversity (van Walsum, 2015). Literature from Latin America (Schwendler & Thompson, 2017; Briggs, et. al. 2019), Asia (Milgroom, 2015) and Africa (Caretta, 2015; Milgroom, 2015) examine the role of women farmers in the context of agroecology and illustrate their unique contributions to the food systems in their communities. Nations labeled as developing often receive focus as sites of gender inequity in which the empowerment of women would lead to better social and economic outcomes. The United States, too, is a site of gender inequity as evidenced by indicators such as inequitable political representation and disparities in wealth and income, and the United States is also a society in which the traditional gender role of women has included food preparation for their families and communities. A gap in the literature exists around understanding the unique contributions of women farmers in the United States and how those relate to global issues of gender and sustainable agriculture. This study seeks to answer the following questions: what are

the practices and approaches of women farmers in the United States, and how do those practices and approaches align with the FAO’s elements of agroecology?

**Methods:**

Overview

A mixed-methods case study approach was conducted with women farmers in the United States. Quantitative and qualitative data were collected using a web-based survey and semi-structured interviews. Data from the web-based survey were used to identify trends across a larger number of women nation-wide, while data from the semi-structured interviews were used to gain an in-depth understanding of the experience of a small sub-set of farmers.

Tools

The interview guide in Table 2 was developed using the five key dimensions, the indicators from the TAPE survey items, and their alignment with the 10 elements of agroecology to produce 15 open-ended questions. The final interview guide is included in Appendix A. The web-based survey was developed by adapting the TAPE (FAO 2019) and the interview guide. The TAPE items were adjusted for relevance to farmers in the United States and formatting was adjusted for compatibility with Qualtrics™ survey design software. The open-ended interview questions were adapted for both closed and open-ended survey questions to capture parallel data. The survey utilized a combination of closed-ended multiple choice and open-ended free form text items, as well as five-point Likert scale-style questions to capture responses. The five-point Likert scale questions asked participants to evaluate their degree of identification with different agroecological practices on a scale of 0 = not at all to 5 = strongly identify. The final survey is included in Appendix B.

*Table 2: Interview guide development using the five key dimensions and 10 elements of agroecology*

Dimension	Element	Question
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Economy	Diversity Synergy Resilience Circular & Solidarity Economy	<u>Products:</u> What crops, livestock, or other products do you produce? Why did you choose that/those product(s)? <u>Land Access:</u> How did you secure your land, and what are the terms of the agreement (lease, purchase, inherit)? <u>Income:</u> What are your income streams for sustaining yourself? Do you foresee this changing over time, and if so, how? <u>Consumer Relationships:</u> How do you market your products? <u>Success:</u> How do you measure success for yourself as a farmer?
Health & Nutrition	Culture and food tradition	<u>Food Culture:</u> Are you aware of a traditional or regional food culture in your community? Does your farm produce those foods or the raw material to make these foods?
Society & Culture	Human & social values Co-creation & Sharing of Knowledge Circular & Solidarity Economy	<u>Information:</u> Where do you get your knowledge and training from? Do you teach/ train others? <u>Farmer Networks:</u> How would you describe your relationship with other farmers? <u>Youth and older people:</u> Are there opportunities for young people on your farm or in your farming community? If so, what are they? Are there opportunities for older people who have experience or would want to learn? If so, what are they?
Environment	Synergy Efficiency Recycling	<u>Resource Management:</u> How would you describe your approaches to soil and water resource management? <u>Inputs:</u> How do you obtain your inputs? (seeds, breeds, fertilizers) <u>Waste Management:</u> What waste does your farm produce and how is it managed?
Governance	Responsible Governance Resilience	<u>Government:</u> Which government programs are you familiar with, and which do you use? <u>Barriers:</u> What is the biggest obstacle you face as a farmer?

		Solutions: What changes or innovations would support your success as a farmer? (example: access to policy, finance, consumer preferences, market facilitation, labor)
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### Participant Selection

All professional farming networks in Table 3 were contacted to assist in identifying participants for surveys through their social media or listserv distribution outlets. Due to the snowball nature of the outreach, the total number of women farmers who received the invitation to participate is unclear and so a percentage response rate cannot be estimated. The women selected to participate in the web-based survey indicated that they identified as women, farmed in the United States, had at least five years of farming experience, and at least two years as a primary farm decision-maker. For participation in the semi-structured interviews, women were identified through convenience sampling, snowball sampling, and outreach through social media and farming networks. The women who were selected for semi-structured interviews indicated that they identified as women and were engaged in farming in the United States for at least two years. The criteria for selection in the interview enabled the inclusion of a broader scope of women engaged in farming that went beyond traditional definitions and thus revealed more nuance in possible emerging trends. Seventy-five women participated in the web-based survey and 13 women participated in the semi-structured interviews. The women selected to participate are not a representative sample of all women farmers in the United States, and thus this research is exploratory rather than explanatory.

*Table 3: Outreach to Farmer Networks*

Organization	Location
ALBA Organics	California
Carolina Farm Stewardship Association	North and South Carolina
Center for Agroecology and Sustainable Food Systems	California
Duke Campus Farm	North Carolina
Food Politics	New York

Georgia Organics	Georgia
MOSES In Her Boots program	Wisconsin
North Carolina State University's Growing Small Farms	North Carolina
New World Agriculture and Ecology Group at the University of Michigan	Michigan
Transplanting Traditions	North Carolina
Tufts COMFOOD	Massachusetts
Women in Agriculture at University of Maryland	Maryland
Women in Food and Agriculture Network	Iowa
Women's Agricultural Network of Vermont	Vermont

### Data Collection and Analysis

The web-based surveys were distributed from November 2020 to January 2021 through Qualtrics™. They took participants approximately 20 minutes to complete. Survey data was analyzed through Qualtrics™ bar charts, statistics, and cross-tab queries. Open-ended survey data was analyzed in NVivo™ for word frequency. The final quantitative survey data was analyzed in R™ software for data visualization using frequency and mapping the distribution of respondents. Boxplots were used to show median and quartile distribution of the data. For each subset of data related to a particular dimension, Spearman rank correlation coefficients ( $\rho$ ) were computed on Likert scale ranking.

The semi-structured interviews were conducted from October 2020 to December 2020 and took between 45 minutes to an hour to complete. Interviews were recorded using the app Call Recorder™ and transcribed using OtterAi™ speech-to-text transcription service. The researcher reviewed the transcripts and the recordings to edit for accuracy and uploaded the final transcripts to NVivo™ qualitative research software for coding and analysis. Coding was done over three phases: the first was by key dimension, the second by agroecology element, and the third for emergent themes. Data were analyzed through word frequency and matrix queries.

### **Results**

Results are organized to provide an overview of the demographics of respondents, and then results along each of the five key dimensions Findings from the survey data and interviews were integrated.

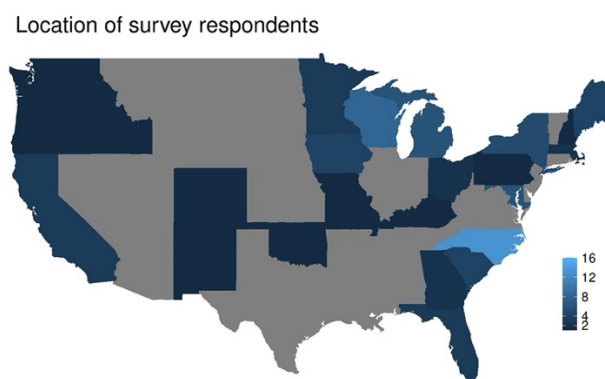
### Demographics

All participants were asked background and demographic questions. The background questions asked about them to describe their farm and their motivations for becoming farmers. The demographic questions asked about their years of experience in farming, their farm size, their farm community, their educational background, their racial and ethnic background, the history of farming within their family, their age, and their location.

#### *Web-Based Survey Respondents*

Seventy-five women participated in the web-based survey. Survey participants were distributed across the United States as shown in Figure 3, with the most participants (17%) from North Carolina.

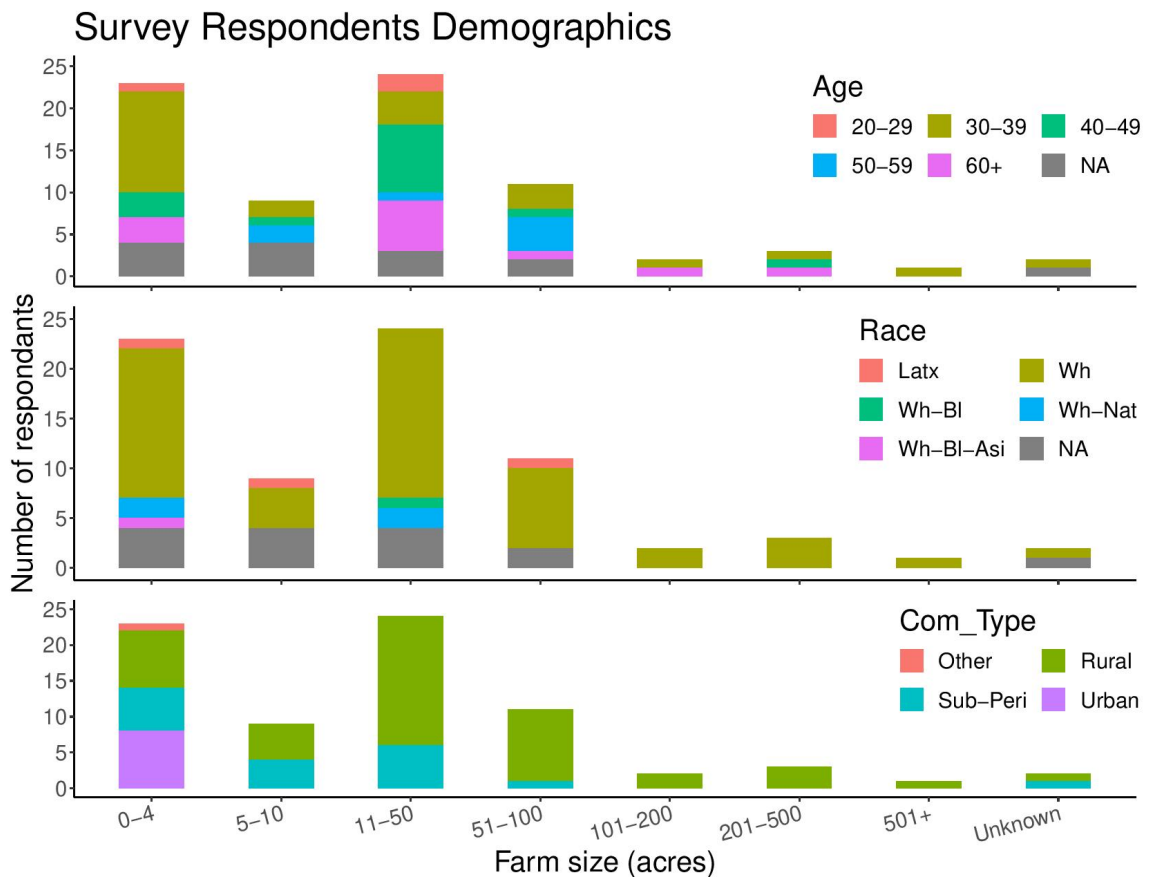
*Figure 3: Map of Survey Respondents*



Distributions across age, race, and community type by farm size are shown in Figure 4. The largest category of survey respondents was 30-39 years old (33%). Most respondents

identified as white (68%). Most respondents were farming in rural communities (64%), followed by 27% in suburban, peri-urban, or small town settings, and then 9% in urban communities. Over half of the respondents farmed on less than 50 acres of land. When asked about their relationship to their land, 29% purchased their land and identify as the sole owner, 20% co-own their land, 17% rent or lease their land, 9% inherited their land, with the remainder having declined to respond. Thus, the majority of respondents (58%) own their farmland.

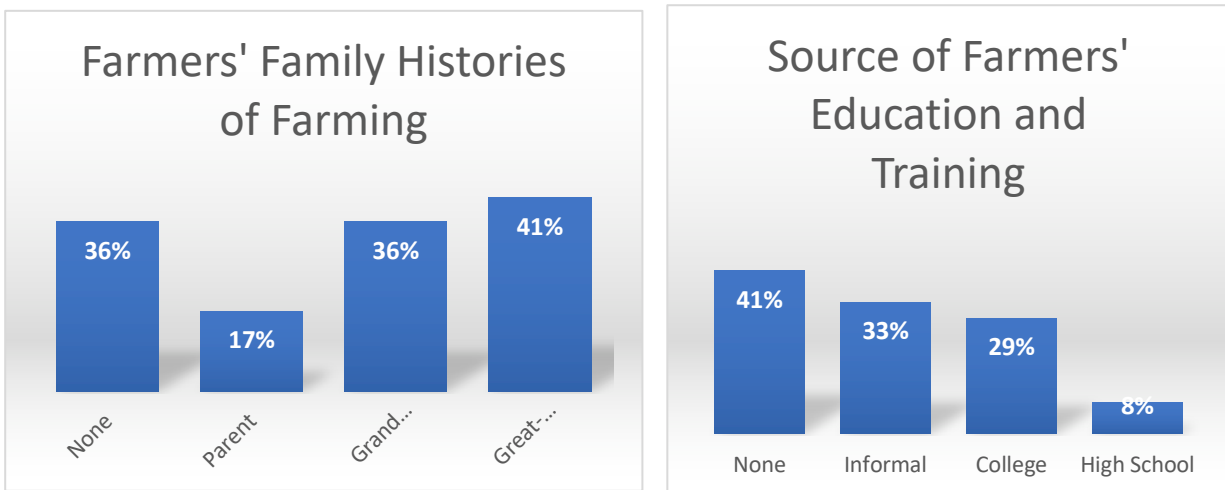
Figure 4: Distributions of Age, Race, and Community Type by Farm Size of Survey Respondents



Farmers were asked about the history of farming in their families and about where they received their farming knowledge and training. Respondents could select multiple responses, and their responses are shown in Figure 5. Thirty-six percent indicated that they had no knowledge of farming within their families, 17% indicated that they had a parent who was a farmer, 36% indicated that they had a grandparent who was a farmer, and 41% had a great grandparent who was a farmer. Thus, the same number of farmers in this study entered the farming profession

with no history of farming in their families as those whose grandparents had been farmers. When asked about their farming education, 41% reported having no formal education in farming and identified as self-taught or indicated that they learned farming by growing up on a farm. One third of respondents (33%) learned farming informally through apprenticeships and internships, 29% studied farming in college or technical school, and 8% learned how to farm in high school. Just over half of respondents (53%) indicated that they farm with a male partner or spouse. Most respondents indicated that they were familiar with agroecology (61%) by rating their expertise in agroecology at either a 3 or a 4 on a 5-point scale, and another 5% identified themselves as experts with a score of 5.

*Figure 5: Farmers' Family Histories and Education Sources*



### *Semi-Structured Interview Participants*

Thirteen women participated in the interviews from the states indicated in the map in Figure 5. Five women were farming in rural communities, five were sub or peri-urban communities, and three were in urban communities. Three women were between 20-29 years old, four women were between 30-39 years old, one woman was between 40-49, three women were between 50-59 years old, and two women were 60 or older. A description of the farm models of each interview participant is provided in Table 4.



Figure 6: Map of Interview Participants



Table 4: Descriptions of 13 interview respondents.

Descriptions of 13 Interview Respondents. All names are pseudonyms.
Beth: Flower farmer in a rural community
Wendy: Farm educator at an alternative school in a rural community
JaNay and Trina: Entrepreneurs growing and selling seedlings and teaching education programs in an urban community + working fulltime in growing-related jobs
Trudi: Executive director of a nonprofit farming network + a part-time vegetable farmer
Paola: Farmer selling to schools through a food hub + graduate science researcher
Katie: CSA Farmer using organic methods to grow eggs, meat, and vegetables
Ellen: CSA Farmer raising heritage pork, poultry, and eggs
Denise: Farmer growing rare and endangered potato varieties
Kristen: Member of an organic farm collective community growing tomatoes
Anja: CSA Farmer growing organic vegetables on a farming collective
Betty: CSA and market farmer growing vegetables
Aliyah: Executive director of an urban farm offering community education programs

Key Dimension 1: Economy

The farmers were asked questions about how they measure and define success. They were also asked to describe their products, business models, sources of income, and assessments of their financial security.

### *Farmer Motivations and Success*

Survey respondents were asked about their motivation for pursuing a career in farming in a closed-ended question in which they could select more than one response. The leading response choice was “to grow healthy food for my family and/or community” (84%) followed by “work outside” (n=71%). All participants were asked to describe how they define and measure success in an open-ended question. The chart in Table 6 indicates a ranked list of the 19 words that were most frequently used in their responses. The top two words were community and people, indicating social metrics for defining success. Making a living, having their own business and enough money indicate economic metrics. Health, land, and soil indicate environmental metrics.

Table 5: Word Frequency Analysis of How Survey Respondents Define and Measure of Success

Word	Count
community	27
people	26
food	23
work	23
good	18
time	15
feel	12
happy	12
living	12
money	12
healthy	11
business	10
enough	10
life	10
family	9
health	9
income	9
land	9
soil	9

Social metrics are important drivers for the women in this study. They value their relationships with their communities and the members of their households. The interviews supported this finding.

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*“[Success is] Feeding ourselves and sharing what we have and our knowledge with the greater community.”*

*(Betty)*

---

Some women embedded and ranked social, economic, and environmental indicators, as evidenced in the two interview responses below.

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*“Financially, I would say I'm not very successful. I'm very happy, I feel like I'm rich. Because I have a farm to roam on, a happy family and friends. We own our land. And we're healthy. And we have kids that are doing really well.”* (Anya)

*“We're not wealthy, we're not looking at being the most profitable. We're looking at using the best ecological processes. And to take care of people. So yes, the farmers have to make a living. But we also want to make sure that high quality organic food is given to people who might not have the ability to pay for it, or the access for it.”* (Kristen)

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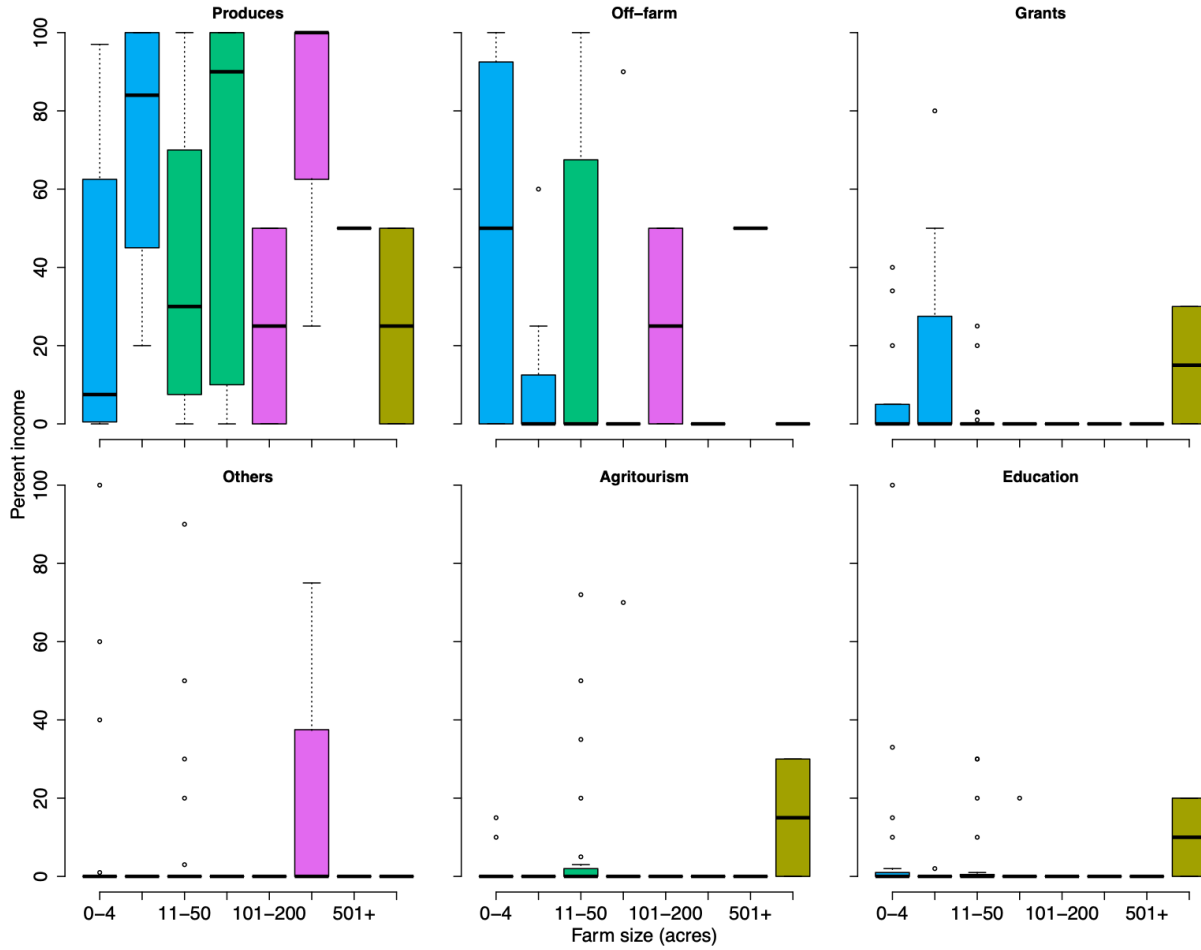
The survey and interview responses suggest that participants measure success for their farms by balancing indicators that align with the three pillars of sustainability: social, economy, and environment.

### *Income Sources and Sales Models*

Farmers were asked to indicate the sources of their income and the percentage of their total income provided by each source. Respondents indicated that their income came from several different sources. Seventy six percent of respondents derive income from product sales, 37% receive income from off-farm employment, 20% source income from grants, 19% derive income through education programs, 16% derive income from hospitality. Two farmers indicated that rental property provided them with income, and two farmers indicated retirement income. Additional responses indicated income from on-farm research and speaking engagements. The data suggest that most farms use product sales as sources of income and that farmers supplement this income from additional sources that include off-farm employment, grants, education and training, property rental, and research.

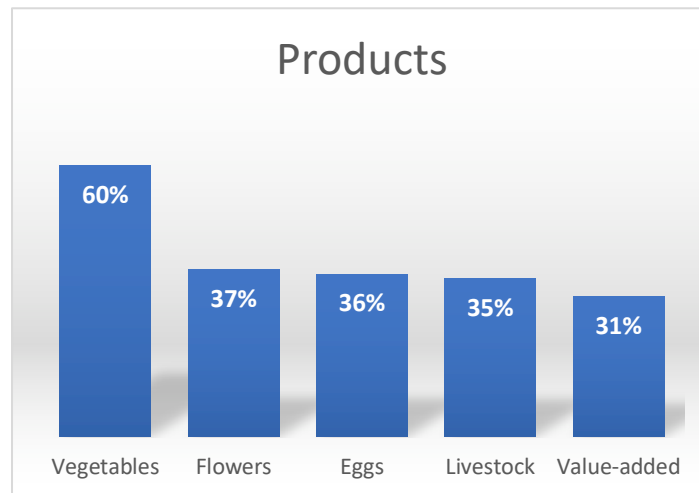
The results of income source by farm size can be seen in Figure 6. The smallest farms at 0-4 acres relied more than other size groups on off-farm employment and grants in addition to product sales for their income. Farms with 11-50 acres had the most indications of agritourism and education in addition to product sales and off-farm employment. Farms with 51-100 acres relied most heavily on product sales. This suggests a relationship between farm size, off-farm employment, and product sales for farms from 0-100 acres.

Figure 7: Percentage of Income from Different Sources by Farm Size



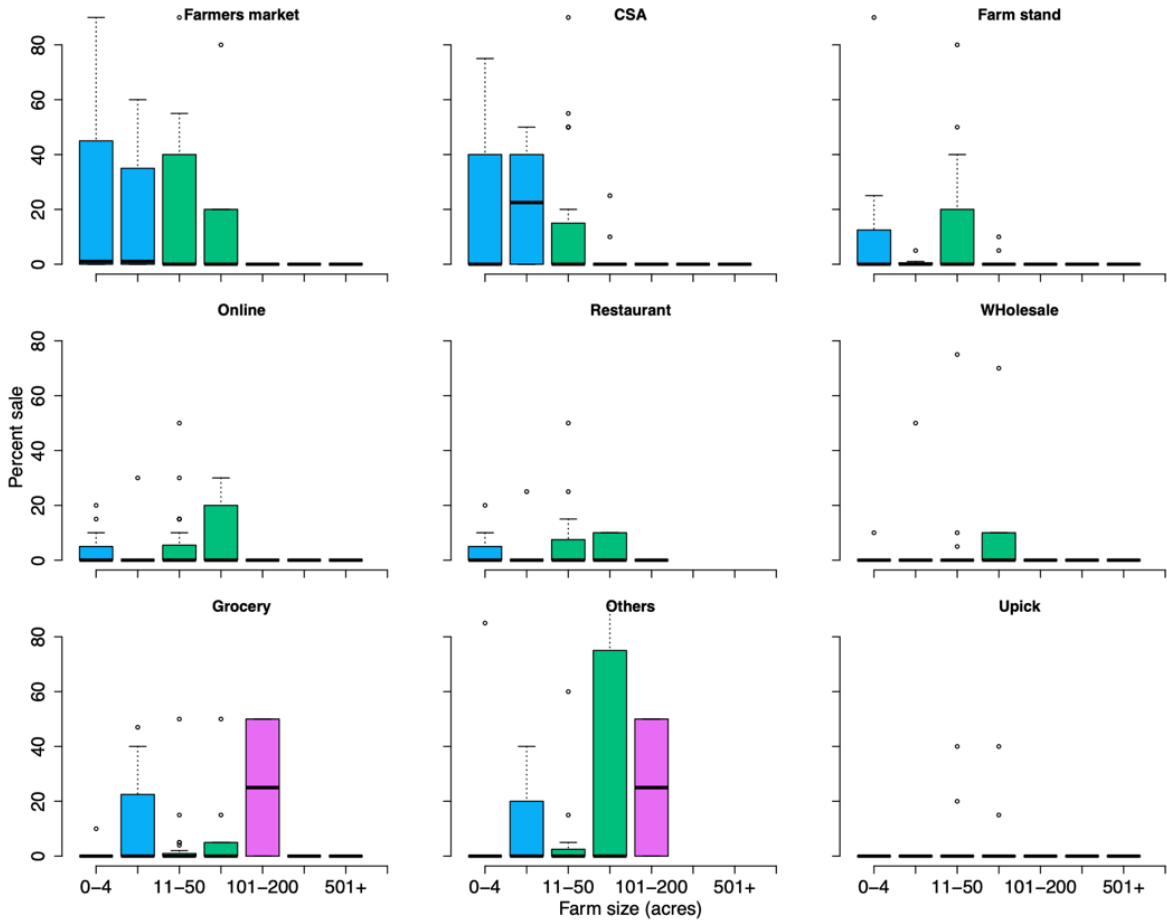
Farmers were asked about the type of products that they offer and could select more than one response (Figure 8). Sixty percent of survey respondents grow vegetables, and about 36% indicated growing flowers, producing eggs, raising livestock, or producing value-added items. Value-added items are products made from enhancing raw agricultural products; examples include jams, pickles, baked goods, and cheese.

Figure 8: Prevalence of Farm Product



Farmers were also asked to indicate the models that they use to sell their products, and the percentage at which they utilize different models. The distribution of sales model by farm size can be seen in Figure 9. The participants in this study used mostly direct sales methods within their local communities through farmers markets (40%), CSAs (32%), farm stands (28%), restaurant contracts (28%), and online farm sales (21%). Additional responses included private sales, community word of mouth, festivals, emergency food programs, food hubs, basket and box distributions, wedding contracts, and grain processors. The smallest farms at 0-10 acres mostly used CSAs and Farmers Markets; 11-50 acre farms use farmers markets, CSAs, and farm stands; 50-100 acre farms use online sales, farmers markets, and direct sales from their farm shops; 101-200 acre farms sell to grocery stores or other centralized purchasers. Thus, the data suggest that 100 acre farms or smaller rely heavily upon local direct-to-consumer models such as CSAs, farmers markets, farm stands, and online sales, while farms that are larger than 100 acres rely more on grocery stores or other centralized purchasers, distributors, or processors.

Figure 9: Distribution of Reliance upon Sales Model by Farm Size



### Inclusive Economic Practices

The interviews revealed four inclusive economic practices to accommodate customers who are unable to afford food at market prices: sliding scales, work-shares, donations, and accepting government nutrition benefits. Sixty-nine percent of interviewees indicated that they valued incorporating one or more of those practices in their business models. Denise describes her success in using sliding-scale pricing:

---

*“I say [to customers] that a quart is normally \$4, but it can be anywhere from \$2 to \$6 - you pay what you can afford. I've had a couple people pay me \$3.50 or \$4, but the majority of my customers either give me what I'm asking or they give me more. And that allows me to lower my prices for somebody who might need it. But it's actually helping me either break even on those individual sales or earn more than I expected.” (Denise)*

---

Three farmers indicated using a workshare CSA model in which they exchange food for labor. Anya uses workshares to bring local college students to her farm, offering them food in exchange for labor. Betty says that she offers \$30 worth of vegetables in exchange for two hours per week of labor. This option allows people who cannot afford a typical CSA membership to receive fresh produce and provides the farmer with much-needed labor. Betty noticed that older rural residents showed interest in this option.

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*“A year ago, we did a pilot program for this. We call it a workshare CSA, where people come and the response was overwhelming. And this was before COVID - and we actually had to turn people away!” (Betty)*

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Another three farmers had community donation built into their business model. Beth, a flower farmer in a rural community, described her satisfaction from donating flowers to local community events.

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*“A huge thing for me that I get a very big personal benefit from is that are a lot of organizations that ask for donations and that feels really, really good to be able to provide. All the schools or for teachers' events ask to donate to them, or hospice care, the ASPCA. Just to be able to have something to give back to the community is priceless.” (Beth)*

---



On her farm collective outside an urban community in California, Kristen described “tithing” as part of their model. They allocate produce for weekly donation to local organizations and food banks. They also run a U-pick operation in which customers agree to give away 20% of the produce they pick for donation. Aliyah runs a nonprofit urban farm and incorporates food donation by allocating community beds.

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*“We have allocated 10% of the food that we grow to be donated to the community. We have designated beds that we are going to be having signage around where community members will be able to come in and pick their own produce, their own fruits and vegetables, as well as the other things that we will be harvesting that will go to the farmers markets around the city.”*

*(Aliyah)*

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## Key Dimension 2: Environment

Questions in the key dimension of environment relate to agricultural biodiversity, soil health, water, and climate change mitigation. Respondents were asked to evaluate the levels of crop diversity on their farms and how much they would identify their practices as conventional, organic, regenerative, or sustainable. Respondents were also asked to rate their management practices.

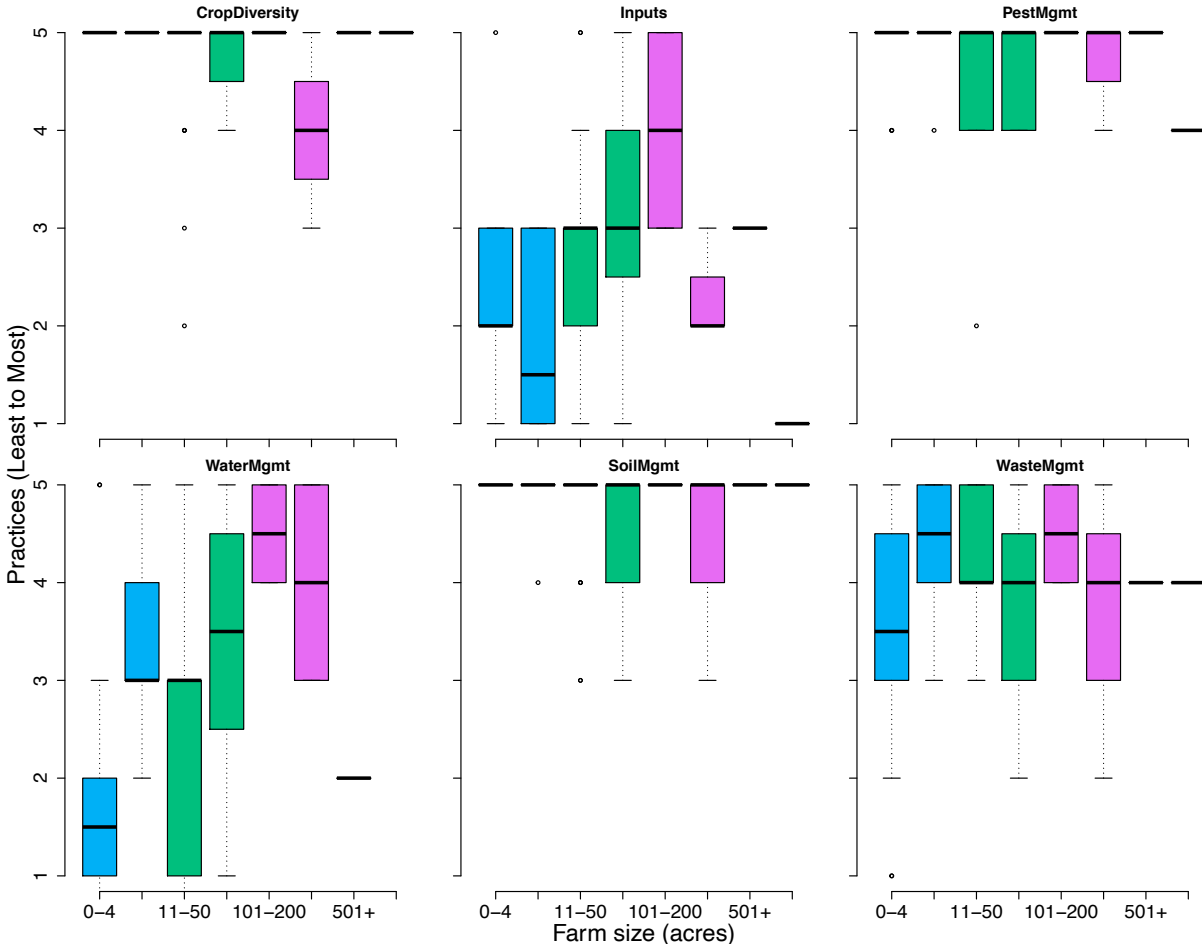
### *Labeling their Practices*

The survey presented a series of Likert-scale items to evaluate how they would identify their environmental practices on a scale of 0 to 5. The majority of respondents do not identify as conventional with a mean score of 0.7. They most strongly identify as organic with a mean score of 4.4, followed by sustainable with a mean score of 4.1 and regenerative with a mean score of 4.0. The respondents overwhelmingly evaluate themselves as having crop diversity with a mean score of 4.6.

### *Evaluating their Management*

Survey respondents were also asked to evaluate their management practices on a scale in 0 to 5 in which 0 signified the most conventional option (reliant upon external inputs, chemical applications, or synthetic products) and 5 signified the most agroecological option (reliant upon organic, diversified, integrated closed-loop methods). The distribution of their responses is shown in Figure 10. Respondents scored themselves highest for their soil management practices (mean = 4.8) and pest management practices (mean = 4.6), and lowest for water management (mean = 2.5) and input procurement (mean = 2.6). Waste management was in the middle with a mean score of 3.8.

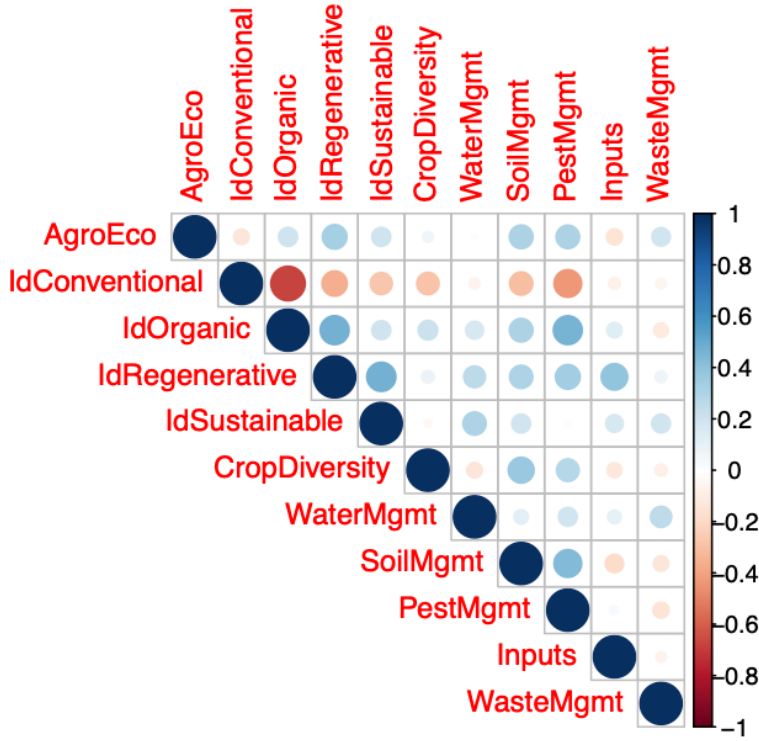
Figure 10: Agroecological Management Evaluation by Farm Size



Management practices were analyzed for correlations and can be seen in the correlation matrix in Figure 8. Strong correlations were found between those who identified with organic

and regenerative farming ( $\rho=0.472$ ), regenerative and sustainable farming ( $\rho=0.477$ ), as well as those who identified as organic and practiced agroecological pest management ( $\rho=0.469$ ). A strong correlation exists between soil management and pest management scores ( $\rho=0.433$ ). Those who identify as regenerative correlate with practicing agroecological input procurement.

Figure 11: Correlation Matrix of Environmental Management Identification and Practice



Soil Building

Sixty-nine percent of interviewees referred to agroecological soil management by mentioning five methods: cover cropping, crop rotation, applying compost, animal manure integration, humanure integration. For two farmers, “healing” or “rebuilding” soil is an explicit objective of their farms.

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*“Healing the land is the main goal of [my farm]. I want to find a space, heal it, design the system, and make sure that it is up and running and then find*

*another space and do the same thing somewhere else and heal another piece of land.” (Paola)*

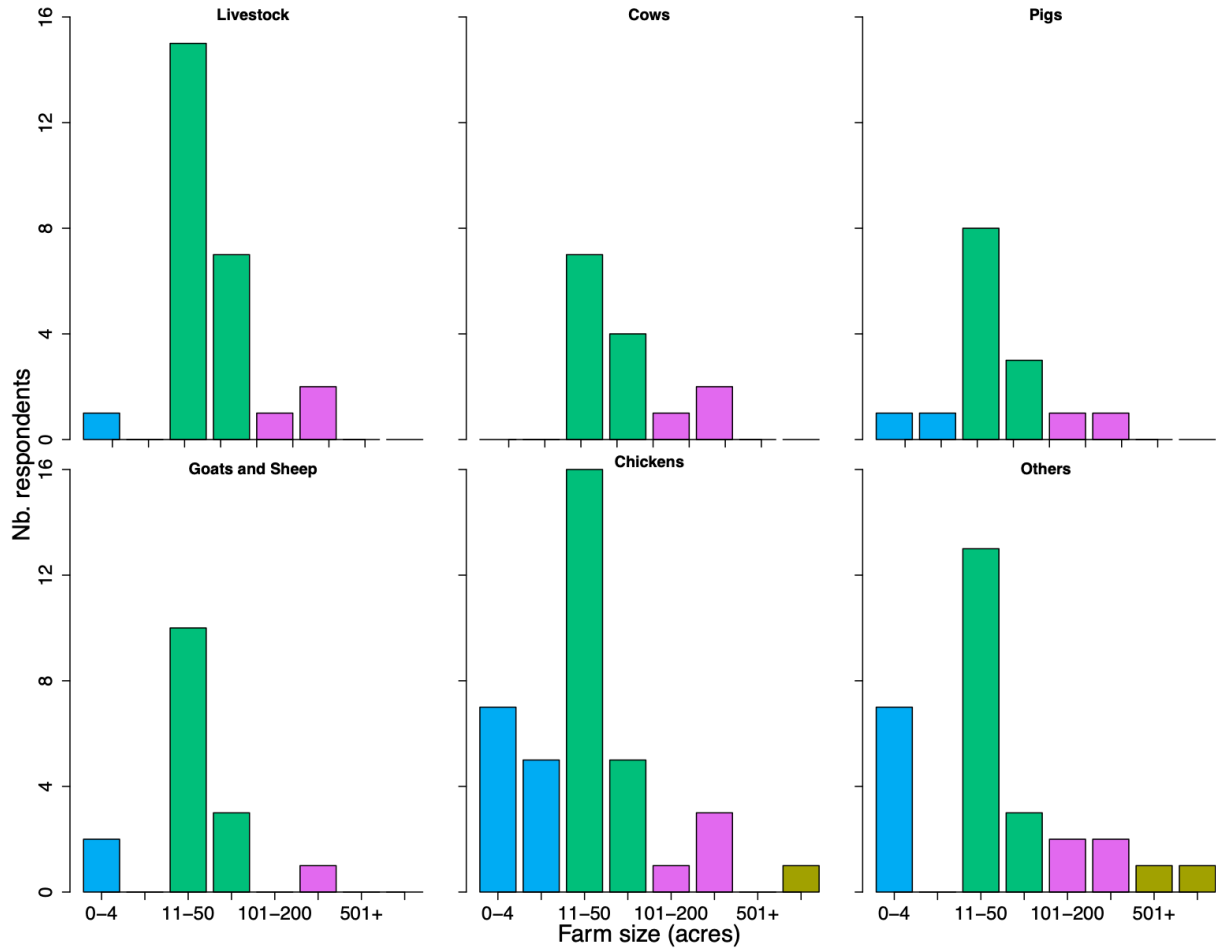
*“For 26 years, I watched my parents' primary goal be soil building. I'm trying to get the organic levels in the soil back up. We're trying to be no-till and we are almost there. It takes a long time. I've learned that, in order to have something healthy like no-till, you often need a healthier environment to start with. You can build those healthy environments, but this is all an investment in the future. This is why people get frustrated with organic because for the first couple years, it might work, but it's gonna take 10 or 20 years before you're seeing the radical beautiful, amazing results that you see on the books. This is all an investment in the future.”(Denise)*

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### *Animal Integration*

The survey data suggest a relationship between farm size and the presence of animals as is shown in Figure 12. Farms between 11-100 acres had the greatest presence of livestock such as cows, pigs, goats, sheep, and chickens.

Figure 12: Farm Size and Livestock



Interviewees described the critical role that animals played in their production processes. For some interviewees, meat production was part of their farm model. In addition to producing meat products for sale, they reaped the benefits of animal integration. Rotating the animals through the crops was a critical element in these farmers' soil management. The animal grazing and movement aerated the soil and managed weeds, and their manure added fertilizer to the soil.

---

*“My whole approach is letting animal power run my farm, utilizing the lands effectively with those animals, and then producing something that is so holistic to the whole picture that a little bit goes a long way. The flavor [of my meat products] is unsurpassed, and the quality of what you can make starting with*

*something that's already that good makes you pause and makes you slow down.” (Ellen)*

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Aliyah educates others about how to raise farm animals in their urban community.

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*“We have a flock of chickens, and three goats right now on site. And we use them for primarily educational purposes to let people know that you can keep animals in the city, and these are the rules, and this is what you need to know in order to do that safely and legally.” (Aliyah)*

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Trudi is a young farmer who aspires to start her own livestock farm. She explains her reasons below.

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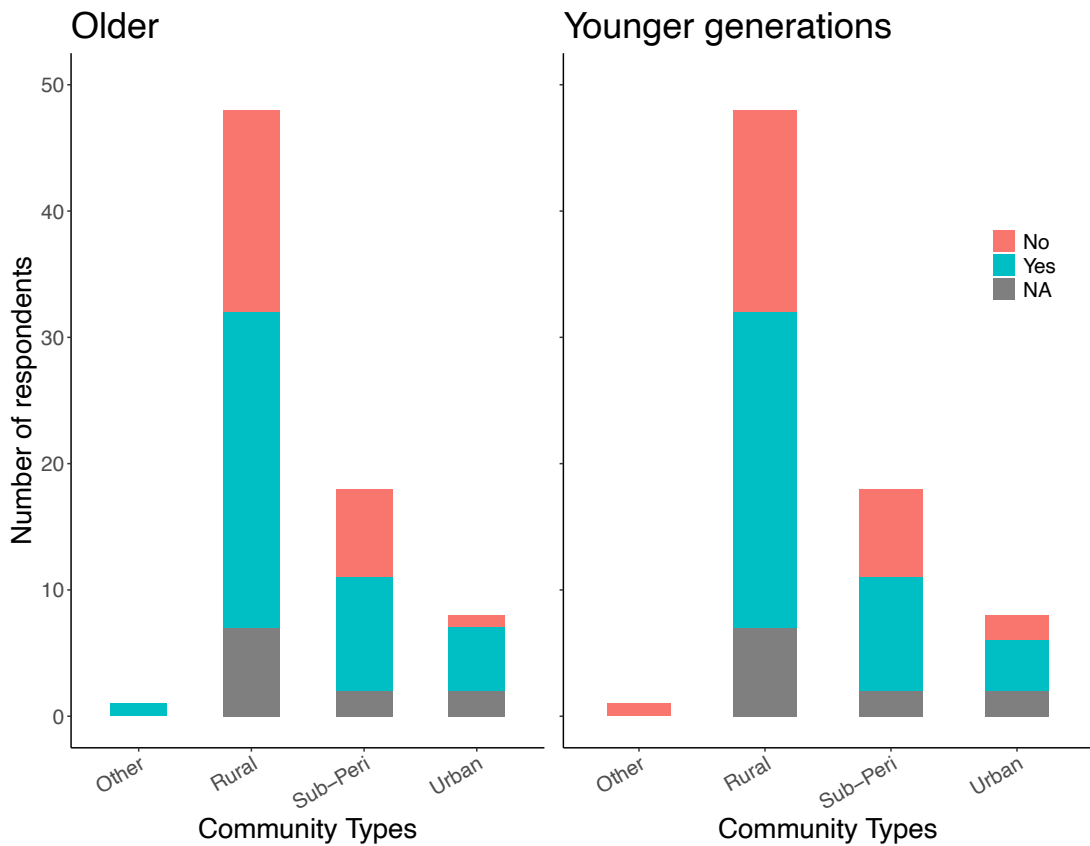
*“I want to do animal agriculture, a) because I like it and b) because I think it's really regenerative and I'd be part of sequestering a lot of carbon back into the soil, and c) because there's more money in it.” (Trudi)*

---

### Key Dimension 3: Society and Culture

Questions in the key dimension of Society and Culture relate to social relationships through the inclusion of young people and older people on the farm, and relationships with other farmers. Of the farmers who completed the survey, 51% offer opportunities for young people to participate on their farm and 53% have opportunities for older people. Figure 13 shows the distribution of opportunities for older and younger people on farms by community type. Urban farms are particularly likely incorporate opportunities for older and younger people.

Figure 13: Opportunities for Older and Younger People on Farms by Community Type



Survey respondents were asked to evaluate their relationships with other farmers using 5-point Likert scale in which 0 signified highly competitive and 5 signified highly collaborative. The mean score was 4.2, indicating that these farmers tended to view their relationships with other farmers as collaborative or highly collaborative. Eighty four percent of farmers indicated that they teach, train, and share their knowledge with others.

In the interviews, 85% of interviewees indicated valuing knowledge-sharing either through intergenerational participation and/or by teaching food preparation and agriculture skills as part of their business model. Fifty-four percent mentioned incorporating intergenerational participation and 38% of respondents indicated offering programs teaching food preparation and agriculture skills. The urban farms indicated a focus on both. Three strategies were referenced by interviewees for intergenerational participation: K-12 school partnerships, university

partnerships, and work-share CSAs. Two strategies for knowledge-sharing were offering workshops and organizing community-building events.

### *Intergenerational Participation*

Anya's farm partners with a local school to provide students with the opportunity to come help and play on the farm each week, and with the local university's environmentally-themed community house. University students also work on the farm, and students can use their meal plan money towards purchasing a CSA share.

At Aliyah's urban farm, she values inclusion of both youth and elderly in her community programs.

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*“A lot of our neighborhood is made up of elderly people who purchased their homes in the 40s or 50s and are still here. We're going to be building raised beds so that the elderly won't have to bend down and if they want garden beds in their house, we're going to have programs where we'll build them for them. Most of our community association meetings are people in that age range. We go to them every month, and we talk about our project, and people are excited. They remember when their parents had a garden, and there's a lot of knowledge. That intergenerational aspect is something that we definitely want to get into and have on site and cultivate a culture of intergenerational sharing.” (Aliyah)*

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### *Knowledge-Sharing Barriers and Opportunities*

Barriers obtaining knowledge related to race, ethnicity, and gender emerged in the interviews, as well as how to turn those barriers into business opportunities. JaNay and Trina talked about their experience as Black gardeners visiting white-owned plant nurseries and feeling



unwelcome and discouraged from asking questions. These experiences motivated them to open their own plant nursery so that they could create an environment that better met the needs of their community.

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*“[Black] people are a lot more relaxed when they're around us and asking us a lot more questions not just from us having a nursery but being interested in gardening for so long. We went to local nurseries, and just the way the way we get treated as customers at some places and the knowledge that we don't gain - if we didn't have it or know it, we would just have to look it up.” (JaNay)*

---

Trudi identified a gap in representation and networking spaces for her ethnic group within the farming community, so she created a nonprofit to bring farmers together who shared this identity.

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*“I would meet people who were [in my ethnic group] and farming and they had no concept that the work that they were doing was actually really connected to their heritage and their ancestors. We saw this whole lack of a community as an opportunity and we decided to fill the hole. The more we dig into this work, and the more visible we become, the more we hear from people that like, "Wow, I've been looking for something like this for so long." (Trudi)*

---

Denise mentioned struggling with sexism in her rural community due to assumptions about her authority as a farmer.

---

*“When I purchased my house, there were men on this road who did not believe that I owned the house. They were not convinced that a young female could have purchased a property on her own or was going to live by herself in that house. I can't walk into the feed store and feel like people are listening to me. It's been more a mental block than anything else. It's also been a driver.*

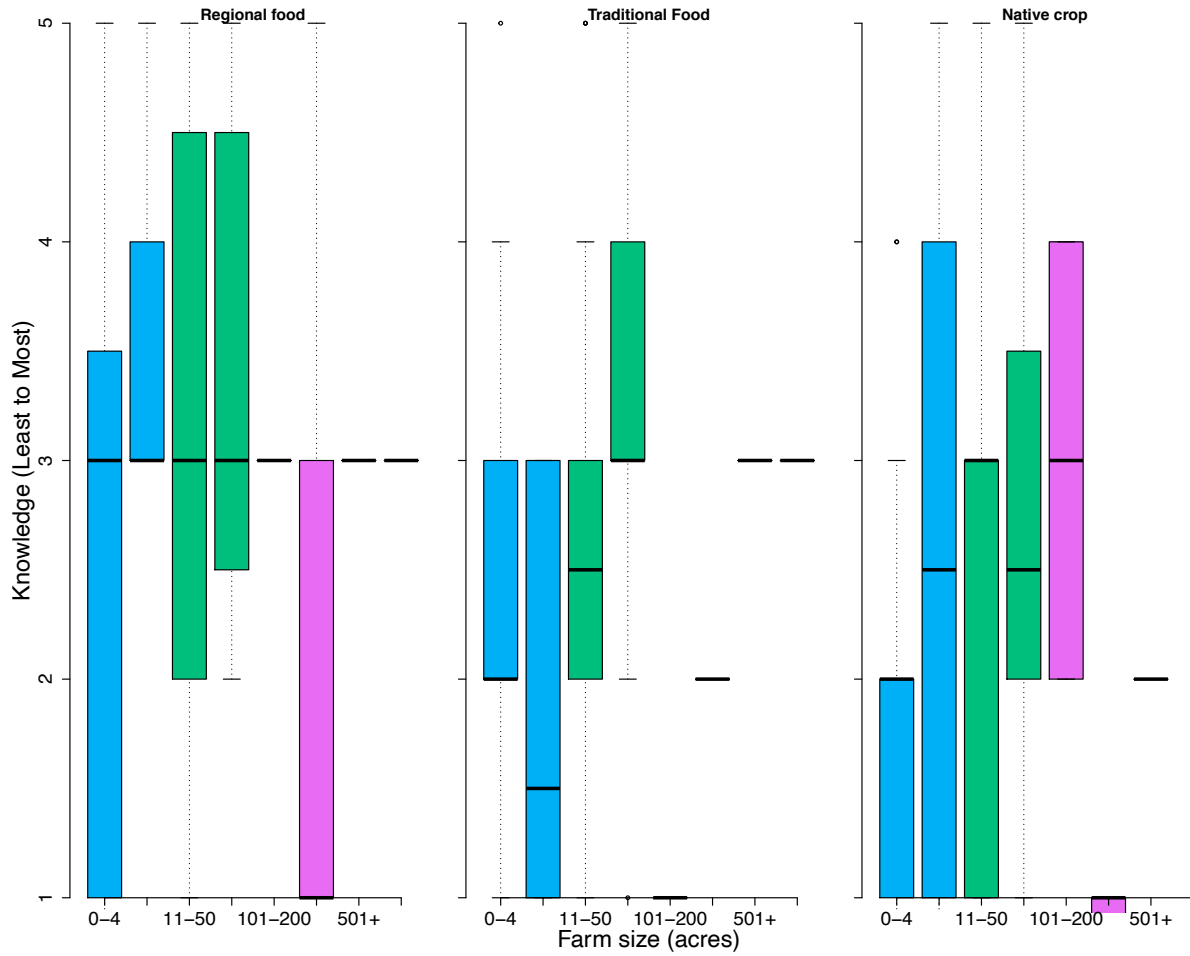
*Because if you're gonna tell me that I couldn't purchase that house, I'm going to purchase two houses and purchase the orchard next door just to prove that I can.” (Denise)*

---

#### Key Dimension 4: Health and Nutrition

Questions in this dimension related to the presence of traditional and regional food cultures. Traditional food refers to food eaten in communities for many generations, and regional food refers to food grown and produced in a particular geographic area. Survey respondents were asked to evaluate the presence of a traditional food culture and a regional food culture on a 0-5 Likert scale in which 0 signified no presence and 5 signified a strong presence. The mean score for a traditional food culture was 2.5 and the mean score for a regional food culture was 3.0. No respondents indicated 5 for traditional food culture whereas 12 respondents indicated 5 for a regional food culture. These data suggest that there is a greater sense of regional food culture than traditional food culture. Figure 14 shows food culture scores by farm size, and that farms between 11 and 100 acres indicated the strongest sense of regional food identity.

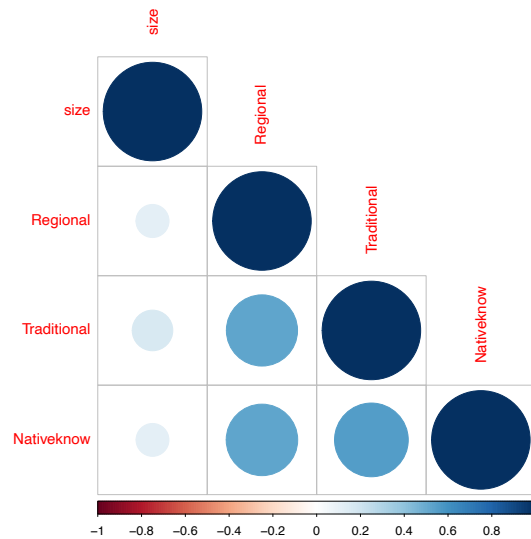
Figure 14: Sense of Food Culture by Farm Size



Respondents were asked to evaluate the level of knowledge in the community of regionally native crops and breeds on a 5-point Likert scale in which 0 signified no sense of local knowledge and 5 signified a strong sense of local knowledge. The mean score was 2.2. A correlation matrix showed correlation between the strength of regional and traditional food culture ( $\rho=0.522$ ), and with the level of knowledge in the community of native breeds and varieties ( $\rho=0.526$ , and  $\rho=0.560$ , for regional and traditional, respectively).

Table 6: Correlation Matrix of Food Culture and Native Crop Knowledge

Figure 15: Correlation Matrix Between Regional and Tradition Food Identity and Native Crop Knowledge



A closed-ended survey item asked respondents about ways in which food is featured in their communities. Respondents could select more than one response. Seventy-two percent indicated the presence of locally-owned non-franchise small food businesses, 53% indicated the presence of festivals, and 64% indicated the presence of farm-to-table restaurants.

### Cooking Skills

The farmers who were interviewed identified the erosion of cooking skills as a problem in the food system, but also as a business opportunity. Betty lamented the decline of cooking skills and the emergence of a food culture based on convenience. She said that sources of the shift were declining wages, increasing work hours, and changing gender roles and family structures. Betty said:

---

*“People don't know how to cook anymore. I have put out several proposals to Extension to help develop cooking classes. The problem is people don't have*

*transportation; they don't have money. They want something that's convenient. People got busy, you got single moms working two jobs, you get tired. I mean, my daughter is single, and she barely has time to make herself food to eat.”*

*(Betty)*

---

By teaching food preparation, farmers can expand their customer base and the capacity for their business. As Ellen grows high quality heritage meats, she leads cooking demonstrations for how to use the different parts of the animal to create gourmet meals. By embracing global culinary traditions and combining community gathering with cooking tips, Ellen is able to create a vibrant following and successful farm business.

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*“The farm is the site of these big gatherings like a whole goat roast. We do it by donation or we sell tickets, but we do these themed events on the farm. People then can come and see the animal, see how they're raised, enjoy what we've pulled together at the butcher shop. It's a full embracing of culinary traditions from all over the place. People will ask us to make scrapple from Philadelphia I'm like, sure we'll do that.” (Ellen)*

---

To teach young people how to prepare food, Kristen has built a partnership between her farm collective and the local elementary school. The school features farmers in the lunchroom and celebrates the local farms who source their food. They also incorporate the farms into the curriculum.

---

*“I've worked in a school [near] where this farm is located. In our school, we have a nationally recognized, spectacular program that gets local farmers to donate, and the school pays for, regional organic farm food. And they use that to have students learn how to cook in the 5th and 6th grade as part of their math curriculum to get a regional education. At the end of sixth grade when*

*they graduate, have to put together a meal with local seasonal produce and know how to measure and know how to create the recipes and prepare it for the whole school.” (Kristen)*

---

Aliyah recognizes the need for community cooking skills in her urban community and builds it into her education offerings.

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*“ When we were partnering with the county market to give out food boxes, a lot of people would open the box over the summer and be like, before I go, can you tell me what all this stuff is? And then sit there for about five or 10 minutes, going through what each vegetable was, and then giving them ideas for how to cook it. Telling people - hey, have you ever tried making noodles out of zucchini? Have you ever tried spaghetti sauce?” (Aliyah)*

---

This finding shows the intersections of value-added production, community engagement, education, and nutrition.

### *Mental Healthcare*

Another theme that emerged in interviews was the desire to incorporate mental health service as an offering and a resource of farms. Two farmers discussed this connection. Paola aspires for her farm to host an apprenticeship program to support healing mental health while also developing marketable skills.

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*“Next week, I'm going to have a meeting with a therapist. I want to develop a project for housing because in wintertime, I do a lot of work with immigrants and housing people. A lot of the capitalist system, it's a lot of systemic sadness and how profiting it is for the system to keep the mentally ill ill. I want to*

*design a program for farm apprentices that is focused on having farm apprentices that are houseless, and preferably females, preferably with a history of mental illness or felonies to help them on becoming sustainable individuals.” (Paola)*

---

Wendy left traditional farming to work at an alternative school with a farm education component. Her school serves students with severe social and emotional trauma and learning disabilities. The model is based on a farm and includes providing students with farming experiences. She describes the value of learning on a farm for her students’ emotional healing needs:

*“We give them the space to de-escalate. But if we were in [a] downtown [city] and a student was having an outburst or getting upset, somebody would call the cops or they would restrain them. We just don't do that - we let kids go out in the world and feel what they're feeling.” (Wendy)*

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### Key Dimension 5: Government

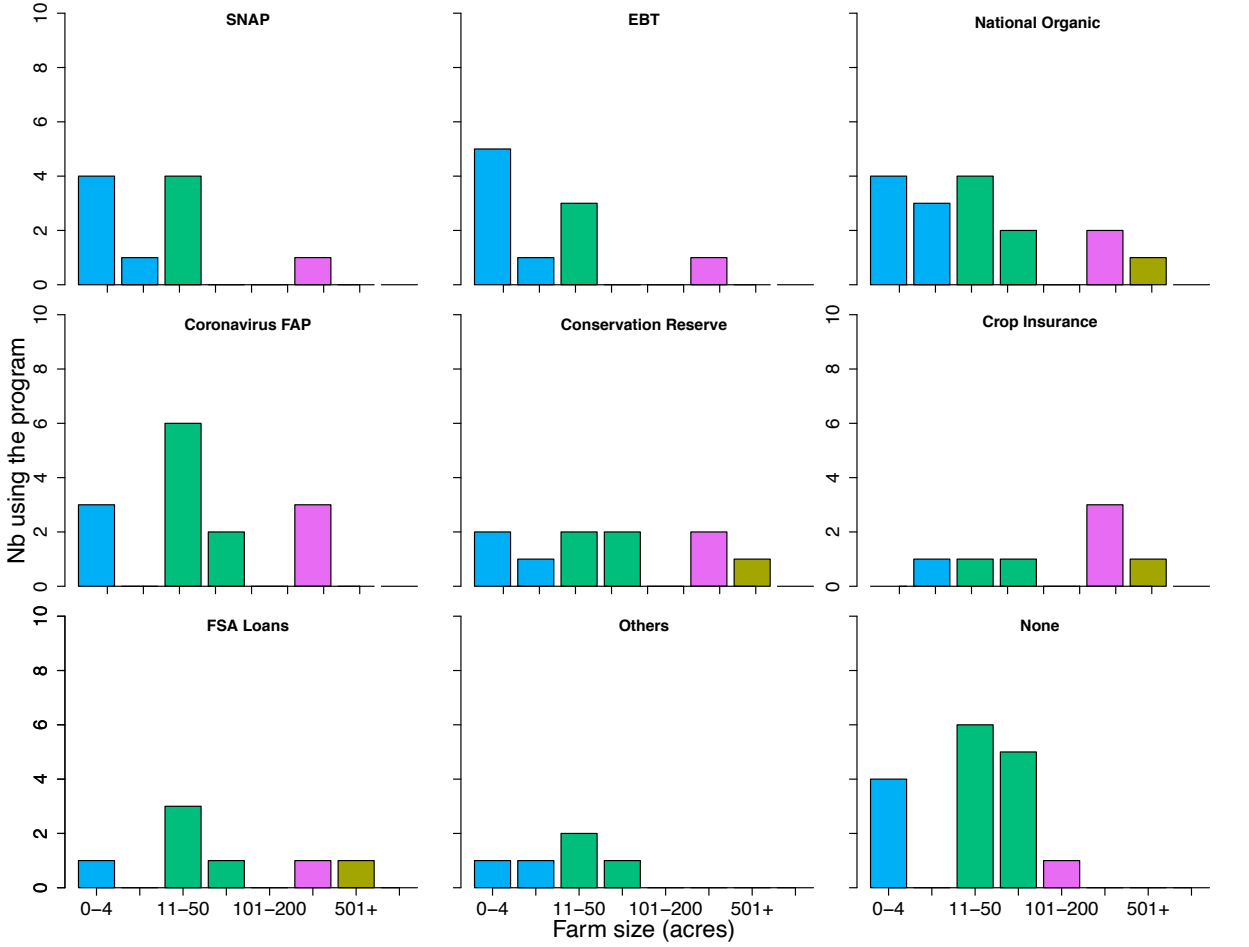
Questions in this section relate to how participants have engaged with government services, the barriers they experience, and the supports they would like to have.

#### *Utilization of Federal Programs*

When asked if they had received support from a government program, 53% of survey respondents said yes, and 31% said no. When asked about which programs they utilize, the most common responses were the National Organic Program (21%), coronavirus assistance (19%), nutrition programs (16%), conservation programs (10%), Farm Services Agency loans (9%), and crop insurance (8%). Participation related to farm size is depicted in Figure 16. Smaller farms utilized the nutrition benefits SNAP and EBT more than larger farm sizes. All farm sizes utilized the National Organic Program and the Conservation programs evenly. The larger farms used

crop insurance programs. This shows that small farms may be best suited to support low-income community nutrition needs.

Figure 16 Federal Government Program Participation by Farm Size



*Organic and the National Organic Program*

Forty-seven percent of respondents described their farming practices as completely or almost completely organic by indicating a 4 or 5 on a Likert-scale in which 0 signified not organic at all and 5 signified completely organic. However, only 21% indicated participation in the federal government’s National Organic Program. When asked why they choose not to participate, 20% of respondents indicated the costs in terms of time and money. Others indicated a distrust in the



program and system (9%), and others indicated that trust and transparency with their customers function in place of the label (4%).

Interview participants were also asked about whether or not they chose to participate in the National Organic Program through obtaining certification. Katie says that she chooses not to get certified as organic despite using organic practices because her local direct-to-consumer sales approach cultivates trust with her customers. At the local level, trust functions in place of the National Organic Program label which is necessary for distribution at the national level.

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*“We don't do certification because it's not necessary for us. We sell directly to our customers, they can come to our farm, they can do what we're doing every day. Having a label like that is important if you're going to grow something and put it in a truck and ship it across the country but that's not what we do.”*

*(Katie)*

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### *Barriers and Supports*

Survey respondents were asked to identify the biggest barriers they face in an open-ended survey item. The biggest barriers were related to income and the value of food, climate change, labor, market access, and healthcare. Twenty-seven percent indicated that making enough money was the biggest barrier, breaking it down into further groups around their ability to make an income, the value placed upon food by consumers, the discrepancy between the high value of land and the low value of food, and their ability to earn a living wage. The second largest barrier was climate change (17%), followed by access to reliable and skilled labor (12%). Additional responses related to having sufficient time in their lives (7%), access to markets (7%), and healthcare support for the physical demands of farming (4%). Interview respondents also indicated a desire for the United States revalue food production.

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*“I wish people would value their food more. I think the U.S. only spends 6% of their income on food, what other countries do 20% or 30%, 50%, depending*

*on where you are, how poor you are. And there's so much waste here - food waste, in production and in the fridges of people. I think its 30 or 40% that the U.S. waste on food. And so we're supposed to produce super cheap, and then consumers don't care because it's so cheap. Then we can't make a living.”*

*(Anya)*

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Farmers were asked about government policies they would want to best support their needs. The largest category of responses related to providing programs that center the needs of small farmers instead of large industrial agriculture corporations (31%). Respondents referenced grants that support farmers to develop their infrastructure, build online platforms, and provide assistance to access markets; subsidies to raise wages for labor and apply regenerative agriculture practices; and relief for healthcare, childcare, and student loan expenses. Interviewees praised existing programs that helped them to develop infrastructure, access land, and relieve other cost burdens.

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*“I'm really excited about things like Agrarian Commons, land trusts and things like that make it possible for young farmers to do what they want to do, which is grow food for community.” (Trudi)*

*“[My state] has a program - if you graduate from any university or college and within two years decide to farm if you agree to farm in [that state] for five years, they will pay off all of your student loans up to \$50,000. I received that so I have had far fewer financial burdens than your average young farmer coming out of college.” (Denise)*

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## **Discussion**

This research sought to understand the practices and approaches of women farmers, and how those practices and approaches align with the FAO’s elements of agroecology.

### The Practices and Approaches of Women Farmers

The women who participated in this study measure success along a balance of social, economic, and environmental indicators. They value feeding their community, meeting their needs, and stewarding natural resources. This supports Trauger's findings (2004; 2009) that women practice sustainable and civic agriculture models, as well as the findings of Lee-Gosselin and Grise (1990) that female entrepreneurs prefer small business models that provide sufficient income while also meeting other professional goals.

The results indicate that the small farms in this study support food security and nutrition in their local communities. Eighty-nine percent of the participants operated farms of less than 100 acres. This is significantly smaller than the average farm size in the United States of 444 acres (USDA, 2020). Farms at this size provide vegetables and animal products directly to their communities through direct-to-consumer models such as CSAs, farmers markets, farm stands, online sales, and restaurant contracts. The smallest farms focus on vegetables, while small farms with 11-100 acres incorporate livestock for animal products. The farms at 0-50 acres are the most likely to utilize government nutrition benefits by accepting payment in those forms, and may incorporate other strategies to include low-income consumers such as sliding scale pricing, community donations, or workshare CSAs.

The environmental management practices of the respondents indicate natural resource stewardship that promotes healthy ecosystems. The majority of these farmers describe their farming practices as almost completely or completely organic, sustainable, and regenerative with mean scores of over 4 on a 5 point scale. They score themselves high for crop diversity with a mean score of 4.6 on a 5 point scale. They scored their soil management and pest management practices as the almost completely agroecology with mean scores of 4.8 and 4.6 respectively. They scored themselves as least agroecological for water management and input procurement, with mean scores of 2.5 and 2.6, respectively. Despite such a high prevalence of organic farming practices, only 21% of respondents indicated that they participate in the National Organic Program. Many who chose not to indicated that the direct-to-consumer trust relationship functioned in place of the label and rendered it an unnecessary expense for their business. Sixty-nine percent of the interviewed farmers indicated that soil stewardship was important to their farm practices. Farms between 11-100 were most likely to raise animals on their farms in

addition to cultivating vegetables, and interviewees elaborated on the benefits of animal integration for soil and waste management.

The programs and product-offerings show that the farms in this study add social value to their communities. Over half of the survey participants offer programs to include younger and older people in the activities on their farms, and 84% indicate that they teach, train, or share knowledge with other farmers. These data support Trauger’s findings that women create value-added educational and experiential services as part of civic agriculture (2009). Fifty-four percent of interviewees mentioned strategies for including younger and older people on their farms such as developing partnerships with local k-12 schools and universities, and offering workshare opportunities. Thirty-eight percent of interviewees indicated that they teach people how to grow and/or prepare food by offering workshops and organize community meals. These services are either monetized in a for-profit model or grant-funded through a nonprofit model.

How Women Farmers in the United States Align with the 10 Elements of Agroecology

The practices and approaches of women farmers in the United States that were identified in this case study align with the 10 elements of agroecology as detailed in Table 7.

*Table 7: Alignment between Practices and Approaches of Women Farmers and the FAO's Ten Elements of Agroecology*

<b>Diversity</b>	The self-assessment of crop diversity, integrated animal and vegetable farming, diverse income streams with value-added products and services.
<b>Co-creation and sharing of knowledge</b>	The self-assessment of teaching, training, and sharing knowledge with others, the presence of programs to include younger and older people, and provide education.
<b>Synergies</b>	Animal integration for meat production and soil management.
<b>Efficiency</b>	Majority of farms are 100 acres or less. Farms that utilize closed-loop waste management practices and input procurement.

<b>Recycling</b>	The use of soil and waste management practices such as composting, humanure, and animal integration.
<b>Human and Social Values</b>	Creation of workshops, programs, and strategies for providing healthy food access to all members of the community.
<b>Resilience</b>	Business models with diversified income streams, diverse crop production, and direct-to-consumer marketing models that can shift in the event of economic shock.
<b>Culture and Food Tradition</b>	The teaching of cooking skills and organizing food-based gathering to develop regional food culture.
<b>Responsible Governance</b>	The utilization of nutrition, organic, and conservation programs. The call for government programs that raise the valuation of food and food production, support the implementation of regenerative agriculture, and relieve cost burdens around student loans, childcare, and healthcare.
<b>Circular and Solidarity Economy</b>	The usage of direct-to-consumer sales models, the incorporation of low-income food access strategies, the development of local relationships with other businesses, organizations, and institutions to sell products, offer programs, or provide donations.

Several factors are worth noting that limit the findings of this research, and offer areas for future study. Due to the exploratory nature of this case study, the findings cannot be generalized to represent all women farmers in the United States. Additional research would need to be conducted using a representative sample to produce explanatory findings. This research illuminated a relationship between farm size and business model, environmental practices, and community engagement. Further research that compares the practices of male and female farmers with farms of the same size would be valuable to further isolate for gender. Research to determine the factors driving the differences between the practices and approaches of male and female farmers would be useful as well.

**Conclusion**

Women's participation in food and farming in the United States has undergone a century of change. Conventional agriculture that relies upon synthetic fertilizers, chemical pesticides, and fossil fuels are unsustainable. The FAO's community of experts is organizing for a global transition to agroecology. Achieving gender equity and empowering women farmers is instrumental to this transition. While previous literature offers insight into trends among women farmers, this case study sought to understand trends in the practices and approaches of women farmers throughout the United States, and to analyze their practices and approaches in the context of the FAO's elements of agroecology. The findings show that the participating women farmers use practices and approaches that realize benefits for food security, nutrition, healthy ecosystems, and social cohesion, and that align with the FAO's elements of agroecology. The implications of this research are important for policy and program development within the United States, and for international collaboration in the fight against climate change. The findings advance knowledge about the farm models being employed by women farmers that operationalize the FAO's elements of agroecology at the local level. Emphasizing, scaling, and further exploring their practices would support the United States in making progress towards agroecology.

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## Appendix

### Appendix A: Interview Guide

Hi \_\_\_\_\_,

I'm conducting research on the practices and approaches of women farmers in the United States and their alignment with principles of agroecology. The research is part of my Master's degree in Environmental Management at Duke.

Are you familiar with agroecology?

Agroecology is the science of applying ecological concepts and principles to manage interactions between plants, animals, humans and the environment for food security and nutrition.

My questions are designed according to themes in agroecology. I will ask you questions about your practices as a farmer and it should take between 45 minutes and an hour.

The data that I collect will be used in a report and may include information about you and your farm. **Are you comfortable, willing, and consenting to have information about you and your farm included?** Or would you prefer not be identified? I can provide you with an advanced copy of the report for your review.

I would like to audio record our conversation to transcribe it later. Both the recording and the transcript will be kept confidential and destroyed when the research is done. **Do I have your permission to record this conversation?**

Your participation is completely voluntary. You can say "next question" to skip a question at any time, and you can ask that we stop the interview at any time for any reason.

Do you have any questions before we begin?

### Questions

1. Background: Tell me about your farm.
2. Background: Why did you decide to become a farmer?
3. Products: What crops, livestock, or other products do you produce? Why did you choose that/those product(s)?
4. Land Access: How did you secure your land, and what are the terms of the agreement (lease, purchase, inherit)? Why did you choose this location?
5. Income: What are your income streams for sustaining yourself? Do you foresee this changing over time, and if so, how?
6. Consumer Relationships: How do you market your products?
7. Food Culture: Are you aware of a traditional or regional food culture in your community? Does your farm produce those foods or the raw material to make these foods?
8. Information: Where do you get your knowledge and training from? Do you teach/ train others?
9. Farmer Networks: How would you describe your relationship with other farmers?
10. Youth and older people: Are there opportunities for young people on your farm or in your farming community? If so, what are they? Are there opportunities for older people who have experience or would want to learn? If so, what are they?
11. Resource Management: How would you describe your approaches to soil and water resource management?
12. Inputs: How do you obtain your inputs? (seeds, breeds, fertilizers)
13. Waste Management: What waste does your farm produce and how is it managed?
14. Government: Which government programs are you familiar with, and which do you use?
15. Success: How do you measure success for yourself as a farmer?
16. Barriers: What is the biggest obstacle you face as a farmer?
17. Solutions: What changes or innovations would support your success as a farmer, or future of farming as a profession? (example: policy, finance, consumer preferences, market facilitation, labor)
18. Age: How old are you?

# Women Farmers and Agroecology

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## Start of Block: Introduction

A1

### Key Information:

This survey is part of a research study to understand the practices of women farmers in the United States and their alignment with the United Nations Food and Agriculture Organization's (FAO) ten principles of agroecology. It was created by graduate student Lianna Gomori-Ruben at Duke University and includes questions that derive from the FAO's Tool for Agroecology Performance Evaluation (2019).

The FAO's ten principles of agroecology are diversity, synergies, efficiency, resilience, recycling, co-creation and sharing of knowledge, human and social values, culture and food tradition, responsible governance, and circular and solidarity economy.

The survey will take no more than 20 minutes to complete. Your participation in this survey is optional. You may stop answering questions and submit the survey at any time for any reason. You may skip questions at any time for any reason. You may choose to be identified as a participant by providing your name and your farm website, or you may choose to not be identified.

The data analysis will be reported in a document for guiding program development related to women farming in the United States. I will summarize these data generally to communicate findings to policy makers, researchers, and/or farmer associations. After completion of the research in June 2021, the data will be destroyed and will not be available for other purposes.

If you have questions, do not hesitate to contact me at any time at (917) 225-8340. If you have questions about your rights as a research study participant, please contact the Human Subjects Committee at Duke University at 919-684-3030.

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## A2 Part 1 of 7: Eligibility

This research is focused on farmers in the United States who identify as women, as owners or primary decision-makers on the farm, who have been farming for at least five years, and been farm decision-makers for at least 2 years. The following questions check to see if you identify in these ways.

---

Q1 Do you farm in the United States?

- Yes (4)
- No (5)

*Skip To: End of Survey If Do you farm in the United States? = No*

---

Q2 Do you identify as a woman?

- Yes (4)
- No (5)

*Skip To: End of Survey If Do you identify as a woman? = No*

---

Q3 Have you been farming for at least five years?

- Yes (4)
- No (5)

*Skip To: End of Survey If Have you been farming for at least five years? = No*

---

Q4 Have you been a primary farm decision-maker for at least two years?

- Yes (4)
- No (9)

*Skip To: End of Survey If Have you been a primary farm decision-maker for at least two years? = No*

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Page Break

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A3 Part 2 of 7: Background

The following questions ask for background information about you as a farmer.

---

Q5 In which state do you currently reside?

▼ Alabama (1) ... I do not reside in the United States (53)

---

Q6 How would you describe your farm community?

- Rural (4)
  - Urban (5)
  - Suburban (6)
  - None of the above (8)
  - Additional (7) \_\_\_\_\_
- 

Q7 What is the size of your farm?

- 0-4 acres (1)
  - 5-10 acres (2)
  - 11 - 50 acres (3)
  - 51 - 100 acres (4)
  - 101 - 200 acres (5)
  - 201 - 500 acres (6)
  - 501+ acres (7)
-

Q8 What is the history of farming in your family? Check all that apply.

- One or more of my parent(s)/guardians is or was a farmer. (1)
  - One or more of my grandparents/my parents' guardians is or was a farmer. (2)
  - One or more of my extended family members is or was a farmer. (3)
  - One or more of my great grandparents/ my grandparents' guardians is or was a farmer. (6)
  - My brother is or was a farmer. (7)
  - My non-male sibling is or was a farmer. (8)
  - No one in my family is or was a farmer, to my knowledge. (4)
  - I don't know (5)
- 

Q9 Do you farm with a male partner or spouse?

- Yes (1)
  - No (2)
  - Additional (3) \_\_\_\_\_
-



Q10 What is your legal relationship to the land you cultivate?

- I purchased it and now own it as the sole owner. (1)
  - I leased-to-own it and now own it. (2)
  - I inherited it and now own it. (3)
  - I co-own it in a partnership. (5)
  - I co-own it in a collective of more than two owners. (7)
  - I lease/rent it. I do not own it. (8)
  - I am a participant in a farm incubator program. (9)
  - Additional (4) \_\_\_\_\_
- 

Q11 Did you study farming or a related field? Check all that apply.

- Yes - High School (3)
  - Yes - Technical School (4)
  - Yes - College (5)
  - Yes - informally (i.e. apprenticeship or internship) (10)
  - No education or training related to farming (9)
  - Additional (6) \_\_\_\_\_
- 

*Display This Question:*

*If Did you study farming or a related field? Check all that apply. = Yes - High School*

*Or Did you study farming or a related field? Check all that apply. = Yes - Technical School*

*Or Did you study farming or a related field? Check all that apply. = Yes - College*

Q12 What field did you study?

- Agriculture/ Agricultural Science (1)
  - Agronomy (2)
  - Animal Science (8)
  - Botany (4)
  - Crop science (7)
  - Environmental Science or Studies (3)
  - Horticulture (5)
  - Soil Science (9)
  - Additional (6) \_\_\_\_\_
- 

Q13 Prior to this survey, how familiar are you with the term or concept of agroecology?

Never heard of it                      I am an expert.

0                      1                      3                      4                      5



Q14 Why did you decide to become a farmer? Check all that apply.

- Follow in my family's business (1)
- Work the land with my hands (2)
- Work outside (3)
- Own my own business (4)
- Set my own schedule (5)
- Be creative (6)
- Build self-sufficiency (7)
- Grow healthy food for my family and/or community (8)
- Earn a living (9)
- Additional (please specify in next question). (10)

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Q15 Tell us more about why you decided to become a farmer.

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Page Break

A4 Part 2 of 7: Economy

Questions in this section relate to your products, income, and business model.

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Q16 What crops, livestock, or other products do you produce or raise for sale?

- Orchard fruit (4)
  - Vegetables (5)
  - Livestock (beef, sheep, goats, pigs) (6)
  - Poultry (7)
  - Eggs (8)
  - Dairy (9)
  - Grains (10)
  - Value-added items (jam, baked goods, cheese etc.) (12)
  - Fibers for textiles (cotton, hemp, flax etc.) (13)
  - Flowers (15)
  - Beans, nuts, legumes (16)
  - Honey (17)
  - Additional (please specify in next question) (14)
-

Q17 Please list the crops, livestock, or other items that you sell.

---

Q18 What percentage of your **sales** comes from the following categories?

Farmers Markets : \_\_\_\_\_ (4)

Farm stand : \_\_\_\_\_ (8)

Community Supported Agriculture (CSA) : \_\_\_\_\_ (5)

Online orders : \_\_\_\_\_ (13)

Restaurants : \_\_\_\_\_ (6)

Wholesale distributors : \_\_\_\_\_ (7)

Grocery stores : \_\_\_\_\_ (10)

Institutions (schools, hospitals, colleges, prisons) : \_\_\_\_\_ (12)

UPick : \_\_\_\_\_ (14)

Additional : \_\_\_\_\_ (9)

Total : \_\_\_\_\_

Q19 What percentage of your **income** comes from the following sources?

Product sales : \_\_\_\_\_ (10)

Farm education programs : \_\_\_\_\_ (4)

Hospitality/Agritourism : \_\_\_\_\_ (5)

Training programs : \_\_\_\_\_ (6)

Grant funding : \_\_\_\_\_ (7)

Off-farm employment : \_\_\_\_\_ (8)

Additional : \_\_\_\_\_ (9)

Total : \_\_\_\_\_

Q20 Describe the business model of your farm.

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Q21 Do you foresee making changes to your business model over time?

- Yes (4)
- No (5)
- Additional (7) \_\_\_\_\_

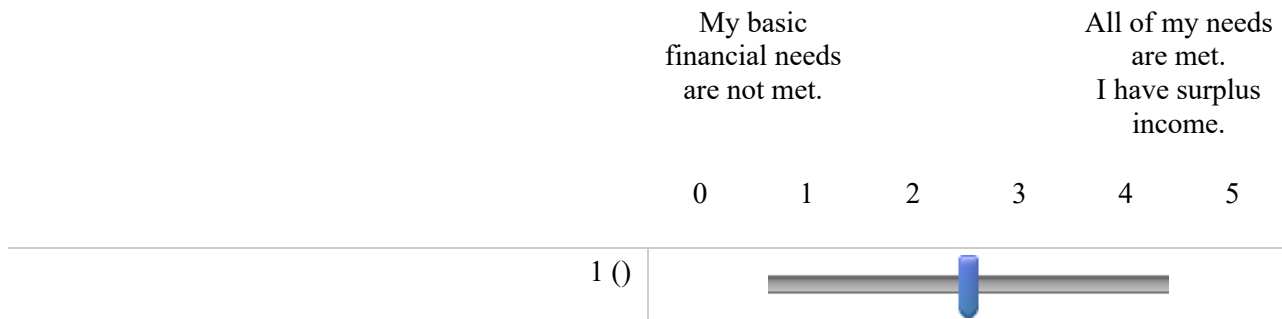
*Display This Question:*

*If Do you foresee making changes to your business model over time? = Yes*

Q22 How?

\_\_\_\_\_

Q23 How would you evaluate your financial status?



Q24 How do you measure or define success for yourself as a farmer?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Page Break



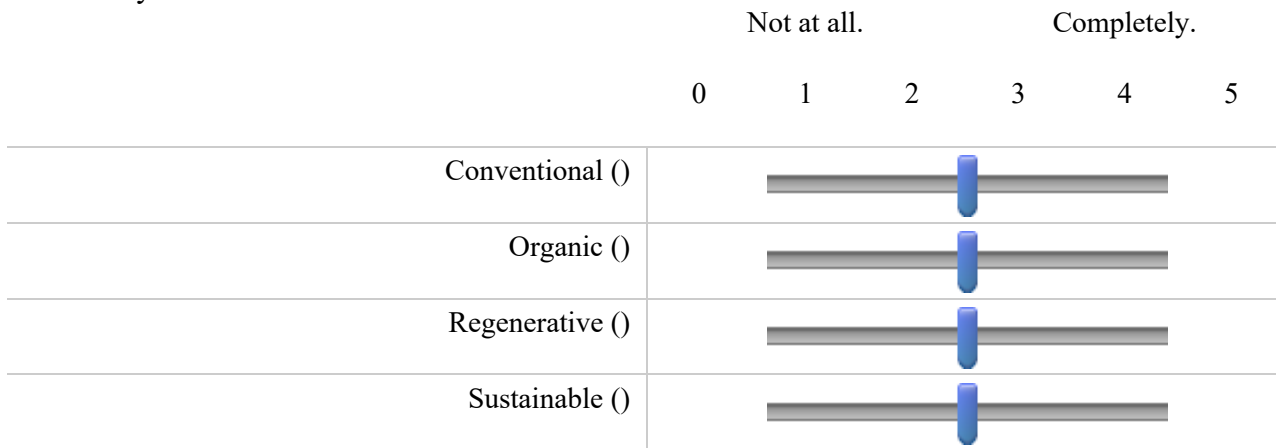
A5 Part 3 of 7: Environment

Questions in this section relate to your natural resource usage and management practices.

Q25 How would you describe the management practices on your farm? The following definitions are adapted from the USDA, the Rodale Institute, and Regeneration International.

Conventional - Production uses seeds or breeds that have been genetically altered and are not certified as organic. Relies on chemical intervention to fight pests and weeds, and provide plant nutrition.

Organic - Production without the use of chemical fertilizers, pesticides, or other artificial agents. Relies on natural principles like biodiversity and composting instead. Regenerative - Production practices reverse climate change by rebuilding soil organic matter and restoring degraded soil biodiversity, resulting in both carbon drawdown and improving the water cycle. Sustainable - An integrated system of animal and plant production practices that will, over the long term, satisfy human food needs and enhance environmental quality for economic viability and enhanced quality of life for farmers and society.



Q26 Are you certified organic?

- Yes (1)
- No (2)



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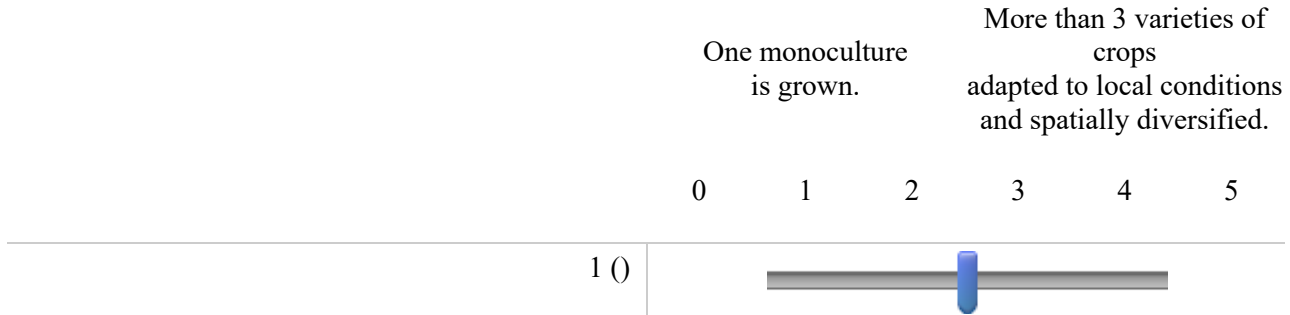
If Are you certified organic? = No

Q27 Why not?

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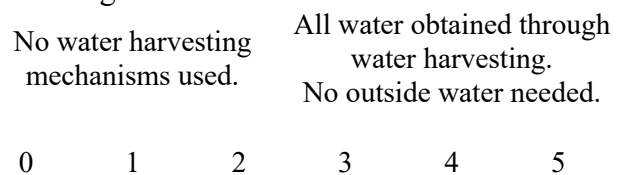
Q28 How would you describe the diversity of crops on your farm?



Q29 Besides pets, are there animals on your farm? Check all that apply.

- Cows (1)
  - Pigs (2)
  - Goats (3)
  - Chickens (4)
  - No animals on the farm (6)
  - Additional (5) \_\_\_\_\_
- 
- 

Q30 How would you describe your approach to water management?



10



Q31 Do you use any of the following water saving and harvesting techniques? Check all that apply.

- Rainwater catchment barrels (1)
- Irrigation tunnels (3)
- Drip irrigation (8)
- Ponding (6)
- Terracing (7)
- Swales (9)
- Composting toilets (2)
- None of the above (5)
- Additional (4) \_\_\_\_\_

Q32 How would you describe your approach to soil management?

Synthetic fertilizers  
used regularly on all crops.

0      1      2      3      4      5

Completely organic.  
No synthetic fertilizers  
used.

10



Q33 Do you use any of the following soil management techniques? Check all that apply.

- No-till (1)
- Intercropping (2)
- Crop rotation (3)
- Cover cropping (4)
- Applying home-made or locally made compost (5)
- Applying manure (6)
- Rotational grazing (10)
- Soil testing (11)
- None of the above (9)
- Additional (8) \_\_\_\_\_

Q34 How would you describe your approach to managing pests and diseases?

Chemical pesticides and drugs regularly used with no other management.	No chemical pesticides or drugs used. Methods are entirely organic.
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0	1	2	3	4	5
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Q35 Do you use any of the following pest and disease management techniques? Check all that apply.

- Integrated pest management (1)
- Bird habitat (2)
- Crop rotation (3)
- Plant refugia/ Pollinator habitat (8)
- Insectary strips (11)
- Bat habitat (10)
- None of the above (7)
- Additional (6) \_\_\_\_\_

Q36 How do you obtain your inputs (seeds, breeds, fertilizers)?

All inputs are purchased from companies outside of the local community.      All inputs are produced on the farm. It is a closed circle.

0      1      2      3      4      5



Q37 Where do you purchase your seeds, breeds, and other inputs?

- Other farmers (1)
- Companies: (2) \_\_\_\_\_
- Additional (3) \_\_\_\_\_

Q38 How do you manage waste products on your farm?

All waste products are disposed of outside of the farm.

All waste products are re-integrated into the farm.

0 1 2 3 4 5



Q39 Do you use any of the following waste management approaches? Check all that apply.

- Composting food scraps (1)
- Feeding scraps to animals (2)
- Gray water harvesting (3)
- Applying animal waste as fertilizer (7)
- Composting toilets (4)
- Additional (5) \_\_\_\_\_
- None of the above. (6)

Q40 How is energy sourced on your farm? Check all that apply.

- Solar (1)
- Wind (2)
- Electric (3)
- Gas (4)
- Biomass (8)
- Geothermal (5)
- Hydropower (7)
- None of the above (9)
- Additional (6) \_\_\_\_\_

End of Block: Environment

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Start of Block: Knowledge and Community

A6 Part 4 of 7: Knowledge and Community

Questions in this section relate to knowledge transmission and relationships with other people.

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Q41 How do you obtain your knowledge and training as a farmer? Check all that apply.

- Professional Organizations (1)
- Community Groups (2)
- Extension Programs (3)
- Local or state government programs (4)
- Federal government (5)
- Informal mentor networks (6)
- Informal peer networks (7)
- Nonprofit organization (8)
- Additional (9) \_\_\_\_\_

---

*Display This Question:*

*If How do you obtain your knowledge and training as a farmer? Check all that apply. = Professional Organizations*

*And How do you obtain your knowledge and training as a farmer? Check all that apply. = Nonprofit organization*

Q42 Please specify which organization.

\_\_\_\_\_

---

Q43 Which knowledge and training source is most valuable for you as a farmer?

\_\_\_\_\_

---

Q44 Do you teach, train, or share knowledge with other farmers?

- Yes (1)
- No (2)

Display This Question:

If Do you teach, train, or share knowledge with other farmers? = Yes

Q45 Please describe how you teach, train, or share knowledge with other farmers.

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Q46 How would you describe your relationship with other farmers?

Highly competitive

Highly cooperative

0

1

2

3

4

5

10





Q47 Do you use any of the following practices to bring people into your farm? Check all that apply.

- Volunteer work days (9)
- Non-monetary CSA (1)
- K-12 school partnerships (2)
- University partnerships (3)
- Farm-to-table dinners (4)
- U-Pick (5)
- Host WWOOF volunteers (7)
- None of the above (8)
- Additional (6) \_\_\_\_\_

Q48 Do opportunities for young people (under 18) exist on your farm?

- Yes (4)
- No (6)

*Display This Question:*

*If Do opportunities for young people (under 18) exist on your farm? = Yes*

Q49 Please explain how young people participate on your farm.

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Q50 Are there opportunities for older people (65+) on your farm?

Yes (1)

No (2)

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*Display This Question:*

*If Are there opportunities for older people (65+) on your farm? = Yes*

Q51 Please explain how older people participate on your farm.

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Page Break

A7 Part 5 of 7: Food Culture

Questions in this section relate to the cultural heritage and practices around food in your farming community.

Q52 "Regional food" refers to food grown and produced in your local geographic area. How would you describe the regional food identity in your local community?

No sense of regional food identity.      Strong sense of regional food identity.  
Mostly national or global brands consumed.      Mostly locally grown and produced food consumed.

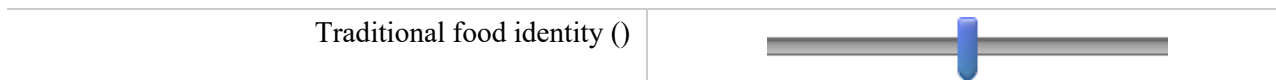
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Q53 "Traditional food" refers to food eaten in communities for many generations. How would you describe the traditional food identity in your local community?

No sense of traditional food identity.      Traditional recipes are valued and actively used, known, and shared in the community.  
Mostly fast or convenience foods consumed.

0      1      2      3      4      5



Q54 Is food featured in any of the following ways in your community? Check all that apply.

- Festivals (i.e. garlic or pumpkin festivals) (1)
- Food-based rituals (i.e. corn husking parties) (3)
- Farm-to-table restaurants (2)
- Presence of locally-owned small food businesses (\*does not include franchises) (6)
- None of the above. (5)
- Additional (4) \_\_\_\_\_

Q55 Tell us more about the food culture in your local community.

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Q56 How would you describe the knowledge of regionally native crops, breeds, and varieties in your community?

No sense of local knowledge of regionally native crops and breeds.      Strong local knowledge of regionally native crops and breeds.

0      1      2      3      4      5



Q57 Do you grow or raise regionally native crops and breeds?

- Yes (1)
- No (2)
- I don't know. (4)

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*Display This Question:*

*If Do you grow or raise regionally native crops and breeds? = Yes*

Q58 Please provide more detail.

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Page Break

A8 Part 6 of 7: Governance

Questions in this section relate to opinions of and experiences with government programs.

---

Q59 Have you received support from a government program?

- Yes (1)
  - No (5)
- 

*Display This Question:*

*If Have you received support from a government program? = No*

Q60 Why not?

- Don't know about them. (1)
  - Don't want to participate. (2)
  - Haven't found a program that fits my needs. (3)
  - Too cumbersome to participate (6)
  - None of the above (5)
  - Additional (4) \_\_\_\_\_
- 

*Display This Question:*

*If Have you received support from a government program? = Yes*

Q61 Please provide more detail about the program.

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Q62 Are you **familiar** with the following United States Department of Agriculture (USDA) programs?  
Check all that apply.

- Supplemental Nutrition Assistance Program (SNAP) (1)
  - Electronic Benefits Transfer (EBT) (9)
  - Pandemic EBT (10)
  - Corona Virus Food Assistance Program (CFAP) (11)
  - National Organic Program (2)
  - Conservation Reserve Program (4)
  - Farm Wetlands Program (12)
  - Grassland Reserve Program (13)
  - Crop Insurance (5)
  - Disaster Insurance (8)
  - Farm Service Agency (FSA) Farm Loans (6)
  - None of the above. (7)
-

Q63 Have you **used** any of the following United States Department of Agriculture (USDA) programs?  
Check all that apply.

- Supplemental Nutrition Assistance Program (SNAP) (1)
- Electronic Benefits Transfer (EBT) (9)
- Pandemic EBT (10)
- Corona Virus Food Assistance Program (CFAP) (11)
- National Organic Program (2)
- Conservation Reserve Program (4)
- Farm Wetlands Program (12)
- Grassland Reserve Program (13)
- Crop Insurance (5)
- Disaster Insurance (8)
- Farm Service Agency (FSA) Farm Loans (6)
- None of the above. (7)
- Additional (14) \_\_\_\_\_

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Q64 What is the biggest obstacle you face as a farmer?

\_\_\_\_\_

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Q65 What changes or innovations from the government would support your success as a farmer?

\_\_\_\_\_

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Page Break





A9 7 of 7: Identifying Information

The following questions ask for identifying information about you and your farm.

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Q66 How old are you?

- 19 or younger (9)
  - 20 - 29 (4)
  - 30 - 39 (5)
  - 40 - 49 (6)
  - 50 - 59 (7)
  - 60 or older. (8)
- 

Q67 What is your racial and/or ethnic identity? Check all that apply.

- White American of European descent (1)
  - Black American of African descent (2)
  - Latinx/ Hispanic American (3)
  - American Indian or Alaska Native (4)
  - Asian or Asian American (5)
  - Native Hawaiian and Pacific Islander (8)
  - Additional (6) \_\_\_\_\_
-

Q68 Do you consent to providing your name?

- Yes. (4)
- No; I choose to remain anonymous for final reporting. (3)

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*Display This Question:*

*If Do you consent to providing your name? = Yes.*

Q69 Please provide your name:

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Q70 Do you consent to providing your farm name and website (if applicable)?

- Yes. (1)
- No; I choose to maintain my farm's anonymity. (2)

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*Display This Question:*

*If Do you consent to providing your farm name and website (if applicable)? = Yes.*

Q71 Please provide your farm name and website:

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Q72 May we contact you to follow up?

- Yes (1)
- No (2)

---

*Display This Question:*

*If May we contact you to follow up? = Yes*

Q73 Please provide your preferred contact information:

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