2022 NATIONAL ORGANIC RESEARCH AGENDA

Outcomes and Recommendations from the 2020 National Organic & Transitioning Farmer Surveys and Focus Groups

ORGANIC FARMING RESEARCH FOUNDATION

By Lauren Snyder, Mark Schonbeck, and Thelma Vélez
Brise Tencer, Project Director

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We extend our deepest thanks to the farmers and ranchers who participated in the organic and transitioning surveys and focus groups. This report would not be possible without them.

We express our sincere gratitude to our partners at the Organic Seed Alliance for their dedicated collaboration on survey design and implementation, data analysis, and invaluable contributions to the report narrative on organic seed and breeding needs.

Thank you to the following organizations for their support hosting focus groups and survey outreach efforts:

California Department of Food and Agriculture • Central Plains Organic Farmers • EcoFarm • Friends of Family Farmers • Iroquois Valley Farmland REIT • Mālama Kaua'I • Michael Fields Agricultural Institute • Montana Organic Association • Midwest Organic and Sustainable Education Service • National Center for Appropriate Technology • National Farmers Union • Northeast Organic Farming Association of Massachusetts • Northeast Organic Farming Association of New York • Northeast Organic Farming Association of Vermont • Organic Association of Kentucky • The Southern Sustainable Agriculture Working Group

We are very grateful to the following reviewers for their thoughtful and insightful feedback on the survey instruments and report:

Chris Schreiner • Michelle Schroeder-Moreno • Keith Richard • Heather Darby • Chris Boomsma • Kristina 'Kiki' Hubbard • Erin Silva

We would like to thank Haley Baron and Vicki Lowell for their dedicated assistance in survey instrument development and focus group protocol.

We would also like to acknowledge Sheila Golden and Kelsey Grimsley for their tremendous support coordinating the focus groups and providing technical assistance.

Thank you to the following organizations whose financial support made this project possible.

USDA National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

USDA NIFA Organic Agriculture Research & Extension Initiative (OREI)

Foundation for Sustainability and Innovation

IROQUOIS VALLEY FARMLAND REIT

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EXECUTIVE SUMMARY

The Organic Farming Research Foundation (OFRF) is excited to present the 2022 National Organic Research Agenda (NORA), a report informed by surveys and focus groups conducted in 2020 with over 1,100 certified organic and seventy-one transitioning-organic farmers and ranchers across North America. Participants provided input and perspectives on their current organic production systems, including the use of regenerative soil health management practices, as well as their most pressing production and non-production challenges, technical assistance needs, and concerns related to organic agriculture.

Building on two previous NORA reports and an ongoing analysis of USDA-funded organic research, our goal here is to provide a comprehensive and updated roadmap for future research, education, Extension, and policy development to address producer-identified needs, and to foster an expanding, prosperous, ecologically regenerative, climate-friendly, and racially equitable organic sector. With permanent funding for organic research secured in the 2018 Farm Bill, an unprecedented opportunity exists to equip producers to implement the knowledge-intensive, ecological approach to agriculture codified in the National Organic Program (NOP) Standards.

The demographics of NORA survey respondents generally reflected those of the U.S. organic farming sector: 1) predominantly White, middle-aged or older, and male; 2) farming operations in all major agro-ecoregions; and 3) representing a wide range of commodity categories. While the percentage of organic producers identifying as Black, Indigenous, and other people of color (BIPOC) in this report was low (4%), it is reflective of farmer demographics documented in the 2019 Organic Survey conducted by the National Agricultural Statistics Service (NASS). This lack of racial and ethnic diversity underscores the urgent need to address racial inequity within the organic sector and throughout U.S. agriculture.

Our findings confirm that organic producers lead the nation in adoption of soil health management and climate-friendly practices. For example, 76% of organic field crop farmers plant cover crops regularly, compared to just 10% of conventional field crop farmers. Most survey respondents regularly ('often' or 'very often') implement environmental stewardship practices that build healthy fertile soils, protect resources, enhance biodiversity and resilience, sequester carbon, and help mitigate climate change. These include cover crops and green manures (68%), crop rotation (81%), intercropping (31%), perennial conservation plantings (74%), water conservation in drought-prone regions (64-69%) and for specialty crops (vegetables, herbs, flowers, berries, and tree and vine crops) in all regions (67-71%). Furthermore, implementation of regenerative organic management practices tended to increase with farming experience, suggesting that farmer-to-farmer mentoring programs could be beneficial for beginning farmers.

Many respondents regularly use manure (54%), organic fertilizers (54%), or compost (40%), while just 20% use compost tea. Manure is used most often in the Northeast, Great Lakes, and Corn Belt where this resource is commonly available on-farm or from nearby livestock operations, and least often in the South and Pacific regions where most respondents grow specialty crops. More frequent use of organic fertilizers in the South and of all organic amendments by transitioning growers may reflect greater needs for inputs to improve soils with lower inherent fertility (South) or history of non-organic management (during transition).

Roughly 70% of organic crops are planted with certified organic seeds. For some crops, unmet needs for organic seeds of desired cultivars or genetic traits create a potential business opportunity. Yet on-farm production of organic seed declined from 63% in 2015 to 46% in 2020, indicating a need for farmer training and technical support in organic seed production.

Certified organic survey participants identified the following production challenges:

- Controlling weeds – 67% of respondents.
- Managing production costs – 59%
- Maintaining adequate yields – 48%
- Managing soil fertility and crop nutrition – 43%
- Controlling insect pests – 41%
- Finding appropriate organic crop varieties and seeds – 38%
- Controlling disease pressure – 36%
- Adapting to climate change – 36%

Controlling weeds clearly emerged as the most pressing production challenge, and the broader topic of "soil health" was second only to weeds in response to the open-ended survey question. Focus group participants discussed difficulties managing weeds without degrading soil health, which underscores the need for additional research in organic weed management strategies that require less cultivation. In addition, focus group discussions revealed that climate disruptions can accentuate other challenges in managing weeds, pests, soil, and water resources. These challenges appeared especially intense for Southern organic farmers, while producers in the moisture-limited Great Plains and Mountains found cover crops and other organic soil management practices more challenging than producers elsewhere. Production costs, pests, diseases, and climate change proved especially challenging for producers of specialty crops.

Leading non-production challenges include:

- Accessing labor – 46%
- Finding and developing markets for organic products – 42%
- Cost of organic certification – 31%
- NOP recordkeeping requirements – 31%
- Developing infrastructure – 31%

Focus groups identified complex challenges related to labor (how to retain workers and pay them fairly while keeping labor costs manageable), markets (paradox of strong demand yet decreasing farmgate prices), and recordkeeping (having to track each crop in detail creates a deterrent to diversifying enterprises). Highly diversified vegetable cropping systems can also make business planning and management more complicated.

The COVID-19 pandemic created new challenges with shifting and uncertain market venues, delays in supply chains (seeds, inputs, wholesale shipments), and increased paperwork. The ensuing shift to online venues made information and technical assistance resources more readily available, and also created challenges with "information overload."

Organic survey respondents registered great concern about:

- Organic fraud and integrity of the USDA organic label – 77%
- "Industrial organic" – 73%
- Contamination of organic crops by NOP-prohibited substances – 63%
- Imbalance of domestic certified organic supply and demand – 58%

Focus group discussions revealed the depth of concern about the impact of these issues on farmer livelihoods, the future of the organic sector, and its reputation with consumers. More than half of survey respondents expressed concerns about lack of skilled labor, need for organic research funding and organic-knowledgeable service providers, animal welfare, and climate change.

Organic producers' needs for technical assistance closely parallel their greatest challenges:

- Organic management of weeds, insect pests, and diseases – 74%
- Soil fertility and crop nutrient management – 65%
- Soil conservation and soil health – 60%
- Securing sales channels – 54%
- Production assistance – 43%
- Labor needs – 41%
- Business and financial planning – 41%

Because the top three technical assistance needs relate to soil health and resource conservation, Natural Resources Conservation Services (NRCS) programs can play a vital role in providing technical and financial support for organic farmers.

A majority of respondents reported that their research and information needs are being met 'somewhat well,' which highlights an opportunity to improve information and technical assistance services for organic producers, especially in the Southern region where these needs appear greater than elsewhere.

Transitioning farmers identified a similar range of challenges as certified organic farmers, and struggled especially with weeds, marketing, and NOP recordkeeping. They expressed great need for technical assistance with weed, pest, and disease management (89%), production (76%), securing sales channels (85%), meeting NOP regulations (78%), organic system plans (74%), and food safety requirements (65%). Farmers in transition apply soil health management practices as diligently as certified organic farmers, and use water conservation, compost, and other organic inputs more often. Our findings illustrate an urgent need and opportunity to design and deliver technical support to help more famers make a successful transition to USDA certified organic.

Beginning organic farmers (<10 years farming) expressed greater needs for technical assistance with soil, pest, weed, and disease management than more experienced producers, used water conservation more often, and were a little more hesitant to plant cover crops. These trends indicate that many beginning organic farmers may not yet have realized the soil health benefits of long-term regenerative organic management and could benefit from technical assistance with soil health.

BIPOC respondents found many aspects of organic production especially challenging, including production costs (80%), weeds (75%), diseases (61%), labor (70%), certification costs (58%), and securing capital and credit (50%). Additionally, a greater percentage of BIPOC farmers and ranchers reported experiencing these challenges when compared to non-BIPOC respondents. These findings, combined with the disproportionately low numbers of BIPOC farmers, underscore the urgent need to address and dismantle structural racial inequities in the U.S. agricultural and food-system and develop policy, technical, and financial support to help more BIPOC producers enter the organic sector.

Survey respondents rated other certified organic farmers as their most valuable information resource (82%),

followed by other farmers (61%), online resources (59%), organic certifiers (57%), and both governmental and non-governmental service providers and organizations (35-48%). While respondents most often preferred printed materials (65%) and on-farm demonstrations and field days (63%), many also valued conferences and workshops, online materials and videos, email groups, and other materials, in-person or virtual courses, and scientific journals (33-53%). This finding indicates a need to deliver information and technical assistance through a wide range of traditional and modern information venues.

Focus group participants indicated that farmer-to-farmer networks and mentoring are by far the most effective ways to obtain and share information, and that strong sustainable agriculture non-profits and conferences can prove vital for new organic producers. Farmer-identified solutions and tips for new farmers include:

- Manage risk through enterprise diversity and building healthy soils.
- Integrate crops with livestock to enhance soil health and enterprise diversity.
- Make changes slowly and have patience.
- Develop strong lines of communication with neighbors.

Recommendations

Based on our findings, **OFRF recommends that organic research, Extension, and technical assistance** focus on the following priorities:

- Cost-effective organic soil, nutrient, crop, weed, pest, and disease management strategies that sustain adequate yields and net returns while enhancing soil health, climate mitigation, and resilience. Specific objectives include:
  - ◇ Improved weed management for all regions and commodities.
  - ◇ Integrated stewardship practices and inputs to optimize soil health.
  - ◇ Optimum soil-plant microbiomes for nutrient cycling and soil health.
  - ◇ Insect pest and disease management and climate resilience for specialty crops.
  - ◇ Strategies to address climate-related changes in weed-pest-disease complexes.
- Practical, region-specific strate gies to co-manage weeds, soil health, and financial challenges during the transition period.
- Plant breeding to develop regionally adapted public cultivars for organic systems, selected for input efficiency, disease, pest, and weed resistance, resilience to climate disruptions, market traits, and nutritional value.
- Strategies to maximize carbon sequestration, climate mitigation, and resilience through organic, regenerative best management practices while enhancing farm resilience and economic viability.
- Training, mentoring, and technical assistance to build farmer capacity to grow organic seeds for on-farm use and/or commercial sale, or to acquire the seeds they need.
- Improved organic pasture-based livestock production and animal health care.
- Resources and tools to help organic producers develop market venues, estimate and manage production costs, obtain farm labor and optimize labor relations, and improve business planning and management for complex, diversified operations.

- Research and technical assistance to address regional challenges such as water limitations in the Western region, and multiple soil pest and disease challenges in the South.
- Socio-economic and policy research to identify and remove barriers to BIPOC farmer access to land, capital, and other foundational resources, and to facilitate BIPOC farmer entry into the organic sector.

Recommended strategies for **effective delivery of information and technical assistance** include:

- Develop farmer-to-farmer learning, networking, and mentoring programs including apprenticeships and incubator farms.
    - ◇ Utilize peer-to-peer venues to share farmer knowledge and innovations and deliver research-based information and tools.
    - ◇ Fund farmer-led and farmer-participatory organic research including plant breeding and cultivar development
    - ◇ Ensure fair compensation for experienced organic farmers who conduct research and plant breeding, and provide educational, training, and mentoring services.
- Support and partner with non-profit agricultural organizations to enhance information and technical assistance delivery.
- Train Extension, NRCS, and other service providers in organic principles and practices; build agency capacity to serve the organic sector.
- Tailor and target Extension, information, and technical assistance services to meet the specific needs of BIPOC, Southern region, and transitioning producers.
- Disseminate research outcomes, information, and technical assistance via multiple modes and formats.
- Develop a centralized location for organic information resources and a coordinated process to deliver new resources to organic producers.

Policy priorities to **support a profitable, expanding, and climate-friendly organic sector** include:

- Recognize and elevate USDA certified organic agriculture as a climate-friendly and climate-resilient system of production throughout USDA climate strategy development, conservation and research programs, and risk management products.
- Increase federal investment in organic agricultural research to be, at least, commensurate with the organic market share in the U.S.
- Increase resources, oversight, and authority for the National Organic Program (NOP) to maintain integrity of the organic label, interdict fraud, and strengthen enforcement of the soil and resource stewardship aspects of NOP Standards.
- Expand the National Organic Certification Cost Share Program (NOCCSP) and adopt a higher cost share percentage for BIPOC and other underserved producers.
- Develop a USDA organic transition program that includes financial assistance, farmer-to-farmer mentoring, and an expanded Organic Transitions (ORG) research program.
- Reform NRCS working lands programs and USDA risk management programs to better support organic and transitioning farmers and best organic stewardship practices.
- Develop win-win farm labor solutions that guarantee fair pay and working conditions for farmworkers and improve organic farmers' access to skilled labor.

- Build and exemplify racial equity throughout the organic sector.
    - ◇ Identify and dismantle structural racial inequities that create barriers to BIPOC producers seeking to launch or expand organic farming enterprises.
    - ◇ Improve access to land, capital, and other foundational resources for BIPOC and other disadvantaged organic farmers.
    - ◇ Engage experienced BIPOC organic farmers and agricultural professionals in training and mentoring beginning and transitioning farmers, and in developing and implementing racial equity solutions within the organic sector and beyond.

Through the survey and focus groups, we have gained a clear and updated understanding of the research, technical assistance, and policy development needed to grow the organic sector and empower certified and transitioning organic producers to develop regenerative, resilient, and climate-friendly farming and ranching systems.

INTRODUCTION

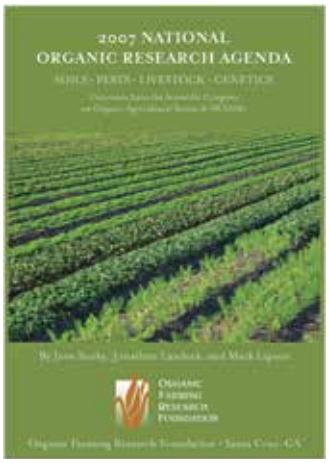
Organic farming is a term coined during the 20th century that describes an ecological approach to agricultural production in response to concerns about the damaging effects of conventional farming practices on soil, crop, livestock, and human health. Many organic practices, such as cover crops and rotational grazing, trace back to Indigenous, African, and other communities of color. These farmers worked the land harmoniously for centuries and played a critical role in developing innovative agricultural practices that are now recognized as the core principles of ecological sustainability, resource conservation, and regenerative agriculture.

Organic practitioners seek to build agricultural systems that simulate natural processes, exclude the use of synthetic fertilizers and pesticides, prioritize healthy, living soils rich in organic matter as the foundation of successful farming, and rely on biological processes for crop nutrition, crop protection, and livestock health. Since 2002, the USDA National Organic Program (NOP) has codified the organic method, regulated use of the USDA Certified Organic product label, and defined organic production as:

> *"A production system that is managed … to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity."*

Organic farmers and ranchers require different information resources, technical assistance, and decision support tools than conventional producers who often utilize synthetic inputs and genetically modified seeds that are prohibited in organic production systems. Development of organic resources requires a substantial investment in research conducted within the context of organic systems and designed to address the holistic goals and needs of organic producers.

The Organic Farming Research Foundation (OFRF) was founded in 1990 specifically to advance research to support the unique needs of organic producers. In 1997, OFRF published a pivotal study, "Searching for the 'O' Word," documenting the dearth of federally-funded organic agriculture research—at the time, less than 0.1% of USDA research funding was allocated to organic agriculture (Lipson, 1997). This stark finding motivated OFRF to advocate for the establishment of the first dedicated USDA organic research program, which was authorized by congress as part of the 2002 Farm Bill.



In 2007, OFRF published the initial National Organic Research Agenda (NORA) report, the first comprehensive blueprint for organic research in the U.S. This landmark document drew on three years of collaboration among farmers and ranchers, scientists, and other agricultural experts to identify and prioritize research needs and develop a framework for publicly supported organic research systems.

The goal of the 2007 NORA report was to outline clear organic agriculture research recommendations and enable university, USDA, and other research programs to support the agricultural, environmental, and economic performance of organic production systems. Four core topic areas emerged in this foundational

NORA report: soil microbiology and fertility; system approaches to pest management; ruminant and poultry production systems; and crop and animal breeding and genetics. While substantial research progress has been made in addressing these areas since the 2007 NORA report, these remain key challenge areas for organic agriculture production.

In response to continued interest in and incremental increases in federal funding for organic research, OFRF published an updated research agenda for organic agriculture in 2016. The 2016 NORA report included a review of novel organic research and identified areas requiring additional research by surveying over 1,400 organic producers across the U.S. The 2016 report called attention to five high-priority research needs identified by organic producers:

- Soil health and fertility management
- Weed management
- Nutritional benefits of organic food
- Insect management
- Disease management

The 2022 NORA report builds on the two prior NORA reports by presenting feedback from over 1,100 farmers and ranchers, including survey results from more than 1,000 organic producers and seventy-one transitioning producers across the U.S., as well as findings from more than 100 organic and transitioning farmers and ranchers at nationwide focus group discussions. The survey of organic producers was conducted in partnership with the Organic Seed Alliance (OSA), resulting in a strengthened discussion of the organic seed and crop breeding needs of organic producers. The 2022 report also describes the potential barriers to the adoption of certified organic production through a survey of farmers and ranchers transitioning to organic agriculture.

ORGANIC seed ALLIANCE

In tandem with OFRF's 2022 NORA report, Organic Seed Alliance released its 2022 *State of Organic Seed,* a five-year report on organic seed systems in the U.S.

Current Needs for Organic Research

Since the 2016 NORA report, OFRF and a broad coalition of organic champions secured historic, permanent funding for organic research in the 2018 Farm Bill, which increased annual federal funding for the USDA Organic Research and Extension Initiative (OREI) from $20 to $50 million by 2023. A key goal of the 2022 NORA report is to provide a clear roadmap, based on organic research and education needs identified by farmers and ranchers, to ensure this increased funding is allocated to address the top needs of organic producers.

Research specific to organic agricultural systems is critical to addressing the unique challenges facing organic producers who are prohibited from using synthetic inputs to solve problems related to soil fertility, weeds, pests, diseases, and other stressors. Organic farmers rely on a knowledge-intensive, ecological approach to meeting these production challenges, one that demands an intimate and site-specific understanding of biological interactions among many different species on the farm—both above- and below-ground—and in the broader landscape. Moreover, climate change continues to impose shifting and even novel abiotic and biotic stressors on farms and ranches, thereby adding greater complexity to the challenges faced by organic producers.

Another major obstacle facing organic producers is limited access to certified organic seed. National Organic Program (NOP) regulations require organic producers to use organic seed when commercially available, but, while the organic seed trade has grown tremendously over the past decade, there is still insufficient supply to fully meet farmer demand and skilled organic seed producers are lacking (OSA, 2016). In addition, organic plant breeding and seed research programs launched on a relatively small scale over the past 15 years must expand greatly to meet organic farmers' needs. As a result, most organic producers, particularly those with large operations, rely on non-organic seed for at least some portion of their operation.

Finally, organic producers need targeted research and technical assistance to help them meet changing NOP regulations. As the National Organic Standards Board (NOSB) reviews emerging technologies or sunsets various provisions (i.e., changes to the National List of Allowed or Prohibited Substances), and makes recommendations to NOP, certified producers may have to pivot to new approaches to manage their farms. NOSB publishes a list of research priorities, updated annually based on input from stakeholders and board member expertise. The objective of this list is to identify the research that organic producers and processors need most to overcome remaining barriers to successfully meeting current NOP requirements and continuing the expansion of the organic sector.

Despite the challenges facing producers, U.S. organic food sales increased by 12.8% percent in 2020 (OTA, 2020), which underscores the need for research, education, and Extension programs tailored to organic systems. To meet this growing demand, organic research must address the ecological, economic, and social challenges associated with certified organic production to help organic producers scale up, diversify, and increase profitability; and encourage more farmers from diverse backgrounds to transition to certified organic production. In conjunction with these research efforts, organic-specific education, technical assistance, and Extension programs that facilitate the implementation of science-based solutions are critical.

About OFRF

OFRF is a national non-profit organization founded in 1990 to advance organic agriculture through scientific research. The organization fosters the improvement and widespread adoption of organic farming systems by cultivating organic research, education, and federal policies that bring more farmers and acreage into organic production. Through these efforts, OFRF strives to create a more resilient and sustainable agricultural system that values healthy environments and people.

OFRF funds organic agriculture research to advance scientific knowledge and improve the practices, ecological sustainability, and economic prosperity of organic farmers and ranchers. It was one of the first nonprofit organizations to award grants dedicated to organic agriculture research. To date, the organization has invested over $3M in organic research and awarded 355 research grants. All results from OFRF-funded grant projects can be accessed for free via OFRF's online database.

Providing educational resources to support organic agriculture is another important part of OFRF's mission. A wide selection of guidebooks, online courses, and webinars analyzes decades of research related to best organic management practices and organizes science-based information by topic for greater accessibility and ease-of-use. OFRF has also partnered with the Natural Resource Conservation Service (NRCS) to provide support, educational guides, and materials to help train agency field staff that interface with organic producers. All OFRF educational material is available online for free.

Another core mission area for OFRF is advocating for federal programs and policies that support the unique needs of organic farmers and ranchers, and working to ensure their voices are heard in Washington, DC. OFRF believes organic producers need equal access to USDA programs and have worked for decades to "level the playing field." In addition to advocating for research, education and Extension resources for the organic sector, OFRF has prioritized improving how conservation programs, crop insurance, and other existing USDA programs work for organic producers. OFRF has worked to remove barriers to organic certification and advocated for programs that support the transition to organic by championing funding for organic certification costs-share and the collection and reporting of organic data by the USDA National Agricultural Statistics Service (NASS) and the Economic Research Service.

In the 2002 Farm Bill, OFRF played an instrumental role in securing authorization and $3 million in annual funding for the first dedicated USDA funding for the newly formed Organic Research and Extension Initiative (OREI). In addition, OFRF advocated for the launch of the Organic Transitions Program (ORG) in 2002. ORG is designed to address barriers to successful transition to USDA certified organic production, and to document ecosystem services realized through adoption of organic systems. In the 2008 Farm Bill, OFRF helped secure $78 million in mandatory funding for the OREI, a historic five-fold increase from the $15 million allocated in the expiring 2002 legislation. In the 2018 Farm Bill, OFRF collaborated with a coalition of organic champions to obtain permanent mandatory funding for OREI at $50 million per year starting in 2023. ORG has received annual appropriations up to $7 million in FY2021. Together, these two programs will provide a little over $500 million in funding for organic-specific research over the next 10 years.

In 2021, OFRF entered into a three-year partnership agreement with the USDA National Institute of Food and Agriculture (NIFA) to conduct a comprehensive external review of both OREI and ORG. The review entails assessing OREI and ORG funded projects by commodity, region, and research topic, and comparing funded projects to priorities identified in 2016 and 2022 NORA reports. OFRF will also: 1) analyze investments against National Organic Standards Board research recommendation priorities; 2) assess producer involvement in funded projects and how well findings were disseminated to stakeholders; 3) conduct an assessment of organic research related to climate mitigation, resilience, and adaptation, identify future needs, and outline promising new research trends; 4) conduct an equity review of how well OREI and ORG are serving 1890 historically Black land-grants, 1994 Tribal land-grants, Hispanic-serving institutions, and organizations led by Black, Indigenous and other people of color (BIPOC); and 5) identify gaps and develop recommendations for future funding of organic research priorities for greatest benefit to producers, communities, and the environment.

Structure of the 2022 NORA Report

The 2022 NORA report begins by highlighting some of the environmental stewardship practices related to soil health, water use, and climate change mitigation that organic and transitioning producers are currently implementing. The report then outlines the most pressing needs of certified organic producers and those transitioning to organic certification, and outlines recommendations to address those needs through research, Extension and technical assistance programs, and policies. The results and recommendations in this report were developed from responses obtained through two national surveys—one for certified organic producers and the other for transitioning producers—and sixteen focus group discussions with organic and transitioning producers. The report presents key findings from the organic and transitioning surveys completed by over 1,100 farmers and ranchers, and contextualizes these results using information gathered during the focus group discussions.

The report is divided into six chapters, beginning with a description of the demographics of the organic and transitioning producers who participated in the surveys. The second chapter describes the current use of environmental stewardship practices, including soil health management practices and water conservation, as well as, organic inputs, and organic seed on certified organic and transitioning operations in the U.S. The third chapter outlines the key production and non-production challenges as well as topics of concern identified by organic and transitioning producers. Chapter four presents farmer-identified solutions to address these challenges and concerns and also discusses information resources and venues that farmers find most useful. The fifth chapter summarizes OFRF's research and policy recommendations to address the needs identified by organic and transitioning farmers, and highlights implications for policy makers and funders. The final chapter describes the survey and focus group methodology.

Each chapter presents results for certified organic and transitioning producers separately, beginning with results from the full organic survey sample and followed by results from the full transition survey sample. Results from the full organic survey sample are followed by an analytical breakdown by farming region, farmer race/ethnicity, and farming experience (i.e., length of time farming); due to low survey response rate, a categorical breakdown of the transition survey data was not feasible.

One key difference between the 2021 NORA report and previous NORA reports is the regional breakdown. Farming region data from the organic survey was categorized using: 1) the four well-established regions outlined by the Sustainable Agriculture Research and Education (SARE) program—Northeast, North Central, Southern, and Western—in addition to, 2) six agro-ecoregions created based on USDA production regions (Aillery et al., 2005)—Northeast, South, Great Lakes, Corn Belt, Great Plains and Mountains, and Pacific. A list of states found within each agro-ecoregion is provided in chapter six. SARE regions are widely recognized and used by many institutions, so this geographic categorization is used to highlight regional research and policy recommendations and make comparisons with regional results from the 2016 NORA report that were also

based on SARE regions. Grouping survey respondents by agro-ecoregions provides a finer scale of geographic categorization that reflects regional specialization of farm commodities, and regional differences in climate, soil types, and environmental stressors. Analyses by agro-ecoregion are highlighted in the main report when discussing needs and challenges related to climatic and environmental stressors.

Demographic information provided by the organic survey participants is used to compare responses from minoritized organic farmers (including Black, Indigenous and other people of color, hereafter 'BIPOC') and White organic farmers, as well as beginning (i.e., 10 years or less of farming experience) and experienced farmers (i.e., more than 10 years of farming experience) to better describe the specific needs of these different organic farming populations. The results for these categorical breakdowns are only presented in the main report when there are notable differences between farming groups; in all other instances, these analyses are provided in the supplements.

The participation of BIPOC organic farmers and ranchers in the NORA survey was low (4%). However, it closely mirrors the 2019 National Agricultural Statistics Service (NASS) data, with just 3.6% of certified organic farmers in the U.S. identifying as BIPOC and only 4.6% of all U.S. farmers identifying as BIPOC. These low percentages are indicative of the structural racism that persists in organic agriculture and agriculture in general.

Preceding the report findings is an acknowledgement statement that provides historical context to better understand the challenges that BIPOC producers have experienced. These challenges are detailed throughout the report, with additional context found in the third chapter of the report. Racial discrimination outlined in this report is only a snippet of the country's long-standing pattern of systemic racism, but raising this lens to the organic community is paramount to an equitable future of organic farming.

In each topical section of the report, the report highlights the top five challenges, needs, or concerns identified by the survey population and provides a discussion around each topic drawing from information gathered from the focus groups. These top challenges, needs, and concerns are used to direct OFRF's research and policy recommendations, which are summarized at the end of each section.

Goals of the 2022 NORA Report

Organic systems rely heavily on the soil food web for crop nutrition and crop protection, and organic practitioners protect soil organisms by avoiding the use of synthetic chemicals and implementing regenerative best organic management practices. One objective of this report is to evaluate how frequently organic farmers are using environmental stewardship practices that are regenerative, build healthy soils, and provide a myriad of benefits related to farm resilience, resource conservation, and climate change mitigation and adaptation. For this report, environmental stewardship entails the use of practices that promote the conservation of natural resources, including regenerative soil health practices, often termed 'soil health management practices,' 'best management practices,' or 'diversified production practices'–these including cover cropping, crop rotations, intercropping, and conservation tillage. OFRF has extensively analyzed the science behind these practices and the roles they play in supporting soil health and the overall resilience of organic farms. The 2022 NORA report describes the use of these beneficial practices by organic and transitioning farmers across the country, and evaluates the extent to which organic practitioners are already implementing practices that provide environmental and climate benefits.

Another main goal of this report is to present up-to-date information on current organic production and non-production challenges faced by organic and transitioning producers and outline corresponding research and policy priorities to address those challenges. To highlight the challenges associated with a limited organic seed supply and a lack of cultivars bred specifically for organic conditions, the updated report features a robust discussion of organic seed and breeding needs developed in collaboration with OSA. The 2022 report also includes a new section on farmer-identified solutions to organic production and non-production challenges that surfaced during focus group discussions with organic and transitioning productions.

The report will inform USDA researchers, universities, agricultural Extension agents, farmers, ranchers, and other stakeholders on how research, education, and Extension activities and funds can be focused to most effectively meet the needs of organic producers and aid in increasing certified organic acreage. By documenting the beneficial practices organic producers are already implementing, identifying where more research and technical support is needed, and highlighting potential solutions, the 2022 NORA report will help advance research, diffusion, and adoption of solutions that will build a more resilient, climate-friendly, and sustainable agricultural and food system.

EQUITY ACKNOWLEDGEMENT

The Organic Farming Research Foundation (OFRF) would like to preface the findings of the 2022 National Organic Research Agenda (NORA) by acknowledging the history, experience, and struggles of farmers and ranchers in North America who identify as Black, Indigenous and other people of color (BIPOC). While we assess the contemporary challenges facing all organic producers, it is imperative to also position the experience of organic BIPOC growers and ranchers within the broader historical context that has too often been inaccurately documented and erased. Including this acknowledgement in the 2022 NORA is just one of many steps OFRF is taking to remain transparent in our research findings and begin to address systemic inequities.

Land dispossession, cultural theft, and labor violations against BIPOC farmers and ranchers in the United States have spanned centuries and impacted generations. Historical examples illustrating these violations include, but by no means are limited to:

- Colonization and destruction of Native communities to erect Anglo settlements and colonies (1492)
- Enslaved African people being forcibly transported to what is now called the United States (1619)
- Seizure of Indigenous lands post-Revolutionary War (1783)
- Indian Removal Act targeting Native peoples (1830)
- Anglo occupation on the lands of Mexican subsistence ranchers in the lower Rio Grande Valley (1848)
- Dispossession of Native Americans of approximately 246 million acres (1862)
- Termination of Special Field Order No. 15, which provided freed Black Americans with 40-acre plots (1865)
- Dawes Act forcibly assimilating Indigenous people and allotting tribal community lands to individual parties (1887)
- Establishment of 150 National Forests, displacing Indigenous and Latino/a/x populations from traditional farmland (1901)
- California Alien Land Law manipulating land ownership requirements targeting predominantly Asian immigrants (1913)
- New Deal systematically excluding Black farmers from subsidies (1930s)
- Executive Order 9066 seizing Japanese-owned property, businesses, and farmland; physically removing populations to incarceration camps (1942)
- Bracero program introducing Mexican contract labor and unchecked farmworker labor violations (1942-1964)
- Continued str uctural racism against Black Americans spanning a century (post-Civil War through Jim Crow era, 1865-1960s)
- United States Commission on Civil Rights exposing USDA racial discrimination against Black farmers (1965)
- Virtual dismantling of the Civil Rights Office of the USDA (1984)
- Pigford v. Glickman finds USDA continuing its discrimination against Black farmers (1999)
- Pigford II finds USDA delaying its settlement claims to Black farmers (2010s)

OFRF acknowledges its privilege as a predominantly White-led organization and recognizes that BIPOC perspectives need to be highlighted for all organic farming systems to develop and thrive. Today's agriculture system is a continued product of stolen land and enslaved labor of people of color to favor the interests of White people. OFRF is committed to advancing beyond the conversation of social justice as it intersects with organic agriculture, and toward an anti-racist future that holds our board members, staff, and partner organizations accountable in dismantling systemic racism in organic farming.

CHAPTER 1
Farmer Characteristics

Organic Survey Participants

All farmers and ranchers who participated in the organic survey were certified organic through the National Organic Program (NOP). They represented a broad range of ages, farm sizes, commodities, and geographic regions in the U.S. (*see Table 1.1*).

There was a wide range of ages represented in the survey. Most organic survey participants were over the age of fifty-four (59%) and about 30% were under the age of forty-five. Female farmers accounted for less than one quarter of survey respondents (22%), while most respondents were male (78%); 1% of respondents preferred not to specify (*Table 1.1*). Most organic survey participants identified as White (96%), while participation by BIPOC farmers was low (4%) (*Table 1.1*). Possible reasons for the particularly low response rate from BIPOC farmers and strategies for increasing participation by this population in future surveys are discussed in chapter three.

The survey asked respondents to report the amount of certified organic land they operated and to distinguish between owned and leased land. The total size of certified organic farms, including owned and leased land, ranged from less than one acre to over 80,000 acres. The median total farm size was sixty acres. While many organic survey participants reported owning or leasing twenty-five acres or less of certified organic land (41% and 43%, respectively), medium- and large-scale operations were also well represented in the survey—almost one third of survey respondents owned and/or leased more than 100 acres of certified organic land (*Table 1.1*). There was a similar breakdown in landholding size when considering the total amount of certified organic land operated by respondents (i.e., owned and leased acres) (*Table 1.1*).

Surveyed farmers were asked to identify the commodities they grew or raised for sale, which were then organized into seven categories. Overall the respondents grew or raised a wide variety of products. Vegetables, herbs, and flowers (37%) and field crops (36%) were the most common, followed by tree and vine crops (26%) and livestock and dairy (25%). Survey participants also grew forage crops (22%), berries (19%), and seeds for planting (14%) (*Table 1.1*).

The organic survey participants were well-distributed across the U.S. (*Figure 1.1a and Figure 1.1b*). West Virginia was grouped with the Southern SARE region in this report. Most survey respondents were in the Pacific region (27%) and Northeast region (21%), followed by the Great Lakes region (16%), Corn Belt region (15%), and Great Plains and Mountains (simply referred to as 'Great Plains' hereafter) region (14%). The Southern region had the fewest organic survey respondents (7%) (*Table 1.1*).

Figure 1.1a

Map of organic survey respondents.

Total farmer responses for the 2022 National Organic Research Agenda.

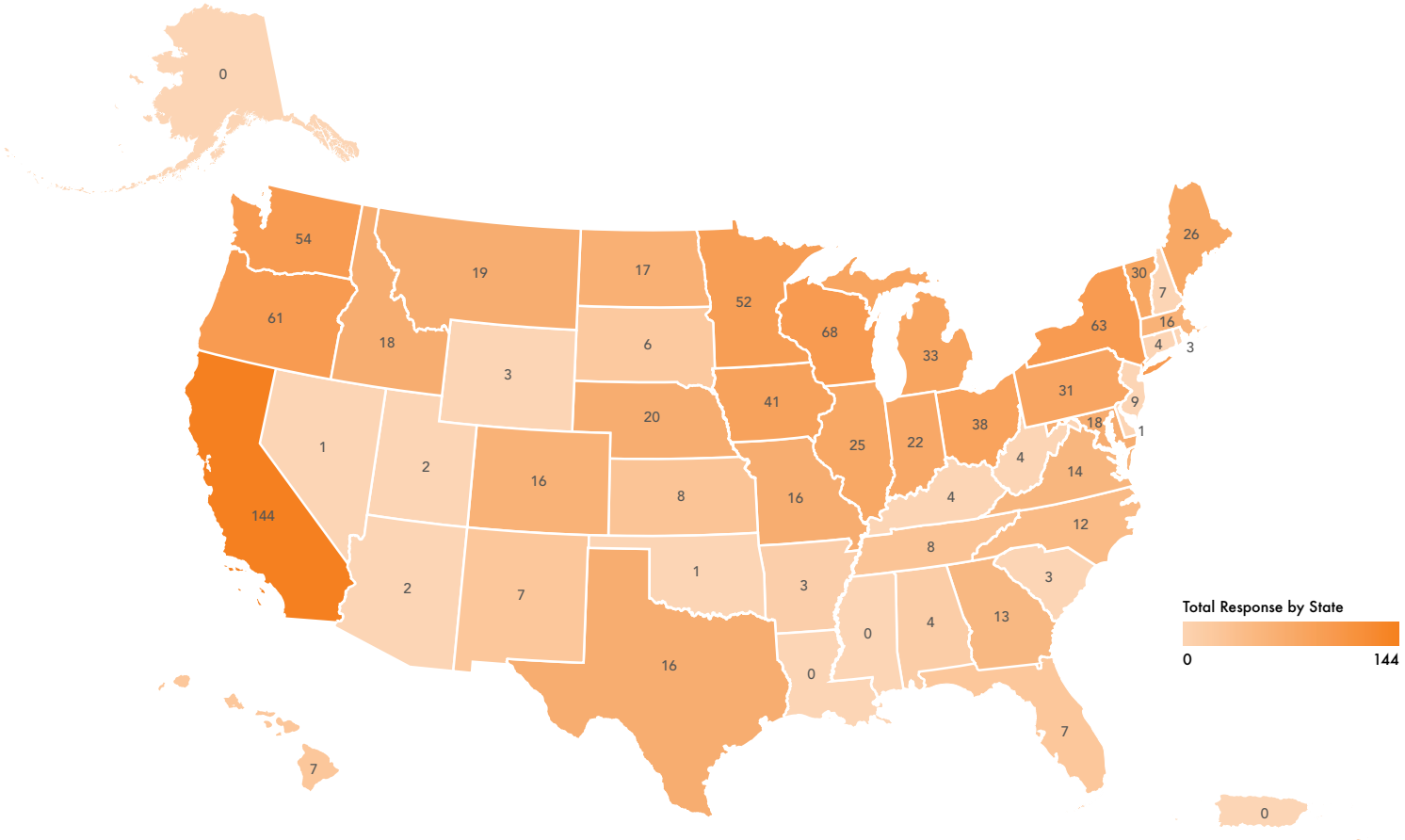


Figure 1.1b

Map of agricultural regions.

Source: Sustainable Agriculture Resource and Education (SARE).

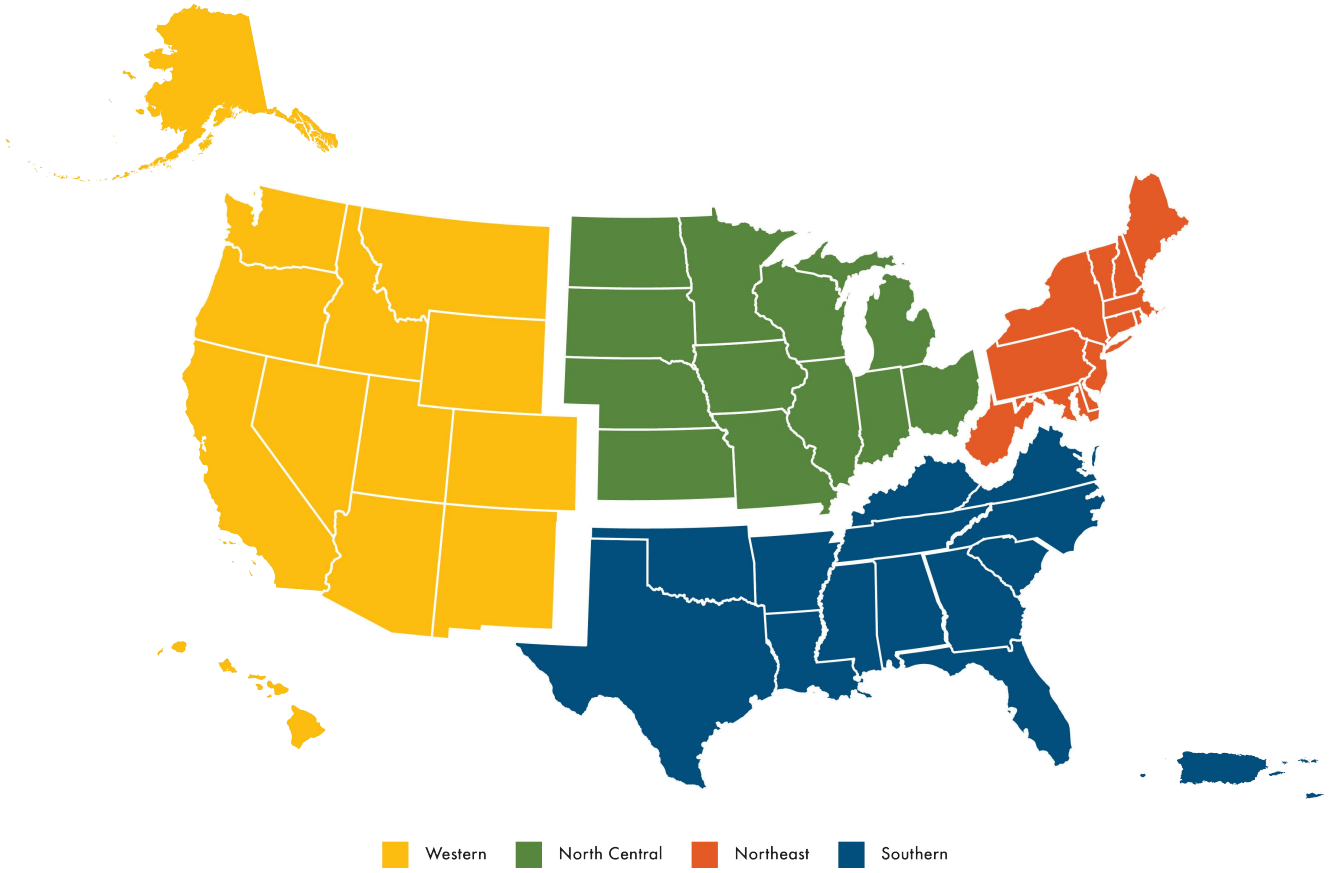


Table 1.1

Demographic information for organic survey participants.

The number of individuals who provided a response in each category is represented by "n." Not all survey participants provided a response to each demographic category.

FULL ORGANIC SURVEY SAMPLE		
Category		Percent
Age	18-24 (n=2)	<1%
	25-34 (n=70)	10%
	35-44 (n=132)	18%
	45-54 (n=99)	14%
	55-64 (n=188)	26%
	65-74 (n=191)	26%
	75-84 (n=43)	6%
	85-94 (n=1)	<1%
Sex	Male (n=568)	78%
	Female (n=160)	22%
	Prefer Not to Say (n=4)	1%
Race	White (n=1,013)	96%
	BIPOC (n=46)	4%
Farming Experience	Beginning Farmer (less than 10 years of farming experience) (n=168)	23%
	Experienced Farmer (more than10 years of farming experience) (n=573)	77%
Organic Acres Owned	25 or less (n=347)	41%
	26-100 (n=212)	25%
	101-500 (n=207)	25%
	501-1000 (n=40)	5%
	More than 1,000 (n=35)	4%
Organic Acres Leased	25 or less (n=208)	43%
	26-100 (n=109)	22%
	101-500 (n=119)	24%
	501-1000 (n=24)	5%
	More than 1,000 (n=28)	6%
Total Acres (Owned & Leased)	25 or less (n=369)	38%
	26-100 (n=334)	22%
	101-500 (n=253)	25%
	501-1000 (n=60)	6%
	More than 1,000 (n=68)	7%

Table 1.1 (continued)

Commodities	Vegetable/Herbs/Flowers (n=346)	37%
	Field Crops (n=341)	36%
	Tree and Vine Crops (n=248)	26%
	Livestock and Dairy (n=230)	25%
	Forage Crops (n=209)	22%
	Berries (n=181)	19%
	Seeds for Planting (n=132)	14%
Location by SARE Region	North Central (n=346)	35%
	Western (n=334)	34%
	Northeast (n=212)	22%
	Southern (n=85)	9%
Location by Agro-ecoregion	Pacific (n=266)	27%
	Northeast (n=208)	21%
	Great Lakes (n=153)	16%
	Corn Belt (n=142)	15%
	Great Plains and Mountains (n=136)	14%
	South (n=72)	7%

Comparison of Age, Race, Sex, and Geography with NASS Survey Data

The organic survey sample showed an age distribution just slightly older than the broader organic community and substantially younger than the whole U.S. farming population reported in the USDA Agricultural Statistics Service (NASS) 2017 Agricultural Census (*Table 1.2*). The 4% of organic survey respondents who identified as BIPOC closely matched 2017 Agricultural Census data for organic farmers (3.6%) and all farmers (4.6%). In contrast, the NORA organic survey sample showed a substantially greater gender disparity than the NASS data (*Table 1.2*).

The younger demographics reflected in both the NORA and NASS organic surveys indicate that investing in organic research, education, and Extension is an investment in the future of agriculture.

It is important to note that the Agricultural Census counted *producers,* allowing up to four respondents per farming operation, while our survey counted *farms*, and was therefore limited to one respondent per operation.

One encouraging observation from the 2017 Agricultural Census report is that the organic sector has grown substantially since 2012 (USDA, 2019). Total organic farmgate sales more than doubled between 2012 and 2017 ($3.12 to $7.28 billion) and average sales per farm increased from about $218,000 to $401,000. The number of certified organic farms soared from 12,771 to 17,741, an increase of more than 40%. The number of farms who reported transitioning acreage into USDA certified organic production increased from 3,240 to 3,723, although the survey did not distinguish farms undertaking organic production for the first time versus those who are adding to existing organic acreage.

Table 1.2

Comparison of sex, age, and race demographics of NORA organic survey respondents, organic farmers from the 2017 NASS survey, and all farmers from the 2017 NASS survey.

Demographics Characteristics		NORA Organic Survey	NASS 2017 Survey:Organic Farmers	NASS 2017 Survey: All Farmers
Sex	Male	78%	63%	64%
	Female	22%	37%	36%
Age*	<25 years	<1%	3%	1%
	25-34 years	10%	14%	7%
	35-44 years	18%	18%	12%
	45-54 years	14%	18%	18%
	55-64 years	26%	25%	28%
	65-74 years	26%	16%	22%
	75+ years	6%	5%	12%
Race	White	96%	96.4%	95.6%
	BIPOC	4%	3.6%	4.6%

*Average Farmer Age: NORA Organic Survey, 56.4 years; NASS 2017 Survey of Organic Farmers, 51.3 years; NASS 2017 Survey of All Farmers, 57.5 years

The distribution of organic survey respondents across SARE and agro-ecoregions closely matched the distribution of the entire population of USDA certified organic producers as reported in the 2019 USDA National Agricultural Statistics Service (NASS) Organic Survey (*Table 1.3*). Thus, the small sample size from the Southern region in our survey noted above reflects the smaller number of organic producers in the South, and not a lower participation rate in our survey.

Table 1.3

Comparison of the geographic distribution of the full organic survey sample (i.e., survey respondents from closed and open distribution surveys) to the broader certified organic farming community in the U.S.

The geographic distribution of survey respondents is based on zip codes provided by survey respondents and the geographic distribution of the broader population is based on state data provided in the 2019 NASS Organic Survey (USDA, 2020).

Region		Percent of Organic Survey Respondents	Percent of All U.S. Certified Organic Farmers
SARE Region	Northeast	22% (n=212)	24% (n=4,004)
	North Central	35% (n=345)	35% (n=5,845)
	Southern	9% (n=85)	8% (n=1,384)
	Western	34% (n=334)	32% (n=5,352)
Agro-ecoregion	Northeast	21% (n=208)	24% (n=3,977)
	South	7% (n=72)	7% (n=1,144)
	Great Lakes	16% (n=153)	15% (n=2,540)
	Corn Belt	15% (n=142)	17% (n=2,772)
	Great Plains	14% (n=136)	12% (n=1,939)
	Pacific	27% (n=266)	25% (n=4,213)

Commodities by Region

Substantial differences emerged among the six agro-ecoregions in the leading organic commodities produced (*Table 1.4*). Two-thirds of respondents from the Corn Belt and more than one-half of respondents from the Great Plains and Mountains and the Great Lakes grow field crops, compared to one-quarter or less from other regions. More than three in ten organic farmers from the Northeast, Corn Belt, and Great Lakes produce livestock or dairy, and similar numbers grow forages, while fewer than two in ten in other regions raise livestock or dairy. Few respondents in the South and Pacific reported growing forage crops, while three in ten from the Great Plains and Mountains produce forages.

Specialty crops lead the commodity lists for the South and Pacific, and nearly two-thirds of respondents from the South grow vegetables, herbs, and cut flowers. Notably, tree and vine crops appear to dominate organic production in the Pacific region, while only 10-22% of respondents from other regions grow tree and vine crops. Smaller numbers of organic farmers from all regions produce seeds for planting.

These regional differences in prevalence of different organic commodities may shed light on regional differences in organic conservation practices (Chapter two), and challenges, concerns, and technical assistance needs (Chapter three).

Table 1.4

Commodities produced by organic survey respondents from each of six agro-ecoregions.

Northeast (n=189)	
Vegetables/Herbs/Cut Flowers (n=82)	43%
Livestock and Dairy (n=69)	37%
Forage Crops (n=55)	29%
Field Crops (n=49)	26%
Berries (n=49)	26%
Tree and Vine Crops (n=36)	19%
Seeds for Planting (n=25)	13%
South (n=64)	
Vegetables/Herbs/Cut Flowers (n=41)	64%
Berries (n=26)	41%
Tree and Vine Crops (n=14)	22%
Seeds for Planting (n=13)	20%
Field Crops (n=12)	19%
Livestock and Dairy (n=11)	17%
Forage Crops (n=4)	6%
Great Lakes (n=145)	
Field crops (n=74)	51%
Vegetables/Herbs/Cut Flowers (n=53)	37%
Livestock and Dairy (n=45)	31%
Forage Crops (n=44)	30%
Berries (n=22)	15%
Tree and Vine Crops (n=21)	14%
Seeds for Planting (n=8)	6%

Corn Belt (n=132)	
Field crops (n=88)	67%
Forage Crops (n=46)	35%
Livestock and Dairy (=42)	32%
Vegetables/Herbs/Cut Flowers (n=30)	23%
Seeds for Planting (n=21)	16%
Berries (n=15)	11%
Tree and Vine Crops (n=13)	10%
Great Plains and Mountains (n=125)	
Field Crops (n=71)	57%
Forage Crops (n=37)	30%
Vegetables/Herbs/Cut Flowers (n=31)	25%
Seeds for Planting (n=24)	19%
Livestock and Dairy (n=21)	17%
Tree and Vine Crops (n=16)	13%
Berries (n=11)	9%
Pacific (n=245)	
Tree and Vine crops (n=144)	59%
Vegetables/Herbs/Cut Flowers (n=102)	42%
Berries (n=53)	22%
Seeds for Planting (n=38)	16%
Field Crops (n=36)	15%
Livestock and Dairy (n=33)	13%
Forage crops (n=19)	8%

Transition Survey Participants

Most transitioning farmers were middle-aged with just over 50% of respondents between the ages of 45 and 64. Roughly one-quarter were under 45 years old. As with the organic survey population, most transition survey respondents were male (58%) (*Table 1.5*). The majority of respondents identified as White (82%) and about one-fifth identified as BIPOC. While the number of female and BIPOC farmers represented in the transition survey was low, they accounted for a greater percent of respondents in the transition survey than in the organic survey, which could suggest more women and BIPOC farmers are going into organic production.

Like organic survey respondents, transition survey respondents were asked to report the amount of transitioning land they operated and to distinguish between owned and leased land. The total amount of transitioning acreage operated by respondents, including owned and leased land, ranged from less than one acre to over 14,000 acres. The median transitioning land size was twelve acres. Most transitioning survey

respondents owned, rather than leased, land that was actively transitioning to organic certification; only eight respondents reported leasing transitioning land (*Table 1.5*). While this finding is based on a limited sample size, one explanation could be that the ability to reap the benefits of the long-term investment in time, labor, and resources required to transition land is more secure for landowners than for lessees. Most transitioning landowners farmed on twenty-five acres or less of transitioning farmland (65%) and few farmed more than 100 acres of transitioning land (16%) (*Table 1.5*). Of those respondents who leased transitioning land, most operated less than 100 acres of transitioning land (n=5), while a couple reported operating more than 1,000 acres of transitioning land (*Table 1.5*).

Like the organic survey respondents, transitioning farmers produced a wide variety of commodities (*Table 1.5*). Half of the respondents grew vegetables, herbs, and flowers, and about one-third grew tree and vine crops and berries. Another 31% grew field crops and 27% raised livestock and dairy. Transitioning survey respondents also produced seeds for planting (17%) and forage crops (15%).

As with the organic survey population, transition survey respondents were well-distributed across the U.S. (*Table 1.5*). Most respondents were in the Pacific region (25%), followed by the Southern region (21%), Corn Belt (18%), Northeast (16%), Great Lakes (11%), and Great Plains and Mountains region (9%).

Due to a low survey response rate (n=71), the report only presents results for the full transition survey sample; the transition survey data was not broken down by farming region, farmer race/ethnicity, or farming experience. The results of the transition survey should be interpreted with this small sample size in mind (*Figure 1.2*).

Figure 1.2

Map of transition survey respondents.

Concentrated numbers of transitioning growers.

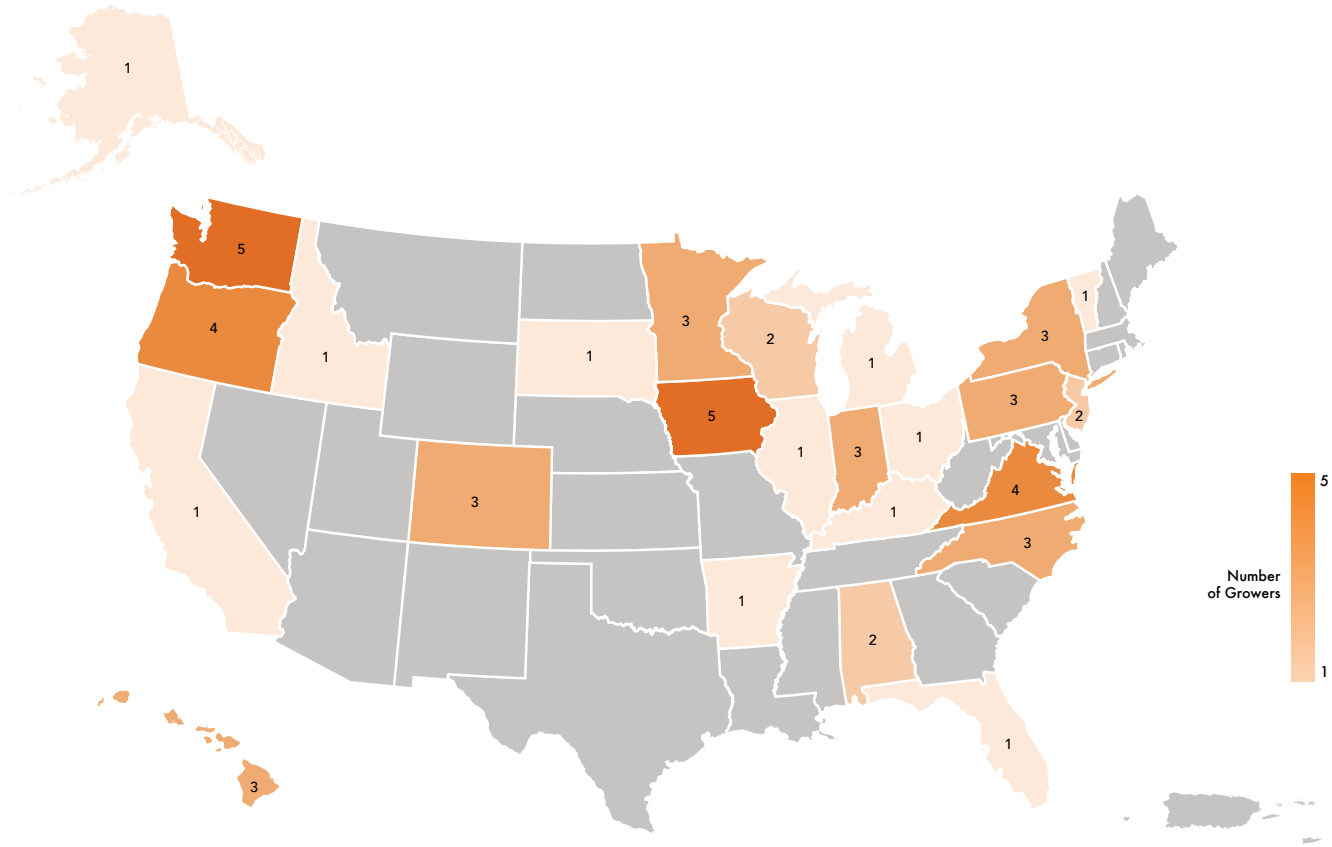


Table 1.5

Demographic information for transition survey participants.

The number of individuals in each category is represented by "n." Not all survey participants provided a response to each demographic category.

FULL TRANSITION SURVEY SAMPLE		
Category		Percent
Age	18-24 (n=0)	0%
	25-34 (n=4)	16%
	35-44 (n=3)	12%
	45-54 (n=6)	24%
	55-64 (n=7)	28%
	65-74 (n=5)	20%
	75-84 (n=0)	0%
	85-94 (n=0)	0%
Sex	Male (n=15)	58%
	Female (n=10)	39%
	Prefer Not to Say (n=1)	4%
Race	White (n=22)	82%
	BIPOC (n=5)	18%
Transitioning Acres Owned	25 or less (n=26)	65%
	26-100 (n=8)	20%
	101-500 (n=4)	10%
	501-1000 (n=1)	3%
	More than 1,000 (n=1)	3%
Transitioning Acres Leased	25 or less (n=3)	38%
	26-100 (n=2)	25%
	101-500 (n=1)	13%
	501-1000 (n=0)	0%
	More than 1,000 (n=2)	25%
Total Acres (Owned & Leased)	25 or less (n=30)	65%
	26-100 (n=10)	22%
	101-500 (n=4)	9%
	501-1000 (n=0)	0%
	More than 1,000 (n=2)	4%

Table 1.5 (continued)

Commodities	Vegetable/Herbs/Flowers (n=24)	50%
	Tree and Vine Crops (n=16)	33%
	Berries (n=16)	33%
	Field Crops (n=15)	31%
	Livestock and Dairy (n=13)	27%
	Seeds for Planting (n=8)	17%
	Forage Crops (n=7)	15%
Location by SARE Region	Western (n=18)	31%
	North Central (n=17)	29%
	Southern (n=12)	21%
	Northeast (n=9)	16%
Location by Agro-ecoregion	Pacific (n=14)	25%
	South (n=12)	21%
	Corn Belt (n=10)	18%
	Northeast (n=9)	16%
	Great Lakes (n=6)	11%
	Great Plains and Mountains (n=5)	9%

Motivations for Pursuing Organic Certification

Transition survey participants were asked to respond "yes" or "no" to a list of potential motivating factors for pursuing organic certification. Survey participants could select as many motivating factors as they desired. Table 1.6 shows the percent of transition survey respondents who indicated each option was a motivating factor for them.

Almost all survey participants who provided an answer for this question indicated that concerns about the environment and biodiversity (98%), and the potential to enhance their farm's environmental sustainability (97%) were key reasons they decided to transition to organic certification (*Table 1.6*). Personal and/or family values (95%) and concerns about human health were also commonly cited motivating factors (*Table 1.6*).

Farmers who were already certified organic also reflected on their motivations for pursuing organic certification during focus group discussions, and many also indicated that their personal values and environmental concerns were primary motivations for becoming certified organic. Some representative organic farmer comments are listed below.

"It's also definitely philosophy, just with water quality and on soil quality and all the issues with human health and health for the planet, as well."

"And so for us a big part of it is kind of setting a standard. Like it's all natural all the time, even if something goes wrong or, you know, just that kind of commitment is really big for us."

"But for me, because of the bigger picture of the importance that I think organic plays in the bigger community, it was more about me supporting the institution of organic and the USDA label and the importance of that and me paying my dues to actually be certified, because I could have easily, in the scale of my farm, I could have easily just been a sustainable farm and marketed myself as growing using organic practices and not actually done the extra legwork and extra paperwork and extra recordkeeping and fees to actually be certified organic. But I feel like it's my responsibility to do that."

"In my view, and I think kind of what many of you have expressed, is that certification, per se, isn't what makes you get up in the morning. It is figuring out how to farm the way you believe in farming."

"You know, kind of this pushback, like [the other participant] mentioned, the breeding hormones, like the BGH, and then all of a sudden we have like pollen drift from these GMO crops. And it was really irritating. I wanted to be part of a bigger group that's pushing back against that. So that's part of it."

A little over three quarters of transition survey respondents (78%) were also motivated by the potential to increase profits (*Table 1.6*). As one transitioning farmer explained:

"For me it was a no-brainer to start this change and continue with it. It seems like in the conventional market every time it looks like there is a dime to be made it's quickly calculated out by the chemical industry to see just where the breaking point is, or in the seed industry just how many traits they can put in."

"We were already planning on growing organically and were, and so the certification itself was to simply to be able to use the word [organic]."

Enhanced resilience to climate change through organic practices (78%) and concerns about farm worker well-being (77%) were also important motivations for farmers transitioning to organic certification (*Table 1.6*).

Another common theme that arose during the focus group conversations, mostly with farmers who already had their organic certification, was that becoming certified organic was a way to simplify marketing and avoid difficult questions.

"I can agree with [the other participant] and say that…you are having to answer that question constantly. You are already doing organic practices and beyond organic practices, and so it was just the easy transition into telling people what exactly we were doing. Plus it helps—because for me I felt like it was—it's more of an

indicator of the way that we were growing. So it's showing people, even before they come up and buy our produce, like, you know, the practices that we use."

"I applied for certification right when I first started my farm for the same reason others have said. It's like, well, I'm going to be growing that way, why do I want a whole host of questions to have to answer and figure out another set of responses, et cetera, et cetera, so to eliminate that."

"I know I personally got kind of sick of trying to answer the, are you organic, question diplomatically, or in the right way, so that was kind of my main motivator."

Table 1.6

List of motivating factors for transitioning to organic certification ranked in order from most common to least common motivating factor.

The "n" denotes the number of survey participants who indicated a topic was a motivating factor.

Motivating Factors	Percent of Respondents Who Rated as a Motivating Factor
Concerns about the environment and biodiversity (n=39)	98%
Potential enhancement of farm environmental sustainability (n=38)	97%
Personal and/or family values (n=36)	95%
Concerns about human health (n=35)	90%
Potential increase in profit (n=28)	78%
Greater resilience to the impacts of climate change through organic practices (n=29)	78%
Concerns about farm worker well-being (n=30)	77%
Access to the expanding market for organics (n=27)	69%
Response to a community need for organically produced products (n=23)	64%
Specific market opportunity or contract from a buyer (n=9)	25%

Marketing Venues

Organic Survey Participants

Most organic survey participants sold the majority of their products locally (64%) and just over one-fifth (22%) of respondents reported selling the majority of their products regionally (*Table 1.7*). Marketing the majority of products at the national scale or at a combination of scales was not common (*Table 1.7*). After wholesale (45%), direct-to-consumer (29%) was the most common marketing venue for organic producers, followed by direct-to-retail (10%) (*Table 1.8*). A small percentage (6%) of organic survey participants marketed the majority of their products to food hubs or cooperatives (*Table 1.8*).

Table 1.7

Scale at which organic farmers market the majority (i.e., 50% or more) of their products.

The number of respondents marketing the majority of their products at each scale is represented by "n." The table shows the scales used by at least 1% or more of organic survey respondents.

Marketing Region	Percent of Respondents Who Indicated as a Primary Sales Region
Local (n=470)	64%
Regional (n=163)	22%
National (n=59)	8%
Local and Regional (n=24)	3%
Regional and National	1%

Table 1.8

Primary marketing outlets used by organic survey respondents.

The number of respondents marketing the majority (i.e., 50% or more) of their products by each outlet type is represented by "n." The table shows the primary marketing categories used by at least 1% or more of organic survey respondents.

Marketing Outlet	Percent of Respondents Who Used as a Primary Marketing Outlet
Wholesale (n=328)	45%
Direct-to-consumer (n=210)	29%
Direct-to-retail (n=72)	10%
Food hub or cooperative (n=47)	6%
Direct-to-consumer & Direct-to-retail (n=14)	2%
Direct-to-consumer & Wholesale (n=8)	1%

Transition Survey Participants

Unlike organic producers, transitioning producers tended to sell the majority of their products locally (85%) (*Table 1.9* and *Figure 1.3a*). Transitioning survey respondents rarely marketed their products at regional and/or national scales (15%) (*Table 1.9* and *Figure 1.3a*). While organic producers tended to market products wholesale, the majority of transition survey respondents marketed direct-to-consumer (46%) (*Table 1.10* and *Figure 1.3b*). The trend of transitioning producers favoring direct-to-consumer markets could be related to the lack of a well-recognized "transitional" definition or label. These markets could give transitioning producers an opportunity to speak directly with customers and explain their transitioning status and production practices. After direct-to-consumer marketing, the most common primary marketing outlet for transitioning producers was wholesale (13%) or a combination of wholesale and direct-to-consumer (13%) (*Table 1.10*). In contrast to organic survey participants, transition survey participants did not report food hubs or cooperatives as a primary marketing venue (*Figure 1.3b*).

Table 1.9

Scale at which transitioning farmers market the majority (i.e., 50% or more) of their products.
The number of respondents marketing the majority of their products at each scale is represented by "n."

Marketing Region	Percent of Respondents Who Indicated as a Primary Sales Region
Local (n=19)	86%
Regional (n=1)	5%
National (n=1)	5%
Local and National (n=24)	5%

Table 1.10

Primary marketing outlets used by transition survey respondents.
The number of respondents marketing the majority (i.e., 50% or more) of their products by each outlet type is represented by "n."

Marketing Outlet	Percent of Respondents Who Used as a Primary Marketing Outlet
Direct-to-consumer (n=11)	46%
Wholesale (n=3)	13%
Direct-to-consumer & Wholesale (n=3)	13%
Direct-to-retail (n=1)	4%
Direct-to-consumer & Direct-to-retail (n=1)	4%

Figure 1.3a

Comparison of organic and transitioning farmers' sales regions.

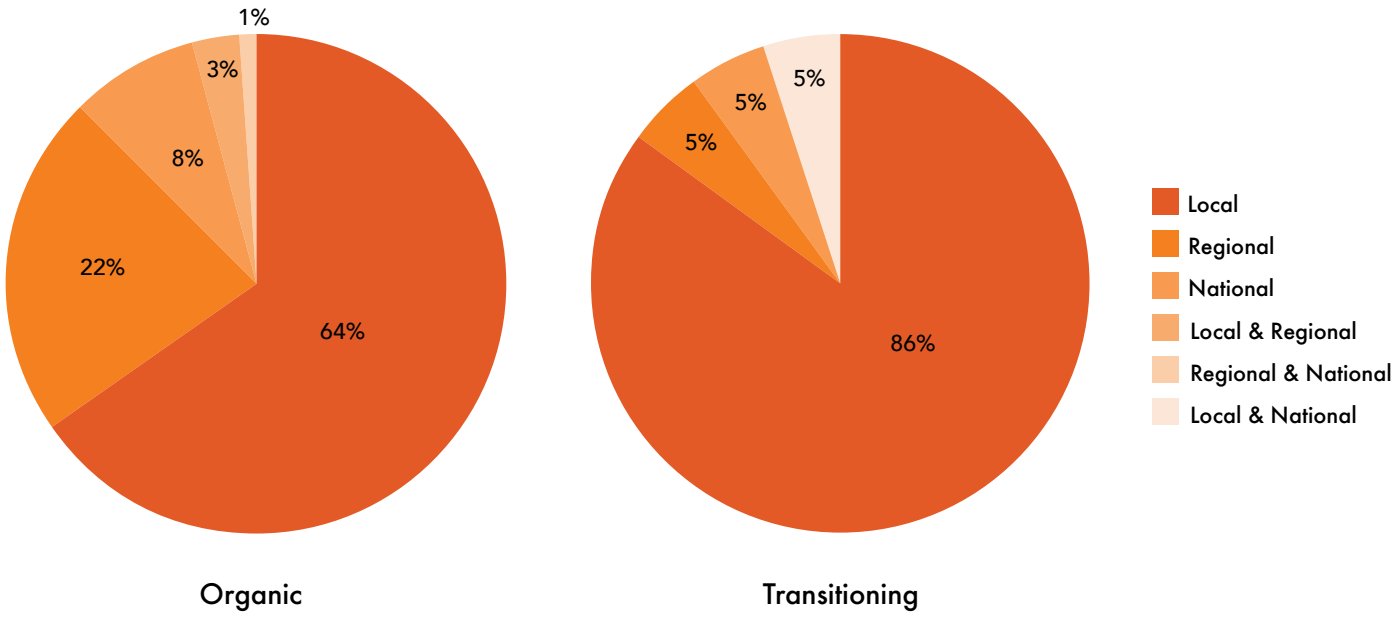
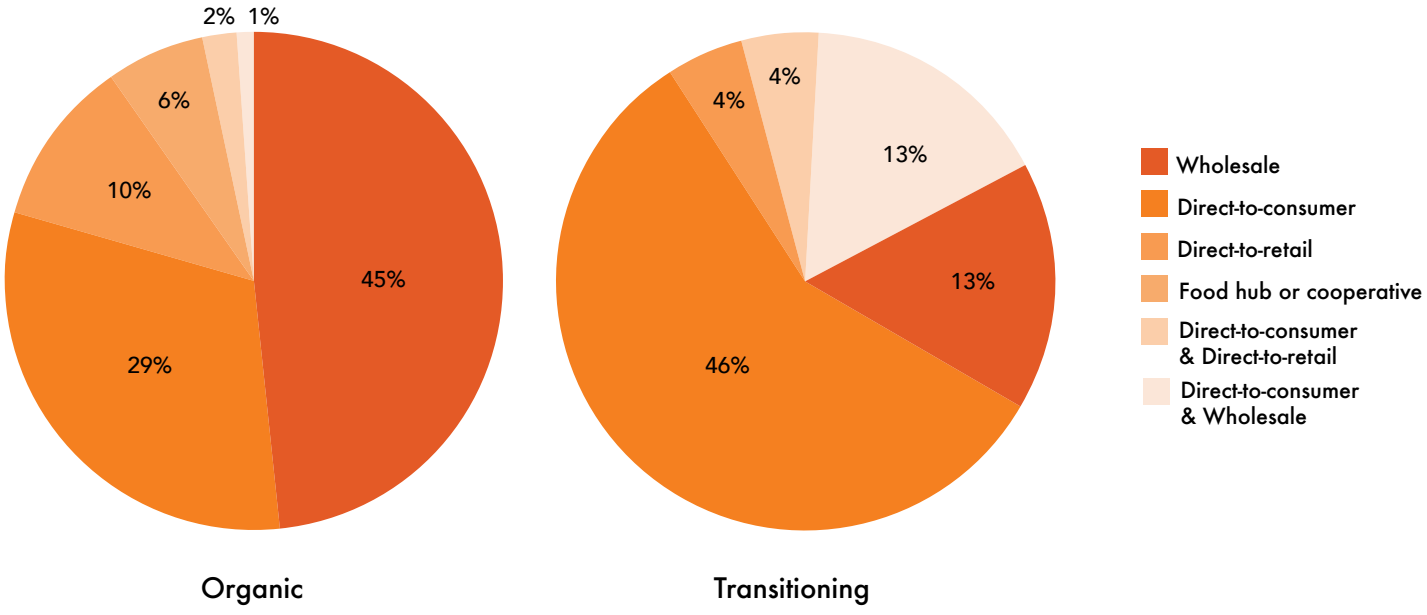


Figure 1.3b

Comparison of organic and transitioning farmers' primary marketing outlets.



CHAPTER 2
Current Use of Soil Health Management Practices, Water Conservation, Organic Inputs, and Organic Seed in Organic and Transitioning Systems

2.1 Soil Health Management Practices

Organic Survey Participants

Full Organic Survey Sample

Organic survey respondents were asked to indicate how often they implemented three types of regenerative soil health management practices related to cropland diversification, including cover crops and green manures, crop rotations, and intercropping. Respondents could indicate how often they implemented these practices using a four-point scale ranging from "very often" to "never." Respondents could also indicate a particular practice was not applicable to their operation.

Crop rotations were the most intensively implemented soil health management practice by organic survey respondents; 63% of respondents reported using crop rotations very often and an additional 23% sometimes or often rotate crops (*Fig. 2.1*). Cover crops and green manures were used by 88% of survey respondents, with almost half of respondents indicating they cover crop very often (*Fig. 2.1*). In contrast, only 19% of respondents indicated they intercropped very often and 36% reported never intercropping (*Fig. 2.1*).

Cover crops and green manures were used by 88% of survey respondents, with almost half of respondents indicating they cover crop very often.

National Organic Program (NOP) rules that address diversification practices include:

§205.203 Soil Fertility and Crop Nutrient Management Practice Standard. "(b) The producer must manage crop nutrients and soil fertility through rotations, cover crops, and the application of plant and animal materials."

§205.205 Crop Rotation Practice Standard. "The producer must implement a crop rotation including but not limited to sod, cover crops, green manure crops, and catch crops that … (a) maintain or improve soil organic matter content. (b) provide for pest management … (c) manage deficient or excess plant nutrients; and (d) provide erosion control."

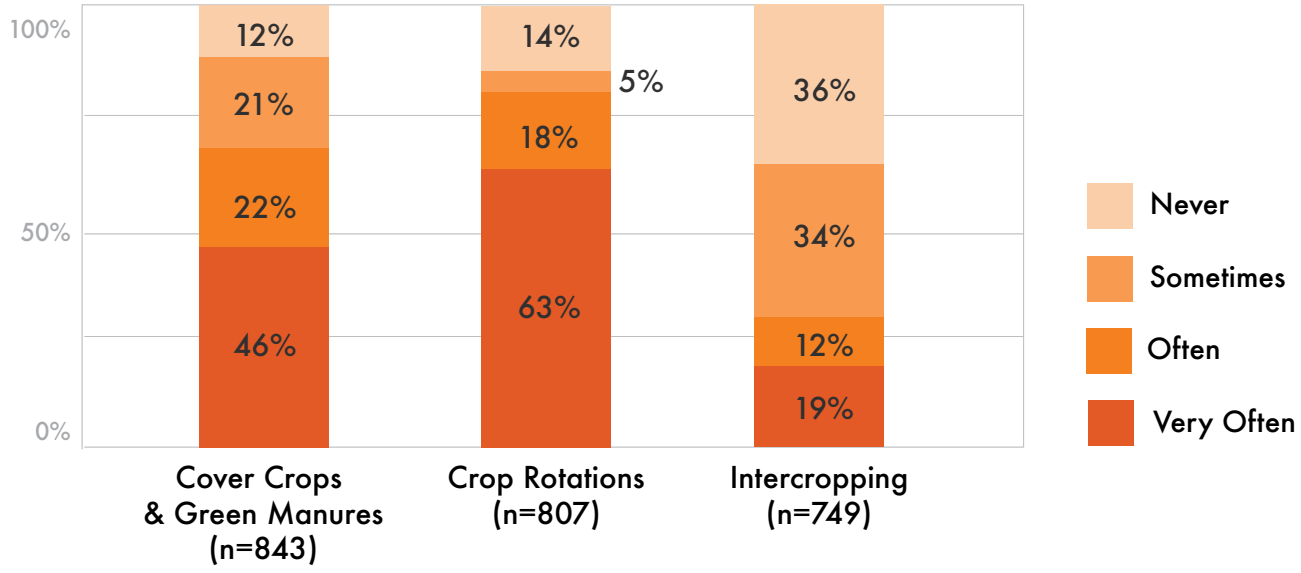
§205.2 Terms Defined. "Crop rotation. The practice of alternating the annual crops grown on a specific field in a planned pattern or sequence … Perennial cropping systems employ means such as alley cropping, intercropping, and hedgerows to introduce biological diversity in lieu of crop rotation.

The high percentages of respondents who rotate crops and plant cover crops indicates a high level of compliance with NOP standards. Because the survey instrument did not include definitions of common organic practices, some respondents may have indicated use of either rotation or cover crops when in fact they implemented both practices. In addition, it is also possible that survey respondents growing perennial crops or grazing livestock, but not annual vegetable or field crops, indicated they never implemented cover crops or crop rotations rather than indicating these practices were not applicable to their operation. In addition, many producers of perennial crops likely used the biodiversity practices outlined above in section 205.2 of the NOP standards cited above.

Figure 2.1

Frequency of implementation of soil health management practices by organic farmers in the U.S (full organic survey sample).

"n" denotes the total number of survey participants who provided a response for the corresponding practice (i.e., cover crops and green manures, crop rotations, intercropping).



Soil Health Management Practices Across Commodity Categories

More than three-quarters of respondents who produce organic vegetables, herbs, cut flowers, or field crops plant cover crops regularly (i.e., "often" or "very often"), and nearly all of them routinely rotate crops. These percentages are notably higher than for respondents who do not produce these commodities (*Table 2.1*). The survey results show that organic producers of annual crops understand that cover cropping and crop rotation are especially important for soil health, pest and disease management, and long-term productivity in annual crops.

Understandably, a lower percentage of tree and vine crop growers indicated that they rotate crops regularly than other respondents; however, they may implement other stewardship practices as noted above. Intercropping is one example, and organic producers of tree and vine crops as well as other specialty crops intercropped somewhat more often than other organic farmers (*Table 2.1*).

Respondents who produce seed for planting utilize all three practices at markedly higher rates than other respondents (*Table 2.1*). This suggests that these growers have found diligent rotation and high plant diversity essential for the production of high-quality seed, likely because these practices break pest and pathogen life cycles, and potentially provide habitat for natural enemies of arthropod pests.

Producers of livestock, dairy, and forage crops reported utilizing these soil health management practices about as often as other respondents (*Table 2.1*). For a full breakdown of organic survey responses on best management practices by commodity category, see *Figure S1* in the Supplements.

Table 2.1

Relationship between organic commodities produced and utilization of cover crops, crop rotation, and intercropping.

The table divides respondents who produce each of the organic commodity categories and shows the percentages who implement each soil health management practice regularly ("very often" or "often"). Differences of ten percentage points or more between those who grow and who do not grow a particular commodity are identified in the table.

Commodity Grown and Raised	Cover Crops	Crop Rotation	Inter-cropping
Farmers who GROW Vegetables/Herbs/Cut Flowers	78% >10%	97% >10%	39% >10%
Farmers who DO NOT GROW Vegetables/Herbs/Cut Flowers	61%	70%	24%
Farmers who GROW Berries	73%	78% >10%	78% >10%
Farmers who DO NOT GROW Berries	66%	80%	27%
Farmers who GROW Tree and Vine Crops	68%	65% >10%	38% >10%
Farmers who DO NOT GROW Tree and Vine Crops	67%	86%	28%
Farmers who GROW Field Crops	76% >10%	96% >10%	35%
Farmers who DO NOT GROW Field Crops	62%	70%	28%
Farmers who RAISE Livestock and Dairy	70%	83%	36%
Farmers who DO NOT RAISE Livestock and Dairy	67%	81%	29%
Farmers who GROW Forage Crops	70%	87%	33%
Farmers who DO NOT GROW Forage Crops	67%	79%	30%
Farmers who GROW Seeds for Planting	84% >10%	99% >10%	47% >10%
Farmers who DO NOT GROW Seeds for Planting	65%	78%	26%

Perennial Conservation Plantings

Perennial conservation plantings play important roles in agroecosystem health and in meeting NOP requirements to conserve biodiversity in organic operations. Most survey respondents (74%) reported maintaining some of their certified land in one or more of the following: buffer strips or border rows (54%); hedgerows, windbreaks or shelterbelts (35%); wildflower strips (17%); and other plantings such as woodland, prairie, or other natural areas (7%). Many organic producers have developed highly diversified agroecosystems that include two (28% of respondents) or three (11%) of these practices. Plantings ranged from 0.1 acres to hundreds of acres in extent, with most respondents reporting total areas for buffers, border rows, hedgerows, windbreaks, or shelterbelts covering one to ten acres, and wildflower plantings of 0.1 to 10 acres.

These plantings provide multiple ecosystem services including beneficial and pollinator habitat, reducing wind and water erosion, intercepting nutrient- and sediment-laden runoff, and enhancing soil health and sequestering carbon within the area covered by perennial vegetation. In addition, when planted along the perimeters of organic production areas, hedgerows and other conservation plantings can intercept pesticide spray and GMO pollen drift and runoff from neighboring conventionally managed fields, thereby protecting organic crops, livestock, and grazing lands from contamination with NOP-prohibited substances.

According to the USDA National Organic Standards, buffer zones between organic crops and non-organic crops must be of sufficient size and structure to prevent drift or runoff of non-approved substances.

Farming Region

When the frequency of implementation of soil health management practices was broken down by agro-ecoregion, there was a notable drop in the use of crop rotations in the Pacific region where 35% of respondents reported never using crop rotations (*Fig. 2.2*). In comparison, crop rotations were implemented to some extent by at least 88% of respondents in the other agro-ecoregions (*Fig. 2.2*).

This likely reflects that, among survey respondents, tree and vine crops are the leading organic commodity in the Pacific region, while either vegetables/herbs/flowers or field crops head the list in all other regions (*Table 1.4*). Diligent crop rotation and annual cover cropping are essential for organic annual cropping systems, while tree and vine crops are grown for several decades after planting; thus, some orchardists may have answered "never" to the crop rotation question. Maintaining year-round orchard floor coverage with diverse vegetation or residues is vital for soil and agroecosystem health in tree and vine crops (Lorenz and Lal, 2016; Reeve, 2012). Organic producers often plant a mixed-species perennial cover in orchard floor and vineyard alley once the trees/vines are well established, but not all respondents may have considered this to be "cover cropping."

Crimson clover, a common cover crop.

Respondents from the South tended to use cover crops more often than in other regions. This may reflect the greater need for cover crops in the rotation to replenish soil organic matter (SOM) and nitrogen (N) in Southern region soils, which tend to lose SOM rapidly and have lower inherent fertility than soils in cooler parts of the U.S. (Duncan, 2017). Coastal plains soils with sandy topsoil horizons have especially low capacity to retain SOM, N, and other nutrients, while many upland soils with higher clay content are especially prone to erosion and compaction (Bergtold and Sailus, 2020; Weil and Brady, 2017). Vigorous cover crops help address these constraints, improve organic crop yields, and reduce input needs (Ibid., Kloot, 2018; Marshall et al., 2016).

Cover crops also protect vulnerable soils from the region's heavy rainfalls, and help producers manage the intense weed, pest, and disease pressures that can develop in hot, humid conditions (Clark, 2007; Schonbeck

et al., 2017). At the same time, the region's long growing seasons and mild winters offer a greater opportunity to utilize a wider range of cover crops and keep the soil covered year-round. In addition, a high percentage of Southern organic farmers produce vegetables, herbs, and/or flowers. Many of these farmers understand the need for high-biomass cover crops in rotation with these low-residue cash crops to prevent erosion and maintain SOM (Schonbeck et al., 2020).

Cover crop use frequency was second highest in the Corn Belt, where two-thirds of respondents grow field crops. Conversely, the colder climates and shorter growing seasons in the Great Lakes and Northeast regions can impose logistical and economic constraints on integrating cover crops into annual crop rotations (Delate, 2013; Sheaffer et al., 2007). These challenges could contribute to less frequent use of cover crops (*Fig. 2.2*). For a breakdown by SARE region, please refer to *Figure S2* in the Supplements.

Figure 2.2

Frequency of implementation of soil health management practices by organic farmers across six agro-ecoregions.

"n" denotes the total number of survey participants from each agro-ecoregion who provided a response for the corresponding practice (i.e., cover crops and green manures, crop rotations, intercropping).

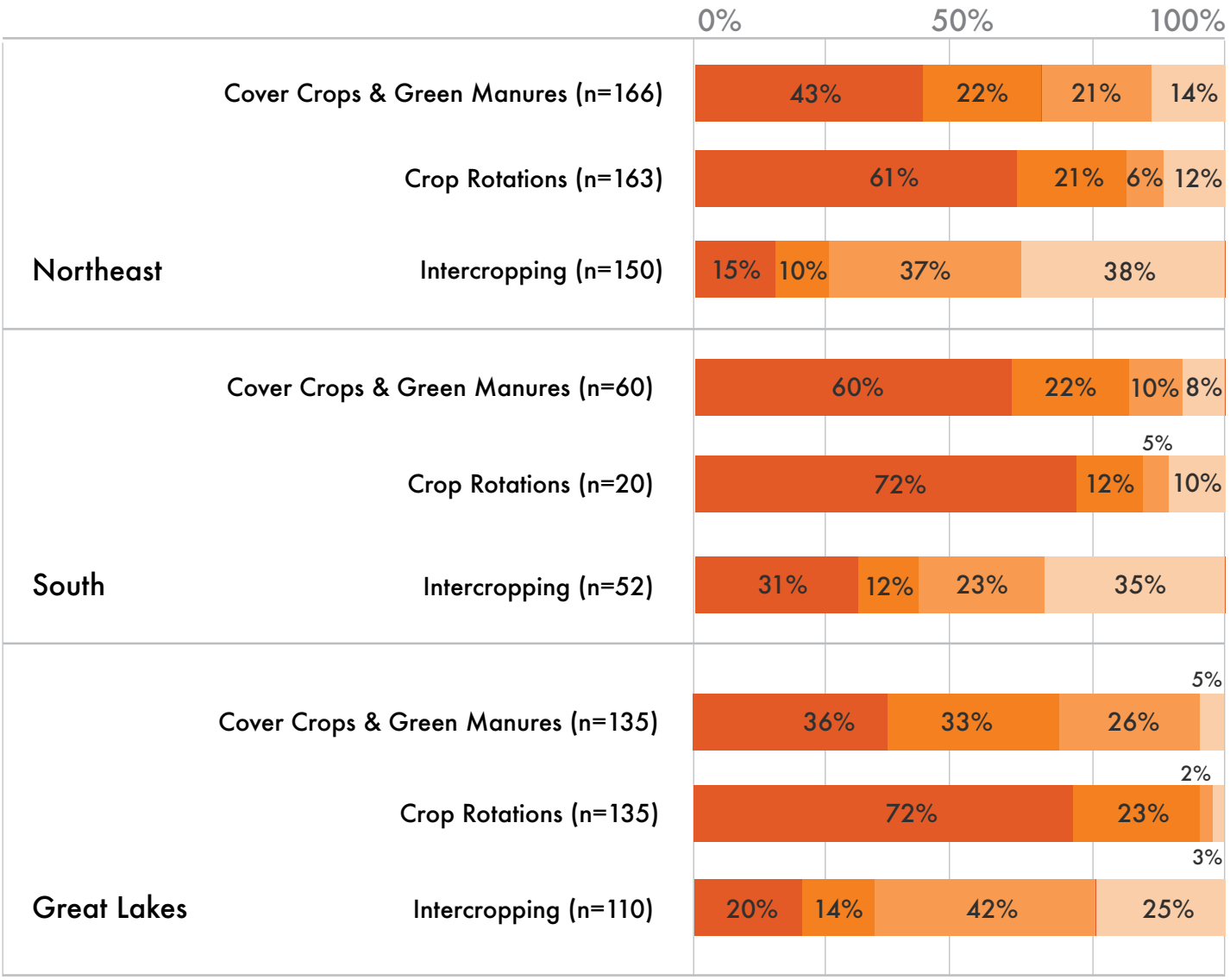
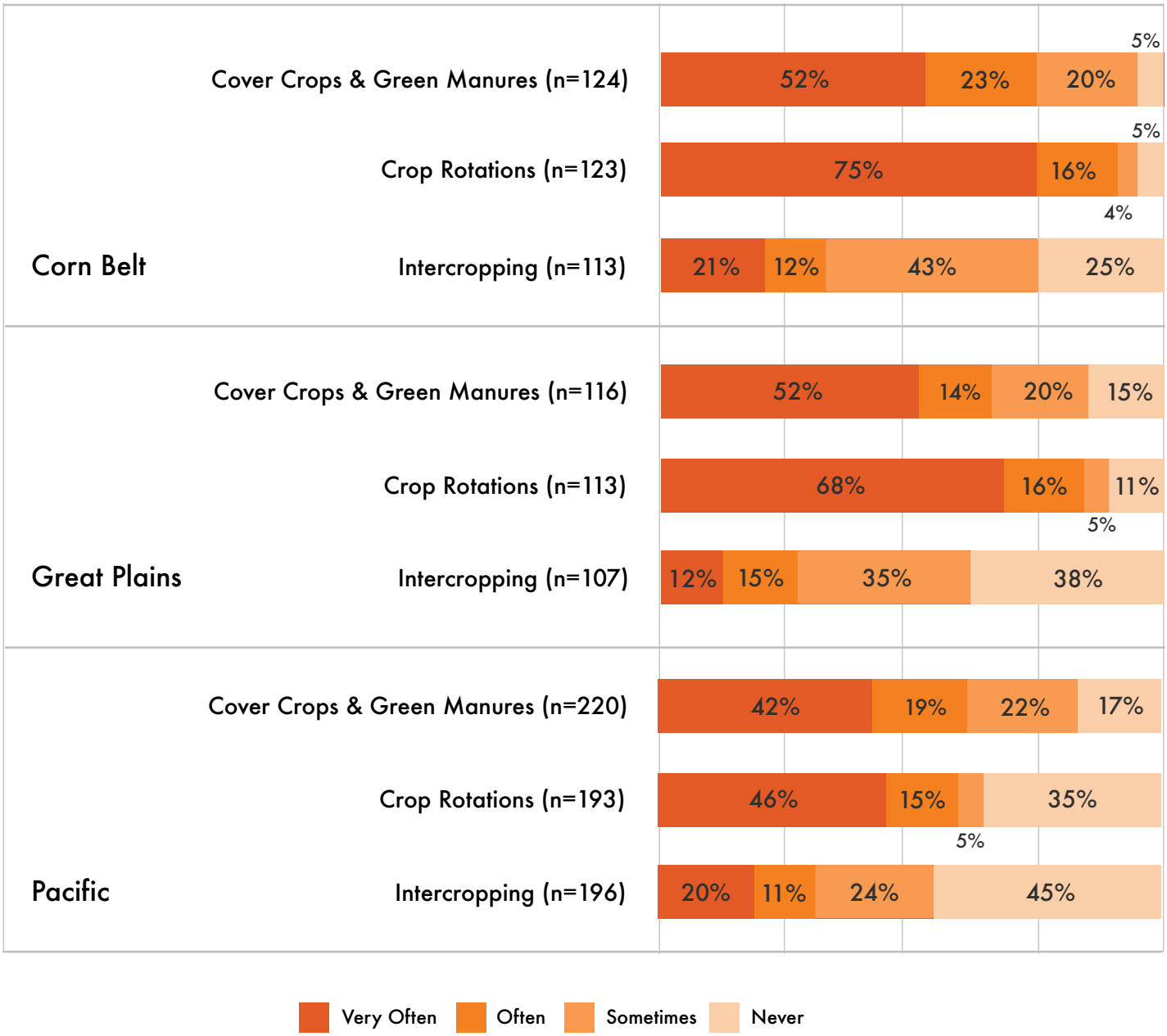


Figure 2.2 (continued)



Farmer Race/Ethnicity

The use of soil health management practices was similar between BIPOC and White organic farmers (*Figure S3* in the Supplements).

Farming Experience

There was an upward trend in the intensity of cover cropping and intercropping with farming experience. Almost half (48%) of experienced farmers implemented cover crops very often whereas just over one-third (36%) of beginning farmers reported using cover crops very often (*Fig. 2.3*). Nearly twice as many experienced farmers (21%) as beginning farmers (11%) intercropped very often (*Fig. 2.3*).

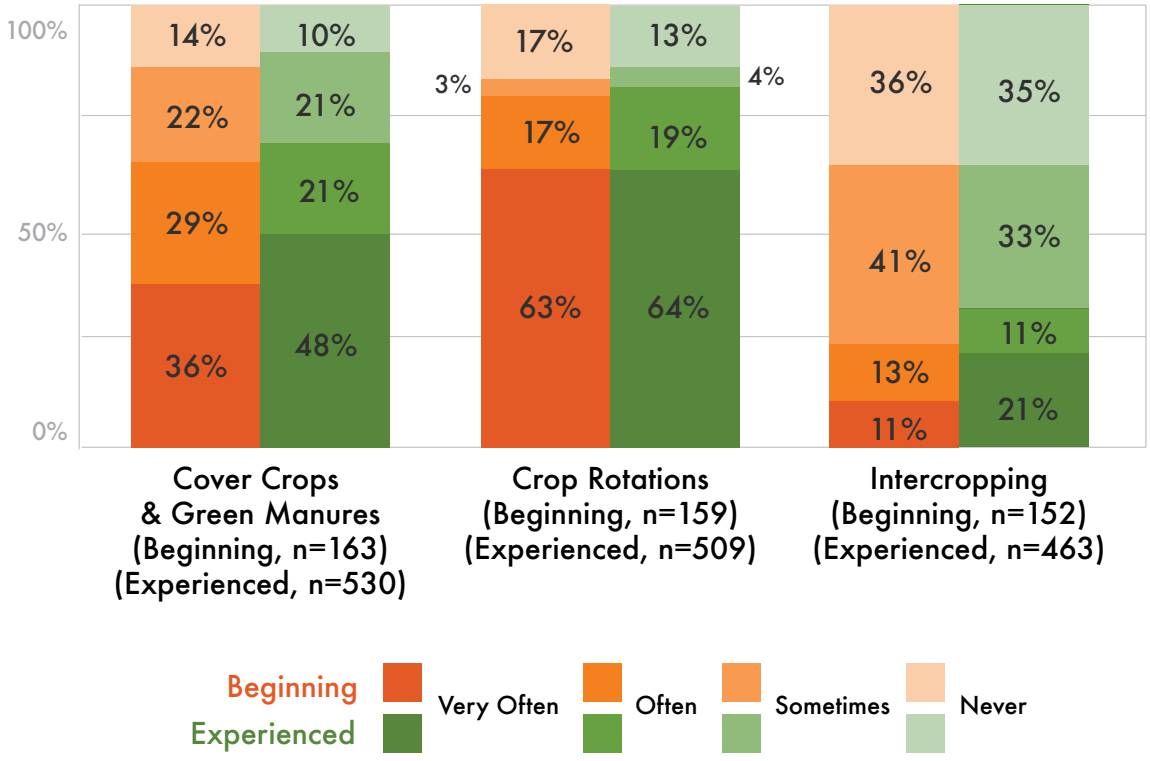
As farmers gain experience with organic production practices, they may feel more comfortable implementing soil health management strategies such as cover cropping and intercropping on a larger scale. Beginning

farmers may face a learning curve, as well as greater pressure to maximize acreage in production to get their operation off to a financially successful start. Providing beginning farmers with additional Extension and technical support to successfully implement these practices and connecting them with experienced organic producers could be one strategy to increase to adoption among beginning organic farmers who may be less aware of the benefits associated with these practices or feel less confident to effectively implement them. Organic survey respondents, and beginning farmers in particular, indicated that organic farmers were their most highly preferred source of information (discussed in Chapter four), which suggests peer-to-peer learning programs that partner beginning farmers with more experienced producers could be a particularly effective form of knowledge transfer.

Figure 2.3

Frequency of implementation of soil health management practices by beginning and experienced organic farmers.

"n" denotes the total number of survey participants in each group who provided a response for the corresponding practice (i.e., cover crops and green manures, crop rotations, intercropping).



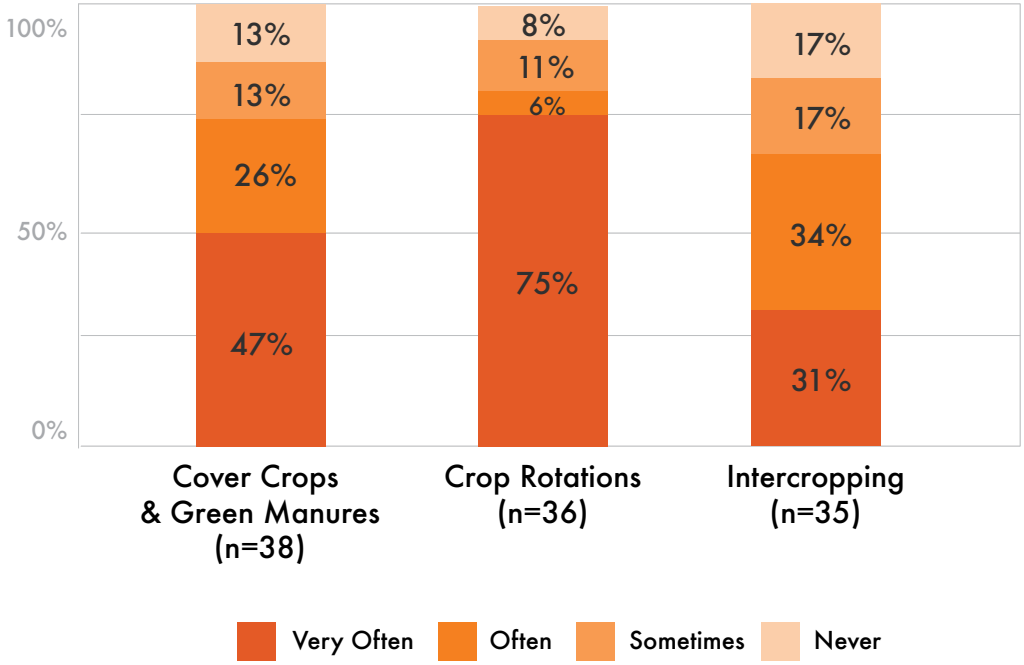
Transition Survey Participants

Like organic survey respondents, transition survey respondents implemented cover crops and crop rotations more frequently than intercrops. However, transitioning farmers appear to implement crop rotations more intensively than organic farmers; three quarters of transitioning farmers reported implementing crop rotations very often (*Fig. 2.4*) compared to 63% of organic farmers (*Fig. 2.1*). In addition, 83% of transitioning farmers reported intercropping to some extent (*Fig. 2.4*) compared to 64% of organic farmers (*Fig. 2.1*). The implementation of cover crops by transitioning and organic farmers was quite similar. These trends should be interpreted with caution because of the small sample sizes for the transition survey; however, the data indicate that transitioning farmers utilize soil health management practices at least as intensively as certified organic producers.

Figure 2.4

Frequency of implementation of soil health management practices by transitioning farmers in the U.S.

"n" denotes the total number of survey participants who provided a response for the corresponding practice.



Organic and Transitioning Farmers as Leaders in Soil and Climate Stewardship

One of the most salient findings of the surveys is that both certified organic and transitioning farmers utilize regenerative, soil-enhancing management practices far more often than conventional producers. In addition to building soil health and fertility and reducing pest pressures, cover cropping, intercropping, and diverse rotations that maximize soil coverage and living roots support carbon sequestration, climate mitigation, and adaptation. Organic producers are leading the way in their implementation. For example, while seven out of eight respondents reported using cover crops to some extent, only about 10% of non-organic producers plant cover crops, according to the 2012 Census of Agriculture (Hellerstein et al., 2019). While the 2017 Census showed a 50% increase in acreage cover cropped over 2012 (from 10.3 million to 15.4 million acres), this still represented only 4% of the nation's cropland (USDA, 2019).

In the 2014 National Organic Producer Survey, only about 40% of all organic field and specialty crop producers said they used cover crops in 2014 (Hellerstein et al., 2019). The 2019 survey reported about 46% of organic producers using green manures and 29% using cover crops; the degree of overlap between the two categories is not known (USDA, 2020). In surveys conducted by the Organic Seed Alliance, 63% of organic farmers planted cover crops in 2019 compared to 54% in 2014, and acreages under cover crops also increased. In 2019, 76% of organic vegetable growers planted cover crops compared to 58% five years earlier, and the corresponding increase among organic field crop producers was from 44% to 64% (Organic Seed Alliance, 2021). This confirms that organic producers continue to lead the way toward widespread and consistent implementation of cover cropping to protect and build cropland soils.

More than half of our organic survey respondents make at least some use of intercropping, a practice rarely implemented in conventional cropping systems. While most conventional farmers practice some form of crop rotation, organic producers tend to maintain more diverse rotations with greater year-round soil coverage, especially in field crop rotations. For example, organic farms often use a corn-soy-cereal-perennial legume rotation while vast acreages of conventional farmland in the Corn Belt are planted to corn-soy with unplanted fallow in winter (Moncada and Sheaffer, 2010).

These trends apply across agro-ecoregions. For example, less than 5% of the 90 million acres of field crops in the Corn Belt were cover cropped during winter (2017 NASS Agricultural Census), yet 52% of Corn Belt organic producer respondents reported planting cover crops "very often" and only 5% never planted them. This shows that the organic method, codified by the NOP standards, promotes and maintains a much higher level of soil and climate stewardship through regenerative soil health management practices. Additional investments in organic research, education, and Extension programs and policy initiatives that support conservation payments could support further adoption of soil health management practices and strengthen the resulting soil health and climate benefits.

2.2 Use of Water Conservation Practices

Organic Survey Participants

Full Organic Survey Sample

Survey participants were asked to describe how frequently they use water conservation practices using a four-point scale that ranged from "very often" to "never." Survey participants could also indicate water conservation practices were not applicable to their operation; roughly 160 respondents selected "not applicable." The term water conservation was intended to include a broad suite of practices such as implementing drip irrigation, adapting irrigation scheduling to current weather conditions, growing drought tolerant crops, mulching, etc.

About the same percentage of organic survey respondents indicated they implemented water conservation practices very often (30%) as never (29%) (Fig. 2.5). This response could reflect contrasting weather extremes resulting from climate change; while some farmers in arid regions of the country are increasingly challenged by drought, others are faced with more frequent and intense rainfall and flooding. A regional analysis of water conservation practices is provided later in this chapter.

The quotes below from focus group participants provide good examples of the climate variability growers are increasingly experiencing, particularly related to rainfall or lack thereof:

"We transitioned about three years ago to using a lot of plasticulture as we expanded our operation. Primarily because of saturated soils and serious crop loss from microbursts and tons of rain through the summer and all the climate change issues."

"Where we farm it is all related to climate change and the extreme weather variability that we're trying to manage around. So that either directly causes or it strongly exacerbates all of the agronomic challenges."

"Where we farm it is all related to climate change and the extreme weather variability that we're trying to manage around. So that either directly causes or it strongly exacerbates all of the agronomic challenges."

"We have seen in the last three to five years extreme beautiful weather to start planting, and then six to eight inches in one month of rain."

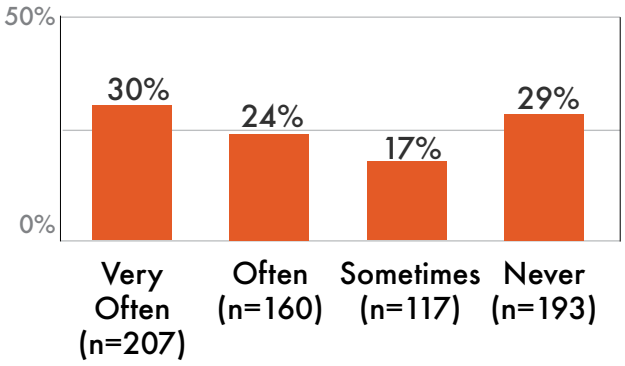
"So the conditions are not like when I was a kid. I remember we used to be able to go out and we would cultivate our crops three times. Then we would walk beans three times throughout the season to control weeds in the row. Those days -- I haven't seen a season like that in a long time. So, yeah, we deal with real heat. We deal with a lot of flooding."

"We have a lot of water, and particularly in my area we have a high water table so that when we do have flooding and then it finally recedes and you think that it's going to be okay, but it's just below the surface. And it really doesn't subside."

Figure 2.5

Frequency of implementation of water conservation practices by organic farmers in the U.S.

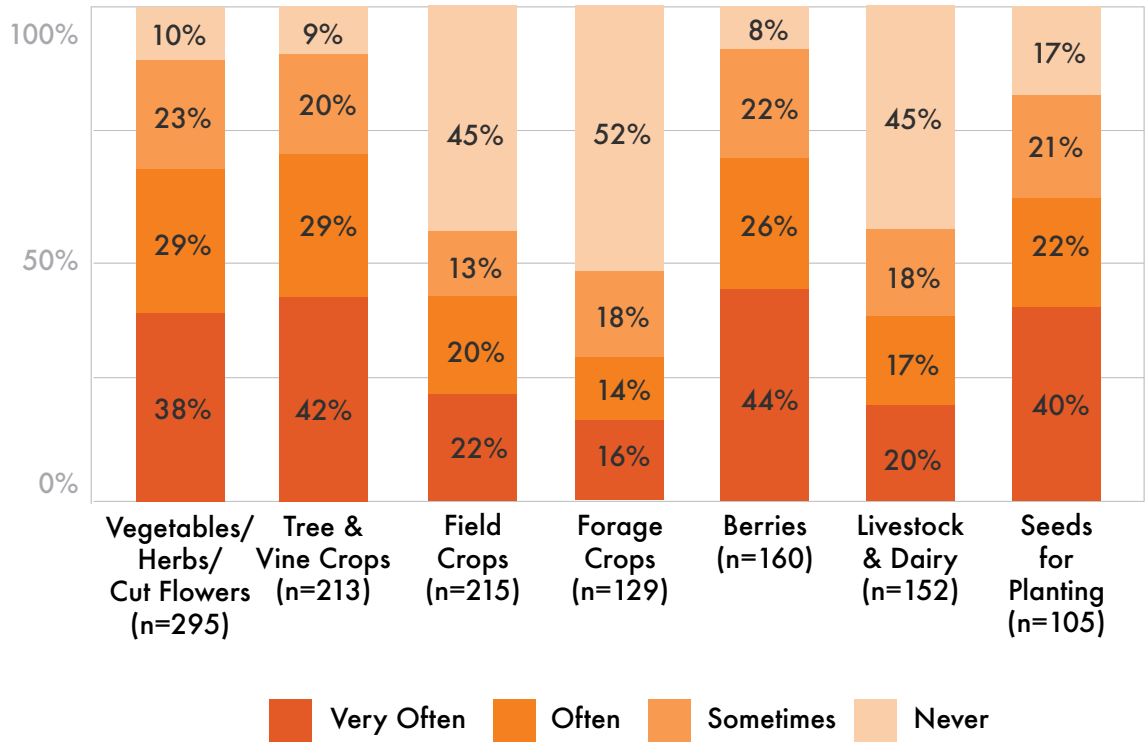
"n" denotes the number of responses for each category (i.e., very often, often, sometimes, never).



About four out of 10 organic producers of specialty crops—vegetables, herbs, cut flowers, berries, and tree and vine crops—reported utilizing water conservation practices "very often" and nine in 10 undertake measures to conserve water at least sometimes (Figure 2.6). In contrast, less than one-quarter of respondents growing field crops, livestock/dairy, or forages utilize water conservation very often, and about half did so at least sometimes. Respondents growing seeds for planting utilized water conservation almost as frequently as specialty crop producers. Most specialty crops require irrigation when grown in regions with low or erratic rainfall, whereas some field crops, forages, and rangeland livestock can be produced successfully in dryland (unirrigated) systems. Warm-season annual crops are especially dependent on irrigation in Mediterranean climates with rainy winters and hot, rainless summers. Thus, the need for water-efficient drip irrigation and other water conservation measures can vary widely with both regional climate and commodities produced.

Figure 2.6

Utilization of water conservation practices by respondents producing each of seven categories of organic commodities.



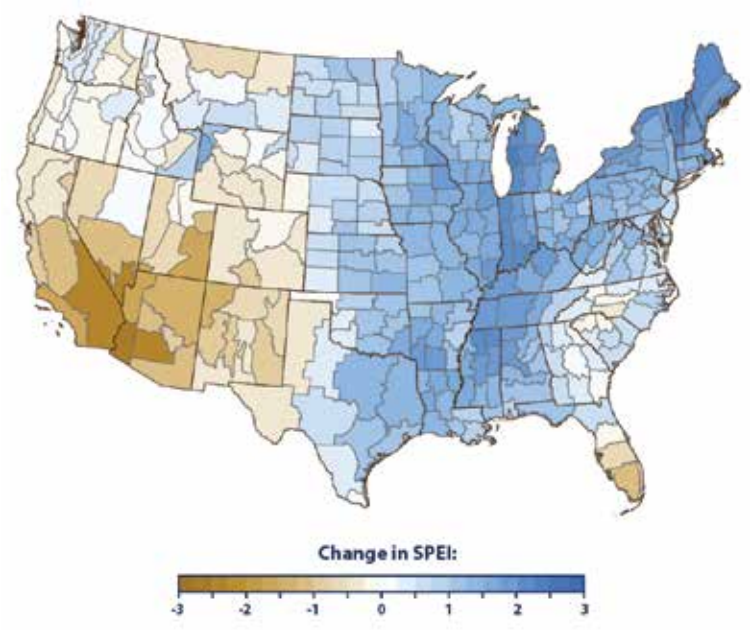
Farming Region

Water availability varies regionally across the U.S. and has been significantly impacted by climate change. Over the past century, there have been large and consistent decreases in water availability throughout the western United States, particularly in southwestern states like California, New Mexico, and Arizona. In contrast, the climate in the eastern United States, in particular the Midwest and Northeast, has generally become wetter (*Fig. 2.7*) (WestWide Drought Tracker, 2021; Daly et al., 2008). As a result, farmers in the western U.S. tend to face water shortages, while those in the Corn Belt, Great Lakes, and Northeast regions are often contending with excess water from intense rainfall and flooding. In the South, climate change has increased both average temperature and annual rainfall, and the rains have become more intense yet more erratic. When periods of excessive moisture that restrict root growth are followed by a sudden shift to prolonged, hot, and dry conditions, crops undergo severe stress. In 2019, such a "flash drought" caused sharp yield losses and hurt late-season pasture quality throughout much of the South.

Figure 2.7

Average change in drought (five-year SPEI) in the contiguous U.S. states.

This map comes from the U.S. Environmental Protection Agency (EPA) climate change indicators and shows the total change in drought conditions across the contiguous 48 states, based on the long-term average rate of change in the five-year Standardized Precipitation Evapotranspiration Index (SPEI) from 1900 to 2020. Blue areas represent increased moisture; brown areas represent decreased moisture or drier conditions.

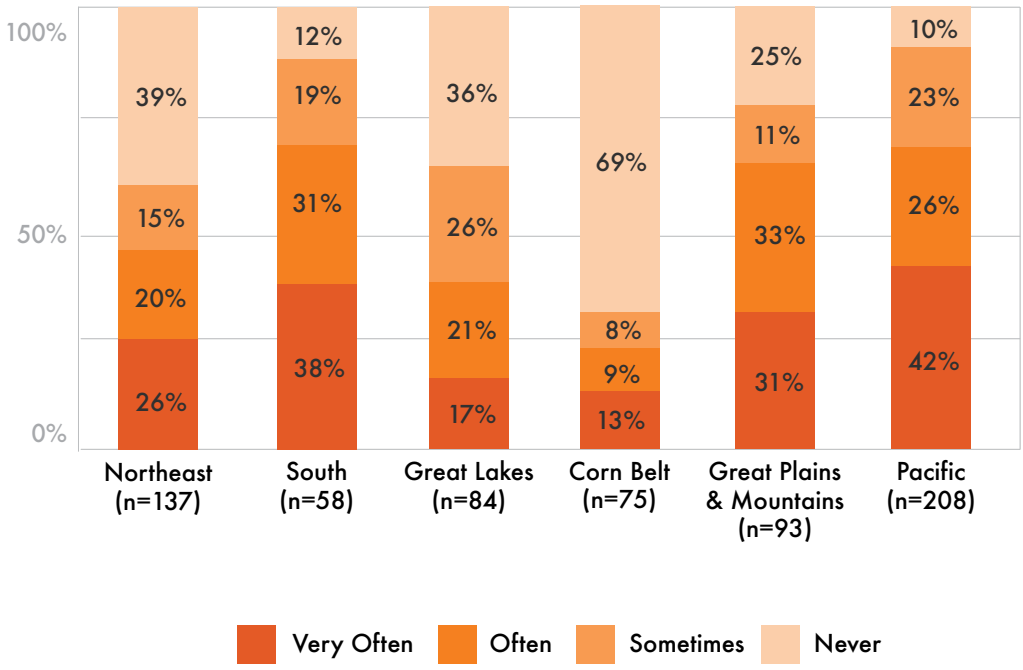


These documented trends were largely reflected in the responses from organic survey participants, whose use of water conservation practices varied substantially across the six agro-ecoregions. Water conservation practices were commonly implemented in the Pacific, Great Plains and Mountains, and South regions (*Fig. 2.8*). In particular, 90% of organic farmers in the Pacific region and 88% in the South region used water conservation practices to some extent (*Fig. 2.8*). In contrast, organic survey respondents implemented water conservation practices to a lesser extent in the Corn Belt, Great Lakes, and Northeast regions (*Fig. 2.8*). Lack of water conservation was particularly notable in the Corn Belt region where nearly 70% of organic farmers reported never implementing water conservation practices (*Fig. 2.8*). For a breakdown by SARE region, refer to *Figure S4* in the Supplements.

Figure 2.8

Frequency of implementation of water conservation practices by organic farmers across six agro-ecoregions.

"n" denotes the total number of survey participants from each agro-ecoregion who provided a response.



Leading organic commodities in each region likely contributed to the observed regional differences in utilization of water conservation. The top three commodity categories for the South and the Pacific region consisted of specialty crops, which are highly dependent on irrigation, especially in the rainless summers of the Pacific region, and also in the South where hot summers and erratic rainfall pose increased risks of crop losses to drought. In contrast, more than half of Great Plains and Mountains respondents grow field crops while only one in four produce vegetables and very few grow berries or tree/vine crops. This may explain the slightly lower frequency of water conservation practices reported by respondents from this driest of all the regions, compared to the Pacific and South.

In the cooler, wetter regions, field crops, forages, and livestock dominate organic production in the Corn Belt, while vegetables, herbs and flowers led the list in the Northeast and were second only to field crops in the Great

Lakes. This likely explains why fewer than one in three Corn Belt respondents reported implementing any water conservation at all, while six in ten from the Northeast and Great Lakes do so.

Farmer Race/Ethnicity

The use of water conservation practices was similar between BIPOC and White organic farmers (*Figure S5* in the Supplements).

Farming Experience

Interestingly, beginning farmers were more likely than experienced farmers to implement water conservation practices (*Fig. 2.9*), though somewhat less likely to cover crop or intercrop (*Fig. 2.3*). Among other challenges associated with implementing cover crops (e.g., increased agronomic complexities, costs, and seed sourcing), this finding could indicate that beginning farmers may hesitate to plant cover crops or intercrops because of their potential to compete with the main production crop(s) for limited moisture. While cover crops generally improve soil moisture capacity over the long-term by building SOM, their short-term water use can hurt the next crop in drier regions including the Great Plains and Mountains and the interior portions of the Pacific agro-ecoregion. Thus, farmers in lower-rainfall regions often face tough tradeoffs between long-term soil conservation and soil health versus short-term moisture availability for the next production crop. Beginning producers may benefit from mentoring and technical assistance in selecting the best cover crops and management strategies for their region, climate, and production system in order to optimize soil benefits while avoiding pitfalls related to shorter term water consumption.

Figure 2.9

Frequency of implementation of water conservation practices by beginning and experienced organic farmers.

"n" denotes the total number of survey participants in each group who provided a response.

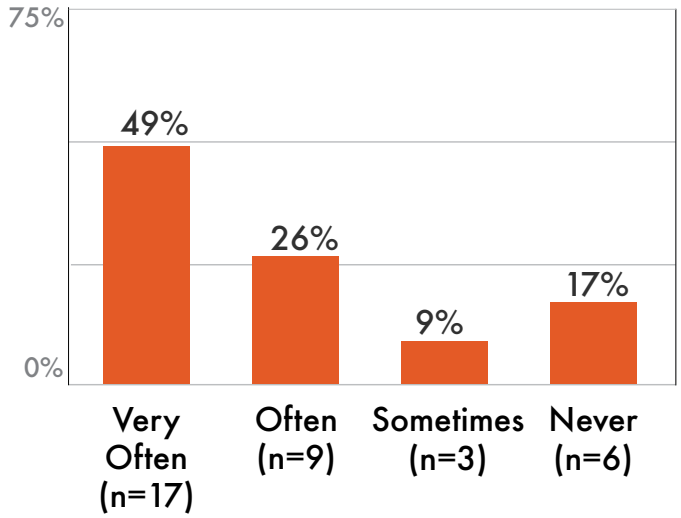
Transition Survey Participants

Nearly 50% (n=17) of transitioning survey respondents implemented water conservation practices very often (*Fig. 2.10*), compared to 30% (n=202) of organic survey respondents (*Fig. 2.5*). While these results should be interpreted with the low transition survey sample size in mind, a comparison of the two figures suggests a greater emphasis on water conservation during transition. Since transition survey respondents are, in effect, beginning organic farmers (though some are experienced as non-organic farmers), it is interesting to note that beginning and transitioning farmers show similarly increased concern with water conservation. One possible explanation is that soils under long-term organic management commonly have enhanced water holding capacities and crop drought resilience due to increased SOM levels and improved soil health, while beginning or transitioning organic producers may be working with soils that have not yet developed this enhanced moisture capacity.

Figure 2.10

Frequency of implementation of water conservation practices by transitioning farmers in the U.S.

"n" denotes the number of responses for each category.



2.3 Use of Organic Inputs

Organic Survey Participants

Full Organic Survey Sample

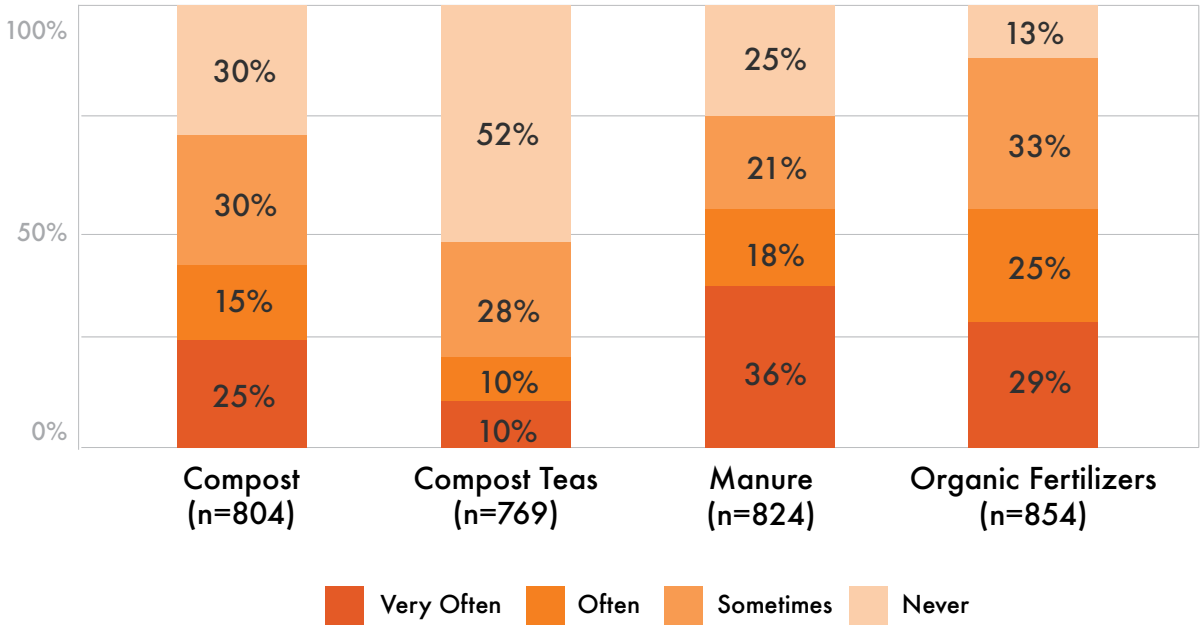
Organic farmers use a wide range of organic inputs to build soil health and fertility. To simplify the survey and reduce response burden, we asked organic survey participants to indicate on a four-point scale from "very often" to "never" how frequently they used four broad categories of inputs: compost, compost teas, manure, and organic fertilizers.

Organic fertilizers were the most prevalent organic input with over three quarters of survey participants indicating they used organic fertilizers to some extent (i.e., very often, often, or sometimes) (*Fig. 2.11*). Organic survey participants used manure more frequently than compost—36% of organic farmers reported using manure very often while only a quarter reported using compost very often (*Fig. 2.11*). In contrast, compost teas were not commonly used; only 20% of organic farmers reported using compost teas regularly (i.e., very often or often). Compost tea requires specialized equipment and a precisely managed process to develop a microbial community with the desired properties; even small deviations from optimum conditions and timing can result in an ineffective or even harmful product. These challenges likely explain the less frequent use of this input by survey respondents.

Figure 2.11

Frequency of use of various types of organic inputs by organic farmers in the U.S.

"n" denotes the total number of responses for the corresponding input type (i.e., compost, compost teas, manure, organic fertilizers).



Farming Region

The use of organic inputs by organic survey participants varied across the U.S. Respondents from the Northeast, Great Lakes, and Corn Belt regions relied more heavily on manure for fertility than on compost or organic fertilizers, and 42-56% reported using manure "very often" compared to just 20-26% of respondents from other regions (Fig. 2.12). In the Pacific region, organic farmers used compost and organic fertilizers more often than manure. Use of organic fertilizers was particularly high in the South, where respondents reported using them far more often than either compost or manure (Fig. 2.12). Compared to other regions, use of all amendments was generally lower in the Great Plains and Mountain region. Compost tea was the least often-used input across all regions.

High levels of manure use by organic farmers in the Northeast, Great Lakes, and Corn Belt likely reflects the prevalence of dairy, beef, pork, and other livestock operations in these regions, including many small to midsize, diversified, crop-livestock integrated operations. More than one in three respondents from these three regions raise livestock, compared to just 13-17% in other regions. Producers who raise both crops and livestock apply on-farm generated manure to cropland, thus enhancing nutrient cycling and reducing the need for off-farm inputs and associated costs. Organic farmers who grow crops only commonly make use of manure from nearby livestock operations, and this may be their most economical NOP-compliant source of nutrients.

Respondents from the Pacific and Southern regions might use manure less often for one or more of several reasons. One, they may have less access to manure from on-farm or nearby sources. Two, both regions are major producers of organic specialty crops, and producers with intensive rotations may prefer finished compost and organic fertilizers that meet NOP requirements for unrestricted use versus manure, which must be soil-incorporated at least 120 days prior to harvest of organic vegetables for human consumption. Finally, repeated

manure use can result in a buildup of excessive phosphorus (P), especially in soils that already test high in P because of inherent soil mineralogy (e.g., some soils in Tennessee and Florida) or a past history of manure or poultry litter applications. Organic producers in Georgia, Arkansas, and several other Southern states with large poultry industries may initially turn to poultry litter for fertility, then cut way back when soil tests indicate P excesses.

A breakdown of organic amendment usage by organic survey participants across SARE regions is provided in *Figure S6* in the Supplements.

Figure 2.12

Frequency of use of organic inputs by organic farmers across six agro-ecoregions.
"n" denotes the total number of survey participants from each agro-ecoregion who provided a response for the corresponding input type (i.e., compost, compost teas, manure, organic fertilizers).

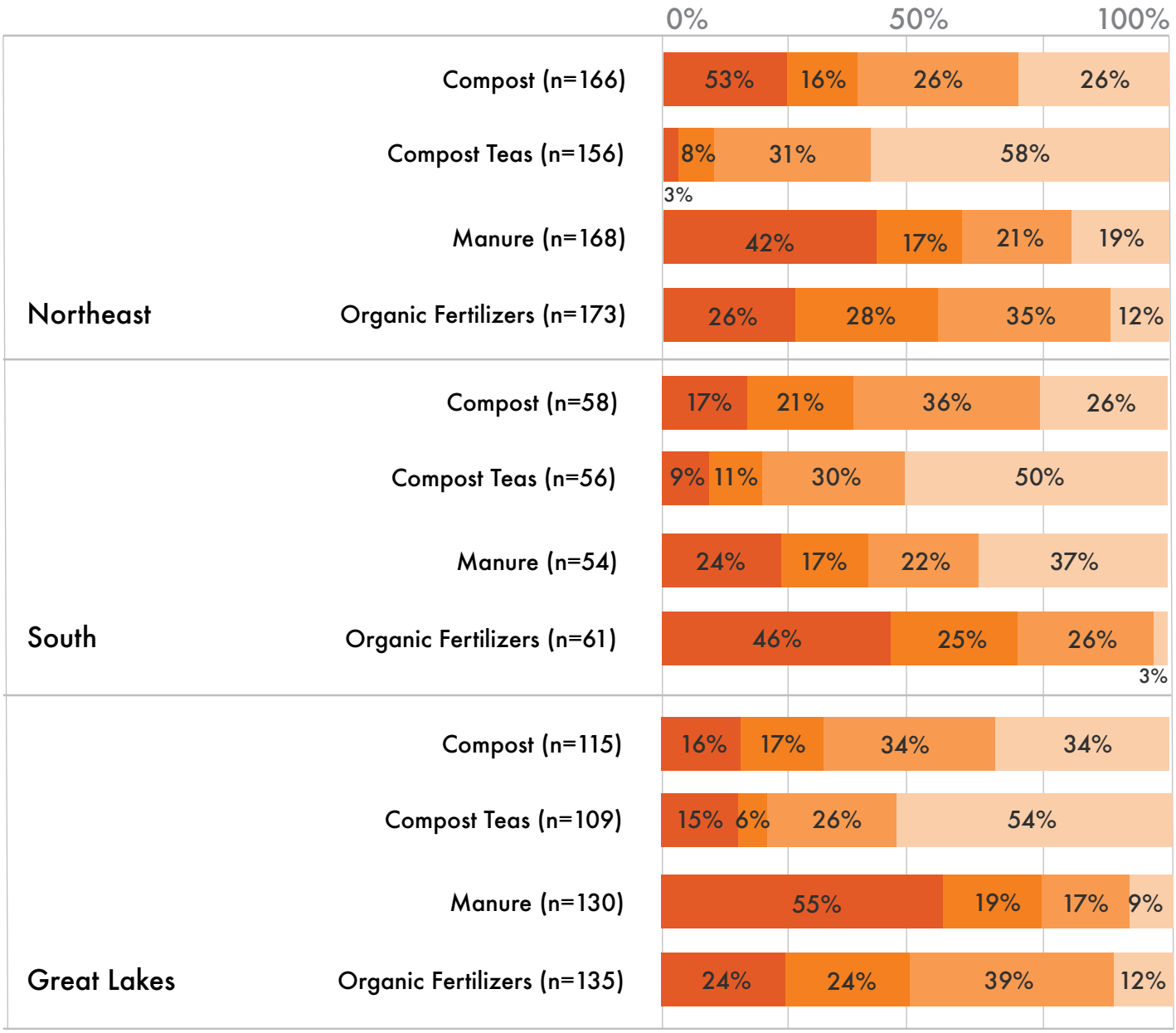
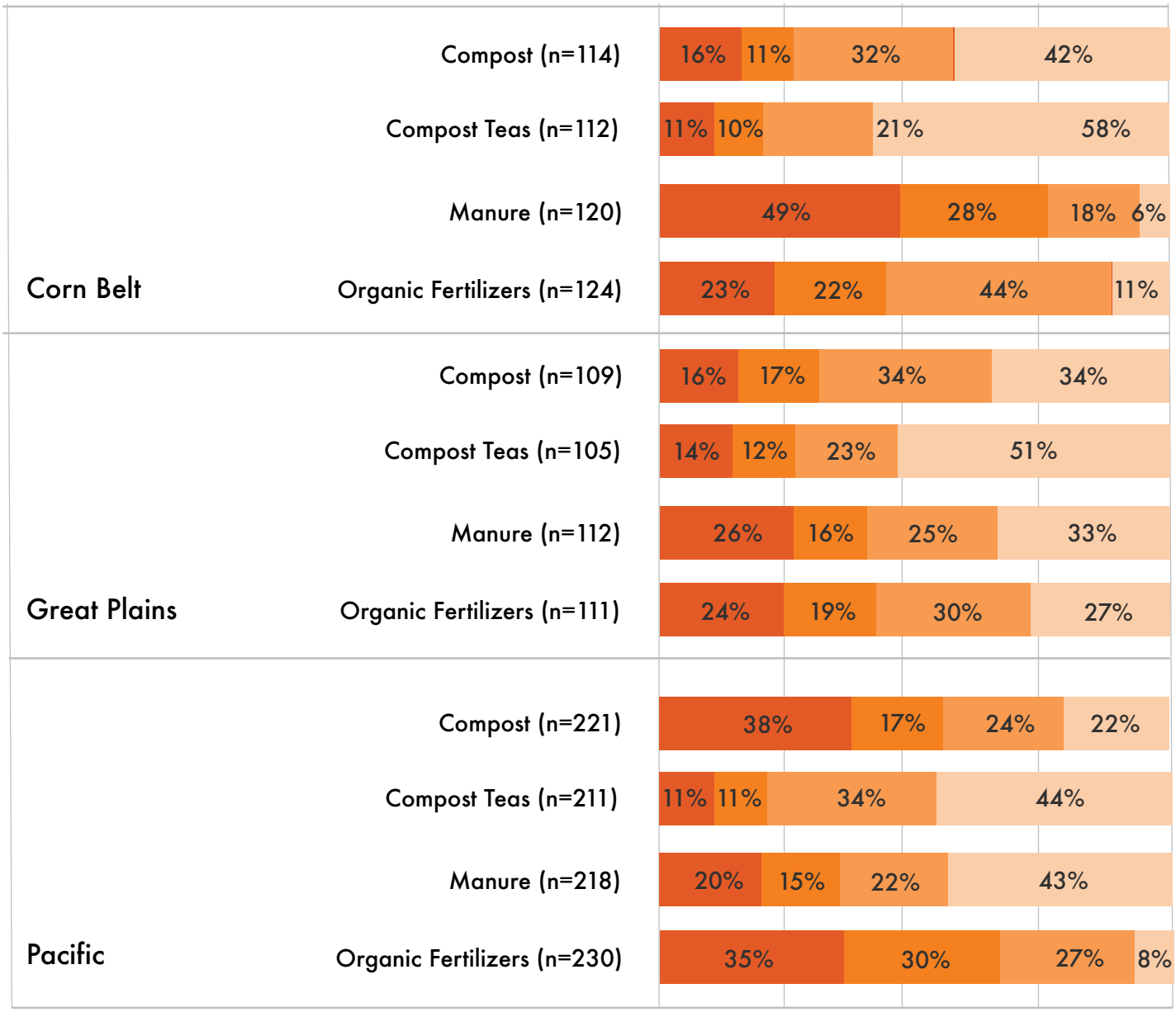


Figure 2.12 (continued)



Farmer Race/Ethnicity

There were no striking differences in the use of organic inputs by BIPOC and White organic farmers (*Figure S7* in the Supplements).

Farming Experience

While there were clear trends between farming experience and the implementation of soil health management and water conservation practices, there was not a clear relationship between farming experience and the use of organic inputs (see *Figure S8* in the Supplements). In other words, beginning and experienced farmers reported using the same categories of inputs at similar frequencies.

Transition Survey Participants

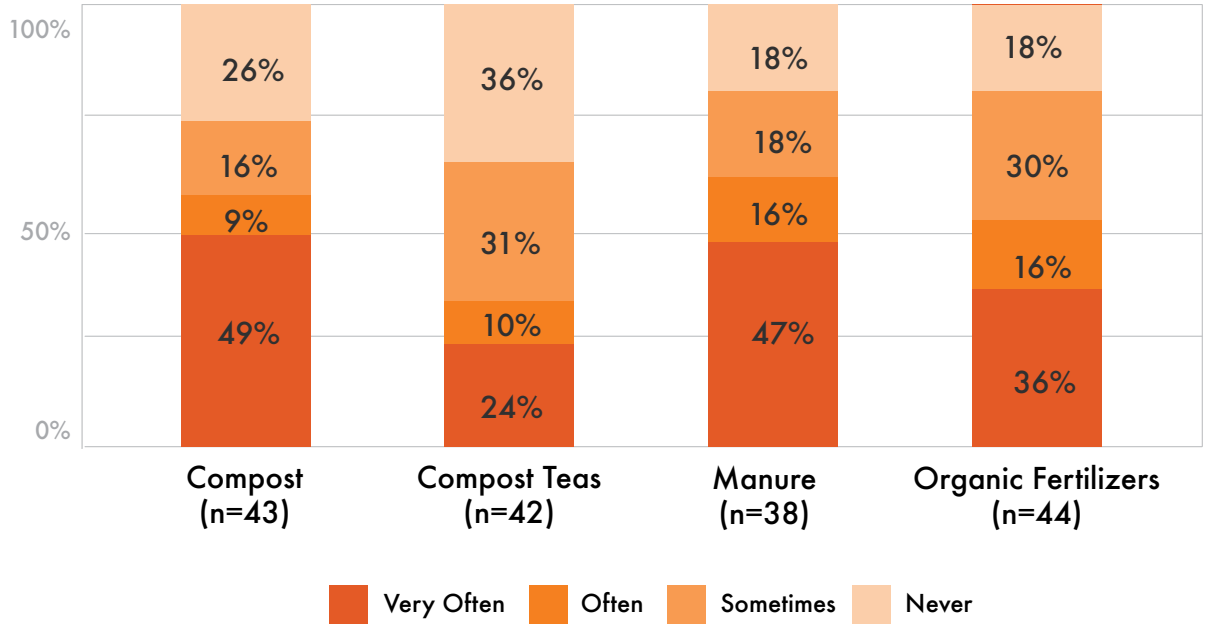
Transitioning farmers relied most heavily on manure and organic fertilizers for soil fertility; just over 80% of respondents reported using these two organic amendments to some extent on their operations (*Fig. 2.13*). About three quarters of transitioning survey respondents also used compost to some extent. Like certified organic farmers, transitioning farmers used compost teas the least often (*Fig. 2.13*).

Higher percentages of transitioning farmers reported using organic inputs "very often" than certified organic. In particular, 49% of transitioning producers use compost "very often" compared to just 25% of organic producers. This trend may reflect the greater need for organic inputs to restore soil health and fertility during transition than in fields that have been under organic management for longer than three years.

Figure 2.13

Frequency of use of organic inputs by transitioning farmers in the U.S.

"n" denotes the total number of responses for the corresponding input type.



2.4 Use of Organic Seed

The National Organic Program (NOP) requires organic operations to use certified organic seed when it is commercially available. While the NOP regulation on certified organic seed use is intended to ensure the integrity of organic production across the entire production chain, NOP allows the use of untreated, non-genetically engineered, conventional (non-organic) seed when an organic variety is not commercially available (Hubbard and Zystro, 2016). Despite critical investments and growth in companies supplying certified organic seed in the marketplace, the organic seed sector has struggled to meet demand, and many organic farmers still rely on conventionally produced seed for at least part of their operation (Hubbard and Zystro, 2016).

Organic Seed Alliance surveys farmers across the U.S. to monitor the status of organic seed systems and publish their State of the Organic Seed reports in 2011, 2016, and now in conjunction with OFRF for the 2022 NORA report (OSA, 2016, 2021). In addition to certified organic acreages in vegetables, field crops, cover crops,

and forage crops, survey respondents were asked to report what percentage of seed they planted for each of these commodities was certified organic, whether these percentages have increased or decreased, and their reasons for not purchasing certified organic seeds.

Organic seed collection, OSA research Farm.

Survey respondents reported planting 70% of their acreage of vegetable, field crop, and cover crops using certified organic seeds in the 2018 cropping year, while the percentage for forage crops was slightly lower (*Table 2.2*). For each crop category, about six out of ten respondents used 100% organic seed, while slightly over one-third used exclusively organic seed for all the crops they grew (i.e., across crop categories). The latter figure is lower because producers growing more than one crop category might obtain and plant exclusively organic seed for one category, but be unable to do so for another.

These percentages show little change from the previous survey (cropping year 2014) with the exception of a sharp rise in the percentage of vegetable growers using exclusively organic vegetable seeds and a moderate increase in exclusive use of organic seed across crop categories (*Table 2.2*). These findings suggest that availability of organic seed for certain vegetable crops or cultivars grown by some respondents was severely limited in 2014 and substantially improved by 2018.

Table 2.2

Utilization of certified organic seeds by organic survey respondents in surveys conducted in 2015 (responses based on 2014 cropping year) and 2020 (responses based on the 2018 cropping year).

Crop Category	Survey Year	Respondents' Average Percent Acreage Planted with Organic Seed	Percent of Respondents Using 100% Organic Seed
Vegetables Crops	2015	69	32
	2020	70	58
Field Crops	2015	78	60
	2020	70	58
Forage Crops	2015	59	61
	2020	62	62
Cover Crops	2015	67	58
	2020	69	56
Across All Crop Categories	2015		28
	2020		37

Organic farmers source most of their seed directly from seed companies, either via catalogs, websites, or sales representatives. Other seed sources include on-farm production, seed stores, processors and buyers, and other farmers (OSA, 2021). About one-half of survey respondents, including both vegetable and field crop producers, reported growing organic seeds for planting, which represents a decline since the 2015 survey, especially for field crops (*Table 2.3*).

Table 2.3

Percentages of organic survey respondents who reported producing organic seeds, either for on-farm use or for sale.

	Survey Year	
	2015	2020
All Survey Respondents	63	46
Field Crop Producers	75	53
Vegetable Crop Producers	61	54

The leading factors in organic growers not buying organic seed were unavailability of organic seed for specific cultivars and lack of desired genetic traits in currently available organic seeds, especially in vegetable crops (*Table 2.4*). Other important factors include insufficient quantities of organic seed available (especially for field crops), unavailability of organic seeds of varieties required by buyers or processors, and organic seed prices. The decline in on-farm production of organic seed (*Table 2.3*) may also have limited availability and use of organic seed. Infrequently cited factors include lack of organic seeds with desired treatments (pelleting, priming, etc.), and concerns about the quality of organic seed.

Factors related to crop genetics have become increasingly important for vegetable producers, for whom lack of organic seed for specific cultivars, genetic traits, and buyer/processor requirements were cited as factors in decisions not to buy organic seed by 77%, 40%, and 15% of producers in a 2015 survey (OSA, 2021). In contrast, field crop growers expressed a similar level of concern about these three issues in 2015 as in 2020.

Insufficient quantities of seed were cited more often in 2015 for field crops (51%) and vegetables (36%) than in 2020, which suggests that supply lines for organic seed have begun to improve. Percentages of respondents who reported saving their own seed as a factor in not buying organic seed remained about the same for vegetables but declined sharply for field crop producers, of whom 55% cited this factor in 2015. Although the NOP regulations regarding seed do not specifically allow the use of non-organic seed on the basis of price differential alone, three in ten respondents cited price as a factor in decisions not to purchase organic seeds, a slight increase over the 2015 survey. On the other hand, trust in organic seed quality shows an improving trend since 2015, when 20% of field crop growers and 11% of vegetable growers cited this concern (OSA, 2021).

Table 2.4

Factors in farmer decisions not to purchase organic seeds.

Table shows percentages of organic survey participants who indicated that the reasons listed were a "moderate factor" or "significant factor" in decisions not to buy organic seeds.

	All Respondents	Field Crop Growers	Vegetable Growers
Specific variety not available as organic seed	75%	64%	83%
Lack of desirable genetic traits	44%	42%	51%
Insufficient quantity of organic seed available	37%	42%	25%
Buyer requires varieties not available organically	32%	33%	29%

Only 35% of respondents said their certifier requested they take greater steps to source organic seed. This was similar to the 40% of respondents who stated this in 2014, and down from 61% in 2009. One potential explanation is that over time, organic certifiers are decreasing their enforcement of the requirement that certified organic farmers demonstrate efforts to source commercially available organic seed when they are using non-organic seed. Another explanation could be that certified organic farmers have learned the necessary steps and documentation required to satisfactorily demonstrate their efforts to source organic seed prior to using non-organic seed. Of the additional steps requested by certifiers, the most common was to research more than three seed catalogs, followed by using the Organic Seed Finder or other online database (OSA, 2021).

CHAPTER 3
Challenges, Technical Assistance Needs, and Topics of Concern for Organic Production

3.1 Production Challenges

Organic Survey Participants

Full Organic Survey Sample

Organic survey respondents were asked to identify their greatest production challenges from a list of possible challenges that they could rate on a five-point scale ranging from "not a challenge" (1) to "a strong challenge" (5). The production challenges were then ranked by calculating the percent of respondents who rated a topic as a substantial challenge (4 or 5 on the scale), and listing them in descending order from highest to lowest percent. The full ranked list of production challenges is presented in *Table 3.1*.

While organic farmers face a wide range of production challenges, this section of the report focuses on the following top five production challenges identified by organic farmers in the survey:

1. Controlling weeds
2. Managing production costs
3. Maintaining adequate yields
4. Managing soil fertility and crop nutrition
5. Controlling insect pests

A breakdown of the rankings for the top five production challenges can be found in *Figure S9* in the Supplements.

In the 2015 NORA survey (which served as the foundation for the 2016 NORA Report), 74% of respondents rated the broader topic of soil health as a high priority for research, followed by weed management (67%),

fertility management (66%), nutritional quality and integrity of organic food (55%), and insect management (51%) (Jerkins and Ory, 2016). One key difference between this report and the 2016 NORA report is that the 2015 survey asked respondents to rate the priority of research topics, as opposed to production challenges. Further, the 2015 survey did not separate production and non-production topics by issues, as was done in the most recent survey. Despite the difference in the framing of the question and the listed options, controlling weeds, fertility and nutrient management, and controlling pests are still among the top five areas of concern and thus key priorities for further research investment.

Table 3.1

Organic production challenges ranked in descending order from most to least challenging.
Production challenges were quantified by calculating the percent of respondents who rated a substantial production challenge as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the substantial production challenge was either a "challenge" or "strong challenge."

Production Challenge	Percent of Respondents Who Rated as a Substantial Challenge
Controlling Weeds (N=536)	67%
Managing Production Costs (N=454)	59%
Maintaining Adequate Yields (N=375)	48%
Managing Soil Fertility and Crop Nutrition (N=336)	43%
Controlling Insect Pests (N=325)	41%
Finding Appropriate Organic Crop Varieties and Seed (N=280)	38%
Controlling Disease Pressure (N=279)	36%
Adapting to Climate Change (N=259)	36%
Managing the Farm as a System (N=228)	33%
Minimizing Adverse Impacts of Tillage on Soil Health (N=225)	31%
Optimizing Soil Structure, Avoiding Soil Erosion and Degradation (N=228)	30%
Integrating Perennials and Permaculture Design (N=126)	28%
Drought Management (N=191)	26%
Managing Animal Production and Health (N=85)	26%
Grazing and Pasture Management (N=87)	24%
Seed Production/Seed Saving (N=116)	24%
Utilizing Cover Crops and Green Manures (N=155)	22%
Post-Harvest Handling Methods (N=146)	21%
Enhancing Agricultural Biodiversity (N=136)	19%
Irrigation and Water Use (N=109)	19%
Managing Pollinators and Habitat for Pollinators (N=130)	19%
Managing crop rotations (n=124)	19%
Access to water resources (n=108)	17%

In addition to the production challenges categories listed in *Table 3.1*, survey participants were given the opportunity to provide written responses to open-ended questions about their top two production challenges (*Table 3.2*). There is a great deal of overlap in the top production challenges farmers identified in the close-ended and open-ended questions.

Table 3.2

Qualitative data for the top production challenges identified by respondents through written responses to open-ended comments.

Open-Ended Responses Production Challenges	Percent of Respondents Who Listed as Challenge
Weed Pressure (n=257)	40%
Soil Health (n=195)	30%
Pest Management (n=195)	22%
Climate Change (n=126)	19%
Disease Management (n=81)	13%
Organic Seed and Breeding (n=77)	12%
Increase Production (n=70)	11%
Cover Crop Challenges (n=23)	4%
Animal Health (n=13)	2%

Controlling Weeds

Two thirds of survey respondents cited weed management as a substantial production challenge, a percentage that surpasses challenges associated with production costs, yields, soil fertility, and other pests by wide margins. Weed control also emerged as the second strongest research priority for organic farmers in the 2016 NORA report. Specific comments provided by survey and focus group participants illustrate not only the severity of the weed challenge, but also the critical role that increasingly extreme rainfall patterns and other climate disruptions now play in further complicating organic weed management.

As some farmers explained in their own words:

> ***"Weeds are a symptom...not a primary problem. But when you're facing a drought it is the biggest thing we face. When there's just not enough moisture to grow a competitive crop, nature puts something there, and that's not always something we want and certainly we don't benefit from. Weed problems are our worst, both in excessively dry and excessively wet circumstances because our systems are designed around what used to be the expected precipitation in both amount and timing, and that doesn't have a lot of meaning anymore."***

> ***"Weather makes it hard to control weeds, it is getting more and more unpredictable. Last year we had no weeds, and then the end of July the super dry, hot weather just made everything go crazy, and there was nothing I could do."***

"We had a really wet two first years, and so then trying to control weeds in direct seeded crops through stale seed bedding is a real challenge."

"Controlling weeds [with] organic biodegradable mulch films!"

Organic farmers also described that increasing weather variability makes it difficult to determine when to plant to avoid additional weed pressure.

"I would like to see more research not on how to kill weeds but how to discourage them to germinate in the first place."

"Production issues for us were we needed more research on ideal planting and harvest dates for us to especially conquer weed pressure."

"And I'm looking at [the weather forecast] every day to find out, not only when I should plant, when I should work the ground, what I should do, but within the day to find out how long I have before I'm going to get rain that's going to put me out. And that is one of my most essential things that I look at every day, even more than markets, is how I can structure my day around what the weather is going to do to me two, four, six days out."

Specific feedback from organic farmers also underscores the need for additional research on controlling weeds such as bindweed, Canadian thistle, giant ragweed, foxtail, and nutsedge. Organic producers also called attention to many of these same weeds in the 2016 NORA report.

"I think our biggest challenge is controlling perennial weeds, in particular, and how if you don't control them well in the beginning, they can take over entire fields and significantly impact production. I would say that the perennial weed is always the biggest challenge on how to control it biologically or mechanically."

"My biggest production issue has been creeping perennial weeds...bindweed and Canadian thistle in particular."

"How to manage field bindweed and Canadian thistle while minimizing tillage."

"Thistle [and] bindweed are the two weeds that hold back production and especially for organic seed production for sale."

"[We need] more weed specific knowledge. For example, how does foxtail work, what creates good growing conditions for it, what can we do to help break its cycle? Since we've used herbicides for so long, nobody knows how to manage weeds biologically, and there are scant resources available."

"We're starting to win on this one, but some perennial weeds like bindweed are particularly difficult. Shading it out with a cover crop like buckwheat seems to work fairly well, in combination with a good weeding beforehand. We're also using occultation,

"My biggest production issue has been creeping perennial weeds... bindweed and Canadian thistle in particular."

flaming and hand weeding. Additional research on other methods would be helpful."

"We have years where painted lady larvae destroy Canada thistle. Any way to encourage their help?"

"How to eliminate Canadian thistle, field bindweed, and nutsedge without having to take a field out of production (to shade it out) for several years straight."

Managing Production Costs

Implementing sustainable and regenerative organic practices that comply with NOP standards can entail significant costs in materials and labor, and 59% of survey respondents indicated that the costs of production pose a substantial challenge. Organic nutrient sources and NOP-allowed pest and disease control products generally cost more than their conventional counterparts, soil building inputs such as cover crop seeds may not pay for themselves in the first few years, and managing weeds and other pests without synthetic crop protection chemicals can entail considerable additional labor. While organic price premiums help, they may not fully cover costs; thus, frugality in production practices emerges as a high priority for organic producers.

Focus group participants consistently expressed a desire for programs that compensate them for implementing best organic management practices. Cover cropping and crop rotations provide numerous ecosystem services that are beneficial to the farmer and the broader community. These include building soil health, sequestering carbon, recovering and conserving crop nutrients, improving moisture retention and reducing runoff, protecting water quality, suppressing weeds, and breaking pest and disease life cycles. However, implementing these practices can result in an opportunity cost for farmers who need to take land out of production.

Focus group participants consistently expressed a desire for programs that compensate them for implementing organic management practices.

In the words of several survey and focus group participants:

"It's hard to make any money on the farm given the high cost of organic inputs and the low cost of fruit sales. Because I am mandated to spray for [Asian citrus psyllid] multiple times and the organic pesticide and organic fertilizer are so expensive (and they don't work very well), I often don't even break even on my farm. We need less expensive organic inputs and/or higher prices for the fruit. Why are organic materials so expensive? Can they be manufactured more cheaply?"

"We need less expensive organic inputs and/or higher prices for the fruit."

"In an ideal world, it would be nice to see us compensated for the ground that is put into cover crop because if you take half of their ground into cover crop that's half of the ground that is not producing for them that year. Obviously, it is creating better production for the coming year for that ground, but in an ideal world it would be nice to see some kind of a program that would do that."

"Just recognizing that farming is such a high capital and low revenue business, I would like to see more grant programs with the government getting more involved with redistributing resources."

"It would be really cool if the government wanted to place value in offsetting some of the cost of growing like quality organic produce that this group does."

Maintaining Adequate Yields

Yield variability and crop failures can pose serious economic risks to any grower, and nearly half of survey respondents indicated significant challenges with maintaining satisfactory yields.

Organic producers in particular face yield-related challenges for several reasons:

- NOP standards prohibit synthetic inputs that provide mid-season quick fixes that conventional producers can implement when pest or nutrient problems arise.
- An historical lack of investment in organic agricultural research including development of crop cultivars and livestock breeds for organic systems has contributed to the ~20% yield gap between organic and conventional production.
- Increasingly erratic weather and rainfall extremes related to climate disruption can hurt yields and interfere with field operations, especially mechanical seedbed preparation, planting, and weed control on which organic producers often depend.

Survey and focus group participants cited yield-related challenges in their operations. For example:

"The biggest risks I've had recently are some crop failures individually, either lack of germination, which I sometimes wondered if some of my organic seed sources, sweet corn, in particular, but it may just be poor practices on my part. And then insect pressures in, particularly, green beans [from the] Mexican bean beetle. I've had individual plantings that have been total failures."

"Our challenge is how to feed the soil organically and keep our yields up to sustainable levels."

"I have trouble getting enough yield to even break even over input costs. I put as much fertility down as I can afford but when I can't push the yield higher I can't ever make a profit. Crop rotations are a struggle as well in our drought prone soils that are very sandy. We can't ever seem to get enough manure or compost to cover everything."

The National Organic Standards require organic livestock producers to provide at least 30% of ruminant dry matter intake from pasture during the grazing season, which can entail challenges related to ensuring adequate quantity and quality of pasture to meet this requirement and provide for animal nutrition. One focus group participant summarized this challenge as follows:

"How to set reasonable expectations for yield from permanent perennial diverse grass-legume pastures, including practical ways to measure yields from grazing."

Managing Soil Fertility and Crop Nutrition

Ensuring that crops receive sufficient nutrients through soil fertility management emerged as the fourth leading challenge, cited by 43% of survey respondents. It was also among the top five research priorities identified by organic farmers and ranchers in the 2016 NORA report. When this topic arose during focus group discussions, organic farmers expressed their understanding that healthy, living soil provides for crop nutrition. While they struggled with tradeoffs between short-term production needs (e.g., weed control), food safety requirements (NOP requires a 120-day interval between manure application or deposition by grazing livestock and harvest of the next organic food crop), and long-term soil stewardship, they discussed this challenge within a wider soil health context, as the following quotes illustrate.

"Soil is very important, and it is the building block of everything else. And if you treat it poorly, it will pay you poorly for years to come. If you treat it well, it will serve you well. You have to be constantly vigilant on your soil, and it is pretty darn important."

"I think there needs to be more discussion and research around soil health in vegetables. It is not very realistic we are going to buy a herd of cattle and start grazing our vegetable ground. Even though we have cattle, we are not going to do that. And there is a lot of organic issues about incorporating animals into our vegetable land, a lot of restrictions. These are frustrations, and I have guilt about my vegetable farm."

"You know, that's really the business we are in is growing and building our soil, and when conditions challenge you to be able to do that, it's foremost in my mind."

"I'm always in this sort of battle with myself about feeling bad about tillage as it is really the bluntest but fastest tool for me to use to flip beds…I think it is a struggle."

Farmers also expressed a desire to better understand and recognize the tangible impacts of implementing various soil building practices such as cover cropping and being able to link specific outcomes with specific practices. This sentiment was also raised by survey participants in the 2016 NORA report, but was more specific to the correlation between adjustments to soil biology (e.g., compost tea and other products to stimulate soil biology), and yield and fertility.

> ***"Cover crop seed is costly and especially if you want to really get some of the different varieties. Whatever you do for soil health, I think it is hard to see the results. You can get a soil test done or you can just visibly observe your crop, but how do you know that was because of this and not because of that. Soil is just so microscopic to begin with.... I want to see results quickly, or not even quickly, per se, but more, definitive. Like, this is because of this. And I do it. I cover crop, and I do all these great things with the belief that I am doing good. And certainly, you know, five years from now I will see such a huge difference or it will be there. But it's all expensive and hopefully I'm doing the right thing.***

Controlling Insect/Arthropod Pests

Managing insect pests emerged as a substantial challenge for 41% of organic producers in the survey and was also among the top five research priorities in the 2016 NORA report. Some farmers reported increasing frequency or intensity of pest outbreaks, including new species of crop-damaging insects and microbial pathogens not seen in the past. Climate changes can lead to new and unexpected pest and disease problems, and focus group participants reported new pests and diseases although they did not explicitly link them to climate change.

Farmers reported increasing frequency or intensity of pest outbreaks, including new species of crop-damaging insects and microbial pathogens not seen in the past.

> ***"We just don't know what is going to be our future, because of all these pests and pathogens and viruses and funguses and insects. That to us is the biggest risk."***
>
> ***"In regards to the pest stuff, all of the advice that comes out is typically all for using conventional sprays, or just even sprays in general. And so that is really tricky."***
>
> ***"I was just going to mention the ever-increasing roster of new and interesting pests and diseases ...It used to be that cucurbit downy mildew wasn't a thing. Basil downy mildew wasn't a thing. There [weren't] leek moth and all these swede midges, onion borers. Just globalization and the way that the world is contracting, becoming smaller, we get to share all of our pests and diseases."***
>
> ***"Our pest complexes are changing."***

Responses to open-ended questions in the organic survey also revealed challenges with specific pests, the most concerning being spotted wing drosophila and flea beetles. Problems with these specific pests were also reported in the previous NORA survey.

Spotted wing drosophila (SWD), a member of the "small fruit fly" or "vinegar fly" genus Drosophilia.

> ***"We need solutions for small growers to Spotted Wing Drosophila. We lose between 20-80% of some of our crops making it hard to stay profitable. We need to have predatory insects already identified (but in quarantine) be released to help stabilize the SWD population. We also need more research on this insect pest and identified solutions that actually work for small growers. Subsidized insect netting?"***

> ***"Row covers don't work here because of wind so there has to be something to stop the flea beetles from destroying the brassica plants."***

Commodity Category

Production challenges varied among commodity categories. For example, managing production costs proved especially challenging for producers of organic specialty crops (vegetables, herbs, flowers, berries, and tree and vine crops), and less so for field crop farmers (*Table 3.3a and Table 3.3b*). Pests and diseases seemed far more troublesome in specialty crops than in field crops, forages, or livestock operations. Weeds presented major challenges across commodity categories, though somewhat less so for livestock and dairy producers, possibly because grazing offers an additional weed management option.

Adapting to climate change seems to present greater challenges for specialty crop production, especially annual crops and berries, and less for forage crops (*Table 3.3a and Table 3.3b*). Minimizing adverse effects of tillage on soil health appeared most challenging in vegetables, herbs, flowers, and seed crops, which require regular cultivation for weed control.

Because most organic survey respondents include more than one commodity type in their operations, the comparisons of challenges among commodity categories are not independent. For example, some producers of specialty crops may also grow field crops; hence some of the field crop growers who reported challenges with production costs, pests, or diseases may have encountered these challenges in their specialty crop enterprises and not in their corn-soy-cereal rotations. Therefore, the data in *Table 3.3a and Table 3.3b* may under-estimate some of the differences in production challenges among commodity categories.

Table 3.3a and Table 3.3b

Relationship between organic commodities produced and production challenges.

The tables divide respondents who produce each of the organic commodity categories and show the percentages who rated each substantial challenge as a "challenge" or "strong challenge." Differences of 10 percentage points or more between those who grow and who do not grow a particular commodity are identified in the table.

Table 3.3a

Commodity Grown and Raised	Managing Prodution Costs	Controlling Weeds	Controlling Insect Pests
Farmers who GROW Vegetables/Herbs/Cut Flowers	65% ≥10%	71%	51% ≥10%
Farmers who DO NOT GROW Vegetables/Herbs/Cut Flowers	55%	64%	35%
Farmers who GROW Berries	72% ≥10%	70%	53% ≥10%
Farmers who DO NOT GROW Berries	55%	66%	38%
Farmers who GROW Tree and Vine Crops	72% ≥10%	69%	55% ≥10%
Farmers who DO NOT GROW Tree and Vine Crops	54%	65%	36%
Farmers who GROW Field Crops	47% ≥10%	54%	28% ≥10%
Farmers who DO NOT GROW Field Crops	66%	71%	49%
Farmers who RAISE Livestock and Dairy	58%	61%	28% ≥10%
Farmers who DO NOT RAISE Livestock and Dairy	59%	69%	45%
Farmers who GROW Forage Crops	52%	61%	24%
Farmers who DO NOT GROW Forage Crops	61%	69%	46%
Farmers who GROW Seeds for Planting	60%	73%	40%
Farmers who DO NOT GROW Seeds for Planting	58%	65%	41%

Table 3.3b

Commodity Grown and Raised	Controlling Disease Pressure	Adapting to Climate Change	Impact of Tillage on Soil Health
Farmers who GROW Vegetables/Herbs/Cut Flowers	48% ≥10%	47% ≥10%	37% ≥10%
Farmers who DO NOT GROW Vegetables/Herbs/Cut Flowers	29%	28%	27%
Farmers who GROW Berries	49% ≥10%	46%	34%
Farmers who DO NOT GROW Berries	33%	33%	30%
Farmers who GROW Tree and Vine Crops	50% ≥10%	40%	28%
Farmers who DO NOT GROW Tree and Vine Crops	31%	34%	32%
Farmers who GROW Field Crops	22% ≥10%	32%	35%
Farmers who DO NOT GROW Field Crops	45%	38%	29%
Farmers who RAISE Livestock and Dairy	23% ≥10%	31% ≥10%	32%
Farmers who DO NOT RAISE Livestock and Dairy	40%	38%	31%
Farmers who GROW Forage Crops	19% ≥10%	25% ≥10%	33%
Farmers who DO NOT GROW Forage Crops	41%	39%	31%
Farmers who GROW Seeds for Planting	33%	43%	40% ≥10%
Farmers who DO NOT GROW Seeds for Planting	37%	35%	29%

A higher proportion of farmers who produce organic seeds for planting (47%) reported challenges with finding appropriate seeds and varieties than those who do not grow crops for seed (36%). Three out of ten organic livestock producers cited grazing and pasture management as a challenge, and 34% found animal production and health challenging. This gives a better estimate of how important these issues are for organic livestock production than the lower percentages shown in *Table 3.1* which included respondents who do not raise livestock.

Other leading production issues showed relatively small differences among commodity categories, which suggests that they are about equally challenging throughout the organic sector. These include maintaining adequate yields, soil fertility and crop nutrition, and optimizing soil structure and avoiding erosion.

Farming Region

Production challenges were analyzed by agro-ecoregion to account for geographic variation in environmental conditions that affect abiotic and biotic stressors. This regional analysis revealed similar production challenges across regions, indicating that some production challenges are ubiquitous and are clear priorities for additional research and technical support. Specifically, controlling weeds and managing production costs were consistently ranked among the top five challenges in all six agro-ecoregions (*Table 3.4*).

Organic farmers in the Northeast, Great Lakes, Corn Belt, and Great Plains and Mountains regions reported similar production challenges. While the order of ranking varied by region, these four agro-ecoregions shared four of the top five production challenges:

- Controlling weeds
- Managing production costs
- Maintaining adequate yields
- Managing soil fertility and crop nutrition

Organic farmers in the South and Pacific regions shared the following four among their top five production challenges:

- Controlling weeds
- Managing production costs
- Controlling insect pests
- Controlling disease pressure

Controlling weeds and managing production costs were consistently ranked among the top five challenges in all six agro-ecoregions.

Despite these similarities, there were some noteworthy regional differences in production challenges. For example, higher percentages of organic survey respondents in the South (62%) and Great Plains and Mountains (43%) cited procuring appropriate organic crop varieties and seed for their operations as a challenge than respondents from other regions (27-39%).

"Rapid climate change is changing what can grow and how to grow it."

The Great Lakes was the only region in which adapting to climate change emerged as one of the top five production challenges, cited by 42% of respondents. One explanation could be that respondents in other regions ranked production challenges that could be aggravated by climate change (e.g., managing soil fertility or controlling insect pests, weeds, or diseases) as stronger challenges than climate change itself. This was reflected in some responses to the open-ended survey questions. For example:

> ***"Unknown plus weather extremes have been increasing. Making management a challenge even on a long-time farm."***
>
> ***"Plant disease — rapid climate change is changing what can grow and how to grow it. Building greenhouses and crop protection structures is expensive."***
>
> ***"Due to Public Safety Power Shut-offs, we were unable to use our irrigation system for 18 days in the summer of 2019. I want to access grant funds to install solar panels on my pump houses. I contacted multiple technical advisors regarding the SWEEP grant and received no response."***

In addition, 54% of respondents from the South cited adapting to climate change as a substantial challenge, even though this was not among the top five for the region. Only 27-36% of organic farmers in the other four agro-ecoregions cited climate change as a substantial challenge. The following quote from a Southern farmer highlights the challenge:

> ***"Extreme variability in weather makes it very hard to manage for consistent production. More information on how different varieties of crops respond to different climatic conditions. Better weather forecasting over 3 months."***

Respondents from the South were considerably more likely to report many production challenges as substantial, which indicates that organic farming can be especially difficult in the region's hot climates and lower-fertility soils.

Compared to other regions, respondents from the South were considerably more likely to report many production challenges as substantial, which indicates that organic farming can be especially difficult in the region's hot climates and lower-fertility soils. For example, Southern region producers face intense weed, insect pests, and disease pressures, and organic producers incur substantial costs in managing these challenges (*Table 3.4*). In addition to the top five challenges listed in the table, many organic farmers in the South find it challenging to adapt to climate change (54%), maintain adequate yields (51%), manage soil fertility and crop nutrition (44%), move beyond input substitution to manage the farm as a system (39%), optimize soil structure and avoid erosion (38%), and minimize adverse impacts of tillage on soil health (37%).

With fewer severe production challenges, Corn Belt organic producers may have greater opportunities to develop strategies for managing weeds with less harm to soil health.

Conversely, respondents from the Corn Belt reported comparatively fewer challenges. While two-thirds cited weed control and half cited maintaining yields, the fourth-ranked issue—soil fertility and crop nutrition—proved challenging for only 38% of respondents (compared to 42-47% in other regions). Minimizing tillage impacts on soil health ranked fifth in the Corn Belt, yet the 34% of respondents who considered this a substantial challenge was similar to percentages in the Northeast, South, Great Lakes, and Great Plains and Mountains, where this was not among the top five. With fewer severe production challenges, Corn Belt organic producers may have greater opportunities to develop strategies for managing weeds with less harm to soil health.

Organic farmers in the Northeastern region also reported fewer challenges than farmers in some other regions. For example, the percentage of respondents from this region who cited weed control as a substantial challenge was notably lower than elsewhere (Table 3.4). While insect pests ranked fifth in the Northeast, the percentage here was a bit lower than other regions.

Issues related to soil management practices (e.g., cover crops, rotations, and perennials and permaculture), soil health (e.g., optimizing soil structure and avoiding erosion, and minimizing impacts of tillage on soil), and water (e.g., drought management, irrigation water use, and access to water resources) were cited less often as leading production challenges (*Table 3.1*). This may reflect respondents' compliance with organic farming principles of resource stewardship and biodiversity as codified in NOP standards, and their skill in implementing stewardship practices.

However, several regional patterns emerged that can inform future research and technical assistance priorities. For example, higher percentages of Great Plains and Mountains farmers noted challenges with cover cropping (34% versus 15-22% in the Northeast, South, Corn Belt, and Pacific), crop rotations (28% versus 14-24% in other regions), and integrating perennials and permaculture design (38% versus 25-29% in other regions). This suggests that the dry climates of this region present special challenges in implementing these practices. In the Great Lakes region, 30% of respondents reported challenges with cover cropping, which may be related to cold climates and short growing seasons limiting options. On the other hand, only 19%, 16%, and 25% of Southern region respondents found cover cropping, crop rotation, and perennial integration challenging, which suggests that long growing seasons and abundant rainfall facilitate implementation of these practices. Skillful implementation of these practices may help Southern organic farmers cope with the intense challenges they often face with weeds, pests, diseases, climate change, and soil health and fertility.

With climate change intensifying and prolonging droughts in the Western region, water management challenges will likely continue to increase.

Water-related challenges showed pronounced regional patterns. For example, 36% of Great Plains and Mountains farmers and 32% of Pacific region farmers cited drought management and 22-23% of respondents from these regions cited access to water resources, while generally fewer respondents from regions further east identified these challenges. With climate change intensifying and prolonging droughts in the Western region, water management challenges will likely continue to increase, especially for dryland (unirrigated) production systems. In the Pacific region, 27% of respondents found irrigation challenging, compared to only 18% in the Great Plains and Mountains. The Mediterranean climates of the Pacific region provide most of the annual rainfall during winter, while many organic growers in this region produce irrigation-dependent specialty crops during spring through fall; hence irrigation will likely emerge as an increasingly urgent challenge as climate change reduces winter mountain snowpack and speeds aquifer depletion.

Very low percentages of Corn Belt and Great Lakes producers reported challenges related to drought management (12-16%), water resources (4-5%), and irrigation (5-8%). This may reflect in part the trend toward increasing rainfall in this region as climate change unfolds. Conversely, higher percentages of Southern organic farmers reported challenges with drought (30%), irrigation (24%) and water resources (25%). While average annual rainfalls in this region have also trended upward, intensifying heat and increasingly erratic rainfall patterns leading to “flash droughts” are likely making water issues more challenging for all Southern farmers.

Research, Extension, and technical assistance efforts can be tailored to help organic producers anticipate and meet region-specific water-related challenges. This can include optimizing and regionalizing soil stewardship and regenerative practices to enhance soil water holding capacity and crop drought resilience, and crop breeding with a focus on drought resistance.

A breakdown of the top five production challenges by SARE region can be found in *Table S2* in the Supplements.

Table 3.4

Top five production challenges in each agro-ecoregion ranked in descending order from strongest to weakest challenge.

Production challenges were quantified by calculating the percent of respondents who rated a substantial production challenge as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the production challenge was substantial.

Agro-ecoregion	Production Challenge	% of Respondents Rating as a Substantial Challenge
Northeast	Managing Production Costs (n=104)	61%
	Controlling Weeds (n=97)	57%
	Maintaining Adequate Yields (n=74)	44%
	Managing Soil Fertility and Crop Nutrition (n=69)	42%
	Controlling Insect Pests (n=62)	37%
South	Controlling Weeds (n=42)	78%
	Managing Production Costs (n=40)	77%
	Controlling Insect Pests (n=35)	65%
	Controlling Disease Pressure (n=32)	63%
	Finding Appropriate Organic Crop Varieties and Seed for Your Operation (n=32)	62%
Great Lakes	Controlling Weeds (n=90)	64%
	Maintaining Adequate Yields (n=70)	56%
	Managing Production Costs (n=16)	55%
	Managing Soil Fertility and Crop Nutrition (n=13)	46%
	Adapting to Climate Change (n=12)	42%
Corn Belt	Controlling Weeds (n=77)	66%
	Maintaining Adequate Yields (n=56)	50%
	Managing Production Costs (n=50)	45%
	Managing Soil Fertility and Crop Nutrition (n=44)	38%
	Minimizing Adverse Impacts of Tillage on Soil Health (n=37)	34%
Great Plains	Controlling Weeds (n=80)	74%
	Managing Production Costs (n=53)	54%
	Maintaining Adequate Yields (n=48)	47%
	Managing Soil Fertility and Crop Nutrition (n=48)	47%
	Finding Appropriate Organic Crop Varieties and Seed for Your Operation (n=45)	43%

Table 3.4 (continued)

Pacific	Controlling Weeds (n=149)	71%
	Managing Production Costs (n=131)	65%
	Controlling Insect Pests (n=103)	50%
	Maintaining Adequate Yields (n=93)	47%
	Controlling Disease Pressure (n=93)	46%

Farmer Race/Ethnicity

BIPOC and White organic farmers shared many of the same production challenges (*Table 3.5*), including:

- Managing production costs
- Controlling weeds
- Maintaining adequate yields
- Controlling insect pests

BIPOC organic farmers rated controlling disease pressure as their third leading production challenge (*Table 3.5*), whereas only 35% of White organic farmers considered diseases a substantial challenge. The percent of BIPOC farmers who rated topics as substantial challenges was also generally higher than the White farming population (*Table 3.5*).

For example, 81% of BIPOC farmers reported struggling with production costs, compared with 57% of White farmers. In addition to the challenges shown in *Table 3.5*, farmers of color often reported substantial challenges with moving beyond input substitution to manage the farm as a system (47%), adapting to climate change (49%), soil fertility and crop nutrition (46%), finding appropriate organic seeds and crop varieties (43%), optimizing soil structure and avoiding erosion (40%), minimizing impacts of tillage on soil health (39%), and drought management (36%). This finding suggests BIPOC farmers face greater obstacles to organic production, potentially because of historical underrepresentation of and support for BIPOC farmers within the broader organic community, and racial inequities in delivery of USDA and Extension services.

81% of BIPOC farmers reported struggling with production costs, compared with 57% of White farmers.

Organic survey respondents explicitly called for additional resources for socially disadvantaged farmers when responding to open-ended questions about their greatest production challenges. One respondent suggested the following:

> ***"Additional research and information on assisting organic socially disadvantaged farmers in organic management, access to organic markets, and increasing sustainability.... Additional research and information on assisting socially disadvantaged farmers with training on organic farming systems."***

Another survey respondent called attention to the structural racism present in the agricultural community:

> ***"Additional research and information on inclusion and racial equity within organic agriculture, organic farming, and the organic culture."***

Table 3.5

Top five production challenges for BIPOC and White organic farmers ranked in descending order from strongest to weakest challenge.

Production challenges were quantified by calculating the percent of respondents who rated a substantial production challenge as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the production challenge was substantial.

Type of Farmer	Production Challenge	% of Respondents Rating as a Substantial Challenge
BIPOC Organic Farmers	Managing Production Costs (n=35)	81%
	Controlling Weeds (n=31)	72%
	Controlling Disease Pressure (n=23)	58%
	Controlling Insect Pests (n=25)	57%
	Maintaining Adequate Yields (n=25)	56%
White Organic Farmers	Controlling Weeds (n=505)	66%
	Managing Production Costs (n=419)	57%
	Maintaining Adequate Yields (n=350)	48%
	Managing Soil Fertility and Crop Nutrition (n=318)	43%
	Controlling Insect Pests (n=300)	40%

Farming Experience

Regardless of farming experience, controlling weeds, managing production costs, maintaining adequate yields, and managing soil fertility and crop nutrition are key challenges for organic production (*Table 3.6*). Beginning farmers struggled more with insect pest control (45%) than with finding appropriate organic seeds and crop varieties (34%) while each of these issues was cited as a challenge by 39% of experienced farmers (*Table 3.6*).

Table 3.6

Top five production challenges for beginning and experienced organic farmers ranked in descending order from strongest to weakest challenge.

Production challenges were quantified by calculating the percent of respondents who rated a substantial production challenge as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the production challenge was substantial

Type of Farmer	Production Challenge	% of Respondents Rating as a Substantial Challenge
Beginning Farmers	Controlling Weeds (n=109)	66%
	Managing Production Costs (n=97)	63%
	Maintaining Adequate Yields (n=72)	46%
	Controlling Insect Pests (n=73)	45%
	Managing Soil Fertility and Crop Nutrition (n=70)	43%
Experienced Farmers	Controlling Weeds (n=361)	67%
	Managing Production Costs (n=297)	56%
	Maintaining Adequate Yields (n=259)	49%
	Managing Soil Fertility and Crop Nutrition (n=223)	42%
	Finding Appropriate Organic Crop Varieties and Seed for Your Operation (n=193)	39%

Transition Survey Participants

Transition survey respondents were asked to identify their greatest production challenges from the same list of possible challenges presented to organic survey participants using a five-point scale ranging from "not a challenge" (1) to "a strong challenge" (5). The production challenges were then ranked by calculating the percent of transition survey respondents who rated a topic as either a 4 or a 5 on this scale, and listing them in descending order from highest to lowest percent. The full ranked list of production challenges for transitioning producers is presented in *Table 3.7*.

The top five production challenges for transition survey respondents included:

1. Controlling weeds
2. Finding appropriate organic crop varieties and seeds
3. Managing production costs
4. Minimizing adverse impacts of tillage on soil health
5. Seed production and seed saving

As with the organic survey respondents, controlling weeds was clearly the most challenging production issue for farmers transitioning to organic certification, with over three-quarters identifying weeds as a substantial challenge compared to less than half of respondents for any other issue (*Table 3.7*). Weed competition against crops often becomes especially problematic during transition of a field from conventional production with herbicides to organic production with mechanical weed control, particularly when sub-optimal soil health makes crops less weed-tolerant (Brown et al., 2017; Lloyd, 2016).

Transitioning respondents cited many of the same challenges as certified organic farmers, including finding appropriate crop varieties and seeds, managing production costs, minimizing tillage impacts on soil health, soil fertility and crop nutrition, and insect pests (*Table 3.7*). Because of the small sample size (n=71) in the transitioning survey, it is difficult to ascertain whether any one of these challenges is more important than others during transition, or whether certain challenges are more severe during transition than for certified organic producers.

Common horsetail, a perennial flowerless weed.

However, there was a trend toward transitioning respondents reporting less difficulty with production costs and maintaining yields and more difficulty with finding organic seeds and crop varieties, and with seed production and saving than certified respondents. This suggests that transitioning growers may tend to be optimistic about increasing net returns through certified organic production because of price premiums and expanding organic markets, and at the same time concerned about producing or obtaining seeds that will comply with NOP standards and will perform well under organic practices.

Some of the transitioning focus group participants expanded on the issue of production costs, linking both production and certification costs to profitability and motivations for becoming certified organic.

> ***"I would say trying to figure out what crop to grow during that transition time that would be still profitable is a problem, and a lot of times some guys are just putting cover crops out there and grazing them with cattle. They don't have as many inputs, but they're not really making any money. They're just basically playing it safe is what they're doing."***

> ***"Certification is an economic decision, and the only reason to be certified is if that gains you access to a market that is worth at least as much as the certification costs."***

When farmers undertake a transition to organic certification, they must immediately stop using synthetic inputs to suppress weeds and instead rely on tillage and cultivation for weed control, which can have negative impacts on soil health. This issue emerged as a substantial challenge for a somewhat higher percentage of transitioning respondents (43%) than certified organic (31%). In addition, production issues related to weed control and the struggle to balance weed control with building soil health was a common theme during focus group discussions with transitioning producers. For example:

> ***"I would say on my operation the challenges are essentially weed control and [soil] fertility."***

> ***"The weed control issue, especially on summer crops, was really difficult and it continues to be difficult....The other thing that I struggle with is trying to reduce tillage as much as possible, keep ground covered, and trying to develop those strategies."***

> ***"Weed control is always a problem and figuring out a rotation is another."***

Table 3.7

Production challenges ranked in descending order from strongest to weakest challenge, as identified by transition survey participants.

Production challenges were quantified by calculating the percent of respondents who rated a substantial production challenge as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the production challenge was substantial.

Production Challenge	% of Respondents Rating as a Substantial Challenge
Controlling Weeds (N=23)	77%
Finding Appropriate Organic Crop Varieties and Seed for Your Operation (N=14)	47%
Managing Production Costs (N=12)	44%
Minimizing Adverse Impacts of Tillage on Soil Health (N=12)	43%
Seed Production/Seed Saving (N=9)	41%
Managing Soil Fertility and Crop Nutrition (N=13)	41%
Adapting to Climate Change (N=12)	41%
Controlling Insect Pests (N=12)	40%
Post-Harvest Handling Methods (N=9)	36%
Controlling Disease Pressure (N=10)	36%
Managing Pollinators and Habitat for Pollinators (N=10)	35%
Managing the Farm as a System (N=10)	35%
Maintaining Adequate Yields (N=8)	33%
Integrating Perennials and Permaculture Design (N=7)	33%
Grazing and Pasture Management (N=4)	31%
Utilizing Cover Crops and Green Manures (N=9)	31%
Irrigation and Water Use (N=7)	30%
Access to Water Resources (N=8)	29%
Optimizing Soil Structure, Avoiding Soil Erosion and Degradation (N=8)	27%
Managing Animal Production and Health (N=3)	25%
Managing Crop Rotations (N=6)	25%
Enhancing Agricultural Biodiversity (N=7)	24%
Drought Management (N=4)	14%

3.2 Non-production Challenges

Organic Survey Participants

Full Organic Survey Sample

Organic survey respondents were asked to identify their greatest non-production challenges from a list of possible challenges that they could rate on a five-point scale ranging from "not a challenge" (1) to "a strong challenge" (5). The non-production challenges were ranked by adding the percent of respondents who rated a topic as either a 4 or a 5 on this scale, and listing them in descending order from highest to lowest percent. The full ranked list of non-production challenges is presented in *Table 3.8*.

Organic farmers face many non-production challenges. This section of the report focuses on the top five non-production challenges identified in the organic survey, which included:

1. Accessing labor
2. Finding and developing markets for organic products
3. Cost of organic certification
4. Meeting recordkeeping requirements
5. Developing infrastructure

A breakdown of the rankings for the top five non-production challenges can be found in *Figure S10* in the Supplements. Compared to responses for possible production challenges, fewer organic survey respondents indicated the listed non-production topics were important challenges for their operations.

Table 3.8

Organic non-production challenges ranked in descending order from strongest to weakest challenge.

Non-production challenges were quantified by calculating the percent of respondents who rated a substantial non-production issue as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the non-production challenge was substantial.

FULL ORGANIC SURVEY SAMPLE	
Non-production Challenge	% of Respondents Rating as a Substantial Challenge
Accessing Labor (n=327)	46%
Finding and Developing Markets for Organic Products (n=307)	42%
Cost of Organic Certification (n=237)	31%
Meeting Recordkeeping Requirements of Organic Certification (n=236)	31%
Developing Infrastructure (n=220)	31%
Accessing Capital and/or Financing (n=191)	27%
Managing Business Activities (n=185)	25%
Farm Succession Planning (n=171)	25%

Table 3.8 (continued)

Accessing Land (n=159)	24%
Farm Business Planning (n=167)	23%
Understanding and Following Food Safety Standards (N=133)	20%
Risk of Contamination from Genetically Engineered Crops (N=137)	20%
Meeting Organic Certification Requirements (N=134)	18%
Relations with Other Farmers (N=75)	10%
Community Relations (N=67)	9%
Social Pressure to Not Farm Organically (N=64)	9%

In addition to the non-production challenges categories listed in *Table 3.8*, survey participants were given the opportunity to provide written responses to open-ended questions about their top two non-production challenges. These responses were coded into different themes. Though the language used for the open-ended themes varies slightly from the language provided in the close-ended survey questions, respondents generally identified similar challenges (*Table 3.9*). For example, the theme coded "profitability/marketing" aligns with close-ended challenge "finding and developing markets" and the theme "facilities and equipment" aligns with closed-ended challenge "developing infrastructure."

Table 3.9

Qualitative data for the top non-production challenges identified by respondents through written responses to open-ended comments.

Open-Ended Responses for Non-production Challenges	Percent of Respondents Who Listed as Challenge
Profitability & Marketing (n=351)	54%
Labor (n=188)	29%
Certification (n=125)	19%
Facilities & Equipment (n=115)	18%
Institutional Support/Extension/Research (n=75)	12%
Government Regulation (n=73)	11%
Business Planning (n=45)	7%
Access to Capital (n=43)	7%
Farm Succession (n=42)	6%
Land Access/Tenure (n=41)	6%
Conflict with Neighboring farms/Neighbors (n=36)	6%
Harvesting and Post-Harvesting Handling (n=34)	5%
Transportation (n=15)	2%
Transitioning (n=10)	2%
Legal Assistance (n=9)	1%

Accessing Labor

Nearly half of organic survey respondents identified accessing labor as a non-production challenge, and more than one in four identified labor as one of their two top challenges in the open-ended question. Comments by focus group participants illustrate the difficulties that organic producers have experienced in securing the labor they need for their operations.

> ***"Dependable, affordable labor. Hard to find."***
>
> ***"I find it is so difficult to get qualified help and the help on a regular basis, especially when the weeds are coming up now at this time of year and then also when we are harvesting."***
>
> ***"It is kind of a question of when to hire, how much, do we get someone full-time, do we get someone temporary a couple days a week or as needed, and then how to kind of know when we can and to source those people, because I know a lot of the more established farms around here have a tough time finding people that, on a full-time basis, that actually fits within the budget that they have."***

"Trying to find people who have the experience that we are looking for is really challenging."

Comments from focus group participants also indicated that labor shortages could be one of the barriers to increasing organic acreage in the U.S. Organic farmers explained that a lack of reliable labor was a key reason for not expanding organic production.

> ***"The last two years, our challenge was labor. We didn't want to increase our production because we didn't want to hire anybody."***
>
> ***"We can't pay people for full-time labor anymore. We are doing part time and cutting down on crops and essentially growing less food for our community because we can't make it happen on our scale."***

Focus group participants also noted that organic practices require more labor than conventional practices, which underscores the need for labor solutions specific to organic systems. As one farmer commented:

> ***"The increased labor associated with organic methods, as opposed to all my counterparts that are using chemicals or herbicides, pesticides, and just hooking up the sprayer and going. It has taken a lot more labor on my part."***

Finding and Developing Markets

Finding and developing markets for organic products emerged as a non-production challenge for 42% of organic producers in our survey, while 54% cited topics related to "profitability and marketing" as among their top two challenges in the open-ended question. It was also an important theme throughout focus group discussions.

> ***" I need to find out more on the marketing because we don't have the help or we don't have the time to actually go into a farmers' market. We just don't have the capability. It is like time, money, and resources, nobody has all three, and so what happens is unless we are with people or unless the people know about us then it is really hard for us to get those buyers."***

> ***"I would have to agree that marketing is risky. With conventional crops, you can basically call the elevator and say I want to sell some grain today. But with organic marketing you have to have some lead time oftentimes, and have to wait a long time for a market sometimes."***

> ***"So direct marketing, you always have the risk [that] you get to set your price, but are you going to get that price? And is the market going to be there?"***

Organic survey participants also identified marketing needs when replying to open-ended questions about non-production challenges in the organic survey. Some specific comments about marketing challenges included:

> ***"Identifying regional market opportunities that smaller growers can serve with aggregated distribution systems like cooperatives or food hubs. We can meet the pricing requirements of some underserved local wholesale markets, but can't meet their distribution and ordering needs for volumes."***

> ***"I can't sell the produce I grow! There is NOT enough Organic Farmers. I can't fill a train car load by myself. Need to COOP."***

> ***"Growing the crops can be challenging enough, but the hardest/most important part is making sure they are sold in time. We sell both CSA and wholesale, but invest a lot of time and money into maintaining markets and trying to find new ones at a fair price."***

One respondent outlined specific marketing questions they would like to have addressed:

> ***"What tools and technologies can best serve micro and small farms trying to sell online and provide delivery services? Is it economically feasible for micro farms and small farms? What trainings can be made available to help us learn how to do this?"***

Focus group participants particularly called attention to issues of supply and demand, and challenges associated with developing stable, reliable contracts with buyers.

> ***"We've been selling on our local farm stand. However, in 2020 we had some contracts with local restaurants which they had shut down and so we didn't gain the sales that we required to become, you know, fully organic. I think we are going to try again this year, but again there is no contract so it's really hard for us to purchase all the seed and then plan, when we are not going to maybe have some buyers."***

> ***"When we got certified back in 2009, we just started with some grain, and one of our biggest things is trying to find buyers for the organics and keeping the prices up, since the yields and everything are not as good as your conventional crop."***

Focus group participants also voiced great uncertainty around price premiums for organic products and concern about a lack of a customer base for organic products that are more expensive than their conventional counterparts.

> ***"We have to charge a premium just to make ends meet, hopefully at least, and I think that it is hard for some people to pay it or want to pay more for that pound of tomato versus the farmer next to you that has it cheaper because they are conventional. I think you are running a risk knowing that you'll have enough customers willing to pay the price that you just need to have."***

> ***"We went through a number of years where you could pretty much assume that organics were going to have some substantial economic advantage when it came to the market, and that has certainly eroded to a large degree. It certainly has to be a big factor today for anybody that's considering first time transition or additional transition."***

> ***"Are people going to be willing to pay, you know, the organic price? Our prices are high, and minimum wage is going up. That's a definite risk...the prices can't keep up with everything else in the economy.... What do you do about that? No one wants to spend too much for food."***

> ***"I have started to notice kind of – maybe a stagnation in prices, and maybe that's just across the board for farms. But I think that there's a lot going on... There's a lot of hype going around organic, and I think maybe the price difference is starting to shrink."***

> ***"I will say out in Montana we don't see the kind of prices like I think a lot of the folks in the east and on the west coast see for organic food, and we just don't have the customer base that can pay $6.00 a pound for heirloom tomatoes. If we put that up at our market, we would take home all of our tomatoes."***

Cost of Organic Certification and Record-keeping Requirements

Almost one-third of survey respondents cited each of two closely related non-production challenges: the direct costs of obtaining NOP certification, and making and keeping all the records required for NOP certified farmers. When considered together, these certification-related issues might present a substantial challenge for half or more of organic producers in the survey.

> *"The biggest challenge for me is I would like to raise more livestock. Having a hard time finding processing, and then like the label that goes along with that processing is expensive."*

"The recordkeeping just was the hardest thing to learn, and any non-compliances we've had have related to just those few records that we lacked."

> *"Other organic farmer friends of mine joke how it is kind of crazy that we have to spend all this money and do all this paperwork and receipt trails just to prove that we are not spraying anything. When that, ideally would be the normal...it would be just interesting if it was flipped."*

> *"I would say that's our biggest issue, too — maintaining organic certification...all the record-keeping that's involved, and as we're scaling up, making sure that everyone who is responsible for record-keeping is keeping up with the record-keeping. It's always just a challenge."*

> *"Making sure people put their record-keeping in, you know, that's the hardest thing with all this digital stuff, just to make sure that it actually got done."*

> *"I'm always amazed at how much paperwork there is in organic certification. I work most of the time in an office on a computer, and I am an editor. I write for a living, and I am just always astounded at the amount of detail of these dozens of forms that you have to fill out and maintain year to year. It would be nice if the process would be simplified somehow."*

Focus group participants also highlighted the fact that the more diversified an operation is, the more difficult paperwork becomes.

> *"Recordkeeping is extremely difficult, and that remains to be a continuing challenge, especially with the more diversified you are."*

> *"The hardest part of the certification is when your certifier asks you to basically trace a crop. They have to trace whatever the crop is from whatever your yield was, or first whenever you sold it, how much you sold, all of it back to your seed. I mean, you all probably know. And then you have 150 different crops, and then you have within those crops, you know, three, four, you know, like lettuce mix, for us we have like – we planted every week. We have like 30 some successions. Then tying it back to that date in the field where it is supposed to be is extremely difficult."*

CASE STUDY

"We are an extremely diversified farm, and most CSA farms have 20 plus crops at the minimum…And so that, combined with confusion around the level of detail that is required of us, can we just talk about mixed vegetables as a crop? Recordkeeping is super complicated. We are doing small quantities of everything. If we are going to plant out 100-foot row in three different crops, it really can get granular in terms of how much seed you are putting in the ground, and like when you are harvesting, are you harvesting off of which basil succession?

I also worked for the NRCS and have done their conservation activity plan for transition to organic and have gone to people's farms and helped them fill out the paperwork and kind of understand. I think having some kind of program like that is helpful. I know that Rodale is doing that with people now, and there are a lot of companies that are doing it especially with grain producers, but then those grain producers are kind of tied to buying seed from that company and then selling their crop to that company. They are kind of buying into a whole program…which kind of grates me a little bit. But I don't know how long they have to stay with that company that's helped them, but that can be daunting as [the other participant] was saying, all that paperwork and what do they really want. And I think some kind of program — I don't know through who — that would be useful for new people to have someone. And it is really about a three- to four-hour timeframe to get people up to speed and get most of the paperwork done for them for somebody who knows what they are looking at."

Developing Infrastructure

Developing infrastructure was another top non-production challenge identified by organic survey participants and it also surfaced in focus group sessions, particularly in discussions related to issues of production scale and equipment needs.

> ***"I would say that having the right equipment is a big challenge, maybe. Equipment is very expensive to do all the things that we want to do like haying, having things that we could reduce tillage and maybe enough people with the right skills to do them."***

> ***"I know what I want to do, but I can't afford the equipment that it's going to take to do it. I need to increase my residue, but my old six row equipment or the old disc or the old field cultivator won't handle the residue that I need for weed control."***

> ***"We are also kind of in a similar scale issue where equipment especially current model equipment, late model equipment, is not really made for an operation our size. It is kind of too big or much too small…the investments take a long time to pay back."***

"I'm farming 12 acres of vegetables…and the affordability of a quality seeder is really difficult."

Lack of infrastructure and equipment exacerbates other issues, such as weed control.

> ***"One of the challenges we just have is we don't have like a cultivating tractor. Our land is just really sloped, and we can't really use a riding tractor. And without that, I don't see how we'll get enough labor to do all the weeding that needs to get done."***

Accessing Land

While land access and costs of purchasing and leasing land for organic farming did not surface as top challenges in the organic survey, it was a prevalent theme in the focus group discussions and was often discussed in tandem with infrastructure challenges. Focus group participants explained that starting an organic operation entails large upfront costs and several focus group participants described pursuing organic farming as a privilege.

> ***"There is no way that I could have like started a farm or had access to a farm without financial support from my family. And my parents liquidated a business that they had worked on their whole life and through selling our property in California after it had burned out and then using that capital to secure land up here. There's just no way that I could be in this position without that immense privilege."***

> ***"I started farming with a lot of privilege and didn't have a lot of debt, and I think it is nearly impossible for somebody to start farming out here and not have that kind of backup and be able to pay themselves because the prices are just pretty rock bottom low, even for organic local food."***

> ***"We wouldn't have bought the farm we just bought without an extremely low interest forgivable loan from our parents. And then access to land is so complicated."***

> ***"Our largest challenge is just access to land to be able to move into what we want to do to have a diversified farm."***

> ***"I would echo a lot of the themes of land, and for us that was an initial startup barrier."***

> ***"I'm talking as a non-landowner — I don't think I'll ever have the money to put towards purchasing a piece of land."***

Focus group participants explained that starting an organic operation entails large upfront costs and several focus group participants described pursuing organic farming as a privilege.

Commodity Category

Several non-production challenges appeared associated with certain categories of organic commodities. Understandably, more than half of farmers whose operations include labor-intensive crops — vegetables, herbs, cut flowers, berries, tree and vine crops, or seeds for planting — reported challenges with accessing labor, while field crops, forages, and livestock were not associated with increased labor access challenges (*Table 3.10*). About one out of four organic survey respondents cited accessing land as a challenge, and this decreased to less than one out of six for producers of organic berry, tree, and vine crops. Potential factors in this trend include the larger acreages required to make a living from field crop or livestock enterprises, and the need for deep, fertile soil and minimally sloping topography for sustainable production of annual crops. Perennial horticultural crops

can be grown successfully on steeper topography with less-ideal soil types, and the high market value of organic fruit, nuts, and wine can make small acreages economically viable. In fact, fruit and nut crops are often grown on hillsides with good air circulation where they are less prone to diseases and frost damage than they would be in level bottomlands.

Organic vegetable enterprises typically include five to twenty or more different crops, each with its own production needs, costs, markets, and enterprise budgets. This may make business planning and management far more complex than for a typical field crop rotation or livestock farm with forage crops.

Producers of organic vegetables, herbs, and cut flowers reported greater challenges with business planning and business management than other respondents (*Table 3.10*). Organic vegetable enterprises typically include five to twenty or more different crops, each with its own production needs, costs, markets, and enterprise budgets; making business planning and management far more complex than for a typical field crop rotation or livestock farm with forage crops.

Risks of contamination from genetically engineered (GMO) crops are associated with those crops for which genetically engineered cultivars are in widespread commercial use on conventional farms. These include field crops (e.g., corn, soy, cotton, canola) and forages (e.g., alfalfa), while few GMO specialty crop cultivars are commercially available. In our survey, organic producers of field crops and forages were more likely to cite GMO risks as a challenge than those who did not grow these crops, while the reverse was true for berry, tree, and vine crops (*Table 3.10*). One in three producers of seeds for planting cited GMO risks as a challenge, as they must maintain and guarantee high levels of seed purity to access organic seed markets.

It is important to note that, because many organic survey respondents include more than one commodity category in their operations, comparisons among commodities are not based on independent data. For example, some vegetable growers also produce field crops or seed for planting, and GMO risk challenges reported by these respondents may relate to the field or seed crops rather than the vegetables. Thus, the data in *Table 3.10* could under-estimate some of the commodity-related differences in level of challenge posed by non-production issues

Several leading non-production challenges varied little among commodity categories. These include market development, certification costs, and NOP recordkeeping requirements. Organic vegetable, herb, and cut flower growers reported slightly greater challenges with infrastructure, capital and financing, and food safety requirements than other respondents.

Relatively few respondents reported challenges with relationships with other farmers, community relations, or social pressure not to farm organically. However, these challenges were reported more often by field and forage crop farmers (13-16%), and organic seed producers (11-13%) than by specialty crop farmers (4–10%), and thus appear to reflect actual or perceived risks of GMO crop contamination from adjacent conventional operations.

One somewhat surprising outcome is that 36% of respondents who produce seed for planting cited challenges with farm succession planning, compared to 23% of those who do not grow seed. Other commodity categories showed little impact on this challenge. This suggests that producers whose operations provide for the next generation of organic seed may also have a greater concern to ensure that their farmland will be passed along to the next generation of organic farmers.

Table 3.10a and Table 3.10B

Relationship between organic commodities produced and non-production challenges.
The tables divide respondents who produce each of the organic commodity categories and show the percentages who rated each substantial challenge as either a "challenge" or "strong challenge." Differences of 10 percentage points or more between those who grow and who do not grow a particular commodity are identified in the table.

Table 3.10a

Commodity Grown and Raised	Accessing Labor	Accessing Land	Business Planning
Farmers who GROW Vegetables/Herbs/Cut Flowers	53%	23%	30%
Farmers who DO NOT GROW Vegetables/Herbs/Cut Flowers	41% ≥10%	25%	19% ≥10%
Farmers who GROW Berries	54%	16%	24%
Farmers who DO NOT GROW Berries	44% ≥10%	26% ≥10%	23%
Farmers who GROW Tree and Vine Crops	56%	14%	24%
Farmers who DO NOT GROW Tree and Vine Crops	41% ≥10%	27% ≥10%	22%
Farmers who GROW Field Crops	42%	29%	18%
Farmers who DO NOT GROW Field Crops	48%	21%	26%
Farmers who RAISE Livestock and Dairy	39%	26%	24%
Farmers who DO NOT RAISE Livestock and Dairy	48%	23%	23%
Farmers who GROW Forage Crops	39%	30%	21%
Farmers who DO NOT GROW Forage Crops	48%	22%	23%
Farmers who GROW Seeds for Planting	54%	26%	22%
Farmers who DO NOT GROW Seeds for Planting	44% ≥10%	24%	23 %

Table 3.10b

Commodity Grown and Raised	Business Management	GMO Crop Risks
Farmers who GROW Vegetables/Herbs/Cut Flowers	33%	16%
Farmers who DO NOT GROW Vegetables/Herbs/Cut Flowers	21% (≥10%)	22%
Farmers who GROW Berries	32%	10%
Farmers who DO NOT GROW Berries	24%	22% (≥10%)
Farmers who GROW Tree and Vine Crops	30%	9%
Farmers who DO NOT GROW Tree and Vine Crops	24%	23% (≥10%)
Farmers who GROW Field Crops	21%	30%
Farmers who DO NOT GROW Field Crops	28%	12% (≥10%)
Farmers who RAISE Livestock and Dairy	24%	22%
Farmers who DO NOT RAISE Livestock and Dairy	26%	19%
Farmers who GROW Forage Crops	16%	31%
Farmers who DO NOT GROW Forage Crops	28% (≥10%)	16% (≥10%)
Farmers who GROW Seeds for Planting	30%	34%
Farmers who DO NOT GROW Seeds for Planting	25%	17% (≥10%)

Farming Region

Accessing labor was the number one non-production challenge across all SARE regions except for the North Central region where organic farmers identified "finding and developing markets for organic products" as their number one non-production challenge (*Table 3.11*). The need for labor was particularly strong in the Southern and Western regions where 61% and 55% of organic farmers, respectively, noted this issue as challenging. Organic farmers in the Southern region also reported concerns about labor in the 2015 NORA survey. However, labor did not register as a major concern for organic farmers in the Western region in the previous survey, suggesting this issue has intensified in the Western region in the last few years.

Organic producers in the Northeast seem to have greater success in developing markets for their products (28% cited this as a substantial challenge) than producers in other regions where close to half of respondents cited it as a challenge (43-46%). The agro-ecoregion analysis for the top five non-production challenges (*Table S3* in the Supplements) indicates that market access is especially challenging in the Great Plains and Mountains (56%) and somewhat less so in the Corn Belt (38%). Farm proximity to population centers may play a role in easing market access challenges, as many organic producers in the Northeast are located within an hour's drive to a major city, while most producers in the Great Plains and Mountains are located far from population centers.

Costs of certification and NOP recordkeeping requirements each posed challenges for a quarter to a third of respondents from all regions. However, Northeastern producers struggled a bit less with certification costs (25% versus 32-38% in other regions), recordkeeping (28% versus 30-33% elsewhere), and meeting NOP requirements (12% versus 16-31% in other regions). These trends suggest that organic farming NGOs and/or government agencies in this region offer better resources to help farmers with marketing and certification-related aspects of an organic operation than do their counterparts in other regions.

One concern related to NOP standards — risk of contamination by GMO crops — emerged as a significant challenge in the North Central region (31%, tied with NOP record keeping for 5th place), and the South (29%), and much less so in the Northeast (12%) and West (8%). Agro-ecoregion analysis (*Table S3* in the Supplements) of this issue confirmed that organic producers in corn and soybean growing regions including the Southern Great Plains (TX, OK) are far more impacted by this challenge than organic producers elsewhere.

Developing infrastructure for an organic operation presented similar levels of challenge across all regions (30-33%). Business planning was noted as challenging a little more often in the Northeast (26%) than elsewhere (21-23%) while 30% of respondents from the Southern and Western regions reported managing business activities as a substantial challenge compared to 24% in the Northeast and 21% in North Central.

About one quarter of respondents from all four SARE regions noted access to land as a substantial challenge. Within the North Central region, agro-ecoregion analysis revealed greater difficulty accessing land in the Corn Belt (31%) than in the Great Lakes (18%).

In the open-ended comments, several respondents cited the land access issue:

> ***"...in central Illinois finding landowners interested in organics is difficult."***
>
> ***"More resources to support land access for small and young farm operations. Currently I lease, but my lease is unstable, and finding a new land situation to lease will be challenging. How are farmers who cannot afford to buy land keeping land tenure around the country?"***
>
> ***"There are many tax shelters present in agriculture. This attracts excessive capital and distorts the market for land. It places family farms at a great disadvantage. Study these tax shelters and how land and people are now considered to be commodities. Study ways to help family farms survive and thrive."***

In the Western SARE region, 32% of respondents found farm succession challenging, compared to 13-25% in other regions, and agro-ecoregion analysis confirmed that producers in both the Pacific (30%) and the western parts of the Great Plains and Mountains (31%) cited this challenge, though it was only among the top five challenges in the Great Plains and Mountains region. A few survey participants also mentioned the issue of farm succession in responses to the open-ended question about non-production challenges:

> ***"What land tenure/financing programs would make it realistic for a new farmer to take over our farm and give us back what we have put into it?"***
>
> ***"Additional training on creating trusts so that existing farms will remain working farms."***

Table S3 in the Supplements provides a breakdown of the top five non-production challenges by agro-ecoregion.

Table 3.11

Top five non-production challenges in each SARE region ranked in descending order from strongest to weakest challenge.

Non-production challenges were quantified by calculating the percent of respondents who rated a substantial non-production issue as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the non-production issue was either a "challenge" or "strong challenge."

SARE Region	Non-production Challenges	% of Respondents Rating as a Substantial Challenge
Northeast	Accessing Labor (n=53)	36%
	Developing Infrastructure (n=44)	30%
	Meeting Recordkeeping Requirements of Organic Certification (n=46)	28%
	Finding and Developing Markets for Organic Products (n=44)	28%
	Farm Business Planning (n=40)	26%
North Central	Finding and Developing Markets for Organic Products (n=123)	46%
	Accessing Labor (n=99)	40%
	Cost of Organic Certification (n=88)	32%
	Developing Infrastructure (n=82)	33%
	Meeting Recordkeeping Requirements of Organic Certification (n=85)	31%
Southern	Accessing Labor (n=38)	61%
	Finding and Developing Markets for Organic Products (n=26)	43%
	Cost of Organic Certification (n=23)	38%
	Developing Infrastructure (n=20)	33%
	Meeting Recordkeeping Requirements of Organic Certification (n=19)	32%
Western	Accessing Labor (n=131)	55%
	Finding and Developing Markets for Organic Products (n=106)	45%
	Meeting Recordkeeping Requirements of Organic Certification (n=83)	33%
	Cost of Organic Certification (n=79)	32%
	Managing Business Activities (n=71)	30%

Farmer Race/Ethnicity

While BIPOC and White organic farmers identified many of the same top five non-production challenges, these issues were especially challenging for BIPOC producers. For example, 68% of BIPOC survey respondents indicated accessing labor was a challenge compared to just 44% of White survey respondents, and certification costs posed a substantial barrier more than twice as often for BIPOC as for White organic producers (*Table 3.12*). Notably, half of BIPOC farmers indicated that accessing capital or financing was a challenge for their operation, compared to only 26% of White respondents. More BIPOC farmers reported difficulty accessing land (30 %) and developing infrastructure (41%) than White farmers (24% and 31%, respectively).

Table 3.12

Top five non-production challenges for BIPOC and White organic farmers ranked in descending order from strongest to weakest challenge.

Non-production challenges were quantified by calculating the percent of respondents who rated a substantial non-production issue as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the substantial non-production issue was either a "challenge" or "strong challenge."

Type of Farmer	Non-production Challenges	% of Respondents Rating as a Substantial Challenge
BIPOC Organic Farmers	Accessing Labor (n=27)	68%
	Cost of Organic Certification (n=26)	61%
	Finding and Developing Markets for Organic Products (n=21)	53%
	Accessing Capital and/or Financing (n=20)	53%
	Meeting Recordkeeping Requirements of Organic Certification (n=18)	41%
White Organic Farmers	Accessing Labor (n=300)	44%
	Finding and Developing Markets for Organic Products (n=286)	41%
	Developing Infrastructure (n=205)	31%
	Meeting Recordkeeping Requirements of Organic Certification (n=128)	30%
	Cost of Organic Certification (n=211)	29%

Although results are based on a limited number of BIPOC survey respondents, the survey findings indicate BIPOC farmers in particular are grappling with foundational challenges related to labor, land, capital, and operating costs, which must be overcome before they can seriously consider organic certification and the costs associated with it. The following open-ended responses from BIPOC farmers to the survey question about non-production challenges further illustrate these barriers:

> ***"I (an Indigenous Woman) started this seed operation at age 54 and need the work force and lack funds to hire that would enable me to increase the operation to be more profitable."***

> ***"Small Organic Farms are overburdened with fees and water testing requirements that impacts the ability to be profitable and sustain the farm. Several State Agencies and CCOF that require fees that are also impactful. Water costs and no real consideration for farm size has made it unsustainable."***

> ***"Infrastructure development — consulting and instruction on 'order of operations' and where to go/how to communicate with service providers about the needs of small farms."***

> ***"Cost of compliance in time and money is expensive and redundant. This is more a policy issue than a technical issue."***

> ***"It is very expensive and hard to find a food safety consultant to help in making sure you are following food safety protocols before an inspection."***

These barriers certainly play a role in the disproportionately low percentages of certified organic farmers who identify as BIPOC. The country's extensive history of racial discrimination and economic disparity has made it much more difficult for BIPOC farmers to obtain the capital and financial resources they need to launch, maintain, or expand a farming or ranching operation. It also made holding onto one's land far more difficult for BIPOC families and farmers due to laws and policies that stripped land ownership and rights, leading to extensive land loss over the 20th century.

"We also produce pasture-raised pork. It feels too complicated and expensive to even begin thinking about certifying our pigs Organic though we would be thrilled to do so."

Capital for farmers is theoretically available from both public and private lenders, although both have historically discriminated against BIPOC farmers and ranchers. Producers who are unable to meet the creditworthiness demands of private lenders, such as banks and cooperatives, can go to the United States Department of Agriculture's Farm Service Agency. However, the USDA has a well-documented history of disfavoring BIPOC producers in its loan programs. In 1999, USDA entered into a settlement agreement in a class action lawsuit (known as the *Pigford v. Glickman* case) brought by Black farmers alleging discrimination in USDA loan programs.

While a settlement agreement was intended to address and remedy these claims, the structure of the settlement agreement led to poorly-handled and inequitable distribution of funds. Although more than $1 billion was distributed through a settlement claims process, the government still failed to remedy its past actions and distribute the settlement funds in a non-biased manner. In 2010, a second settlement (Pigford II) was announced that was intended address shortcomings from the first settlement through the distribution of an additional 1.25 billion. As with the first settlement, the USDA again failed to remedy its past actions in distributing these funds. After more than a century of discrimination and decades of settlement discussions, the Federal government has yet to correct its past. In 2021, Congress continues to have discussions about providing additional debt relief to BIPOC producers in its budget reconciliation process.

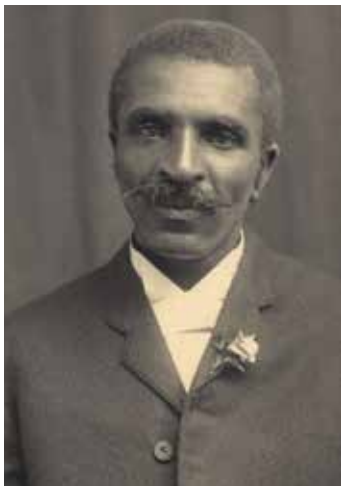
The Pigford cases as well as the *Garcia v. Vilsack* and *Keepseagle v. Vilsack* cases, brought the USDA's discrimination to a broader audience, which ultimately has led to Congressional action to try and remedy centuries of prejudice against Black, Latinx, and Indigenous producers. While these are positive steps forward, much more must be done to truly dismantle historical and structural racism in U.S. agriculture. For example, the long legacy of dispossession has so depleted the wealth of BIPOC families that few have land or capital resources to pass along to younger generations who might want to farm.

"There is no way that I could have like started a farm or had access to a farm without financial support from my family."

Several comments by White organic farmers in focus group discussions (quoted above) reflect their awareness that it is only the privileges of family wealth that allowed them to acquire these basic resources to launch and operate their organic operations without incurring huge and unmanageable debts. The USDA's recent Congressionally-mandated work to provide debt relief to BIPOC farmers, and Presidentially-mandated efforts to address racial equity issues in US agriculture, would begin to address this huge wealth gap and help these farmers stay in business. Unfortunately, this initiative is bogged down in litigation at the time of this report.

Beginning in the 1600's with the arrival of White Colonial settlers in what we now call the United States, Native Americans have faced land dispossession, institutionalized and overt racism, and genocidal and biological warfare. The first reservation was created in 1786 in the United States, formalizing a system that allowed for the reallocation of Native American tribes and pushing them off of their ancestral lands.

Though many of the land and food production management practices were lost, Indigenous American agricultural traditions have persisted and exemplify many aspects of regenerative organic farming, land stewardship, and biodiversity. In addition to the "three sisters" polyculture of corn, beans, and squash, examples include the Hopi system of dryland farming, the low-impact wild rice harvesting practices of the Minnesota Chippewa, and sustainable forestry practices of the Menominee tribe in Wisconsin (Johnson et al., 2021). While 1.7% of U.S. conventional farmers identify as Indigenous compared to just 0.8% of the U.S. population, only 0.4% of certified organic producers are Indigenous (USDA, 2019).


When Africans were enslaved and sold to White landowners in the U.S. in the 1600s-1800s, they brought with them agricultural traditions that exemplify many of the organic farming principles that align with NOP standards. At the beginning of the 20th Century, three Black leaders (*left to right*) — Booker T. Washington (founder of Tuskegee University), George Washington Carver, and W.E.B. DuBois — launched a vibrant Black farmers movement that emphasized organic and sustainable methods (researched and taught in depth by Carver) as well as democratically managed farmer cooperatives. This movement empowered many thousands of former sharecroppers and workers on White-owned farms to start their own farming enterprises. At one point, the percentage of farms and farm acreage in Black management roughly matched the percentage of Black people in the U.S. population (White, 2018). However, brutal repression during the Jim Crow era, exacerbated by racial discrimination in delivery of USDA programs throughout the 20th Century, forced most Black farmers off the land. During the latter half of the century, Fannie Lou Hamer's Freedom Farm Cooperative, and the Federation of Southern Cooperatives helped empower many Black farmers to resume farming, yet in the 2017 Agriculture Census, Black people represented only 1.3% of the nation's farmers, and just 0.5% of certified organic producers (158 individuals), compared to about 13% of the U.S. population (USDA, 2019; Wikipedia).

Achieving racial equity in our food and agricultural system is imperative. The organic sector is uniquely positioned to elevate the voices and platforms of BIPOC leaders and mentors, and provide recognition of the ecologically-sound, regenerative traditions that serve as the roots for organic farming and ranching. Today, leaders such as Leah Penniman of Soul Fire Farm (Penniman, 2018), and networks such as the Southeast African American Farmers Organic Network (SAAFON) do inspiring work to empower BIPOC organic and other farmers to pursue viable livelihoods as land stewards. Now is the time for the organic sector as a whole to embrace this work as an essential part of building a restorative agricultural future.

Several comments from White focus group participants reflect an acute awareness of the role of White privilege in their capacity to launch or continue an organic farming operation, and their desire to make this same opportunity available to current and aspiring organic farmers of color:

> ***"[I] also benefit from my white privilege and my education and my inherited family help, and my husband being from here. We didn't just like come and say like we are totally new here. We had family…in the area. I think we are all like a testament to this huge, huge inequality that we all know about that's affecting everyone in the food system."***

> ***"You can even just look at this focus group, what is the diversity of the folks that we have gathered here? The people who are able to pursue this kind of agricultural work, generally speaking, are folks who already come into it with a head start, whether that is a family farm, inherited land, inherited wealth, or money that was earned through a previous career. There is not a lot of support for people who don't have access to those things."***

> ***"I think as a farm and as a person I see this generally among white folks in this current moment is there's this acknowledgment that the ways in which – the practices in which various organizations and things we are part of are continuing this legacy of white supremacy. And the ways that we've gone about hiring in the past are doing that, so we reach out to our communities, and so it's only white people who come in who might get this chance. And so we are continuing this legacy of white farmers in Vermont…wanting to raise up farmers who look different than what we pictured as farming Vermont for there to be farmers of color, queer farmers, trans farmers, more female identified farmers."***

> ***"We also consider a lot of those things about trying to be more inclusive and reach out beyond just our immediate community, and one of the challenges has been even when we have landed some candidates that do pique our interest, the affordable housing situation comes up every single year with us and employees. Even if we have this great opportunity to bring in some people from outside…it comes down to affordability. Even though we do sort of offer some kind of on-site on-site housing, it is still limited. We work constantly trying to, as a farming organization, trying to seek out affordable housing options for employees and people to come into our community, and it's been really challenging."***

In response to the open-ended survey questions, one respondent expressed interest in the following:

> ***"unconventional land tenure arrangements to make land available to young people (not family members)…how best to set up long term mechanisms for young people to build equity in some version of communal farming?"***

Farmer Experience

Beginning and experienced organic farmers held some non-production challenges in common, while other challenges shifted with organic farming experience (*Table 3.13*). Beginning and experienced organic farmers found accessing labor, market development, and the cost of organic certification challenging to similar degrees. Infrastructure and capital were more of a concern in the early years of farming, as only 26-27% of experienced farmers noted these as substantial challenges. In contrast only 18% of beginning farmers felt challenged by farm succession planning, an issue which naturally becomes of greater concern later in a farming career (*Table 3.13*).

"Doing something to simplify the system of Certification for smaller scale diversified farms would be the biggest thing you could do to help smaller farms."

In a somewhat surprising survey outcome, a higher percentage of experienced organic farmers seemed to find NOP recordkeeping requirements more burdensome (33%) than beginning organic farmers (23%). Comments from focus group participants may help put this finding in perspective. A couple of organic farmers explained that the effort of recordkeeping to achieve organic certification was initially worthwhile as it was a clear way to communicate their practices to a new customer base, but upon establishing a secure customer base familiar with their practices, the burden of recordkeeping began to outweigh the benefit.

> ***"At first, [certification] felt like it was just an easy way to communicate to people like, 'Hey, we're taking this seriously and trying to do this the right way, the sustainable way,' and now I debate each time it comes around to try to summarize all my records and get it sent in and the certifiers coming to the farm."***

> ***"Now that my customers know me, can't I just say, 'I'm still doing it the same way?' And now, I've posted enough things on my social media about putting in cover crops, and what it does for the soil. I've just talked about it enough that the certification kind of feels a bit irrelevant at this point, but I'm still not sure that it is to all the customers that I might reach with just the word 'organic.'"***

In addition, as organic farmers gain experience their farming systems may become more diverse, which could make recordkeeping requirements more complex and time consuming. On the other hand, some experienced organic farmers may cut back their crop mix to those that perform best and give the best net returns, maintaining a level of crop diversity that supports soil health without creating overwhelming production schedules and recordkeeping work.

> ***"For farms producing under 1 million in sales the certification process should be changed. We grow over 100 crops and cannot keep accurate harvest records. We distribute most of what we sell to CSA and don't have reasons to keep records of pounds of production. We are being forced to prove what we sell is Organic when there is really no question that it is. Doing something to simplify the system of Certification for smaller scale diversified farms would be the biggest thing you could do to help smaller farms."***

Table 3.13

Top five non-production challenges for beginning and experienced organic farmers ranked in descending order from strongest to weakest challenge.

Non-production challenges were quantified by calculating the percent of respondents who rated a substantial non-production issue as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the substantial non-production issue was either a "challenge" or "strong challenge."

Type of Farmer	Non-production Challenges	% of Respondents Rating as a Substantial Challenge
Beginning Farmers	Accessing Labor (n=65)	47%
	Finding and Developing Markets for Organic Products (n=68)	45%
	Developing Infrastructure (n=62)	45%
	Accessing Capital and/or Financing (n=20)	34%
	Cost of Organic Certification (n=47)	31%
Experienced Farmers	Accessing Labor (n=231)	45%
	Finding and Developing Markets for Organic Products (n=207)	40%
	Meeting Recordkeeping Requirements of Organic Certification (n=178)	33%
	Cost of Organic Certification (n=211)	32%
	Farm Succession Planning (n=131)	27%

Transition Survey Respondents

Transition survey respondents were presented with the same list of non-production challenges provided in the organic survey and w ere asked to rate them using the same five-point scale ranging from "not a challenge" (1) to "a strong challenge" (5). The non-production challenges were ranked by adding the percent of transition survey respondents who rated a topic as a 4 or 5 on this scale and listing them in descending order from highest to lowest percent. The full ranked list of non-production challenges is presented in *Table 3.14*.

The top five non-production challenges for transition survey respondents included:

1. Finding and developing markets for organic products
2. Meeting recordkeeping requirements
3. Developing infrastructure
4. Accessing labor
5. Accessing capital/financing

Transitioning-organic and certified organic respondents shared four issues among their top five non-production challenges: finding and developing markets, recordkeeping, developing infrastructure, and accessing labor. Respondents to the transitioning survey seemed to find non-production issues more daunting than participants in the organic survey. For example, over three-quarters of transitioning farmers identified market development as a substantial challenge compared to just 42% of certified organic farmers. Other challenges noted more often by transitioning farmers include NOP recordkeeping requirements (53%), meeting certification requirements (43%), and certification costs (40%), versus 31%, 18%, and 31% of organic farmers, respectively. In focus group

discussions, farmers expanded on the need for assistance with these hurdles to make a successful transition:

> "A hurdle to transitioning is really the fear of paperwork…I feel like if there were mentors that would help farmers do that last, maybe through all of transition, but especially the last year of transition and into their first year of completing the application, we'd see more organic operations that would become certified."

> ***"I am in transition. I'm in year two of the three year. I'm working with OEFFA, the Ohio Ecological Food and Farming Association. They've been great. But what I think is so difficult is that even though I've worked on organic farms in different capacities for 15 years, I still don't know what is acceptable. For example, calling about manure and trying to get manure spread on my property and then trying to figure out… who do I take this paperwork to, and who actually has to kind of testify that they didn't spray anything? There's all these questions that are reasonable. When I call OEFFA, they have a reasonable answer, but I find myself tripping over them because I don't immediately have the answer at my fingertips. Sometimes I feel frustrated that I have to take time to figure it out because I've already delayed my certification by doing something wrong."***

> ***"I will say that what made me resist getting certified maybe at first was just knowing all the T's to cross and I's to dot, and just knowing every little thing that I would need to follow to make sure to do it correctly."***

Developing infrastructure and accessing capital presented substantial challenges to 51% and 46% of transitioning survey respondents, respectively, compared to just 31% and 27% in the organic survey. Transitioning farmers also reported challenges with business planning (43%) and managing risks of crop GMO contamination (42%), issues cited by only 23% and 20% of certified organic producers, respectively.

Accessing labor is a non-production challenge shared equally among certified organic and transitioning farmers.

While concerns about social pressures not to farm organically, and relations with other farmers and the surrounding community appeared low on the list of challenging issues, they tended to emerge with greater frequency among transitioning farmers than certified organic farmers (compare *Table 3.14* and *Table 3.8*). Accessing labor stood out as one concern shared equally among certified organic (46%) and transitioning (48%) farmers.

While these findings are based on a small number of participants in the transitioning survey, they indicate a clear trend toward more intense non-production challenges during transition and the first year of organic certification, and point to a need for greater support for those in transition in overcoming these hurdles to becoming successful, certified organic producers.

Table 3.14

Non-production challenges ranked in descending order from strongest to weakest challenge, as identified by transition survey participants.

Non-production challenges were quantified by calculating the percent of respondents who rated a substantial non-production issue as either a "challenge" or "strong challenge." "n" denotes the number of respondents who indicated the substantial non-production challenge was either a "challenge" or "strong challenge."

Non-production Challenge	% of Respondents Who Rated as a Substantial Challenge
Finding and Developing Markets for Organic Products (n=23)	79%
Meeting Recordkeeping Requirements of Organic Certification (n=16)	53%
Developing Infrastructure (n=14)	50%
Accessing Labor (n=11)	48%
Accessing Capital and/or Financing (n=11)	46%
Farm Business Planning (n=12)	43%
Meeting Organic Certification Requirements (n=13)	43%
Risk of Contamination from Genetically Engineered Crops (n=11)	42%
Cost of Organic Certification (n=12)	40%
Managing Business Activities (n=9)	32%
Understanding and Following Food Safety Standards (n=7)	29%
Accessing Land (n=10)	23%
Social Pressure to Not Farm Organically (n=6)	23%
Community Relations (n=6)	21%
Relations with OtherFarmers (n=5)	17%
Farm Succession Planning (n=4)	17%

3.3 Organic Seed and Crop Breeding Needs

Procurement, Production, and Use of Seeds Suitable for Organic Production

Organic survey participants were asked to register their level of agreement with five statements regarding organic crop seed and risks of unintended introduction of GMO seeds into their operations, to indicate whether they produce organic seed for on-farm use or commercial sale, and whether they are interested in producing organic seed for sale in the future. In addition, respondents were asked to identify two crops they feel most need plant breeding efforts for organic production, and two priority genetic traits for each crop.

More than eight in ten respondents agreed that crop cultivars bred for organic production, and certified organic seeds are important to the success and integrity of organic production, with slightly higher levels of agreement among vegetable growers than

> "There is more genetic diversity needed in the organic production practices or the biological production practices versus what we've been breeding for the last 50 years."

field crop farmers (*Table 3.15*). Focus group participants also expressed a need for production and cover crop cultivars bred for organic production systems, as the following quotes exemplify:

> ***"We are having to use varieties and species that have been bred to perform differently. Some crops in the field…just seem to compete better with weeds than others, so they compete better with some of our organic practices. And so that tells me that if we had some breeding programs for selecting around organic production practices we could make a lot of headway."***

> "We have serious disease issues in the Midwest that are not being adequately addressed by seed companies and breeders."

> ***"And specific issues are challenging now. Cover crops have come a long [ways] in eight or ten years in the over-crimping of cereal grains for cover cropping. But the biggest issue there is, if we try to do a multi-species cover crop to roll down, it is hard to find a pea and a vetch and a rye that's going to mature at the same time. It's simple things like that, but it is quickly becoming clear the lack of genetic diversity we have, or there is more genetic diversity needed in the organic production practices or the biological production practices versus what we've been breeding for the last 50 years."***

Focus group participants also cited a need for regionally adapted seeds and the related issue of limited crop genetic diversity as constraints on successful organic farming. For example:

> ***"I know if we work with a couple of private forage seed companies and the new varieties are coming from Denmark or Germany or Czech Republic, Ukraine. We are not, you know, it should be being done [locally]. We've actually got one meadow fescue that took about five years. You know, that University of Madison was involved with doing genetic testing and everything of it. It was incredibly hard to get just one variety into any type of marketable position."***

> ***"Most of the plant breeding for U.S. markets seems to be focused on the coasts. We have serious disease issues in the Midwest that are not being adequately addressed by seed companies and breeders."***

Nearly three-quarters of organic farmers consider unintended introduction of genetically engineered (GE or GMO) crop seeds onto their farms a significant risk, and fewer than one-quarter find existing federal regulations on GMO crop varieties adequate to mitigate this risk (*Table 3.15*). Seven in ten agreed that seed companies should test their seeds for GMO contamination.

Table 3.15

Agreement with statements regarding crop seed for organic systems.

Table lists percentage of respondents who "strongly agree" or "agree" with the statement.

Statement	All Respondents	Field Crop Growers	Vegetable Growers
Varieties bred for organic production are important to the overall success of organic agriculture.	86%	82%	87%
Organic seed is important to the integrity of organic food production.	83%	76%	87%
Unintentionally planting GMO-contaminated seed on my farm puts at risk the integrity of my organic products.	74%	71%	71%
Seed companies should conduct testing and report rates of GMO contamination in organic and conventional seed.	72%	71%	70%
The federal regulations that oversee GMO crop approvals are adequate for protecting my organic farm product(s) from potential contamination by GMO crops.	20%	26%	16%

The level of concern about unintended planting of GMO seeds on organic farms jumped from just 41% in a 2010 organic seed survey to 83% in the 2015 survey and 74% in 2020, while the level of confidence in federal regulations of GMO cultivars decreased from 27% in 2010 to just 15% in 2015, when three-quarters of producers disagreed that the regulations were adequate (OSA, 2021). This concern appeared to diminish slightly by 2020, when 20% agreed and 51% disagreed that federal GMO regulations are sufficient. Field crop farmers expressed greater concern that federal GMO regulations are inadequate than vegetable growers, likely because GMO corn, soy, cotton, and canola seeds are widely grown by conventional farmers and pose a substantial risk to organic producers of these crops, while GMO contamination issues rarely occur in vegetable crops. Farmer responses to statements about organic seed, cultivars developed for organic systems, and GMO testing by seed companies were similar across the three surveys.

As noted earlier, 38% of organic survey respondents reported that finding appropriate organic crop varieties and seeds is a substantial production challenge. This percentage increased to 47% for transitioning farmers, 46% for BIPOC organic farmers, 43% for organic producers in the Great Plains and Mountains, and 62% of organic survey respondents from the Southern agro-ecoregion. "Access to seeds bred for organic systems" was cited as a "concern" by 44% of organic survey respondents, increasing to 54% among transitioning growers and 66% for organic respondents from the Southern region. Slightly lower levels of concern were expressed regarding "access to certified organic seeds," ranging from 35% of organic farmers to 52% of transitioning farmers and 53% of Southern region organic farmers. Although the survey question on technical assistance did not include seed sourcing issues, these findings indicate a need for technical assistance with obtaining suitable seeds for organic production, especially for Southern region organic farmers and for transitioning farmers nationwide.

On-farm seed production can help meet organic farmer needs for suitable crop seeds and can also become an income-generating enterprise. Organic Seed Alliance has developed a substantial body of educational materials and resources to empower organic farmers to produce high-quality organic crop seeds for themselves and other farmers in their region. Yet, percentages of respondents who reported growing organic seed in the 2018 season, and who expressed interest in producing seed for sale in future years declined considerably since the 2015 survey (*Table 3.16*). This indicates that producers have encountered serious barriers in attempting to produce quality organic seed for planting, and/or in making commercial organic seed production a profitable enterprise for their farms. Some producers may no longer be producing seed for their own operations because they feel their seed needs are being better met by the commercial seed industry and no longer need to produce their own. While only 24% of organic survey respondents considered on-farm seed production and saving a production challenge (possibly because fewer farmers are now undertaking or considering on-farm seed production), 41% of transitioning producers identified seed production as a challenge, suggesting a greater level of interest in seed production among farmers undertaking a transition to certified organic production. This is a striking result, as organic seed production is quite challenging, especially for farmers with limited experience in organic methods.

Table 3.16

On-farm organic seed production, and interest in future commercial production of organic seed among organic survey respondents, compared to a 2015 survey conducted by Organic Seed Alliance.

Current On-Farm Organic Seed Production		
	2015 Survey	2020 Survey
None	37%	54%
For On-farm Use Only	39%	29%
For Commercial Sale Only	3%	2%
For Both On-Farm Use and Commercial Sale	20%	15%

Interest in Future Commercial Production of Organic Seed		
Not Interested	47%	61%
Somewhat Interested	32%	23%
Interested or Very Interested	21%	16%

With organic seed usage remaining near 70% in recent years while the numbers of USDA certified organic farmers increase steadily year after year, a growing need exists to expand farmer capacity to produce certified organic crop seed and market it profitably. Research may be needed to identify causes of the recent decline in farmer interest and engagement in organic seed production. Possible issues include the high production costs including labor in organic seed production and processing, increasing problems with pests and diseases, direct impacts of climate change, or socioeconomic factors impacting seed markets. A separate survey conducted by OSA in 2021 with 131 commercial producers of certified organic seed found that, among other challenges, the greatest challenges for organic seed production were (in order from strongest to weakest challenge): achieving adequate seed yields, estimating seed yields, controlling weeds, managing isolation distances, adapting to

climate change, and accessing appropriate seed cleaning equipment. In focus groups, one participant cited issues related to crossing with conventional crops and added labor costs of sorting out off-type seeds:

> ***"We save a lot of own seeds to use the next year, and we are surrounded by conventional farms. And so with corn specifically we see a lot of cross-pollination with conventional corn. And so for us that means we spend a lot of time at the end of the season and into the winter sorting out all those corn seeds. And there are steps that you can take. Like we are trying to work on our buffers and everything, but like there is just too much. Like there is not a lot of effective solutions that are going to be like thorough enough to get over that like need to sort through. So, yeah. I think, yeah, organic standards are not necessarily always like supportive of those types of practices, like saving your own seeds, things like that."***

Breeding and Development of Crop Cultivars for Organic Production

Organic farmers clearly recognize that crop varieties selected to thrive and yield well in organic and low-input production systems would greatly enhance the success of their operations (*Table 3.15*). Many modern crop cultivars were developed for conventional cropping systems dependent on high inputs of soluble fertilizers and synthetic crop protection chemicals and are ill-equipped to perform in organic systems that depend on biological processes for crop nutrition and crop protection (Hultengren et al., 2016). Organic survey participants were asked to identify their top priorities for organic plant breeding, including two crops they feel are in most need of improvement for organic systems. For each crop, they were then asked to list two traits that most need improvement.

Vegetable producers listed tomato, brassicas, and cucurbits as their top breeding priorities, and seven other vegetable crops were cited by at least 5 percent of respondents (*Table 3.17*). Field crop farmers prioritized corn, soybean, alfalfa, and wheat — four crops that commonly comprise an organic field crop rotation. In addition to capacity to maintain yields in an organic system, disease resistance and heat tolerance seemed especially important to vegetable growers, and field crop farmers sought nutrient-efficient and weed competitive cultivars.

These findings were similar to results from the 2015 survey (repres enting the 2014 growing season) except that interest in heat tolerance for cucurbits and brassicas is new, and likely reflects the intensifying impacts of climate change.

Table 3.17
Plant breeding priorities identified by organic survey respondents.
"n" denotes the number of producers identifying each crop as a breeding priority.

	Priority Crops	Percentage of Respondents	Priority Traits
Field and Forage Crops	Corn (n = 98)	22%	Yield
			Competitiveness with weeds
			Nutrient use efficiency
	Wheat (n = 48)	10%	Yield
			Quality
			Nutrient use efficiency
	Soybean (n = 40)	9%	Competitiveness with weeds
			Germination/seedling vigor
			Yield
	Alfalfa (n = 34)	8%	
Vegetable and other Specialty Crops	Tomatoes (n = 64)	14%	Disease resistance/tolerance
			Flavor
			Quality
	Brassicas (n = 58)	13%	Disease resistance/tolerance
			Heat tolerance
			Yield
	Cucurbits (n = 54)	12%	Disease resistance/tolerance
			Yield
			Heat tolerance
	Berries (n = 20)	5%	
	Sweet corn (n = 15)	3%	
	Carrots (n = 14)	3%	

Public investment in crop cultivar development has declined sharply over the past 50 years, leaving private seed corporations to fill the gap. These companies offer a low diversity of crop cultivars that respond to high-input conventional systems, lack regional adaptation, and are often covered by utility patents that prohibit farmers from saving and selecting seed for improved performance at their locales. Thus, an urgent need exists to restore crop genetic resources available to producers, including a diversity of regionally adapted, public cultivars that are selected for stress resilience and yield stability under organic management.

USDA has begun to take steps toward restoring capacity for public plant breeding and cultivar development, thanks in large part to advocacy by OSA, OFRF, National Sustainable Agriculture Coalition (NSAC), National Organic Coalition (NOC), and other sustainable agriculture NGOs. In the past fifteen years, several OREI-funded farmer-participatory plant breeding networks have developed and released new public cultivars of tomato, carrot, cucurbits, other vegetables, grains, soybeans, and dry beans that are especially suited to organic

and low-input farming systems, with dozens more in the pipeline (Schonbeck et al., 2017b). While a much larger investment in public plant breeding is needed, recent increases in OREI funding and a recently introduced Request for Applications (RFA) for public cultivar development within the Agriculture and Food Research Initiative (AFRI) have expanded opportunities for farmer-participatory endeavors to develop and release new seed varieties for organic systems. Findings of this survey can inform and guide these efforts.

Restoring crop genetic diversity and making regionally adapted, stress resilient cultivars available to farmers and breeders without restrictive intellectual property provisions will play a critical role in the capacity of U.S. agriculture and food systems to withstand the impacts of climate change. New cultivars with priority traits for organic production, such as nutrient use efficiency, heat resilience, disease resistance and competitiveness against weeds will help all of U.S. agriculture meet the climate-related challenges of increased drought, heat, and other weather extremes, as well as shifts in seasonal patterns and weed, pest, and disease pressures.

Training and empowering producers to save and select seed, to grow organic seed for on-farm use or commercial sale, and to develop new cultivars and land races better adapted to their specific soil and climate conditions will play a vital role in the success of organic agriculture and in meeting the challenges of the climate crisis. Survey respondents were asked about their level of interest in conducting on-farm plant breeding and crop improvement, and in receiving training in plant breeding and in organic seed production. Eighty-four percent of respondents were interested in receiving training in organic seed production, similar to previous responses from OSA's 2016 State of Organic Seed report. Forty-six percent of respondents were interested in conducting plant breeding on their farm, 42% were interested in training that could help them conduct on-farm plant breeding, and 80% were interested in learning about economic opportunities related to on-farm plant breeding.

3.4 Technical Assistance Needs

Organic Survey Participants

Full Organic Survey Sample

In addition to identifying production and non-production challenges, organic survey participants were asked to report their greatest technical assistance needs. Participants were presented with a list of potential technical assistance needs and asked to rank their need for each on a four-point scale that included "no need," "little need," "some need," and "strong need." Participants could also indicate a topic was not applicable to their operation. The list of potential technical assistance needs included a wide range of topics, ranging from soil health and pest management to financing and transportation logistics, to better gauge the relative need for assistance with production versus non-production issues.

The technical assistance needs were ranked by adding the percent of organic survey respondents who indicated there was a "strong need" or "some need" for a topic and listing technical assistance needs in descending order from highest to lowest percent. The full ranked list of technical assistance needs is presented in *Table 3.18*.

The top five technical assistance needs included:

1. Organic weed, insect pest, and disease management
2. Soil fertility and management of crop nutrients
3. Soil conservation and soil health
4. Securing sales channels
5. Production assistance

A breakdown of the rankings for the top five technical assistance needs can be found in *Figure S11* in the Supplements.

The top three technical assistance needs outlined above can be addressed in part through existing conservation programs that offer technical and financial assistance for soil conservation and soil health, nutrient management, integrated pest management, and whole farm conservation assessment, planning, and implementation. These programs include the USDA Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), and the Regional Conservation Partnership Program (RCPP), as well as state level programs in soil health, water resource protection, and climate mitigation.

Ongoing efforts to tailor program implementation and individual conservation activities for organic systems is improving agency and program capacity to meet the conservation needs of organic producers. This strong finding calls for increased investment in proven conservation programs coupled with continued refinement of organic conservation systems and a concerted effort to leverage farmers' preferred information sources and modes to ensure this knowledge reaches organic producers.

Table 3.18

Technical assistance needs ranked in descending order from most need to least need.
Technical assistance needs were quantified by calculating the percent of respondents who indicated they had either "some need" or a "strong need" for a particular topic. "n" denotes the number of respondents who indicated they had either "some need" or a "strong need."

Technical Assistance Need	Percent of Respondents Who Rated as a Need
Organic weed, insect pest, and disease management (n=517)	74%
Soil fertility and management of crop nutrients (n=444)	65%
Soil conservation and soil health (n=406)	60%
Securing sales channels (n=353)	54%
Production assistance (n=273)	43%
Labor needs (n=275)	41%

Business and financial planning (n=272)	41%
Access to capital/resources (n=256)	39%
Processing/value added products (n=223)	37%
Logistics of product distribution (n=224)	35%
Food safety, FSMA, and other food safety requirements (n=208)	34%
Risk management/crop insurance (n=211)	33%
Transportation options (n=202)	31%
Water management (n=200)	31%
Livestock production and health (n=129)	31%
Organic certification regulations (n=196)	29%
Integrating livestock in organic production (n=132)	29%
Organic system planning (n=190)	28%
Meeting National Organic Program (NOP) requirements (n=177)	27%
Legal assistance (n=152)	23%
Land access (n=88)	14%

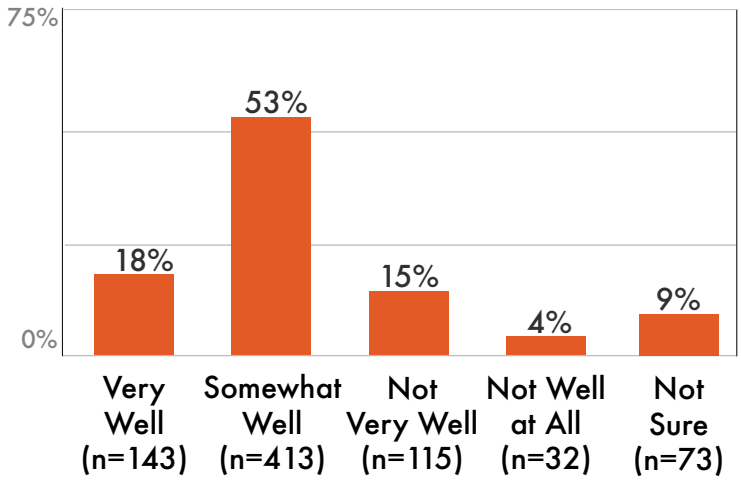
In addition to identifying their top technical assistance needs, organic survey respondents were asked to report how well their needs were being met using a four-point scale ranging from "very well" to "not well at all." Respondents could also indicate they were not sure how well their needs were met.

A little over 70% of organic survey respondents indicated their research and information needs were being met to some extent (i.e., very well or somewhat well), while roughly one fifth of respondents felt their needs were not adequately met (i.e., not very well or not well at all) (*Fig. 3.1*). The large number of "somewhat well" responses indicates both farmer interest in applying research-based information and room for improvement in the degree to which farmer needs are met and the efficacy of the "research to on-farm implementation" pipeline.

Figure 3.1

Responses from organic survey participants indicating how well their organic production and non-production research and information needs are currently being met.

"n" denotes the total number of responses in each category.



Farming Region

A majority of organic farmers across all SARE regions reported needs for greater technical assistance with organic weed, insect pest, and disease management; soil conservation and soil health; and soil fertility and crop nutrient management (*Table 3.19*). In all regions except the North Central region, more than half also need technical assistance with securing sales channels, and at least four out of ten respondents from all regions sought more production assistance. Technical assistance needs were also fairly consistent across regions for business and financial planning (38-44%) and access to capital (37-45%).

Organic survey respondents expanded on these needs in their responses to open-ended questions, focusing on securing sales channels:

> ***"It can be hard to find a wide range of good sales sources. We are constantly worried about losing our current sales sources and not having anything to replace them with. It is very hard to compete with non-organic vendors who claim to be "as good as organic." More regulation surrounding this and more information going out to the public to explain organic would help."***

> ***"My main wholesale account has become unstable and I need new sales channels but am finding that my area is very competitive and saturated for the small-scale direct sales-oriented farmer."***

"Every year it is always a challenge to market and sell CSA shares. The popularity of CSA seems to have diminished and I have not sold out my shares for 3 years."

> ***"What we are doing is working for now, but worried that CSA is less appealing to customers now that big organic produce is in box stores (convenience) and sometimes at a discount (price) It is harder and harder to grow CSA membership each year."***

Respondents from the southern region expressed greater needs for technical assistance overall compared to other regions. In addition to the issues listed in *Table 3.9*, half or more of Southern organic farmers reported needing assistance with labor needs, processing and value-added products, and food safety compliance. As one organic survey respondent from the South explained:

> ***"We do not have a pool of interested young people that exists in other parts of the country. We have to pay $15/hour to keep employees."***

The top five technical assistance needs across agro-ecoregions are provided in *Table S4* in the Supplements.

Table 3.19

Top five technical assistance needs in each SARE region ranked in descending order from strongest to weakest need.

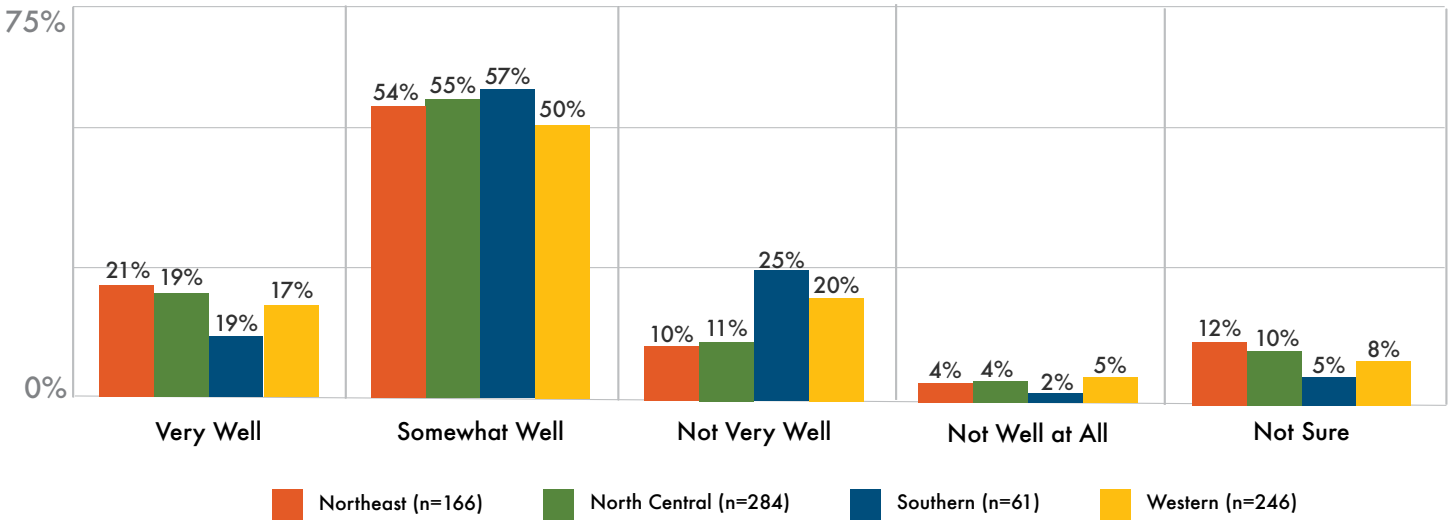
Technical assistance needs were quantified by calculating the percent of respondents who indicated they had either "some need" or a "strong need" for a particular topic. "n" denotes the number of respondents who indicated they had either "some need" or a "strong need."

SARE Region	Technical Assistance Need	Percent of Respondents Rating as a Need
Northeast	Organic weed, insect pest, and disease management (n=113)	75%
	Soil fertility and management of crop nutrients (n=101)	69%
	Soil conservation and soil health (n=99)	66%
	Business and financial planning (n=65)	44%
	Securing sales channels (n=60)	44%
North Central	Organic weed, insect pest, and disease management (n=189)	74%
	Soil fertility and management of crop nutrients (n=162)	64%
	Securing sales channels (n=136)	56%
	Soil conservation and soil health (n=137)	55%
	Production assistance (n=102)	43%
Southern	Organic weed, insect pest, and disease management (n=44)	79%
	Soil conservation and soil health (n=38)	69%
	Soil fertility and management of crop nutrients (n=38)	67%
	Securing sales channels (n=36)	67%
	Production assistance (n=30)	57%
Western	Organic weed, insect pest, and disease management (n=163)	74%
	Soil fertility and management of crop nutrients (n=136)	63%
	Soil conservation and soil health (n=124)	59%
	Securing sales channels (n=111)	54%
	Production assistance (n=97)	47%

The SARE regional analysis shows that organic research and information resources are somewhat lagging in the Southern and Western regions, where 27% and 25% (respectively) indicated that their research and information needs are not being adequately met (*Fig. 3.2*). For a breakdown of responses across agro-ecoregions, please refer to *Figure S12* in the Supplements.

Figure 3.2

Responses from organic survey participants across the four SARE regions indicating how well their organic production and non-production research and information needs are being met.
"n" denotes the total number of survey participants from each SARE region.



Farmer Race/Ethnicity

In general, BIPOC and White organic farmers identified similar technical assistance needs, although BIPOC farmers tended to express a greater desire for help with building soil health and fertility (*Table 3.20*). The high level of interest in assistance with soil conservation, health, and fertility may reflect the long history of land-stewardship traditions carried by many Black, Indigenous, and other farmers of color (Penniman, 2018; White, 2018).

White and BIPOC respondents indicated similar needs for assistance with securing sales channels (54-56%) and for production assistance (42-46%). A key difference was that 57% of BIPOC farmers identified a need for locating transportation options, compared to just 29% of White farmers. In addition, there was a slight trend toward fewer BIPOC farmers reporting their research and information needs were being met compared to White farmers (Fig. 3.3).

Table 3.20

Top five technical assistance needs for BIPOC and White organic farmers ranked in descending order from greatest to lesser needs.

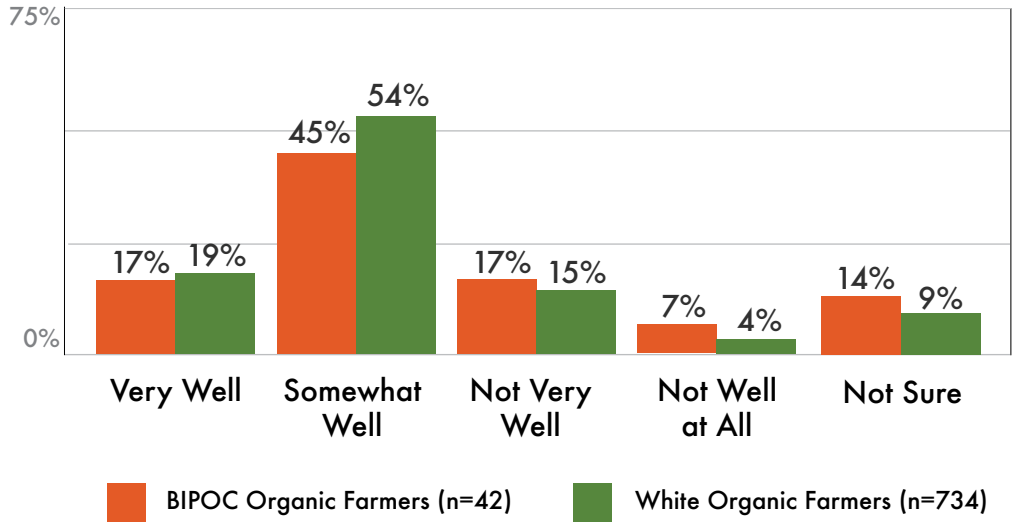
Technical assistance needs were quantified by calculating the percent of respondents who indicated they had either "some need" or a "strong need" for a particular topic. "n" denotes the number of respondents who indicated they had either "some need" or a "strong need."

Type of Farmer	Technical Assistance Need	Percent of Respondents Rating as a Need
BIPOC Organic Farmers	Soil conservation and soil health (n=30)	79%
	Organic weed, insect pest, and disease management (n=29)	73%
	Soil fertility and management of crop nutrients (n=28)	53%
	Transportation options (n=21)	57%
	Securing sales channels (n=20)	56%
White Organic Farmers	Organic weed, insect pest, and disease management (n=488)	75%
	Soil fertility and management of crop nutrients (n=416)	64%
	Soil conservation and soil health (n=376)	59%
	Securing sales channels (n=333)	54%
	Production assistance (n=257)	42%

Figure 3.3

Responses from BIPOC and White organic farmers indicating how well their organic production and non-production research and information needs are being met.

"n" denotes the total number of survey participants in each group who provided a response.



Farmer Experience

The top technical assistance needs for beginning and experienced farmers align closely with one another — weed, insect pest, and disease management, and soil health and conservation are cross cutting issues (*Table 3.21*). As described with the full organic survey sample, these top technical assistance needs are directly linked to existing conservation programs. Therefore, increasing investments in these conservation practices would provide benefits across all farmer demographics and is an obvious area to focus investment efforts.

Beginning and experienced farmers reported the same top four technical assistance needs: weed, pest, and disease management; soil fertility and crop nutrition; soil conservation and soil health; and securing sales channels, with beginning farmers registering a greater need for assistance with each of these issues than those with have farmed organically for longer than ten years. Half of beginning farmer respondents wanted technical assistance in accessing capital resources compared to 35% of experienced farmers, while needs for production assistance were similar for beginning organic farmers (45%) and those with more experience (42%).

Nearly two-thirds of beginning farmers indicated that their information and research needs are met "somewhat well" and were less likely than experienced farmers to be either highly satisfied or strongly dissatisfied with the level and quality of research-based organic farming information (*Figure 3.4*).

Table 3.21

Top five technical assistance needs for beginning and experienced organic farmers ranked in descending order from greatest to least needs.

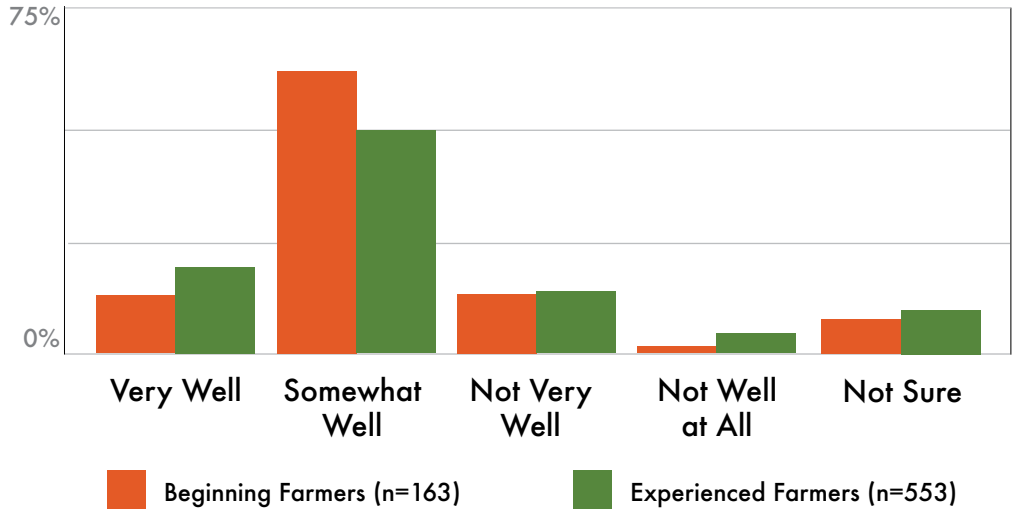
Technical assistance needs were quantified by calculating the percent of respondents who indicated they had either "some need" or a "strong need" for a particular topic. "n" denotes the number of respondents who indicated they had either "some need" or a "strong need."

Type of Farmer	Technical Assistance Need	Percent of Respondents Rating as a Need
Beginning Farmers	Organic weed, insect pest, and disease management (n=122)	82%
	Soil fertility and management of crop nutrients (n=109)	75%
	Soil conservation and soil health (n=104)	71%
	Securing sales channels (n=383)	60%
	Access to capital/resources (n=69)	50%
Experienced Farmers	Organic weed, insect pest, and disease management (n=369)	72%
	Soil fertility and management of crop nutrients (n=310)	61%
	Soil conservation and soil health (n=283)	56%
	Securing sales channels (n=254)	52%
	Production assistance (n=199)	42%

Figure 3.4

Responses from beginning and experienced organic farmers indicating how well their organic production and non-production research and information needs are being met.

"n" denotes the total number of survey participants in each group who provided a response.



Transition Survey Participants

Transition survey participants were presented with the same list of potential technical assistance needs as organic survey participants and asked to rank their need for each on a four-point scale ranging from "no need" to "strong need." Participants could also indicate a topic was not applicable to their operation. The technical assistance needs were ranked by adding the percent of transition survey respondents who indicated there was a "strong need" or "some need" for a topic and listing technical assistance needs in descending order from highest to lowest percent. The full ranked list of technical assistance needs is presented in *Table 3.22*.

The top five needs included:

1. Organic weed, insect pest, and disease management
2. Securing sales channels
3. Organic certification regulations
4. Production assistance
5. Soil fertility and management of crop nutrients; and organic system planning

Farmers undertaking a transition to certified organic production identified a wide range of technical assistance needs, with high percentages citing the five top needs noted by certified organic farmers: weed, pest, and disease management; securing sales channels; production assistance; soil fertility and crop nutrition; and soil conservation and soil health. In addition, three-quarters of transitioning farmers sought help with organic certification requirements and development of an Organic System Plan (OSP), and more than half had technical assistance needs with meeting NOP requirements for conservation and biodiversity, food safety requirements, processing and value-added products, distribution logistics, transportation options, and water management (*Table 3.22*).

Although these data are based on a small sample, the trends are strong and consistent enough to illustrate an urgent need for enhanced technical assistance for producers undertaking or considering a transition to certified organic production. Expertise is needed in three distinct realms: organic production practices, marketing and market development, and meeting regulatory requirements for certification. At the same time, nearly three in ten respondents stated that their research and information needs are met very well, and the needs of half were met "somewhat well," indicating a strong opportunity to continue building the capacity of service providers to meet the technical assistance needs of the organic sector (*Figure 3.5*).

Table 3.22

Technical assistance needs ranked in descending order from most need to least need.

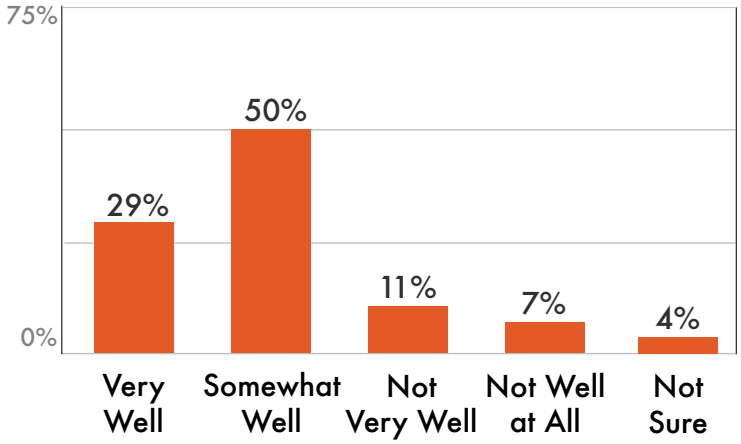
Technical assistance needs were quantified by calculating the percent of respondents who indicated they had either "some need" or a "strong need" for a particular topic. "n" denotes the number of respondents who indicated they had either "some need" or a "strong need."

Technical Assistance Need	Percent of Respondents Who Rated as a Need
Organic weed, insect pest, and disease management (n=24)	89%
Securing sales channels (n=22)	85%
Organic certification regulations (n=21)	78%
Production assistance (n=19)	76%
Soil fertility and management of crop nutrients (n=20)	74%
Organic system planning (n=20)	74%
Logistics of product distribution (n=17)	68%
Food safety, FSMA, and other food safety requirements (n=15)	65%
Meeting National Organic Program (NOP) requirements for biodiversity and resource conservation (n=17)	63%
Technology assistance with processing/value added products (n=16)	62%
Integrating livestock in organic production (n=11)	61%
Soil conservation and soil health (n=15)	60%
Transportation options (n=214)	56%
Water management (n=13)	52%
Access to capital/resources (n=11)	48%
Legal assistance (n=12)	48%
Business and financial planning (n=11)	44%
Risk management/crop insurance (n=11)	44%
Livestock production and health (n=5)	33%
Labor needs (n=8)	32%
Land access (n=4)	18%

Figure 3.5

Responses from transition survey participants indicating how well their organic production and non-production research and information needs are being met as they transition to organic certification.

"n" denotes the total number of responses in each category.



3.5 Farmer Concerns

Organic Survey Participants

Full Organic Survey Sample

Organic survey participants were presented with a list of potential topics of concern related to organic production, costs, marketing, and resources and were asked to indicate whether they were "very concerned," "concerned," "somewhat concerned," or "not concerned" about each topic. To summarize the findings, we ranked topics of concern by quantifying the percent of respondents who indicated they were either "very concerned" or "concerned" about the topics. *Table 3.23* presents these ranking for all topics. The six top concerns included:

1. Organic fraud and integrity of the USDA organic label
2. Industrial organic
3. Crop contamination
4. Imbalance of domestic certified organic supply and demand
5. *Lack of skilled labor Availability of organic research funds
   *Availability of organic research funds
   **Tied for fifth place*

To see a breakdown of the rankings for the top five concerns, refer to *Figure S13* in the Supplements.

Table 3.23

Topics of concern in organic agriculture ranked in descending order from most to least concerning.

Topics of concern were quantified by calculating the percent of respondents who indicated they were either "concerned" or "very concerned" about a topic. "n" denotes the number of respondents who selected either "concerned" or "very concerned" for a topic.

Topics of Concern in Organic Agriculture	Percent of Respondents Who Rated as a Concern
Organic fraud and integrity of USDA organic label (n=571)	77%
Industrial organic (n=499)	73%
Crop contamination (e.g., GMOs, pesticide drift) (n=454)	63%
Imbalance of domestic certified organic supply and demand (n=399)	58%
Lack of skilled labor (n=374)	54%
Availability of organic research funds (n=378)	54%
Access to agricultural service providers who are knowledgeable about certified organic operations (n=224)	53%
Animal welfare (n=311)	52%
Adaptation to climate change (n=363)	52%
Access to seeds bred for organic systems (n=300)	44%
Use of transitional label (n=232)	38%
Access to certified organic animal feed (n=176)	36%
Access to certified organic seeds (n=245)	35%

Organic Fraud and Integrity

Farmers clearly indicated organic fraud and integrity of the USDA organic label was their top concern (*Table 3.23*). The focus group findings presented below reveal that the concern about fraud and integrity exists at all scales — from smaller scale, direct market outlets (e.g., farmers markets) and larger scale, wholesale market outlets (e.g., imported commodities).

> "There needs to be some kind of enforcement…on the agricultural theft and the mislabeling of products…. It's too commonplace…. It's really kind of heartbreaking."

Concern about organic fraud and integrity also frequently surfaced in the focus group discussions for the 2022 NORA report where organic farmers explained how a loss of trust in the organic label due to inconsistent enforcement was a de-motivating factor for them.

> ***"I'm really concerned about the future of organic. I don't know if the integrity has been lost. I know some of my neighbors are cheating. I turned them in. Nothing has been done. I'm actually dropping organic acres because it's not working, and I'm losing integrity in the organic industry as a whole."***

Comments from focus group participants revealed that specific concerns related to fraud in farmers markets where committees, not the USDA, regulate operations and vendors. These findings suggest this is a venue where organic farmers could be particularly vulnerable to the economic impacts of fraudulent claims by competing vendors.

> ***"There is no tracking of the produce at the farmers' market. No farmer has to show where he got his produce from. They can stand there and say it is organic, and it's not organic."***
>
> ***This has happened to me at the farmer's market…I'll walk around and talk to people. And I'll say, 'This is pretty nice looking sweet corn, where did you get the seed?' It says organic corn and they are not certified, and they are like, 'Well, we are under $5,000.' I stand next to them every week. I know that's not true. But I'm not going to give them a hard time."***

Several focus group participants specifically drew attention to the issue of fraudulent "organic" produce that is imported from overseas competing against their genuine USDA certified organic produce.

> ***"Another participant brought it up earlier. And this is maybe more grain specific, too, but there is this issue of imports, especially with corn and soybeans, and some of them being fraudulent from other countries. There was a great roundtable on this at MOSES last year…. Really good discussion on a lot of the ins and outs of that, which I'm not an expert on, but I wish there was an easier way to kind of learn a little bit more about that and figure out what's going on and how I could maybe help proactively, because I know it is hurting us."***

Intertwined with the issue of organic fraud, is a need for transparent information on international organic regulations and enforcement of those regulations that is made clear to U.S. organic producers. A couple of focus group participants noted uncertainty around the organic standards of imported goods.

> ***"People are upset about fraudulent imports of so-called organic, but really when you think about it when stuff comes from another country…we don't really know how that is raised, even if it is raised organically…and that's a big risk, as far as, well, what is my market, you know. And a great portion of corn and soybeans is imported, and yet we don't have any idea how that is really, you know, panning out as far as this being a good thing for that country or whether, you know, are they taking – going the extra step to worry about their soil or not. We don't know that."***
>
> ***"[A] non-production challenges for us as pecan growers, we are very close to the Mexican border, and we get some questionably certified organic pecans that come across. And so just finding ways…to better know that those are legitimate organic pecans, because…they go***

on the market much less expensive than American grown pecans. It's my competition, and I'm not really sure that they play by the same rules."

Farmers also raised concerns that inconsistent interpretation and enforcement of the organic rules across certifying agencies is undermining the integrity of the organic label. As one farmer explained:

> *"I did bump into differences in terms of how the rules were interpreted by certifiers. One certifier said they would certify that, no problem, and my certifier will not. So, I could literally switch certifiers, and then probably certify [my] field."*

Another farmer called attention to the issue of "rotational organic" where producers move land in and out of organic certification.

> "We have this discussion with a lot of people who will not be certified organic because they think it's been co-opted and it's watered down."

> *"I'm more concerned about certification, especially for larger operations that are allowing people to come in and out, or…their rotation is conventional, transition, and organic, and then organic back to conventional through transition, back to organic. And they do that on a fair amount of acres on the entire operation, and there is no commitment to full-time organic. And yet for those of us that are in the organic grain production arena, they are softening our market to a great degree by bringing a huge amount of that production onto the organic market. And technically from my standpoint where I was educated from, they are not meeting the spirit of the organic rule."*

Focus group participants also voiced concern that the lack of integrity with the organic label is deterring non-organic farmers from transitioning. Organic farmers described a desire for stricter standards that are enforced to build and maintain trust in their practices and the organic label.

> *"I would say [it] is a barrier at times to transition when farmers don't feel that the rules are either being equally implemented between farms or they feel that the organic regulations are somewhat compromised. That does damage, and in my experience, it has been that organic farmers want strict standards."*

Although the topic of organic integrity was framed differently in the 2016 NORA report and was intertwined with the nutritional quality of organic food, it emerged as a top priority in both surveys. In both surveys, organic producers linked organic integrity with the idea of industrial organic, which is discussed below, and as one respondent in the 2016 NORA report explained:

> *"The rising tide of industrial scale organic grain and livestock production threatens the integrity of organic food and the social and environmental benefits that come with ecologically based, diversified organic crop/livestock production systems."*

Industrial Organic

Nearly three quarters of organic survey participants reported concerns about large-scale organic production (i.e., industrial organic). This contention may stem from a widely-held perception that larger-scale organic operations only meet the minimum requirements for organic certification through the process of substitution, whereby NOP-allowed materials are used in place of synthetic inputs. Though input-substitution is not the norm in the organic sector, some mid- to smaller-scale respondents may feel that larger monoculture operations have the potential to undermine the integrity of the organic standard that many farmers have long advocated for such as: building and maintaining soil health, using non-degrading practices, increasing biodiversity, protecting water quality, environmental stewardship, and maintaining high quality animal welfare standards. By diluting the meaning of certified organic and reaping the benefits of economies of scale, such operations can undersell family farmers who adopt the organic method to enhance economic, social, and ecological well-being. Another aspect of this concern is inexpensive organic imports (which may or may not be truly organic) that undersell domestic organic producers.

These concerns were also voiced by focus group participants who explained that it is increasingly difficult to compete against large-scale suppliers and big chain grocery stores.

> ***"As we see the maturation of the organic industry, what we're going to see is larger and larger entities. The voice of the individual in marketing is going to become diminished more and more."***

> ***And then the other people trying to market a product that you can't really direct market, and you've got these multinational corporations owned by foreign governments that they have to compete in price against."***

> ***I think the industrial conventional mindset is coming into organics. There is no question about it. The food industry is taking off and running with it."***

Concerns related to fraud and industrial organic are linked to proposed rules and legislation designed to improve enforcement, continuous improvement, and accountability in organic standards. In 2020, the United States Department of Agriculture Agricultural Marketing Service (AMS) proposed amending the USDA organic regulations to create more robust oversight and enforcement of the production, handling, and sale of organic products. The proposed amendments aim to protect integrity in the organic supply chain and build consumer and industry trust in the USDA organic label by strengthening organic control systems, improving farm to market traceability, and providing enhanced enforcement of organic regulations. Bipartisan legislation through the Continuous Improvement and Accountability in Organic Standards Act also addresses the need for USDA to act on NOSB recommendations to further evolve organic standards and ensure consistency across certification agents. Both measures are critical to responding directly to top concerns identified by organic and transition survey respondents.

It is important to note that increased regulations and oversight by certifiers requires more time and resources, which translates into increased operating costs that are often passed along to their clients (i.e., actively transitioning and certified organic farmers). Subsidizing certifier costs could increase the resources available for oversight and enforcement of the organic label and alleviate some of the financial burden on organic farmers.

Crop Contamination

The National Organic Program prohibits the use of genetically modified organisms (GMOs) and synthetic pesticides in organic agriculture. Nationwide, 60% of surveyed organic farmers indicated crop contamination by GMOs and pesticides was a concern for their operation. Regions in the Midwest where pesticide usage and GMO crops (e.g., corn and soy) are common expressed the greatest concern about crop contamination; organic farmers in the Great Plains, Corn Belt, and Great Lakes regions were particularly concerned about crop contamination *Table S5* in the Supplements). GMO contamination specifically was also rated as a high research priority in the 2016 NORA report, particularly in the North Central region.

"Another challenge I have is I initially have the land I need, but an issue in North Dakota that interferes with organic production are pesticide or fertilizer applicators that fail to read maps, and they apply to your field and then you lose your certification. And I've had this happen three times since 2014. Three different applicators."

"And for my final, at least a challenging one for 2020 , being misapplication of prohibited substances.... There's really no research out there to help a farmer in that situation, and so ultimately, I have had to work through an attorney...there is really nothing out there that can help you try to settle a claim. That's really, really challenging."

"As we work towards our certification, a big obstacle we are facing is just being surrounded by conventional...even just constantly being exposed to the spraying is stressful as a farm is trying to become certified."

"I'd love to have a small stream that my cattle could actually have, but I'm actually discouraging that because I'm worried about the chemicals that are washing back into my fields and pastures from other neighbors."

Drift is a thing and we don't have control over it, so if our neighbors aren't doing it and we are, we're still not safe to what we can protect and what we're doing with our land."

"Pesticides are a big challenge. With drift and other things, especially with bees. The fact that our regulatory system doesn't really seem to do its job of protecting the environment and protecting people like it is supposedly supposed to. I think that is a huge issue."

"The biggest frustration I think I'm going to see...is chemical drift."

" Drift of agri-chemicals or non-organic seed is a major challengee. Climate change means it is windy all the time now so conventional farmers are forced to spray even when it's windy."

Imbalance of Organic Supply and Demand

Nearly 60% of organic survey respondents cited strong concerns about the imbalance of organic supply and demand. Focus group participants put this concern in context with their description of concerns related to declining organic prices and consumer willingness to pay a premium for organic products.

> ***"The drop in organic prices over the last five years has really done a number on my operation, just my cash flow projections that I had are totally messed up. I basically just threw them out the window."***

> ***"We had a little bit of a bump when O-Farm put a stop to the organic imports that was very helpful. That was really a bright spot. I think that was like 2018. But now we're back down to $6 corn. That just doesn't make sense for organic when you got conventional corn at $5.50. It's not good."***

> ***"Since I've been in on this for the last six years prices have declined. At the same time, I go to marketing meetings, and they keep telling me demand is up for organic products so, you know, it's hard to believe. Why is demand up but prices are down? And there is much grain out there."***

"I am in the midst of hiring right now and trying to find people who have the experience that we are looking for is really challenging."

Lack of Skilled Labor

Slightly more than half of survey respondents expressed concern about the lack of skilled labor. Difficulty finding sufficient skilled labor for organic farming operations also emerged as the leading non-production challenge for organic producers (43%) and the sixth most important technical assistance need (41%). The labor issue presents a formidable barrier to the expansion of the organic sector and will require engagement of all stakeholders (i.e., farmers, farmworkers, buyers, policy makers) to identify constraints and opportunities, innovative multidisciplinary research to develop and test new approaches to the socio-economic challenges of enhancing quality of life while getting the work done, and skillful, creative policy development to help organic farmers meet their labor needs while providing workers fair wages and a safe, healthful, and rewarding work environment that will enhance retention of farm staff and reduce turnover.

> ***"I'm bringing labor back up. It's still the biggest challenge of anything on a farm."***

> ***"I think that the discussion around labor needs to be tied to the discussion of a career path in organic farming, because if you are depending on these laborers or seasonal tasks like weeding but then there is no future for them to look forward, you are going to constantly be on this treadmill of every year having to hire these short-term employees."***

"The increased labor associated with organic methods, as opposed to all my counterparts that are using chemicals or herbicides, pesticides, and just hooking up the sprayer and going. It has taken a lot more labor on my part."

[Labor] is very difficult for a small farmer. One thing about a small farm is when they are doing direct marketing is that they have a very large variety of tasks that need to be completed, and so they find themselves training their employees in a great number of things. They now have to be trained in say 40 different crops, 40 different ways of planting and harvesting, and all kinds of things. These are huge disadvantages."

Availability of Organic Research Funds

Our survey results suggesting that organic farmers are as concerned about organic research funding as they are about the serious labor crunch they face daily shows a high level of awareness of the importance of research in making truly profitable and sustainable organic farming possible.

Increasing USDA investment in organic research to become at least commensurate with the market share of organic is vital to realizing the potential of the organic sector to provide viable farming livelihoods, protect soil and other resources, mitigate climate change, and enhance resilience of the U.S. agriculture and food system.

The broad concern about the availability of organic research funds per se was not a major topic of discussion in the focus groups, but participants were vocal about specific research needs. In particular, the need for research on climate related issues and the carbon sequestration potential of organic agriculture were common topics.

"Our local university [is] looking at, you know, how to grow more in a drier climate…It's changing faster than they can get the research done."

"I think some important research questions would be heat-tolerant varieties of seasonal vegetables."

"I'm going to just start by saying it's all about the soil and it's the carbon sequestering that we are able to do with our pasture operations. When I say pasture, it is permanent pasture, and we do as good a job with that as anywhere in the country here on the coast in California and Oregon and Washington. I would like to see more verification and studying the carbon sequestering that is happening and then literally the soil studies."

"Is there some research that we can get done to really sequester more carbon than maybe what's been thought we can? You know, a variety of deep-rooted plants."

"I think certainly there is so much cool research happening right now on the biological side, on the carbon sequestration side, and on the nutritional side of how we build nutrient dense plants by having a healthy soil. But it seems like right now that's all in sort of the infant stage and trying to parse through what is actually at the peer reviewed level and stands up to scrutiny versus what sounds really cool on a podcast. I think we'll need to see how that evolves in hopefully in the near future. I guess we don't all have to agree on the same parameters, but it would just be neat to see the science evolve a little bit."

"There is no one around who understands our operation who can give decent advice on planning, risk management, accurate budgeting."

Access to Agricultural Service Providers who are Knowledgeable about Organic Systems

Slightly over half of organic survey respondents also registered concern about access to service providers with knowledge of organic systems. Focus group participants also expressed a desire for organic-savvy service providers, as did survey participants through responses to open-ended questions about their concerns.

"I thought that was a mythical position. I didn't realize there are actually organic extension agents."

"There is no one, private or public entity, [who] can come out to our field and look at our issues and help us address them. No one around here has any knowledge, so the farmer's end up being the experts which is frustrating…as a farmer you need assistance, and all you get is the 'deer in the headlights' look from highly compensated bureaucrats."

"There is no one around who understands our operation who can give decent advice on planning, risk management, accurate budgeting. We grow better crops than the University that does specialty crops demonstrations. It is hard to listen to them when we are ahead of them. We have figured out cover cropping and are far ahead of the extension agents etc. who give advice. There are a very few other farmers who I talk to who are helpful but that is all I can find."

"[We] are doing this all on our own. [We] need an extension agent available to visit and make suggestions."

"I don't think any farm planners, be they in extension or private industry, understand organic, or want to learn or even try to learn."

"Our region has some unique disease issues (Cytospora in peaches), and the local/regional university extension and ag research efforts are underfunded… tree fruit research is slow going, and shortage of funds reduces the bandwidth of expertise and research effort."

Adaptation to Climate Change

The 52% of organic survey respondents who expressed concerns about adaptation to climate change considerably exceeded the percentage who identified climate change as a challenge in their own operations (36%). Organic farmers clearly anticipate future needs to cope effectively with impending climate disruptions, and many are already feeling — and attempting to respond to — the impacts of climate changes already underway. As noted above, climate change can exacerbate other challenges and underlie some other concerns such as the need for more research into organic systems. One focus group participant clearly drew the connection between climate change and other production challenges:

> ***I feel like weather and climate has played such a huge role for farmers lately. And it's organic or conventional, but dealing with weather extremes so much more than we did even ten years ago is just a tremendous burden right now, and it's leading to a host of other issues. Our pest complexes are changing. How diseases enter the area is changing. It just feels harder and harder to basically produce the same crops that we could have produced relatively easily ten years ago."***

Survey respondents also clearly called attention to the need for climate change research and tools in their responses to open-ended questions on production challenges:

> ***How can we make our farming systems more resilient in the face [of] climate change?"***
>
> ***We need to address climate change or this entire questionnaire is pointless."***
>
> ***Rapid climate change is changing what can grow and how to grow it."***
>
> ***UNL drought monitor is helpful for monitoring drought. More research like http://hydrometeorology.oucreate.com/ needs to be done to monitor and predict drought and excess moisture, bad weather events."***

One farmer noted their biggest production challenge was, "*adapting to climate change,*" and also noted they need:

> ***..more information about growing seed crops in different types of structures, and innovative techniques for building resiliency into our production systems."***

CASE STUDY

"We know functional diversification is a critical element of resilience in the face of climate change. But how can diversified producers really feasibly implement and manage a vast array of mini-systems on their farm? It's one thing to say, 'no till is crucial for soil health.' If you have thousands of acres and can invest in no-till seeding equipment that's a fairly linear way of improving soil health. But this doesn't translate very well when you are growing 45 different crops in rotation and cannot invest in equipment/processes that are tailored to each situation.

For example, we know very well on our farm that grain production would be a very good idea for reducing off-farm inputs for livestock feed, managing high phosphorus levels in our soil, providing certified organic straw for mulch, all while utilizing the small grains as cover crops that feed our soil. But the combine and machinery/equipment that we would need is not available/designed to fit our scale of operation and/or it is cost prohibitive.

As another example, we know that integrating livestock and crops and create mutually beneficial relationships. But how can we feasibly do this given the significant labor challenges. How do I design a crop/livestock integrated system **specific to my farm** (Generalities don't provide enough support!) that helps me manage the high fertility needs of my produce fields while keeping animals healthy and managing the grazing lands so external inputs are not required (which is one key to financial viability)?

More research/support and emphasis on how we leverage Donella Meadows System Thinking concepts for supporting and maintaining self-fulfilling cycles that reduce the burden on farmers and create cyclical, naturally improving systems is critical."

Farming Region

Clear majorities of respondents from all regions expressed concern about organic integrity and fraud (64-84%), industrial organic (61-85%), crop contamination with NOP-prohibited substances (55-69%), and imbalance of supply and demand for domestic organic products (52-65%). Organic farmers in the Northeast region were most concerned about industrial organic, while organic integrity and fraud emerged as the top concern in the other three SARE regions (*Table 3.24*).

Just over two-thirds of respondents from the Southern region expressed high levels of concern about access to skilled labor, animal welfare, and seeds bred for organic systems (*Table 3.24*). Additional concerns cited by more than half of respondents from this region include access to service providers knowledgeable about organic (66%), crop contamination (65%), adapting to climate change (64%), funding for organic research (64%), imbalance of organic domestic supply and demand (62%), access to certified organic seeds (54%), and access to certified organic animal feed (52%). While results from the relatively small sample size for the Southern region should be interpreted with caution, the high levels of concern across a wide range of issues indicate that organic farmers from this region perceive a greater level of risk associated with many environmental and socio-economic factors. Research and outreach efforts should be tailored to help organic producers in the South address their concerns.

In the Western region, six out of ten respondents expressed concern about the lack of skilled labor, and three topics were tied as the fifth more pressing concern at 54%: availability of organic research funds, adapting to climate change, and imbalance of domestic certified organic supply and demand (*Table 3.24*).

Nearly two-thirds of North-Central region organic farmers, expressed concern about the imbalance of organic supply and demand, and more than half cited availability of organic research funds as a concern (*Table 3.24*). A list of the top five topics of concern across agro-ecoregions is provided in *Table S5* in the Supplements.

Table 3.24

Top five topics of concern for organic farmers in each SARE region ranked in descending order from greatest to least need.

Topics of concern were quantified by calculating the percent of respondents who indicated they were either "concerned" or "very concerned" about a topic. "n" denotes the number of respondents who selected either "concerned" or "very concerned" for a topic.

SARE Region	Topics of Concern in Organic Agriculture	Percent of Respondents Rating Topic a Concern
Northeast	Industrial organic (n=133)	85%
	Organic fraud and integrity of USDA organic label (n=130)	80%
	Crop contamination (e.g., GMOs, pesticide drift) (n=95)	62%
	Animal welfare (n=76)	56%
	Access to agricultural service providers who are knowledgeable about certified organic operations (n=87)	54%
North Central	Organic fraud and integrity of USDA organic label (n=229)	84%
	Industrial organic (n=190)	77%
	Crop contamination (e.g., GMOs, pesticide drift) (n=187)	69%
	Imbalance of domestic certified organic supply and demand (n=169)	65%
	Availability of organic research funds (n=146)	56%
Southern	Organic fraud and integrity of USDA organic label (n=48)	80%
	Lack of skilled labor (n=40)	69%
	Animal welfare (n=31)	69%
	Industrial organic (n=36)	68%
	Access to seeds bred for organic systems (n=37)	67%
Western	Organic fraud and integrity of USDA organic label (n=152)	64%
	Industrial organic (n=129)	61%
	Lack of skilled labor (n=135)	61%
	Crop contamination (e.g., GMOs, pesticide drift) (n=122)	55%
	*Availability of organic research funds (n=119)	54%
	*Adaptation to climate change (n=120)	54%
	*Imbalance of domestic certified organic supply and demand (n=112)	54%

*These topics of concern tied for fifth among Western Organic Farmers.

Farmer Race/Ethnicity

Both BIPOC and White organic farmers indicated organic fraud and integrity of the USDA organic label was their chief concern (*Table 3.25*). Both groups also identified industrial organic and crop contamination as top concerns. BIPOC organic farmers reported greater concerns about animal welfare (67%) and the lack of skilled labor (65%) than White farmers (just over 50% for each topic). The same percent of BIPOC (53%) and White farmers (53%) were concerned about access to agricultural professionals trained in organic practices (*Table 3.25*).

Table 3.25.

Top five topics of concern for BIPOC and White organic farmers ranked in descending order from greatest to least need.

Topics of concern were quantified by calculating the percent of respondents who indicated they were either "concerned" or "very concerned" about a topic. "n" denotes the number of respondents who selected either "concerned" or "very concerned" for a topic.

Type of Farmer	Topics of Concern in Organic Agriculture	Percent of Respondents Rating Topic a Concern
BIPOC Organic Farmers	Organic fraud and integrity of USDA organic label (n=32)	74%
	Crop contamination (e.g., GMOs, pesticide drift) (n=26)	68%
	Animal welfare (n=22)	67%
	Industrial organic (n=21)	66%
	Lack of skilled labor (n=26)	65%
White Organic Farmers	Organic fraud and integrity of USDA organic label (n=539)	77%
	Industrial organic (n=428)	74%
	Imbalance of domestic certified organic supply and demand (n=375)	63%
	Securing sales channels (n=333)	58%
	*Access to agricultural service providers who are knowledgeable about certified organic operations (n=368)	53%
	*Availability of organic research funds (n=355)	53%
	*Lack of skilled labor (n=348)	53%

*These topics of concern tied for fifth among White Organic Farmers.

Farming Experience

Beginning and experienced organic farmers shared the same top four concerns: organic fraud and integrity of the USDA organic label, industrial organic, crop contamination, and imbalance of domestic supply and demand (*Table 3.26*).

Sixty two percent of beginning farmers indicated they are concerned about adapting to climate change (*Table 3.26*) compared to 50% of experienced farmers. There are a couple of potential explanations for this finding. One possibility is that younger generations are more concerned about climate change as they realize they will have to contend with the consequences more than older generations. Another explanation could be that, with experience, some organic farmers develop strategies to make their operations more resilient to climate change,

though many remain concerned about climate impacts. Research that intends to improve climate resilience in organic systems must include farmers who have gained experience on the front lines of climate change, and outreach programs should connect beginning organic farmers with experienced farmers who have begun to develop climate resilience strategies.

While not among the top five challenges for beginning or experienced organic farmers, slightly more than half of respondents in both groups expressed concern about accessing labor, service providers with experience in organic systems, and funding for organic research, and differences between beginning and experienced farmers were small.

Table 3.26

Top five topics of concern for beginning and experienced organic farmers ranked in descending order from strongest to weakest need.

Topics of concern were quantified by calculating the percent of respondents who indicated they were either "concerned" or "very concerned" about a topic. "n" denotes the number of respondents who selected either "concerned" or "very concerned" for a topic.

Type of Farmer	Topics of Concern in Organic Agriculture	Percent of Respondents Rating Topic a Concern
Beginning Farmers	Industrial organic (n=105)	77%
	Organic fraud and integrity of USDA organic label (n=116)	74%
	Crop contamination (e.g., GMOs, pesticide drift) (n=99)	65%
	Imbalance of domestic certified organic supply and demand (n=88)	64%
	Adaptation to climate change (n=90)	62%
Experienced Farmers	Organic fraud and integrity of USDA organic label (n=420)	78%
	Industrial organic (n=4360)	73%
	Crop contamination (e.g., GMOs, pesticide drift) (n=329)	63%
	Imbalance of domestic certified organic supply and demand (n=286)	57%
	*Availability of organic research funds (n=273)	53%
	*Lack of skilled labor (n=267)	53%

*These topics of concern tied for fifth among Experienced Farmers.

Transition Survey Participants

Transition survey participants were presented with the same list of potential concerns related to organic production as organic survey participants and were asked to indicate whether they were "very concerned," "concerned," "somewhat concerned," or "not concerned" about each topic. To summarize the findings, we ranked topics of concern for transitioning farmers by quantifying the percent of respondents who indicated they were either "very concerned" or "concerned" about the topic. Table 3.27 presents the rankings for all topics. The five top concerns for transitioning farmers included:

1. Industrial organic
2. Organic fraud and the integrity of the USDA organic label
3. Crop contamination
4. Access to organic agricultural service providers
5. Access to certified organic animal feed

The first three were also the top three concerns for certified organic producers, which indicates that transitioning farmers have very similar concerns related to the integrity of both the method and the products of organic farming enterprises. Nearly two-thirds of transitioning respondents registered concern about access to service providers knowledgeable about organic and sourcing organic livestock feed, compared to 53% and 35% of certified organic respondents, respectively.

Roughly the same percent of transition survey respondents (27%) raised livestock as organic survey respondents (25%). This suggests that access to organic feed is indeed more of a challenge for transitioning farmers compared to organic farmers.

Slightly more than half of transitioning farmers expressed concerns about obtaining seeds bred for organic systems, and accessing certified-organic seeds, compared to just 44% and 35% of certified growers, respectively. A little more than half of transitioning growers were also concerned about funding for organic research, animal welfare, climate change, and access to skilled labor, which is very similar to findings for certified organic producers.

Taken together, these findings indicate that transitioning farmers are lacking networking support to locate reliable sources of information and identify the supply chains for the inputs they need in order to successfully transition their operations to organic production.

Table 3.27

Topics of concern in organic agriculture ranked in descending order from most to least concerning by transitioning survey respondents.

Topics of concern were quantified by calculating the percent of respondents who indicated they were either "concerned" or "very concerned" about a topic. "n" denotes the number of respondents who selected either "concerned" or "very concerned" for a topic.

Topics of Concern in Transitioning Farmers	Percent of Respondents Who Rated as a Concern
Industrial organic (n=16)	70%
Organic fraud and integrity of USDA organic label (n=17)	68%
Crop contamination (e.g., GMOs, pesticide drift) (n=15)	65%
Access to agricultural service providers who are knowledgeable about certified organic operations (n=17)	65%
Access to certified organic animal feed (n=11)	64%
Animal welfare (n=14)	58%
Availability of organic research funds (n=14)	58%
Adaptation to climate change (n=14)	56%
Access to seeds bred for organic systems (n=14)	54%
Access to certified organic seeds (n=13)	52%
Lack of skilled labor (n=12)	52%
Imbalance of domestic certified organic supply and demand (n=12)	48%
Use of transitional label (n=6)	26%

3.6 Impacts of COVID on Organic Producers

The organic survey instrument for the 2022 NORA report was developed shortly before the COVID-19 pandemic, so there were no survey questions related to the impact of COVID on organic producers. However, all but one focus group was hosted during the pandemic and while there were no discussion prompts directly related to COVID-19, the topic naturally surfaced in many of the focus group discussions. Below, the report outlines pandemic-related challenges identified by organic producers, as well as a few opportunities.

Uncertain Markets & Congested Supply Chains

Focus group participants frequently mentioned shifting and uncertain markets due to the pandemic. In particular, multiple organic farmers explained they lost most or all of their business from restaurants, which were heavily impacted by COVID-19. Participants also talked about the way the pandemic impacted their supply chains, delaying shipments and making it difficult to access processing services.

> ***"For instance, last year...because the restaurants were closing, we didn't have a sure buyer, it was really hard for us to find out who would buy our produce."***

"I've stopped for the most part going to farmer's markets because customers just don't want to show up, now especially."

"I think like everyone has faced here with COVID, as far as market development and just market shifts, I think that's one of the biggest things that I have seen in this past year as far as I have lost pretty much all of my restaurant business...because nobody does take out salads, really. I switched to online, and that's worked well. It didn't work too well this past fall, but worked well last spring, so we'll see this spring. So that's one of the major challenges is just market shifting. With COVID it was extreme, but is this something that we are going to be seeing as we go forward like every two, three, four years, something like this? I don't know."

"I was just going to echo what [the other farmer participant] said on the restaurant sales with the COVID situation. I just ended up looking at doing all my sale results for the last season and I compared them to the previous four seasons, and the restaurant sales were down considerably, of course, because of COVID. Fortunately, the farmers' market sales were up a bit, so that helped balance it out, but I hope the restaurant sales come back."

"Well, we do ship to Korea, and what we've run into is the pandemic economics of it and who is shipping where and tariffs. Completely messed up worldwide shipping...to the point where a shipment I had ready to ship to Korea in December only left a few weeks ago from LA because the LA port is totally stuck with ships circling the block out in the ocean because they can't get unloaded. And the people in the business are saying they have never seen anything like this."

"So as a meat producer right now, at least in Wisconsin, processing is a huge issue, especially with COVID. Processors were just flooded. I don't know how so many people all of a sudden were raising animals. Like, where did all those animals come from? It's been crazy. All the processors around me are booked either until 2022, and they haven't opened their calendars for 2022 yet or through 2022, which means...you can't get your meat. You have to book your appointments before your animals are even alive. So that's kind of a big issue, especially locally."

Challenging Processes and Scarce Resources Intensify

Another key message from focus group participants was that the pandemic exacerbated existing challenges. As a few farmers explained, processes such as organic certification paperwork and procuring organic seeds became even more difficult during the pandemic.

> ***"This is my first year filling out all the paperwork to become certified…and that whole process is pretty involved…even if you have hay or just a couple of different products. But it was my first year, and I'm doing vegetables, so I had maybe upwards of 35 different seeds that I needed to document…especially during COVID it was…even more onerous there. As a vegetable farmer, it would be nice if…some of that were streamlined a little bit more and standardized so that it [was] a little bit simpler. I'm hoping it will be easier next year."***

"One thing I feel like is just exponentially a headache more and more is just seed availability of organic versus non-organic seeds, especially with COVID and everybody and their brother looking for seeds. Companies like Johnny's are doing great things where they are only accepting commercial orders right now, but High Mowing, which is one of the companies we use for 100% organic seed, the lag time of trying to get seeds is excruciating, especially now."

"Somebody told me, 'You are a farmer, and you always live in the future because you are always planning.' With the pandemic…last year was crazy, but I feel like this year is even crazier. Like High Mowing, we work with them, too, and it's really difficult. I feel like the planning that we usually get all of our seeds earlier in January, we should have been getting them in December, because the planning should have happened before for farmers. All the seeds, it seems like they are just like disappearing."

Positive Takeaways from the Pandemic and Future Concerns

Focus group participants did identify some silver linings from COVID-19, for example, flexible virtual learning opportunities and some benefits to organic dairy. However, they also expressed uncertainty about what lies ahead.

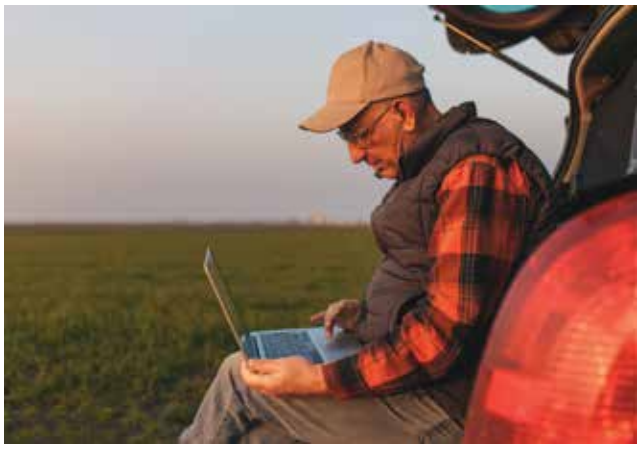
> ***"Time is always the greatest enemy, but I feel like one of the nice silver linings of COVID is that NOFA has been able to provide virtual visits and taping those visits, which makes it really accessible. If you can't make it at that particular time you can look at it later on, which I think is a really nice thing."***

"NRCS did a nice training down here on crop planting, which brought me up to putting it all on the computer. Oh, my goodness, is that so nice. You know, I'd love to see more of that, with the certifiers that do that."

"There's a boom right now going on. We have a lot of food because of COVID, but the organic commodity stability really concerns me."The pandemic has helped organic dairy in some ways, but, you know, will it be enough?"

Keeping Up with Information

The shift to virtual gatherings during the pandemic removed many geographic and financial barriers to networking and information sharing. While these virtual resources provided great benefits, as described above, focus group participants also described feeling overwhelmed with the deluge of information and learning opportunities.



"Just keeping up with the need to know information... COVID changes work, you know, how to do it, what to do. Last year starting the e-commerce; otherwise you wouldn't stay alive. And then backing that up with all the supporting information needed to know to start an e-commerce website. It is that need to know information, and then it becomes for me time management. Okay, well, when are you going to put this, and then the priority. The list just keeps going, you know. The day is only so long...[to] keep on improving. And the growing, the practices, the way to communicate, etc. It is a challenge in just keeping up with the need to know information."

"This winter where pretty much all conferences and learning times are virtual, there is no shortage. I am realizing here we are halfway through the winter, and I have signed up for all these learning times, you know, whether they are just one-hour meetings or day-long conferences, that I'm having a very hard time focusing when I'm at home on the computer. I have it set up in the kitchen, and I'll try to be multitasking doing three things at once, and I'm really missing out on the conference, or my head is just not in it. Whereas, if I was going in person somewhere, at least while you are there at that meeting you are engaged with the presenter more."

CHAPTER 4
Preferred Information Resources and Farmer-Identified Solutions

4.1 Preferred Sources and Modes of Information

Organic Survey Participants

Full Organic Survey Sample

The organic survey asked participants to describe the usefulness of different sources of information using a four-point scale ranging from "very useful" to "not at all useful." Information sources were ranked by quantifying the percent of respondents who rated each source as either "very useful" or "mostly useful." *Table 4.1* presents the rankings for all information sources. For a breakdown of the usefulness rankings of the top five sources of information, please refer to *Figure S14* in the Supplements.

The five top sources of information for organic producers included:

1. Certified organic farmers
2. Other farmers
3. Online resources
4. Organic certifiers
5. Crop consultants

Survey respondents identified other organic farmers as their most valuable source of information by a substantial margin, followed by other (non-organic) farmers (*Table 4.1*). Focus group participants also underscored the importance of learning from other organic farmers and the need for mentorship programs. As organic farmers explained in their own words:

"I find the best thing I have is the fellow organic farmers."

"And farm visits, that's really, really helpful to me, and also smaller farmer groups…I'm part of a group of, I think it's six farmers, that we get together like five or six times over the winter and…we just talk to each other about challenges and what we are doing to address those challenges. Just finding a small farm community to bounce those ideas off of and get other ideas is the best thing for us."

"I find always in my experience that the best place to go for farming advice is other farmers."

"Organic producers are probably the biggest and best resource…one thing that I have found when you talk about cropping practices, the type of crops that you should grow, the ones that will have a tendency to be the most profitable in working with other people that are in your region of the country that's going to be one of the greatest sources of information because they are facing exactly the same challenges that you're facing, and they have been able to develop, you know, quite a number of successful options in dealing with them."

"I do think there are some good programs out there, but there is a lack of coordination between all these various like incubator farms or mentorships or apprenticeships. Maybe I'm missing it, but I wish there was more of like a way to collate all of that and kind of funnel people. I know for us on our farm, mentorship and having worked on other farms and having active mentors that we still contact have been crucial to us, and I think incubator farms or apprenticeships are great when they can learn hands-on things and then save up some money and some value and then move onto like another system."

"Every time we lose several old people in the community, there are no young people coming to replace them. I think that we need to — and the whole COVID thing brings it [specially] to light — figure out new ways to rebuild the community and to reanimate the person-to-person interaction…basically we need to mentor and transfer knowledge from one person to another."

These results present a clear signal that farmer-to-farmer learning and networking is the most effective way to disseminate knowledge and technical assistance, and conform with findings in previous NORA reports. This appears to be a consistent sentiment as organic farmers who participated in the 2015 NORA survey also identified other farmers as their most useful resource. A comment from one farmer in the previous NORA report describes the long tradition of farmer-to-farmer knowledge sharing in organic:

> ***"Other farmers who share their experiences—we learn and support one another. When you're developing or on the cutting edge of adopting new practices there isn't research out there to benefit from. Such was the case with organic when we certified 20 years ago — we only had other farmers and our own (expensive) process of trial and error."***

At the same time, over half of respondents found organic certifiers and online resources useful, which was also reflected in the 2016 NORA report. More than one third found value in each of the following sources: crop consultants, Extension agents with knowledge of organic systems, nonprofits, NRCS, growers' associations, suppliers, and buyers. Each of these entities can offer information and perspectives that complement farmer knowledge and experience, and can support and enhance farmer-to-farmer learning whenever relationships of trust, credibility, and collaboration currently exist or can be established.

Federal investments in conservation, research, Extension, and education for organic producers should build upon existing relationships among organic farmers and make best use of information sources such as certifiers, growers' associations, and agricultural nonprofits. One effective strategy is to promote on-farm organic research and demonstration projects led by farmer-scientist teams. The USDA Organic Research and Extension Initiative (OREI), Sustainable Agriculture Research and Education (SARE), and NRCS On Farm Conservation Innovation Trials fund many projects that engage farmers and farmer groups as partners in research, development, demonstration, and dissemination of new tools, practices, strategies, and crop cultivars for organic and sustainable systems. Research and demonstration trials that yield success on working farms provide other organic farmers with direct evidence that novel strategies could be successfully implemented on their operations, not just in the context of an experimental station. Endeavors by governmental and nongovernmental entities to promote adoption of best organic practices can and should make greater use of highly effective farmer-to-farmer peer learning venues.

It is also critical that peer-to-peer training and on-farm research programs provide compensation for farmers who participate. As one survey participant stated:

> ***"The expectation with the training programs is that it's either unpaid volunteer time or you are going to pay to be a part of the program. Lost income is a barrier to accessing education and the experience you need to do this."***

Focus group participants also expressed a desire for a "clearinghouse" of the many resources out there for organic growers. For example, as a couple of farmers explained:

> ***"I feel like there are so many resources out there, and I'm currently thinking about this transition thing. You've got Agrarian Commons. You've got Renewing the Countryside, Land Stewardship Project, MOSES. They all have resources for access***

of land and this kind of thing that I need a clearinghouse of clearinghouses for all this information."

"I wish that there was a way to put the resources available…on a listserv, and there was more of a schedule…"

Centralizing resources for organic growers would make it easier for them to access the knowledge they need to address specific issues on their farms.

Table 4.1

Sources of information ranked by organic survey participants in descending order from most to least useful.

Sources of information were quantified by calculating the percent of respondents who rated an information source as either "mostly useful" or "very useful." "n" denotes the number of respondents who selected either "mostly useful" or "very useful" for the corresponding information source.

Sources of Information	Percent of Respondents Who Rated as Useful
Certified organic farmers (n=572)	82%
Other farmers (n=403)	61%
Online resources (n=369)	59%
Organic certifiers (n=392)	57%
Crop consultants (n=241)	48%
Extension personnel focusing on organic production (n=266)	46%
Nonprofit agriculture organizations (n=238)	44%
Suppliers (n=214)	37%
Natural Resources Conservation Service (NRCS) (n=202)	37%
Grower association (n=170)	36%
Buyers (n=197)	35%
Handlers and processors (n=152)	29%
State agriculture department (n=139)	26%
Extension personnel focusing on conventional production (n=99)	18%

The organic survey also asked participants to indicate their most preferred way of receiving information. Participants could respond to a list of options using a four-point scale ranging from "highly preferred" to "not preferred." The modes of information were ranked in the same way as the sources of information and are presented in *Table 4.2*. A breakdown of how respondents rated their preferences for the top five modes of information is presented in *Figure S15* in the Supplements.

Organic survey participants indicated a preference for receiving information via the following formats:

1. Printed materials
2. On-farm demonstrations and field days
3. Conferences and workshops
4. Online materials
5. Email newsletters, groups, and listservs

More organic farmers indicated a preference for printed informational materials (65% of survey respondents) or on-farm demonstrations and field days (63%) than other formats (*Table 4.2*). Conferences and workshops; online materials; email newsletters, groups, and listservs; and online videos were each preferred by about half of respondents, while in-person classes, scientific journals, and online classes and webinars were each valued by at least one in three. On-farm demonstrations and field days, conferences and workshops, online materials, and printed materials were also the top-ranking information formats in the 2016 NORA report. Because learning styles are known to vary amongst any human population, we recommend making all of these learning formats available to the organic farming community rather than focusing exclusively on the topmost few in the list.

Table 4.2

Information formats ranked by organic farmers in descending order from most preferred to least preferred.

Preference for information formats was quantified by calculating the percent of respondents who rated a format as either "preferred" or "highly preferred." "n" denotes the number of respondents who selected either either "preferred" or "highly preferred" for corresponding format.

Information Formats	Percent of Respondents Who Rated as Preferred
Printed materials (books, manuals, pamphlets, magazines) (n=458)	65%
On-farm demonstrations and field days (n=438)	63%
Conferences and workshops (n=372)	53%
Online materials (digital materials and/or websites) (n=350)	51%
Email newsletters, groups, and listservs (n=333)	48%
Online videos (n=313)	46%
In-person classes and/or coursework (n=258)	38%
Scientific journals (n=228)	34%
Online courses and webinars (n=226)	33%
Films or documentaries (n=186)	28%
Social media (Facebook, Instagram, Twitter) (n=64)	9%

Farming Region

Respondents from all four SARE regions agreed that organic farmers, other farmers, online resources, and organic certifiers are their most valuable sources of information (*Table 4.3*). While fewer organic farmers from the Northeastern and Western regions gave a rating for crop consultants than for Extension personnel focused on organic systems, those who responded to the questions considered the two sources similarly useful (51-53%). Less than half of respondents from the North Central and Southern regions reported finding Extension and consultants useful. Focus group comments indicate that while awareness of organic management practices within the agricultural Extension community appears to be growing in some regions, there is a clear need for Extension agents trained specifically in organic practices.

> ***"I am really gratified that the land grant university and extension agencies have become much less dismissive of organic growing than they used to be. Used to be kind of bashful about admitting that you were organic at some of these folks, but it is much more mainstream."***

> ***"And I'll say for extension agents, in Montana at least, I am educating our extension agents on small scale vegetable growing. There is nobody out here that knows anything about no-till, or if they do...you need this machine that costs half a million dollars to roll your oats in order to get this no-till. It is not the same."***

North-Central region respondents seem especially likely (90%) to turn to other organic producers for information, and somewhat less likely than respondents from other regions to draw on Extension, NRCS, or state departments of agriculture for information on organic production. This may reflect the efficacy of regional organizations like Practical Farmers of Iowa (PFI), Land Stewardship Project (LSP), and Midwest Organic and Sustainable Education Service (MOSES) in supporting farmer-to-farmer learning and mentorship.

Organic farmers from the Southern SARE region indicated a slightly stronger preference for online resources over other organic farmers (*Tables 4.3*). This may reflect the low number of certified organic producers per capita in this region compared to other regions (USDA, 2020), which could limit opportunities for peer learning and mentorship. Respondents from the Southern region were more likely (51%) to find agricultural non-profit organizations useful than respondents from other regions (42-46%), which points to opportunities for these organizations to foster relationships among organic growers in the South to strengthen farmer mentorship.

The top five sources of information across agro-ecoregions are presented in *Table S6* in the Supplements.

Table 4.3

Top five sources of information for organic farmers in each SARE region ranked in descending order from most preferred to least preferred.

Sources of information were quantified by calculating the percent of respondents who rated an information source as either "mostly useful" or "very useful." "n" denotes the number of respondents who selected either "mostly useful" or "very useful" for the corresponding information source.

SARE Region	Sources of Information	Percent of Respondents Rating Source as Useful
Northeast	Certified Organic Growers (n=127)	83%
	Other Farmers (n=98)	68%
	Online Resources (n=75)	56%
	Organic Certifiers (n=81)	53%
	Crop Consultants (n=54)	53%
North Central	Certified Organic Growers (n=236)	90%
	Organic Certifiers (n=156)	61%
	Other Farmers (n=145)	58%
	Online Resources (n=119)	55%
	Crop Consultants (n=93)	46%
Southern	Online Resources (n=34)	69%
	Certified Organic Growers (n=35)	67%
	Organic Certifiers (n=28)	57%
	Nonprofit Agriculture Organizations (n=21)	51%
	Other Farmers (n=26)	50%
Western	Certified Organic Growers (n=161)	76%
	Online Resources (n=135)	64%
	Other Farmers (n=125)	62%
	Organic Certifiers (n=114)	52%
	Extension Personnel Focusing on Organic Production (n=92)	52%

Printed materials and on-farm demonstration and field days were among the top three formats of information in all regions, and on-farm events were especially preferred by organic farmers in the North Central region (*Table 4.4*). Respondents from the Southern and Western regions registered equally strong preference for receiving information through online and printed materials, with half or more also preferring online videos (*Table 4.4*). In contrast, organic producers in the Northeast and North Central regions clearly preferred printed materials over electronic venues (39-47% preference for online materials, videos, and email sources).

Conferences and workshops were also highly ranked in the Northeast and North Central regions. A number of very active organic organizations in these regions — for example, the Midwest Organic and Sustainable Education Service (MOSES), the Northeast Organic Farming Association (NOFA), and Practical Farmers of

Iowa — regularly host farmer conferences, which could partially explain this preference. Indeed, focus group participants from these regions highlighted the value of these venues.

> ***"I kind of entered farming through sustainable agriculture, and then MOSES was like the center of inspiration and knowledge and meeting people."***

> ***"I absolutely would say that that has been 100% the resource that I have used — conferences and other growers. And that is how I've gotten to where I've gotten today."***

> ***"Certainly, we started off very much farmer-to-farmer through conferences or nonprofits, whether it be Practical Farmers of Iowa at the Sustainable Farming Association, etc."***

> ***"Big organizations like NOFA, what they have online and also workshops, and conferences are huge. I'm a conference junky. Always trying to figure out what other farms are doing to figure these problems out."***

The top five modes of information across agro-ecoregions are presented in *Table S7* in the Supplements.

Table 4.4

Top five information formats for organic farmers in each SARE region ranked in descending order from most preferred to least preferred.

Preference for information formats was quantified by calculating the percent of respondents who rated a format as either "preferred" or "highly preferred." "n" denotes the number of respondents who selected either "preferred" or "highly preferred" for corresponding format.

SARE Region	Sources of Information	Percent of Respondents Rating Source as Useful
Northeast	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=116)	73%
	On-Farm Demonstrations and Fields Days (n=96)	62%
	Conferences and Workshops (n=88)	56%
	Email Newsletters, Groups, and Listservs (n=73)	47%
	Online Materials (Digital Materials and/or Websites) (n=65)	42%
North Central	On-Farm Demonstrations and Fields Days (n=178)	73%
	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=167)	66%
	Conferences and Workshops (n=151)	59%
	Online Materials (Digital Materials and/or Websites) (n=111)	46%
	Email Newsletters, Groups, and Listservs (n=109)	45%

Table 4.4 (continued)

Southern	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=36)	69%
	Online Materials (Digital Materials and/or Websites) (n=36)	67%
	On-Farm Demonstrations and Fields Days (n=33)	57%
	Online Videos (n=32)	51%
	Online Courses Webinars (n=28)	50%
Western	Online Materials (Digital Materials and/or Websites) (n=130)	59%
	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=128)	59%
	On-Farm Demonstrations and Fields Days (n=116)	53%
	Email Newsletters, Groups, and Listservs (n=115)	52%
	Online Videos (n=111)	51%

Farmer Race/Ethnicity

While both BIPOC and White farmers considered organic and non-organic farmers and organic certifiers among their most useful sources of information (*Table 4.5*), BIPOC respondents valued a much wider range of resources. In addition to Extension personnel trained in organic production, organic certifiers, NRCS, and crop consultants (listed in *Table 4.5*), over half of BIPOC farmers found online resources, non-profit organizations, suppliers, buyers, and processors/handlers to be useful information sources.

Table 4.5

Top five sources of information for BIPOC and White organic farmers ranked in descending order from most preferred to least preferred.

Sources of information were quantified by calculating the percent of respondents who rated an information source as either "mostly useful" or "very useful." "n" denotes the number of respondents who selected either

Type of Farmer	Sources of Information	Percent of Respondents Rating Source as Useful
BIPOC Organic Farmers	Certified Organic Farmers (n=33)	85%
	Other Farmers (n=26)	68%
	Extension Personnel Focusing on Organic Production (n=20)	65%
	Organic Certifiers (n=26)	63%
	*Natural Resources Conservation Service (NRCS) (n=26)	59%
	*Crop Consultants (n=16)	59%
White Organic Farmers	Certified Organic Farmers (n=539)	82%
	Other Farmers (n=377)	61%
	Online Resources (n=348)	59%
	Organic Certifiers (n=366)	56%
	Crop Consultants (n=225)	48%

*These topics of concern tied for fifth among BIPOC Organic Farmers.

"mostly useful" or "very useful" for the corresponding information source.

BIPOC and White organic farmers expressed similar preferences regarding information formats, including on-farm demonstrations and field days, printed and online materials, and conferences and workshops (*Table 4.6*). However, more BIPOC organic farmers reported a preference for online videos (60%) and films and documentaries (47%) than White farmers (45% and 27%, respectively). Email venues received similar ratings by BIPOC (55%) and White respondents (48%).

Table 4.6

Top five information formats for BIPOC and White organic farmers ranked in descending order from most preferred to least preferred.

Preference for information formats was quantified by calculating the percent of respondents who rated a format as either "preferred" or "highly preferred." "n" denotes the number of respondents who selected either "preferred" or "highly preferred" for corresponding format.

Type of Farmer	Information Formats	Percent of Respondents Rating Format as Preferred
BIPOC Organic Farmers	On-Farm Demonstrations and Fields Days (n=29)	85%
	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=28)	68%
	Online Videos (n=24)	65%
	Conferences and Workshops (n=24)	63%
	*Email Newsletters, Groups, and Listservs (n=23)	59%
	*Online Materials (Digital Materials and/or Websites) (n=22)	59%
White Organic Farmers	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=430)	65%
	On-Farm Demonstrations and Fields Days (n=409)	63%
	Conferences and Workshops (n=348)	53%
	Online Materials (Digital Materials and/or Websites) (n=328)	50%
	Email Newsletters, Groups, and Listservs (n=310)	48%

*These topics of concern tied for fifth among BIPOC Organic Farmers.

Farming Experience

Beginning and experienced farmers shared many of the same preferences for sourcing and viewing information (*Table 4.7* and *Table 4.8*). Organic and non-organic farmers were both important sources of information for organic farmers, regardless of their farming experience, while beginning farmers showed a particularly high preference for online resources (*Table 4.7*). Nonprofit agricultural organizations were valued by 56% of beginning farmers compared to just 41% of experienced farmers. About half of organic farmers, regardless of experience, consider crop consultants a preferred resource (*Table 4.7*). However, somewhat fewer beginning farmers (51%) than experienced farmers (58%) turned to their certifiers for information.

On-farm demonstration and field days, printed and online materials, and conferences and workshops were all highly preferred information formats by both beginning and experienced organic farmers (*Table 4.8*). However, beginning organic farmers preferred online videos (56%) rather than newsletters or email groups, which were preferred by organic farmers with more farming experience (49%) (*Table 4.8*).

Table 4.7

Top five sources of information for beginning and experienced organic farmers ranked in descending order from most preferred to least preferred.

Sources of information were quantified by calculating the percent of respondents who rated an information source as either "mostly useful" or "very useful." "n" denotes the number of respondents who selected either "mostly useful" or "very useful" for the corresponding information source.

Type of Farmer	Sources of Information	Percent of Respondents Rating Source as Useful
Beginning Farmers	Certified Organic Farmers (n=122)	80%
	Online Resources (n=95)	69%
	Other Farmers (n=95)	63%
	Nonprofit Agriculture Organizations (n=62)	56%
	Crop Consultants (n=48)	51%
Experienced Farmers	Certified Organic Farmers (n=438)	84%
	Other Farmers (n=303)	61%
	Organic Certifiers (n=303)	58%
	Online Resources (n=263)	56%
	Crop Consultants (n=185)	47%

Table 4.8

Top five information formats for beginning and experienced organic farmers ranked in descending order from most preferred to least preferred.

Preference for information formats was quantified by calculating the percent of respondents who rated a format as either "preferred" or "highly preferred." "n" denotes the number of respondents who selected either "preferred" or "highly preferred" for corresponding format.

Type of Farmer	Information Formats	Percent of Respondents Rating Format as Preferred
Beginning Farmers	On-Farm Demonstrations and Fields Days (n=107)	69%
	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=96)	62%
	Online Materials (Digital Materials and/or Websites) (n=92)	59%
	Conferences and Workshops (n=91)	59%
	Online Videos (n=86)	56%
Experienced Farmers	Printed Materials (Books, Manuals, Pamphlets, Magazines) (n=346)	66%
	On-Farm Demonstrations and Fields Days (n=311)	61%
	Conferences and Workshops (n=266)	51%
	Email Newsletters, Groups, and Listservs (n=249)	49%
	Online Materials (Digital Materials and/or Websites) (n=244)	48%

Transition Survey Participants

Transition survey participants were asked to rate the usefulness of the same list of information sources as the organic survey participants. *Table 4.9* presents the rankings for all information sources from the transition survey. The top five sources of information for transition survey respondents included:

1. Online resources
2. Non-profit agriculture organizations
3. Certified organic farmers
4. Organic certifiers
5. Other farmers

In contrast with certified organic farmers, the greatest numbers of transitioning farmers preferred sourcing information through online resources, followed by nonprofit agriculture organizations (*Table 4.9*). Just over two thirds of transitioning farmers indicated organic farmers and organic certifiers as valuable sources of information (*Table 4.9*). About half of transitioning farmers cited NRCS and Extension personnel with organic training as valuable sources, while only one in five found crop consultants useful.

Table 4.9

Sources of information ranked in descending order from most to least useful, as identified by transition survey participants.

Sources of information were quantified by calculating the percent of respondents who rated an information source as either "mostly useful" or "very useful." "n" denotes the number of respondents who selected either "mostly useful" or "very useful" for the corresponding information source.

Sources of Information	Percent of Respondents Who Rated as Useful
Online resources (n=22)	82%
Nonprofit agriculture organizations (n=15)	75%
Certified organic farmers (n=15)	71%
Organic certifiers (n=16)	67%
Other farmers (n=13)	59%
Natural Resources Conservation Service (NRCS) (n=12)	52%
Extension personnel focusing on organic production (n=10)	50%
Grower association (n=7)	50%
Suppliers (n=8)	38%
Extension personnel focusing on conventional production (n=6)	29%
State agriculture department (n=5)	28%
Buyers (n=5)	28%
Handlers and processors (n=4)	22%
Crop consultants (n=3)	19%

Transitioning farmers most often expressed preference for online materials, email newsletters, groups, and listservs, and online videos as information formats, followed by on farm events, conferences and workshops, and printed materials (*Table 4.10*), while the latter were most preferred by certified organic producers (*Table 4.2*). Half or more of transitioning respondents also cited in-person classes, online courses and webinars, and scientific journals as preferred formats, compared to about one-third of certified organic farmers. While these data are based on a small sample size of transitioning farmers, they suggest some real differences in preferred modes of information delivery among the two groups of farmers.

Table 4.10

Top five information formats for transitioning farmers ranked in descending order from most preferred to least preferred.

Preference for information formats was quantified by calculating the percent of respondents who rated a format as either "preferred" or "highly preferred." "n" denotes the number of respondents who selected either "preferred" or "highly preferred" for corresponding format.

Information Formats	Percent of Respondents Who Rated as Preferred
Online materials (digital materials and/or websites) (n=19)	79%
Email newsletters, groups, and listservs (n=18)	72%
Online videos (n=17)	65%
On-farm demonstrations and field days (n=16)	64%
Conferences and workshops (n=16)	61%
Printed materials (books, manuals, pamphlets, magazines) (n=14) In-person classes and/or coursework (n=15)	60%
Online courses and webinars (n=13)	52%
Scientific journals (n=12)	50%
Films or documentaries (n=8)	33%
Social media (Facebook, Instagram, Twitter) (n=6)	25%

4.2 Farmer-Identified Solutions

In addition to two national surveys, OFRF conducted sixteen focus group discussions with organic and transitioning farmers and ranchers across the U.S. While the primary goal of these discussions was to gather more detail about the specific issues or challenges producers were facing, participants frequently interacted with one another during the sessions and shared their own strategies and solutions for issues raised by their fellow focus group participants. This section of the report highlights the perspectives, strategies, and tools organic producers found important for the success of their farms and ranches.

Useful Resources

Like survey participants, focus group participants identified other organic farmers as an invaluable resource for solving production challenges and avoiding common pitfalls.

> ***"[Fellow organic farmers are] very helpful. Very open on what they do, and it really saves me a lot of pitfalls that could ruin a crop coming from conventional or using herbicides, to knowing the exact timing and different types of mechanical tools that you can use to prevent a problem before it begins versus usually chemicals you have that safety of going back in and spraying after the fact if you see a problem I found that very helpful, talking to other organic farmers in the area and getting their point of view on things. It helps as well because when you're transitioning you don't have every piece of equipment that you really want to have... So it is nice to have people in the area that you can say, 'Hey, can I pay you to come in and do this at this time?' Especially when you're just starting, and it really has been very, very helpful."***

> ***"Probably the biggest help for us in terms of production has been our community of farmers, and specifically there is a group of farmers that meet once a year. And it has been extremely helpful, and we stay in contact via email. So just generally a community of experienced farmers that you can go to."***

Focus group participants explained that these farmer networks were usually driven by individuals and having access to these groups was mostly a matter of being fortunate to be in a place where there was a socially active farming community. This feedback suggests that coordinated efforts by nonprofits, Extension, and other education programs to create farmer-to-farmer networks in places where there is not a strong organic farming community would be a very valuable resource for organic and transitioning producers.

"We, in terms of research and resources information, have been very fortunate in having been included in several...farmer peer groups that share information and organize some get-togethers and have been incredibly valuable, but it is really entirely due to individuals taking initiative and organizing these groups."

> ***"And I just think it is such a basic thing, but when farmers can manage to take some dedicated time to talk to each other, it is so incredibly useful. And, again, we've been fortunate in our farming community to have pretty easy access to that, and I think it just depends on the individuals and the farms. And some areas don't have as much of a network like that, and so a lot of the networking just with other farms that are similar to us has been a huge – really important resource for our development."***

> ***"I mean, one thing I did when I just started getting into organic apple production back in 2003 was that I learned of a grower field day. And, you know, like, oh, great. Is there a group of us? And, no, there was no organization, but they would love to have one. So we started one...a few of us could get together who would dare to share our experiences with each other."***

Focus group participants also found organizations such as the Organic Grain Resource and Information Network (OGRAIN), the Midwest Organic and Sustainable Education Service (MOSES), and the Natural Resources Conservation Service (NRCS) to be valuable resources.

> ***"I just want to toot the horn of OGRAIN, which did not get funded properly this year. And they have been huge, a huge, huge resource for me as a relatively new grain grower, so I feel badly that OGRAIN is probably going to have less impact now. But there is still opportunity for more funding, maybe."***

"I would echo OGRAIN again. They do great work there and been a really nice resource for us kind of when we were getting going."

"I would also add that Practical Farmers of Iowa, or PFI, has a really nice and well-organized kind of online resource for a lot of different topics. They do a great job of getting it online in a way that's kind of easy to understand...that's been something that we went to a lot kind of to learn more about specific topics."

"I would just like to add that ATTRA is a good resource for production challenges and for listings and things like that. They are like the extension of NGO."

"Information from MOSES has been just fabulous over all these years. MOSES is one of the really outstanding groups."

"Usually they have like a local office, both the Farm Service Agency and the NRCS. The Farm Service Agency is really good for beginning farmer loans or farms of smaller sizes, like non-collateral type of loans that they offer. And then as [the other participant] had mentioned, they are great with helping you subsidize some of these projects. They will even help if you put in a newer tech irrigation system, so there are times they will even help pay for drip line, micro-sprinklers, that kind of thing."

Reducing Risk and Forms of Crop Insurance

Focus group participants commonly discussed ways they managed risk on their operations. A couple of specific programs through the USDA and specifically the Farm Service Agency (FSA) were highlighted.

> ***"But I did stumble on...a USDA crop insurance program...for drought. The opposite of what [the other participant] is dealing with. It is drought insurance, but it's based on rainfall. And because, according to OSHA here in the northeast where it is supposed to be getting much wetter springs and falls and drier summers and winters – I signed up a couple years ago and put down the summers as the time – the dry time that I want to be insured against, and I have gotten paid back in the last two years in a row. This past year, as you can imagine, it was very significant."***

"I just found out that...FSA offers a [program] which if your farm is owned by 50% or more women, then you can get crop insurance for free, which I thought was pretty awesome. And it would be interesting to see organizations expand that out to other socially disadvantage groups."

More often, focus group participants explained that they relied on commodity and market diversification to manage their risks.

"On the small scale we deal with our risk just by having that super diversified plan, like [another participant] was saying."

"Because of how we market through a CSA, so we sort of inherently spread our risk out. Not just a lot of different customers, but also a lot of different crops. CSA is the marketing tool, but it is also a risk management strategy, so that helps out a little bit. It is on the marketing side of things, or on selling the products side of things, but also on the growing because you can have individual crop failures."

"I would say every farm around here really does manage their risk by having multiple marketing outlets. No one is selling just one thing."

"For me and my business maintaining a nimble business and having the ability to pivot quickly was huge for me this year, and having customers and all CSA market wholesale sectors was great because someone can always kind of absorb what I have. So that's been really useful to get those relationships, even though it is challenging to manage all of them."

"The risk is mostly spread out. You grow lots of different crops and maybe one or two of them don't work good but luckily through diversification you got lots of different things, and that spreads out the risk. Price and same thing on the marketing end. If you have different outlets then your risk is lessened because if one thing isn't working out hopefully you can make up for it on another end.

"And from a marketing standpoint, having the well-rounded thing of vegetables and meat, I think is a good thing. I think it is a good way to go, and I also think from the perspective of kind of the holistic system of people getting their food from local farms, I think it is really good to be providing meat, as well as vegetables. And I think, you know, the ideal situation is to have it integrated, and I hope to get there to a greater extent."

Organic farmers and ranchers also underscored the idea that healthy soils are their most important form of crop insurance.

"Soil is very important, and it is the building block of everything else. And if you treat it poorly, it will pay you poorly for years to come. If you treat it well, it will serve you well. You have to be constantly vigilant on your soil, and it is pretty darn important."

"In terms of the crop insurance, soil health is how you mitigate risk and…you know, we don't have crop insurance. We never have. We never will. Our system buffers itself. Instead of externalizing risk, we internalize risk. We figure out ways to internally build buffers for risk. And, you know, it's a big concept, and everybody is going to approach it differently. But it all comes back to soil health. And you cannot avoid the basics of a good

rotation, you know, increasing organic matter, neutral pH. You just can't get beyond those basics. And what I tell these new guys that are starting, if you start out from there with good basics, with a good foundation of healthy soil, you know suddenly your disease problems, your pest problems, so many of these problems disappear."

"Soil health is our insurance policy. It's our fertilizer package. It's our protector of the plants."

"I think soil health is pretty much everything…You know, if you don't have it, it is difficult to get a very healthy plant, and if you do have good soil health, it is much easier to grow a plant. There is no question about that. I think it is important to focus on building the soil as best you can and trying to maintain microbial activity within that soil. It is a benefit to the plants, and then in your farming practices try not to ruin the plant's growth."

"Basically half of our land is in a cover crop, and we find it incredibly important to do because that's how we grow our nitrogen and our soil organic matter. And we are not going to be able to get a crop if we don't have nitrogen present and good soil organic matter."

Importance of Integrating Livestock with Cropping Systems

Many focus group participants discussed the key role livestock play in mitigating risk by providing an additional source of income and helping build healthy soils.

"Getting back to the risk management, livestock on the crop farm adds another source of income. It greatly reduces the risk…I think livestock and crops are, from every perspective…a key component. And then there is a lot of land that can't support crop farming, so to speak, or could support perennial farming. There is a lot of ag land that is only suitable for livestock. Clearly there is a role there as well."

"I think the livestock are integral to our soil fertility, just trying to have the least amount of imported inputs. They have been integral to building the soil fertility on our farm."

"Eliminating livestock operations from the farm has been one of the serious detriments to the possibilities of maintaining a healthy soil system;

and, you know, mitigating, you know, some of the big issues that are…brought about in conventional agriculture, the idea of cover crops. They're going to – I don't think that we're going to fully and adequately address the needs of, you know, considerations for soil health unless we make some kind of a shift back to the incorporation of diversification with livestock in the farming operations."

One focus group participant also promoted the idea of integrating livestock to provide an additional revenue stream during the transition period and advocated for further research in this area.

"I think perhaps an interesting research item…cattle being used to help transition land. Make it to organic production by providing the income necessary for that land to get off of its ally residue. It is a perfect case study for how ranching and farming can integrate, and particularly the crux point of it is getting income on transition acres until you can establish an organic rotation, and using cattle as that supplemental income to limp that land through its recovery period until we can germinate legumes on it again. I think it is really interesting, and we are going to be doing it this year."

Practicing Patience

Organic farmers recommended making any changes on small parts of the farm; don't try to tackle everything at once and have patience.

"Break up your farm. Just break up your farm, whether it's your backyard or a thousand acres and just deal with 5 or 10% of it at a time and attempt to do it right, whatever you can."

"You have to be patient. Patient with this part, this part, this part, so it supports your efforts in that respect because it is always giving you that replenishment, that mindset of being patient and tolerant of things, whether you get pests or no pests or whether you try different things and not. And you are constantly observing. You have that mindset of, 'What is up with that animal? What is going on here?' You are on the focus. You are on the front burner of doing observation as well. And it gives you a diversity of sorts, a diversity of enterprises, a diversity of things to be able to look at and do, and then it shows you more importantly to how each play a role in the full ecosystem. And that's supporting organic agriculture. It shows you the rejuvenating part of it. It shows you how it all works amazingly well, and you just have to facilitate it. You just have to know what you are doing to facilitate it."

Good Communication with Neighbors is Key

Multiple focus group participants pointed out the importance of developing strong lines of communication with neighbors. In their experience, establishing good relationships with neighbors can provide access to important resources for the farm and mitigate potential contamination issues from surrounding conventional farms.

"If I'm going to get inputs to spread on a field, I'm going to try to get them as close as possible. I mean, I have a dairy farm like right down the street from me, and so that's a huge resource for us. I have been trying to source more and more stuff from him because I think he probably has more cows and more manure than you want to

be spreading on an area. I think if I can mitigate that and also just try to source things as close as possible and be helping my neighbor, you know what I mean, I think it…has a benefit."

"The relationship with neighbors and communication is the whole thing, in my opinion, and certainly I'm surrounded by neighbors that in several cases could not buy into the organic concepts at all, but even at that I've been able to have a reasonable conversation. I give them an understanding of what our requirements are and why, and so consequently when they're doing their spraying practices and so forth, we have a good line of communication, and they check in and make sure that everything is going to be okay. They don't want to be a pain in the butt to me, and good understanding really helps."

"Until we can achieve the integration of livestock at an important scale, we're looking at our neighbors who have a resource of manure, and we're bringing that in, adding that into our rotation as an additive."

Photo credit: Haley Baron

CHAPTER 5
Recommendations and Priorities

5.1 Summary of Survey and Focus Group Results

Findings from the 2022 NORA report reveal that organic and transitioning producers are leading the way in the use of soil and climate stewardship practices such as cover crops, crop rotations, and intercrops. Close to nine in ten organic and transitioning producers reported using cover crops compared to only about one in ten non-organic producers (Hellerstein et al., 2019). More than half of organic survey respondents and over 80% of transition survey respondents reported intercropping, a practice that is rarely used on conventional farms.

Despite the widespread use of these beneficial practices, the report demonstrated that certified organic and transitioning producers face a formidable array of challenges related to production, marketing, certification, labor and business management, and other key determinants in the success of an organic operation. Leading production challenges identified in our survey include organic weed, insect pest and disease management, soil fertility and health, managing production costs, maintaining yields, and accessing appropriate crop seeds and cultivars for organic production. Top non-production challenges included accessing skilled labor, markets, and infrastructure; meeting recordkeeping requirements of NOP certification; and the costs of organic certification. Survey respondents expressed especially high levels of concern about the impacts of organic fraud, industrial-scale organic operations, and crop contamination by NOP-prohibited substances on their livelihoods and the integrity and customer trust of the organic label. They also registered concern about the availability of organic research funds.

While adaptation to climate change did not rank as a top production challenge for organic producers, slightly more than half of survey respondents expressed concern about the climate crisis in agriculture. Furthermore, comments during focus group sessions reflect the role of climate shifts in exacerbating challenges related to weed, pest, disease, and water management, as well as a desire for recognition of organic farmers' contributions to soil carbon sequestration.

Survey respondents identified many information sources and venues that they find helpful and identified other organic farmers as their most valued resource. They also cited room for improvement, as slightly over half rated existing sources of technical assistance as meeting their needs only "somewhat well," and a majority also expressed concern about the need for more agricultural professionals with knowledge and underst anding of organic systems. Technical assistance needs were greatest among transitioning organic producers, BIPOC organic farmers, and respondents from the Southern region.

Despite the many challenges and needs cited, 29% of organic survey respondents plan to increase their certified organic acreage and another 65% plan to maintain current organic acreage, while plans to decrease organic acreage, drop organic certification, or cease farming altogether were each noted by only 2% of respondents. The goal of the survey was to determine the beneficial practices organic and transitioning producers are already implementing, and identify the research, technical assistance, and policy measures that would best support current organic producers to meet their economic, environmental stewardship, and quality of life goals, facilitate successful organic transition, and promote the expansion of the organic sector.

The following priorities and recommendations are based on the survey and focus group findings presented in the preceding chapters, and address production and non-production challenges separately. Section 5.2 focuses on the research needed to mitigate the top organic production challenges identified by organic and transitioning producers and section 5.3 describes the outreach efforts needed to translate this research into practice. The fourth section then describes the associated policies needed to address these production challenges.

The focus of chapter five then shifts to describe the diverse measures needed to address the top societal and non-production challenges facing the organic sector. Specifically, section 5.5 addresses the urgent need to build racial equity into the U.S. food and agriculture system, and the potential for the organic sector to take a leadership role in dismantling systemic racism. Section 5.6 then addresses the top farmer and rancher concerns related to organic markets, USDA certification, and the integrity of the certified organic label, and section 5.7 focuses on labor, land, capital, and infrastructure. Section 5.8 concludes the discussion with region- and commodity-specific recommendations and priorities.

5.2 Research Priorities for Organic Production Systems

Organic Weed Management

Field bindweed, often called "morning glory" weed.

Controlling weeds surpassed all other production challenges nationwide by a substantial margin in the organic and transition surveys, and 40% of organic survey respondents cited weed pressure as one of their top two production challenges in the open-ended survey question about production challenges, followed by soil health at 30%. About three out of ten organic survey respondents and four out of ten transitioning survey respondents found it challenging to minimize tillage impacts on soil health. Organic producers also identified the broader category of "organic weed, pest, and disease management" as their leading technical assistance need (75%).

OFRF recommendations for organic integrated weed management (IWM) research include:

- Farmer-researcher collaboration to develop regionally adapted, cost effective, and labor-efficient organic IWM strategies, including best planting dates to avoid weed pressure.
- Develop and evaluate new non-soil-disturbing technologies such as electrical weed control and weed-recognition robotics to selectively remove within-row weeds.
- Fine-tune "tried-and-true" non-cultivation tactics such as mulching, mowing, flame, tarping, and manual removal.
- Breed, select, and evaluate crop cultivars for weed tolerance and weed competitiveness.
- Develop organic IWM strategies that combine non-soil-disturbing tactics with strategic crop rotations, cover cropping, nutrient and water management to favor crops over weeds, and weed-resilient crops to minimize the need for cultivation.
- Research and develop strategies to manage weeds and restore soil health during transition to organic production.
- Design and demonstrate new cultivation tools or tool combinations that give the best weed control with the least damage to soil structure and soil life.
- Develop adaptive IWM strategies that can respond effectively to increasingly extreme and erratic rainfalls and droughts related to climate change.
- Develop organic IWM strategies for invasive perennial weeds especially bindweed, Canada thistle, nutsedge, and rhizomatous grass.

Canadian thistle, an aggressive perennial plant.

Manage Production Costs and Maintain Adequate Yields in Organic Systems

Farmer livelihoods depend on keeping production costs manageable while maintaining yields, and these needs emerged as the second and third greatest challenges for organic producers. Production costs seem especially challenging in organic specialty crops including tree and vine crops, berries, vegetables, herbs, and cut flowers.

Focus group participants noted that yields and prices for organic products are often not sufficient to cover the high costs of organic inputs and labor-intensive organic methods. They also sought financial remuneration for the ecosystem services provided by organic conservation practices such as cover cropping, which entail short-term costs and foregone income, with delayed returns on the investment in soil health.

OFRF recommends the following research to address these challenges:

- Conduct interdisciplinary research to evaluate the net profitability of organic systems considering costs (labor, inputs, etc.), income foregone for conservation practices, proceeds from sales, and long-term economic trends under organic management.
    - ◇ Cost analysis and enterprise budgeting for individual specialty crops and for diversified vegetable rotations and perennial horticultural cropping systems may be especially helpful for organic produce and tree nut farmers.
- Document advantages, disadvantages, and net returns for different marketing strategies.
- Research and develop organic management strategies to reduce labor requirements.
- Research, document, and demonstrate the capacity of organic conservation and soil health practices to maintain satisfactory yields and reduce input costs by enhancing nutrient- and water-use efficiency, crop resilience, and disease suppression.
- Document conservation benefits and ecosystem services provided by organic farms to establish appropriate levels of financial assistance through NRCS and other programs to offset implementation costs and support adoption of USDA certified organic production.
    - ◇ Update NRCS tools and models used to predict resource impacts of production practices, rank program applications, and determine program payments to provide a more accurate assessment of the conservation benefits of organic farming and ranching systems. Conduct research to refine application of Revised Universal Soil Loss Equation (RUSLE2), Wind Erosion Prediction System (WEPS), Soil Conditioning Index (SCI), N and P indices for nutrient management, and other tools as appropriate for organic systems.

- Develop more practical, reliable, and affordable economic analysis tools for farmers to use in their production and management decisions.
  - ◇ Provide outreach and assistance on integrating these tools into day-to-day management, particularly through farmer-to-farmer learning.
- Research, document, and model the impacts of weather extremes related to climate change on organic yields and production costs and develop region-specific resilience strategies.
- Conduct impartial evaluations of the efficacy and cost-efficiency of commercial microbial inoculants and other inputs marketed to organic growers and claimed to improve soil health, suppress disease, or enhance yields.

Soil Health, Organic Matter, and Soil Life

About four out of ten survey respondents considered soil fertility and crop nutrition a substantial production challenge, and two-thirds of organic farmers and three-quarters of transitioning farmers desired technical assistance with this aspect of organic farming. Three in ten respondents included the broader topic of soil health among their top two production challenges, six in ten sought technical assistance with soil conservation and soil health, and focus group participants clearly understood the importance of soil health for long term yield stability, resilience, and farm economic viability.

OFRF recommends that USDA continue to make a robust investment in organic soil health research, including the following:

- Research on soil biotic communities in organically managed soils, including rhizosphere and endophyte microbiomes. Evaluate impacts of different crop rotations, crop genetics, tillage practices, organic amendments, NOP-allowed crop protection materials, and non-use of synthetic inputs on biological soil functions.
- Develop practical organic minimum tillage strategies for different cropping systems and regions, especially annual vegetables, field crops, and seeds for planting.
- Develop and deliver practical, reliable, and affordable tools and methods for measuring soil health parameters related to tilth, fertility, and other soil biological functions.
- Develop advanced biologically based organic nutrient management strategies.

Organic Insect Pest and Disease Control

Damage from apple codling moth infestation.

Controlling insect pests also emerged as one of the top five challenges nationally in the organic survey, particularly in the South, and Pacific regions. Just over half of organic survey respondents who produce specialty crops (vegetables, herbs, flowers, berries, tree and vine crops) found both insect pests and plant diseases challenging to manage.

OFRF recommends the following research priorities:

- Develop organic insect pest management (IPM) strategies for insect pests and diseases based on an ecological understanding of the target organism.
  - ◇ For insect pests, integrate crop diversification and habitat plantings for natural enemies of insect pests with biopesticides and other NOP-allowed materials.
  - ◇ For diseases, combine crop rotation, soil health practices, varietal resistance, anaerobic soil disinfestation, and other methods to build a disease-suppressive soil microbiome, with biofungicides and other NOP-allowed materials.
- Develop organic IPM strategies for serious pests and diseases of fruit, vegetable, and other horticultural crops. Examples include:
  - ◇ Spotted Wing Drosophila in fruit and flea beetles in brassicas.
  - ◇ Citrus greening disease spread by the Asian citrus psyllid.
  - ◇ Fire blight in tree fruit, late blight in tomato, and downy mildews in vegetables and basil.
- In addition to addressing individual pests and pathogens, research, develop, and promote cost-effective organic strategies to build soil and agroecosystem health and manage pest and pathogen complexes through prevention and avoidance as well as targeted suppression tactics.
  - ◇ Evaluate the effects of these strategies on crop damage, yield, and profitability as well as pest/pathogen abundance.
- Monitor the spread of insect pests and pathogens beyond their historical ranges into new regions in response to climate change and adapt organic IPM strategies accordingly.
- Identify, monitor, and prioritize new invasive pests and pathogens for organic IPM research.

Organic Seeds and Crop Cultivars

About 70% of crop seeds sown by participants in the organic survey were certified organic, and more than one-third of respondents reported challenges with obtaining appropriate seeds for organic production. Percentages of organic farmers who produce crop seed for on-farm use or for sale, and who are interested in growing certified organic seed commercially, have declined substantially since 2014. Production of certified organic seed presents unique challenges and requires special care to maintain seed quality and purity, and to ensure exclusion of GMO pollen. Organic producers depend on high quality, reliable seed of cultivars that meet the needs of their markets, and certified organic seed that meets these criteria are not consistently available.

Recommended research and outreach activities to address this shortfall include:

- Research, develop, and demonstrate improved practices for certified organic seed production from crop production and protection from exposure to GMO pollen through harvest and post-harvest seed processing and handling.
- Conduct interdisciplinary research to identify and overcome constraints to the expansion of on-farm production of organic crop seeds as a profitable enterprise.
- Improve testing and trace-back capabilities to detect and prevent GMO contamination of certified organic seed or untreated seed used in organic production.

A vast majority of organic survey participants understand that varieties bred for organic production are important to the overall success of organic agriculture. Vegetable and field crop farmers seek nutrient-efficient, weed-c ompetitive, and disease-resistant cultivars that yield well under organic management, which can reduce the need for inputs and cultivation, and thereby lower production costs and save soil. In addition, cultivars selected for regional adaptation to climate and soil conditions including resilience to local impacts of climate change, and for enhanced capacity to partner effectively with mycorrhizal fungi and other beneficial microbes, can provide the agronomic traits organic producers need (Schonbeck et al., 2017, 2019).

While funding for public cultivar development has declined severely over the past fifty years, some USDA research programs, notably OREI and Agriculture and Food Research Initiative (AFRI), now include plant breeding and public cultivar development as funding priorities. Several OREI-funded farmer-participatory plant breeding projects are developing and releasing new cultivars of tomato, carrot, and other vegetables; specialty grains; and winter cover crops that combine multiple priority traits for organic systems. However, this investment needs to increase substantially to meet the needs of organic farmers for adapted, resilient seed.

OFRF recommends the following plant breeding priorities:

- Continue to expand farmer-participatory plant breeding and public cultivar development through OREI and other programs.
- Engage organic producers interested in plant breeding and cultivar development with ongoing or new plant breeding projects, through networking and training.
- Conduct classical plant breeding, selection, and evaluation of cultivars and breeding lines on certified organic land to enhance cultivar adaptation to organic production systems.
- Emphasize development of regionally adapted cultivars, as exemplified by ongoing OREI-funded participatory breeding projects in cover crops and vegetables.
- Prioritize traits for organic systems, including nutrient- and water-efficiency, seeding vigor, weed competitiveness, disease and pest resistance, effective root-microbial symbioses, and market traits such as flavor, color, and nutritional value.
- Select for traits that help organic farmers cope with the climate crisis, including resilience to drought, heat, and other weather extremes, and performance in climate-friendly production systems such as organic minimum till.

Organic Livestock Production

While only 221 organic survey respondents (21%) reported producing dairy or other livestock products, 311 organic survey respondents registered animal welfare as a concern (52% of those who answered this question), 167 (36%) cited access to certified organic animal feed as a concern, and eighty-seven (24%) noted grazing and pasture management as a production challenge. Technical assistance needs included livestock production and health (129 respondents, 31%) and integrating livestock into organic production (132 respondents, 29%). Because only a minority of survey respondents produce livestock or dairy, the percentages may underestimate the research and technical assistance needs of current and aspiring organic livestock farmers.

OFRF recommends:

- Research and development of improved organic dairy and livestock production and health management systems.
- Research into adaptation of NRCS grazing-related conservation practices (prescribed grazing, advanced grazing management, fencing and water provision for grazing systems, etc.) for implementation on organic farms and ranches.

Cover Crops, Rotations, Intercropping, Organic Amendments, and Water Resources

Our survey confirmed that organic and transitioning farmers are leaders in the use of cover crops, diversified rotations, perennial buffer and border plantings, and organic amendments to improve soil health and protect resources. While fewer survey respondents reported challenges with soil-related best management practices and water management than with other aspects of organic production, research into optimizing these practices and inputs can enhance the soil, environmental, and economic benefits of organic production.

OFRF recommends the following research priorities:

- Tailor crop rotations, cover crops, and management practices to meet production and soil health objectives within the constraints of different regions.
- Breed and select cover crops for organic production in different regions.
- Research best use of compost, manure, and other organic amendments and fertilizers to:
  - ◇ Meet crop nutrient needs without building excesses of soil P or other nutrients.
  - ◇ Reduce input costs and optimize net returns.
  - ◇ Protect and enhance soil biodiversity and soil health.
  - ◇ Optimize N cycling and delivery to organic crops while minimizing N leaching and emissions of the greenhouse gas nitrous oxide (N_2O).
- Evaluate and improve the design, species composition, location, and management of perennial buffer plantings (hedgerows, windbreaks, etc.) and other landscape practices for effective protection of organic fields from pesticide spray and GMO pollen drift.
- Document and optimize the capacity of integrated organic systems that combine crop diversification with organic amendments to enhance soil, crop, and livestock health, resilience, and productivity.
- Develop strategies to facilitate successful transition to organic production through optimum use of best management practices and organic amendments.
- Document and optimize the capacity of organic soil management to improve water infiltration and soil water-holding capacity, thereby meeting regional challenges of limited or erratic rainfall as well as moisture extremes related to climate change.

Adaptation to Climate Change

Photo credit: Haley Baron

Organic survey respondents rated adaptation to climate change as their eighth greatest production challenge (36%) and their ninth greatest concern (52%). Farmer comments during focus group sessions and in response to open-ended survey questions revealed that increasingly erratic weather accentuates difficulties in managing weeds, pests, and diseases as well as soil health, timely planting, and organic crop management. This year, farmer publications have run many stories of farmers struggling to adapt to climate disruption; for example, impacts of extreme heat and wildfire smoke on producers, farmworkers, and crops have hit Western region organic specialty crop operations especially hard and necessitated major, innovative changes in crop management strategies (Kulla, 2021; Tanner, 2021).

In addition, climate mitigation has become a key component of the resource stewardship ethic of the organic farming sector. Recognition of the organic method as codified in NOP standards as a climate-friendly production system can help organic farmers market their products to customers and buyers seeking food grown with greater carbon sequestration and a smaller GHG footprint.

Research priorities related to organic farming and climate include:

- Develop, test, and promote regional climate-adaptation and resilience strategies for organic production, especially vegetables, fruit, and other specialty crops.
  - ◇ Develop strategies through farmer-scientist collaborations that integrate Indigenous wisdom, farmer innovations, and cutting-edge research.
- Develop practical tools to assess the impacts of organic systems and practices on whole soil profile C and N dynamics, net C sequestration and GHG mitigation, and resilience-related soil properties such as water-holding capacity.
- Develop, fine-tune, and demonstrate best organic soil health practices for each agro-ecoregion to sequester carbon, mitigate GHG emissions, and increase agricultural resilience to climatic variability.

5.3 Outreach Strategies: Translating Research into Practice

Emphasize Farmer-to-farmer Learning in Organic Education and Technical Assistance

Farmer-to-farmer learning through farm visits, farmer groups, on-farm field days, farmer conferences, mentoring, incubator farms, and apprenticeships emerged as by far the most effective means to share and transmit valuable practical information and to help beginning and transitioning farmers learn how to farm organically and successfully.

Farmer solutions shared in focus groups emphasized crop and enterprise diversification, crop-livestock integration, and building soil health in lieu of crop insurance as risk management in organic farming. Farmers also shared advice about taking the process of building an organic farming system one step at a time, and how to build positive relationships with neighbors in a way that can help procure local resources (e.g., manure) as well as mitigate crop contamination risks. These farmer successes further underline the importance of farmer-to-farmer learning and drawing on experienced producers as a prime resource for education, training, and technical assistance for beginning and transitioning farmers.

To strengthen support for peer-to-peer learning, OFRF recommends the following:

- Governmental and non-governmental programs that provide education, training, and technical assistance to organic and transitioning producers should make the greatest use of farmer-to-farmer venues of information exchange.
- Organic agricultural research funded through OREI, ORG, SARE, and other programs should be farmer-driven or at least engage producers or producer organizations as equal partners from priority setting through project execution and evaluation.
    - ◇ Farmers must be fairly compensated for the expertise they bring to these projects.
    - ◇ Projects should utilize farm field days, mentoring programs, apprenticeships, and incubator farms to disseminate practical findings, tools, systems, and techniques.
- Practical information and tools developed by agricultural scientists and initially delivered by service providers can be disseminated through farmer-to-farmer networks and other farmer driven venues.
- Engage existing, successful farmer-to-farmer peer groups to gather and disseminate best practices for developing and maintaining farmer-to-farmer networks that effectively transfer information and are practical for farmers' with limited time.
- Develop farmer mentoring and incubator farm programs that fairly compensate experienced organic producers to provide beginning and transitioning organic farmers with the training and technical assistance they need to establish successful enterprises.

Build Capacity of Extension, NRCS, and other Agricultural Professionals to Serve the Organic Farming Sector

Photo credit: Haley Baron

There is a clear need for more Extension personnel and other service providers trained specifically in organic farming systems. Slightly over half of certified organic respondents expressed concern about access to agricultural service providers who are knowledgeable about certified organic operations. This concern increased to 65% among transitioning farmers and 67% for certified organic farmers in the Southern SARE region, who also registered greater needs for technical assistance with a range of topics compared to organic farmers in other regions.

While focus group participants noted that Extension has not been a reliable source of information on organic production in the past, nearly half of organic survey respondents and almost two-thirds of BIPOC respondents indicated that Extension agents with organic training have become valuable information sources. In addition, more than half of organic and transition survey respondents believe that their technical assistance needs are met "somewhat well." Taken together, the report findings illustrate a need and opportunity to strengthen technical support for organic producers through Extension and other existing sources.

OFRF recommendations include:

- Train more service providers within Extension, NRCS, FSA, and other USDA agencies in the principles and practices of certified organic production.
- Build agency and service provider capacity to meet the technical assistance needs of organic and transitioning producers, especially in the Southern region.
- Educate NRCS, Extension, and other service providers on the potential conservation, climate mitigation, and resilience benefits of NOP certified organic farming, as well as the technical assistance organic producers need to realize this potential.
- Develop resources and financial tools to help organic and transitioning farmers gain access to the markets, capital, credit, equipment, and infrastructure they need.
- Build trust, credibility, and relationships between farmers and agricultural service providers by developing long-term collaborations between agricultural service providers and nonprofits and other organizations with existing relationships with farmer audiences.

Provide Training and Technical Assistance for Transitioning and Beginning Organic Producers

Educational and technical assistance needs appear especially acute during the transition years when soil health may be below par, organic price premiums are not yet available, and producers face a substantial learning curve. Transitioning survey respondents registered strong needs for technical assistance on a wide range of production and non-production issues. Unique challenges for the transition period include financially viable strategies for the three-year transition period, restoring soil health while learning to manage weeds without herbicides, acquiring new equipment and infrastructure needed for organic production, and navigating NOP-related paperwork during the last year of transition and first year of certification.

Beginning certified organic farmers also indicated somewhat higher technical assistance needs than those with more than ten years' farming experience. For example, beginning farmers may hesitate to plant cover crops or intercrops because of possible competition with production crops for moisture or nutrients.

OFRF recommendations for meeting the information, training, and technical assistance needs of transitioning and beginning organic producers include:

- Build capacity and support for farmer-to farmer training, mentoring, and technical assistance by compensating experienced organic producers who are interested in providing this valuable service.
- Train Extension, NRCS, and other service providers in the special needs of transitioning organic producers.
- Develop and deliver information resources and technical assistance to help transitioning and beginning organic farmers with the following:
    - ◇ Understanding the basics of organic production, especially soil health and management of nutrients, weeds, pests, and diseases without synthetic inputs.
    - ◇ Understanding and navigating the organic certification process and associated paperwork.
    - ◇ Co-managing soil health, weed, and financial challenges during the transition period including crop rotations that reduce weed pressure and maintain economic viability.
    - ◇ Selecting and managing cover crops, inputs, and water resources to restore soil health while avoiding yield reductions related to water use or nutrient tie-up.
    - ◇ Avoiding the pitfalls of input substitution including high input costs and excess soil P from heavy use of poultry litter, manure, or compost.
    - ◇ Designing the farming system to avoid crop contamination through buffer plantings, runoff diversions, and other measures.
    - ◇ Acquiring crop seeds for organic production, organically produced livestock feed, and other essential inputs and supplies for NOP certified production.
    - ◇ Market development, business planning and management, acquisition of capital and financing, and distribution and transportation logistics.

OFRF also identifies a need for a coordinated effort to track and identify transitioning growers. The response rate to the transition survey was relatively low with only seventy-one usable responses. The 2017 Census of Agriculture estimated there are roughly 700 farmers and ranchers actively transitioning to organic certification in the U.S., but there is no database to track or connect with these growers. A coordinated effort to identify and track transitioning growers would enable future research efforts to more easily connect with this population to assess their research and technical assistance needs, and develop responsive support programs for the transition to organic certification.

Increased Investment in Nonprofit Agricultural Organizations

Nonprofit organizations were consistently ranked as important sources of information for beginning and BIPOC organic farmers, and farmers transitioning to organic certification. Focus group participants cited farmer organizations such as PFI, OGRAIN, MOSES, and LSP in the North Central region, and the NOFAs in the Northeast and the farmer conferences sponsored by these NGOs as critically important resources that helped them successfully start, continue, and expand organic operations. While the Western and Southern regions also have strong farmer-driven NGOs such as Carolina Farm Stewardship Association, Florida Organic Growers, Virginia Association for Biological Farming, Oregon Tilth, and EcoFarm, there may exist a need and opportunity to build their capacity to provide the level and quality of services offered by the North Central and Northeast NGOs.

Specific recommendations include:

- Work closely with farmer-led and farmer-driven NGOs in all regions to build more effective training, education, and technical assistance, especially for transitioning and beginning organic farmers.
- Encourage OREI, ORG, SARE, and other NIFA program funding that engage organic farmer NGOs as major project partners.

Disseminate Research Outcomes, Educational Materials, and Practical Information and Tools via Multiple Venues and Formats

While organic farmers clearly consider other farmers their most valuable information resources, they have varying preferences for information venues and formats. Beginning organic farmers rated online sources more highly than experienced farmers, who preferred printed materials and on-farm demos. Many respondents, especially transitioning and beginning farmers, value online materials, videos, e-mail venues, conferences, and workshops. Because individual learning styles vary, it is important to continue providing organic farming information through a variety of venues and formats.

In addition to providing farmer-to-farmer and other in-person learning and mentoring opportunities, OFRF recommends that Extension, NRCS, other governmental agencies, and NGOs:

- Continue to provide information and tools in hard copy to meet the needs of those who find this format most useful and user-friendly.
- Continue to expand online resources including videos and email venues, especially for transitioning and beginning organic producers.

Develop a Centralized Location for Organic Information Resources and Coordinate Rollout and Announcement of New Resources

While some organizations such as ATTRA are working to centralize organic resources, comments from focus group participants suggest these efforts need to be better advertised to organic producers, as there were frequent comments about the need for a clearinghouse of organic resources.

OFRF recommendations include:

- Increase coordination among nonprofits and governmental agencies to reduce duplicative information resources.
- Create a nationwide information clearinghouse or network to make it easier for organic and transitioning producers to locate the information they need.
- Collect additional feedback from organic producers through focus groups and surveys to identify resources of which they are or are not aware. Use this information to identify gaps and guide efforts to streamline information delivery for organic producers.

Deliver Information, Training, and Technical Assistance on Priority Topics

In addition to the priorities outlined above, our survey revealed some specific technical assistance needs.

OFRF recommendations to meet these needs include:

- Present farmer information on best organic soil health, conservation, and climate mitigation practices within a framework of cost management, yield stability (resilience), and improved net returns for farm enterprises.
- Provide informational resources to help organic farmers obtain high quality certified organic seed, and to identify and procure suitable cultivars for organic production in their regions, including new releases from organic plant breeding endeavors.
- Build farmer capacity to grow organic seeds for on-farm use and/or commercial sale, through training, mentoring, and technical assistance.
- Provide technical and financial assistance with optimizing animal living conditions, grazing and pasture management, compliance with NOP requirements for organic livestock, and procurement or on-farm production of certified organic animal feed.
- Offer practical guidance on optimum use of manure, compost, organic fertilizers, and other inputs for production, soil health, and net returns, including:
  - ◇ Making the best use of on-farm and nearby nutrient resources.
  - ◇ Nutrient budgeting to meet crop needs without building excesses of P or other nutrients.
  - ◇ Minimizing both direct and environmental costs of organic inputs.
  - ◇ Integrating inputs with cover crops and rotations to enhance soil health.
- Provide technical assistance in building resilience to regional impacts of climate disruption through soil health and other organic practices.
- Provide technical assistance in establishing perennial buffer and habitat plantings to protect organic fields from NOP-prohibited substances, create habitat for pollinators and other beneficials, control erosion, and provide other conservation benefits.

5.4 Policy Priorities to Support Organic Production

Increase Organic Research Funding to Reflect the U.S. Market Share for Organic Products

A long history of under-investment in organic agriculture research and a lack of crop cultivars for organic systems have hindered successful adoption of organic practices and led to a 19% yield gap between organic and conventional grain crop yields (Ponisio et al., 2014). Since 2002, the USDA Organic Agriculture Research and Extension Initiative (OREI) and the Organic Transitions Program (ORG) have provided $290 million in funding for organic research, education, and Extension projects and yielded many important advances and practical tools for organic producers (Schonbeck et al, 2016). However, many research needs of organic producers remain unmet, and over half of survey respondents registered concerns about availability of funding for organic research.

Even though the 2018 Farm Bill increased annual OREI funding to $50 million effective in 2023, total USDA investment in organic remains below 2% of its total annual research budget, far short of the 6% market share of organic products in the US food system. While annual funding for ORG has also increased (to $7 million in 2021), other programs invest relatively little in organic systems. For example, during 2011-2015, just 0.2% of funding through the USDA's largest extramural research program, the Agriculture and Food Research Initiative (AFRI) addressed organic topics, and SARE support for organic research dropped from about $5 million in 2010 to $2.5 million in 2019. Annual funding for intramural USDA organic research through the Agricultural Research Service (ARS, total annual budget a little over $1 billion) reached a high of $18 million in 2005-06, then declined to about $12 million in 2014-present.

The survey results confirm that organic producers lead the nation in adoption of resource and climate stewardship practices and corroborate earlier findings that organic systems can enhance resilience, carbon sequestration, and GHG mitigation (Schonbeck et al., 2018). These findings justify substantial increases in organic research investment to become at least commensurate with the current market share of organic food, with emphasis on addressing farmer-identified barriers to successful transition to organic production, and engaging farmers as equal partners in research endeavors.

Specific recommendations include:

- Increase total funding for organic agricultural research to at least 6% of the total annual USDA research budget, or about $220 million. Continue to increase organic funding as market share increases.
- Establish the ORG transitions program as a permanent part of the USDA extramural research portfolio, with substantially increased funding and applicant eligibility expanded to include nongovernmental organizations and other entities as well as to universities.
- Recognize, include, and actively support organic farmers and ranchers as key partners in USDA's Action Plan for Climate Change Adaptation and Resilience, in the Department's Climate-Smart Agriculture and Forestry (CSAF) Strategy, and in current and future USDA-funded research into climate change adaptation and mitigation practices in agriculture.
- Substantially increase funding for public crop cultivar and livestock breed development especially for organic production systems, regional adaptation, and climate resilience.
- Strengthen emphasis on farmer leadership and engagement in Requests for Application (RFAs) for OREI, ORG, SARE, and other NIFA-funded organic research, and instruct review panels to give due weight to farmer engagement when reviewing grant proposals.

Increase Federal Support for USDA Certified Organic Production and Organic Transition

The USDA National Organic Program (NOP) and various organic initiatives within NRCS conservation programs have assisted the expansion of the organic sector, yet these programs require improvements to make the organic method more widely accessible and economically viable for stewardship-minded farmers. For example, the su rvey results indicate that the costs of organic certification pose a substantial challenge for 31% of all organic farmers, and 58% of BIPOC organic farmers.

In addition, USDA support for organic conservation systems and for organic transition remains limited. The top three technical assistance needs identified by organic farmers nationally—weed and pest control, soil fertility, and soil health and conservation—are directly linked to existing conservation programs that offer technical and financial assistance. This strong finding calls for increased investment in proven conservation programs, amended to better serve organic and transitioning producers and help them realize their resource stewardship and production goals.

OFRF recommends the following policy and programmatic measures to strengthen support for organic production and organic transition:

- Increase total funding and per-farm funding limit for the National Organic Certification Cost-share Program (NOCCSP).
- Develop and implement a USDA organic transitions incentives and assistance program to help producers meet the unique challenges of the transition period, understand and meet NOP

requirements, and successfully complete the certification process. Provide funding for technical assistance and farmer-to-farmer mentoring as well as direct financial assistance during the economically difficult transitions period.

- Redesign the Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), and other conservation programs to better support certified and transitioning organic farmers in adopting best soil health, whole farm conservation, and climate stewardship practices through EQIP, CSP, and other conservation programs.
  - ◇ Increase the number of Technical Service Providers (TSPs) trained to assist farmers in developing Conservation Activity Plans for organic transition.
  - ◇ Harmonize NRCS conservation planning for transitioning organic farmers with development of the Organic Systems Plan required for NOP certification.
  - ◇ Increase funding for the EQIP Organic Initiative and increase the per-contract payment cap to the level for general EQIP contracts, i.e., $450,000.
  - ◇ Restore and strengthen the CSP Organic Initiative, including conservation enhancements and bundles for organic systems and for organic transition, including advanced grazing, soil health, and nutrient management activities.
  - ◇ Expand funding for CSP to $4 billion per year and for EQIP to $3 billion per year, as mandated in the Agriculture Resilience Act of 2021.
  - ◇ Reinstate the Organic Field Border Initiative offered through CRP to help farmers protect organic fields from contamination and realize other conservation benefits.

Encourage Further Adoption of Soil Health Management Practices

Federal policy should effectively support organic and transitioning producers to meet NOP requirements regarding soil health management practices, organic amendments, and exclusion of NOP-prohibited synthetic substances from organic production areas. In 2016, the USDA Farm Services Agency offered an Organic Buffers Initiative through the Conservation Reserve Program to help organic producers establish buffers to protect their fields from NOP prohibited substances while serving other conservation purposes. However, this initiative has not been offered since 2017.

OFRF policy recommendations include:

- Reinstate the Organic Buffers Initiative as a permanent part of USDA conservation programming to provide technical and financial assistance in their implementation.
- Develop policy to defray organic farmer costs of protecting organic fields from pesticide and GMO pollen drift and runoff from neighboring non-organic farms.
- Increase support for climate-friendly organic soil and nutrient management strategies through NRCS conservation activities such as high-level enhancements on the Nutrient Management practice standard (CPS 590), and adoption of the new interim Soil Carbon Amendment (CPS 808) as a permanent, nationwide conservation practice.
- Increase USDA support for crop and enterprise diversification, crop-livestock integration, and advanced organic soil health management systems in conservation planning, working lands program ranking and contract payment, climate smart agricultural strategies, and crop insurance actuary tables.

Recognize and Establish Organic Agriculture as a Key Player in Climate Change Solutions

Survey results regarding organic farming practices illustrate the high degree to which organic and transitioning farmers already implement climate-friendly production practices, such as cover crops, diverse rotations, and organic amendments. These elements work together to sequester more soil carbon than any one of these practices alone (Brennan and Acosta-Martinez, 2017; Delate et al., 2015; Hooks et al., 2015). In addition, the exclusion of synthetic agrochemicals from organic production protects soil functional biodiversity, which plays a critical role in mitigating net agricultural GHG emissions. Yet, neither the USDA Action Plan for Climate Change Adaptation and Resilience nor the Climate-Smart Agriculture and Forestry Strategy 90-day Progress Report (USDA, 2021a, 2021b) mention organic agriculture as a key player in climate change solutions.

OFRF recommends the following federal policy initiatives:

- Recognize and elevate USDA certified organic agriculture as a climate-friendly and resilient system of production throughout USDA climate strategy development, conservation programs, and risk management products.
- Center organic farmers as leaders and mentors in climate, soil, and resource stewardship.
- Support and compensate organic producers to research, develop, teach, and demonstrate advanced climate-friendly organic systems that integrate soil health management practices, organic amendments, water conservation, and other organic practices.
- Support adoption and maintenance of organic climate stewardship practices through NRCS working lands programs, especially CSP. Ensure that CSP gives equal weight to maintenance of ongoing conservation practices and adoption of new conservation practices in application ranking and contract payments.

5.5 Building Racial Equity and Supporting BIPOC Producers in the Organic Sector

Perhaps the most telling result related to the BIPOC organic community is that only 4% of organic survey respondents were BIPOC, which closely parallels the 3.6% of organic producers in NASS surveys who identify as non-White (Formiga, 2021) and is far below the 27% of the U.S. population who are BIPOC. Thus, the survey data on challenges and technical assistance needs may understate the difficulties that current and aspiring BIPOC organic farmers face. The disproportionately low percentage of BIPOC farmers illustrates the urgent imperative that the organic sector must work to restore racial equity in its ranks and help current and aspiring BIPOC organic farmers recover their rightful place as land stewards and providers of food for their communities.

Expand Technical Support for Black, Indigenous, and other Organic Farmers of Color (BIPOC)

Higher percentages of BIPOC organic farmers than White organic farmers reported challenges with a wide range of production and non-production issues, especially diseases, pests, organic systems management (versus input substitution), costs of production and of organic certification, accessing labor, capital and financing, marketing, and meeting NOP certification and record keeping requirements. BIPOC farmers also indicated greater needs for technical assistance, especially with soil health and fertility. As noted above, the survey cannot account for the unknown and possibly large number of BIPOC individuals and families who have aspired to become organic farmers but found these same challenges insurmountable.

Some research, education, and technical assistance priorities for the BIPOC organic farming community include:

- Engage BIPOC farmers and agricultural professionals as leaders to research, teach, demonstrate, and provide technical assistance in traditional sustainable farming practices. Integrate these traditions with cutting edge soil health and agroecological research to develop viable and climate-friendly food and agricultural systems.
- Conduct research into the structural racial inequities that deny access to land, capital, and other foundational resources to current and aspiring BIPOC farmers and develop policy models and proposals to dismantle these barriers.
- Provide technical assistance to help BIPOC certified, transitioning, and aspiring organic farmers and ranchers overcome the many production and non-production hurdles to successful organic production.
- Launch and support BIPOC-led mentoring programs for beginning, transitioning, and aspiring BIPOC organic farmers.

- Provide financial and marketing information, tools, and resources to BIPOC and other low-income, underserved producers.

Build and Exemplify Racial Equity and Empowerment Throughout the Organic Farming Sector

A few policy recommendations that could help BIPOC producers become successful USDA certified organic producers and help the organic farming community take leadership in promoting racial equity throughout the U.S. food and agriculture system include:

- Conduct a review of the NOP to identify potential reasons for the very low numbers of BIPOC certified organic producers, especially African American farmers. Identify and remove barriers to BIPOC participation in NOP.
- Conduct a review to determine whether and how the NOP Standards could formulate and enact enforceable standards for racial justice and fair treatment of farm labor in a USDA certified organic operation.
- Adopt a higher organic certification cost share percentage and funding limit for BIPOC and other historically underserved producers.
- Promote and provide technical and financial assistance for organic transition and certification for urban farms and community gardens, which commonly serve communities of color.
- Provide more funding to 1890 historically Black land-grant institutions, 1994 Tribal land-grant universities, and Hispanic-serving colleges and universities (HSCU) to increase their technical assistance capacity and ensure their personnel are included as equal partners in the development of organic education strategies across agencies.
- Enact the USDA initiative to provide debt relief to BIPOC producers.
- Conduct a thorough review of USDA loan programs to identify and eliminate any remaining structural racial inequity in program delivery and explore ways to assist BIPOC producers with limited financial resources to acquire the land, infrastructure, and other resources they need to launch or expand an organic farming enterprise.
- Implement immigration reform and farmworker labor rights protections to provide skilled labor for organic and other producers and help to build racial equity and justice.
- Ensure that members of the BIPOC farming and food system community take leadership roles in the development, evaluation, implementation, and enforcement of policies and programs to address these needs and objectives.

5.6 Organic Markets, USDA Certification, and Organic Integrity

Technical Assistance with Market Development, Business Planning, and Business Management

Finding and developing markets for organic products was cited as a challenge by 42% of organic survey respondents (a close second to accessing labor), 53% of BIPOC organic farmers, and 79% of transitioning respondents, and as a technical assistance need by 54% of organic and 85% of transitioning producers. Respondents listed profitability and markets as one of their top two non-production challenges, nearly twice as often as labor. Focus group participants observed that, while demand for organic products has remained strong or increased, organic price premiums have eroded as buyers become less willing to pay more for organic products.

Organic producers of vegetables, herbs, and cut flowers reported greater challenges with farm business planning (30%) and business management (33%) than those that do not grow these crops (19% and 21%, respectively). Business planning and management also posed greater challenges for transitioning producers than organic producers (43% and 32%, respectively) and for BIPOC organic producers than white organic producers (32% and 40%, respectively).

When the COVID-19 pandemic hit the U.S. shortly after the launch of the NORA survey, farmers faced a whole new range of challenges related to marketing and delivery of organic farm products, supply lines for farm inputs, and business management. Specific issues ranged from the loss of restaurant chefs as buyers and disruptions in meat processing and shipping of farm products to the need to "pivot" rapidly to online marketing venues. Some respondents welcomed the new skills and venues associated with online marketing and distribution as an opportunity. However, even as pandemic-related restrictions in economic activity continue to ease, farmers will face a whole new spate of shifting market conditions, problems, and opportunities, and will need to develop longer-term marketing and distribution strategies to make their operations more resilient to unpredictable future crises.

Based on survey findings related to marketing, business management, and the impacts of the pandemic, *OFRF* recommends the following research and outreach priorities:

- Conduct marketing research for organic farming enterprises to identify underlying causes of the disconnect between high demand and inadequate farmgate prices.
- Research models for marketing of organic vegetables, fruits and other products, including farmer cooperatives and local/regional food system venues. Develop tools and methods for making these models more effective.
- Research and document the many impacts of the COVID-19 pandemic on organic markets and supply chains, adaptive responses by producers and market venues throughout the organic sector, and future needs. Identify:

- Lessons learned: successful innovations as well as failures and their causes.
- Farmer needs to adapt to near-future market shifts in the wake of the pandemic.
- Strategies for building farm, market, food system, and community resilience to future crises.

- Build capacity to deliver technical assistance with market development and other aspects of farm business planning and management.
- Prioritize BIPOC and transitioning producers for farmer-to-farmer mentoring and other technical assistance with market development and business management.
- Develop and deliver farmer-friendly, dynamic informational resources on the business aspects of highly diversified organic specialty crop enterprises that entail more complex budgeting, financial planning, and other business management activities. In particular, educational resources and tools that increase farmers' understanding of the costs of production and that are specifically designed to account for the cropping system used by the farmer.

Research and Technical Assistance to Support Organic Integrity and Market Access

In both surveys and focus groups, certified organic and transitioning farmers registered high levels of concern about organic fraud and the integrity of the USDA organic label, the impacts of large-scale industrial organic operations, and the threat of contamination of organic crops by NOP-prohibited substances. In addition, over half of organic producers registered concern about the imbalance of domestic certified organic supply and demand, which could be related to market globalization and industrial organic. Industrial operations can depress prices and undercut smaller scale organic farmers. Crop contamination ca n cause a loss of organic certification for up to three years. Any of these issues can undermine the reputation of USDA certified organic farm products, restrict organic market opportunities, and threaten farmer livelihoods.

Clearly, an urgent need exists for strengthened policies to protect the integrity of USDA certified organic products, improve market access, and sustain the economic viability of small- to mid-scale organic farms and ranches.

Effective policy development will require additional research in the following areas:

- Document and optimize the design of buffer plantings, diversions, and other landscape practices to protect organic crops from spray drift and GMO pollen.
- Improve the accuracy, practicality, and affordability of testing and tracking for domestic and imported products distributed and marketed as "organic" to detect and intercept fraudulent products, and to identify presence and sources of pre-harvest or post-harvest contamination beyond the organic producer's control.
- Support market and socio-economic research to evaluate and mitigate the impacts of industrial organic on market access for small to midsize organic producers.

- Develop improved criteria by which NOP can more consistently and effectively enforce requirements for crop rotations and other measures to build and maintain soil health, soil-friendly tillage practices, and measures to protect and maintain biodiversity.

In the meantime, organic farmers need Extension, education, and technical assistance to meet the challenges of organic integrity and market access, including:

- Assistance in identifying and developing direct markets and local and regional supply chains for small to medium scale organic operations.
- Educational tools to help farmers identify potential sources of contamination of their organic crops and implement buffer plantings and other mitigation practices.
- Legal support to deal with crop contamination issues including spray drift, GMO pollen, GMO contamination of crop seed, and instances of organic fraud.

Strengthen Federal Policies to Protect Organic Integrity and Organic Farmer Livelihoods

Photo credit: Haley Baron

The USDA Organic Standards are updated periodically in consultation with the National Organic Standards Board (NOSB) as new production technologies are introduced, research data on existing materials and methods emerge, and inconsistencies among certification agencies or other organic integrity issues arise. In addition, NOSB is empowered to explore ways to strengthen enforcement of the more qualitative NOP requirements related to biodiversity, soil health, and resource stewardship. Industrial operations tend to cut corners on these requirements to reduce production costs, which can hurt smaller organic farms whose reputation and customer appeal depends on their land stewardship as well as product quality.

In response to growing concerns about organic integrity and fraud, the USDA Agricultural Marketing Service (AMS) proposed amendments to NOP regulations in 2020. These measures would create more robust oversight of the production, handling, and sale of organic products; improve farm to market traceability; and enhance enforcement of organic regulations. In addition, the bi-partisan Continuous Improvement and Accountability in Organic Standards Act recently introduced in Congress would address the need for USDA to act on NOSB recommendations, update NOP standards, and ensure consistency across certification agents.

Organic farmers also need greater protection against financial losses resulting from contamination of their organic crops, livestock, and other products through events beyond their control. This could take the form of provisions to cover such losses through USDA crop insurance programs, cost share for buffers or other preventive practices, and/or policies that ensure a fair sharing of responsibility between abutting organic and conventional producers to prevent unintended transport of NOP prohibited substances into organic production areas.

OFRF recommends the following policies to protect organic integrity and farmer livelihoods:

- Finalize and expedite implementation of AMS proposed amendments to the NOP regulations to strengthen oversight and enforcement.
- Increase oversight of imported organic products.
- Amend NOP to explicitly disallow "rotational organic" management (in which larger scale farms rotate fields into and out of organic production, then back in to maintain lucrative organic product streams) and enforce this provision.
- Pass and enact the Continuous Improvement and Accountability in Organic Standards Act.
- Strengthen NOSB's mandate to recommend ongoing improvements to the NOP standards, including building NOP capacity to enforce "qualitative" standards such as diverse rotation with cover crops, tillage practices that maintain soil health, and maintaining biodiversity.
- Develop policies and programs to protect organic producers from financial losses resulting from crop contamination through causes beyond their control.
- Strengthen USDA regulation of existing and new GMO crop varieties, including measures to protect organic farms from pollen drift of seed contamination, and to indemnify organic producers against financial loss from GMO crop contamination.

Reform Recordkeeping for USDA Certified Organic Operations

NOP recordkeeping requirements emerged as a substantial non-production challenge for 31% of organic survey respondents and focus group comments revealed widespread concern with this issue, especially for highly diversified operations like CSAs with 20 or more different crops and multiple plantings. NOP requirements for detailed seed-to-market documentation for each crop and planting impose a serious burden on diversified operations, and create a major disincentive to maintain the crop diversity that builds soil health, climate resilience, and ecological balance, and that is required by the NOP standards themselves.

OFRF recommends research into ways to reduce the record-keeping burden while maintaining the ability of farmer records to provide robust verification and enforcement of compliance with NOP practice standards.

Specific strategies to explore include:

- Conduct focus groups with producers, certifiers, organic inspectors, and other stakeholders to develop ideas about how to streamline the recordkeeping process.
- Develop user-friendly data technology to simplify data entry.
- Simplify recordkeeping requirements for highly diversified, specialty crop rotations and polycultures.

5.7 Labor, Land, Capital, and Infrastructure

Skilled Labor

Organic production methods are generally more labor-intensive than conventional systems. Accessing labor was the leading non-production challenge, identified by 46% of organic survey respondents and 48% of transition survey respondents, and was the second most frequently noted challenge in the open-ended question in the organic survey regarding top non-production challenges. Specialty crops and seeds for plantings are particularly labor-intensive and more than half of respondents who produced one or more of these commodities cited labor as a substantial challenge. Four out of 10 organic survey respondents desired technical assistance with labor needs, and just over half expressed concerns about a lack of skilled labor.

Organic farms can provide meaningful work for job seekers, yet the tight budgets under which many organic farms operate can make it difficult for producers to afford to hire and appropriately remunerate the skilled workers they need. Several focus group participants had to limit or cut back production acreage because of labor costs or labor shortages. Organic farms with good labor relations can serve as training grounds as their employees gain skills and find their own callings to become independent farmers. This helps the organic farming sector grow but leaves the employer once again seeking labor. At the other extreme, the crushingly low wages, exploitative work schedules, and poor living conditions that millions of farmworkers hired by industrial-scale agribusiness operations face day in and day out amount to a national humanitarian crisis.

A critical need exists to develop win-win solutions that:

- Provide organic farmers, particularly specialty crop and seed growers, with reliable, affordable, skilled labor.
- Offer meaningful work opportunities to vulnerable communities including people of color, at-risk youth, low-income inner-city neighborhoods, and military veterans.
- Guarantee all farmworkers a living wage, a safe and respectful workplace, and other basic labor rights protections.
- Provide a pathway from farmworker to farmer, while at the same time facilitate hiring of additional help as employees graduate to manage their own farms.
- Institute immigration reform that would increase access to a skilled labor force.

An urgent need exists for multidisciplinary and socio-economic research to develop new models for farmer-worker relations that meet these needs, and to identify policy needs to support the desired outcomes. Stakeholder sessions or focus groups comprised of farmers, farm labor, rural sociologists, educators, policy makers, and other key stakeholders will play a vital role in this process. With the paradox that both employers and employees in the farming sector often experience severe financial stress, taxpayer-funded government subsidies designed to ensure decent farmworker wages while maintaining farm economic viability may be warranted.

Access to Land, Capital, and Infrastructure

While access to land did not emerge as a top challenge in the surveys, focus group discussions revealed how critical this issue can be, with several participants noting that only privileged circumstances allowed them to own their farms, and others indicating that they do not realistically hope to purchase farmland.

Focus groups also discussed the challenges of obtaining the right equipment for their scale of farming, management needs, and soil stewardship goals. Many farmers make do with older, outdated equipment that inadequately meets their needs. Land and farm equipment entail major capital outlays that can pose barriers to aspiring farmers and burden existing farms with major debts. Research and outreach priorities to address these economic barriers include:

- Information on grant and loan programs that can help producers purchase the equipment they need, and on how to establish farmer cooperatives to share equipment.
- Information and technical assistance in designing and establishing land trusts, conservation easements, and other means to provide farmers with affordable land access.
- Socio-economic and multidisciplinary research into land, capital, and infrastructure needs of beginning and aspiring organic producers, leading to the development of policy proposals to facilitate access to these foundational resources.
- Research into farmland succession issues, and development of more effective "farmlink" services to put retiring farmers and other landowners in touch with farmland seekers.

OFRF recommends the following policy measures to help certified, transitioning, and aspiring organic producers to gain access to land, capital, and other foundational resources:

- Promote and utilize the Conservation Reserve Program (CRP) Transitions Incentive Program, which provides two years additional CRP payments after transitioning the land into organic farming and other high-level land stewardship systems, as a means to improve organic farmer access to farmland.
- Development and funding of "farmlink" services that would match beginning farmers and ranchers with those looking to transfer their farm and ranchland, as well as increased outreach about existing farm loan programs, and the introduction of a reduced interest rate to those farming organically to compensate them for the environmental benefits provided by organic farming.

5.8 Region- and Commodity-specific Research and Outreach Priorities for Production and Non-production Challenges

While organic and transitioning farmers across the U.S. shared common challenges, concerns, and technical assistance needs, some issues emerged that relate to specific commodity categories or agro-ecoregions that merit a targeted approach to research and outreach for organic producers.

OFRF recommendations related to regional and commodity-specific production challenges and technical assistance needs include:

- Target research and outreach efforts to help organic farmers in the South address the wide range of challenges, concerns, and technical assistance needs reported in this region.
  - ◇ Conduct organic production systems research to address the compounding challenges of intense weed, pest, and disease pressure, lower soil fertility, and climate change.
  - ◇ Explore and develop the potential of high biomass cover crops and other organic, soil health management practices to mitigate these challenges by improving soil health and by suppressing weeds, pathogens, and plant-parasitic nematodes.
  - ◇ Develop organic seed systems and crop cultivars adapted to organic production in the Southern region.
  - ◇ Research and develop organic solutions for animal welfare issues in Southern climates.
  - ◇ Provide technical assistance to help Southern organic producers meet labor challenges.
- Tailor soil health management practices for organic dryland grain production and irrigated specialty crops in the low-rainfall climates of the Great Plains and Mountains, and the Mediterranean climates (dry summer, rainy winter) of the Pacific region.
  - ◇ Identify best cover crop species and management strategies.
  - ◇ Identify and develop new production crops and cultivars including specialty grains, pulses, and oilseeds for dryland rotations, and specialty crops with reduced irrigation needs.
- Research, develop, and implement advanced drought management, water conservation, and irrigation efficiency in the Pacific, Great Plains and Mountains, and Southern regions, including strategic rotations, organic soil health practices that enhance water infiltration and moisture holding capacity, and agroecological landscape design.

- Research GMO crop contamination risks and develop mitigation strategies for organic producers in field crop growing regions, especially the North Central SARE region and parts of the South.
- Research and develop cold-tolerant fast-growing cover crops and relay interplanting strategies for the short growing seasons of the Northeast, Great Lakes, Corn Belt, and northern Great Plains.
- Conduct research, outreach, and mentoring programs in organic tree and vine crop production in the Pacific region, with emphasis on cost-effective integrated pest and disease management and strategies to reduce production costs.

OFRF recommendations related to region-specific and commodity-specific non-production issues include:

- Address organic marketing challenges that especially impact producers in the Great Plains and Mountains.
- Determine what resources or supportive factors may be helping Northeastern organic producers meet marketing and certification challenges, how they might be strengthened, and how they might be replicated or adapted for other regions.

CHAPTER 6
Survey, Focus Group, & Data Analysis Methodology

Surveys and focus groups for the 2022 NORA report were conducted by the Organic Farming Research Foundation (OFRF) in partnership with the Organic Seed Alliance (OSA) to identify challenges and concerns that organic and transitioning growers across the U.S. encounter, and assess their needs for additional research-based information, and technical assistance related to these issues. The goal of the data collection was to identify the barriers and challenges associated with organic farming, and the practical information, technical assistance, and other resources organic producers need to make a livelihood and meet the growing demand for certified organic products.

Using a mixed methods approach, we collected quantitative and qualitative data from two national-level surveys as well as qualitative data from sixteen focus group discussions with organic and transitioning producers across the country. One survey targeted certified organic farmers and ranchers (organic survey) and the second targeted producers who were actively transitioning land to organic certification and who were not previously certified organic (transition survey). The data collected from both surveys represents respondents' experiences in 2019 (stated as "last year" or "in 2019" in the survey instruments).

Survey Design

Both the organic and transition surveys were written and designed by OFRF and OSA staff with input from social scientists at the Washington State University (WSU) Social and Economic Science Research Center (SESRC). The survey instruments were designed based on the Tailored Design Method (TDM) model of social science survey principles, practices, and protocols (Dillman et al., 2009). The TDM guides survey content and design to maximize user comprehension, ensure ease of navigability, and accommodate accessibility needs.

Question types in both survey instruments were predominantly closed-ended, including a mix of dichotomous (i.e., respondents choose between two options), semantic differential (i.e., respondents rate an item within the

framework of a multi-point rating scale), rank order (i.e., respondents rearrange and rank multiple options in order of their importance), and/or multiple-choice questions (i.e., respondents choose one or more items from a limited list of options). We included several open-ended questions to capture more detail on individual farmers' top production and non-production challenges, and technical assistance needs and perspectives. Demographic questions allowed us to analyze, cross-tabulate, and cross-reference responses based on geographic location, farming experience, and the race/ethnicity of respondents. Drafts of the organic and transition survey instruments were pretested by organic and transitioning farmers and ranchers who provided feedback and recommendations regarding content, format, and navigability.

The surveys were reviewed for protection of human subjects by the Washington State University (WSU) Human Subjects Institutional Review Board (IRB). Both surveys were certified exempt. To develop the survey procedures, SESRC staff followed the code of professional ethics and practices of the American Association for Public Opinion Research (AAPOR). That code states that "unless the respondent waives confidentiality for specified uses, we shall hold as privileged and confidential all information that might identify a respondent with his or her responses. We shall also not disclose or use the names of respondents for non-research purposes unless the respondents grant us permission to do so."

Organic Survey

The questions in the organic survey were designed to identify the most pressing production and environmental challenges for organic farmers and ranchers; the social, economic, and policy barriers to successful organic agricultural enterprises; and the technical assistance and financial support programs organic producers need to overcome these barriers. Because access to high quality organic seed is a vital but challenging need, the survey included questions to assess respondents' perspectives on organic seed, including current use and difficulties in sourcing organic seed. The survey also asked which crops and crop traits should be prioritized in organic plant breeding programs. Because the organic survey was conducted in conjunction with OSA, some questions were abbreviated, and definitions of common agricultural terms or concepts were not provided to limit the length of the survey instrument. To view the organic survey instrument, please see *Appendix A*.

To capture a representative sample of the broader organic farming community and to reach as many growers as possible, the organic survey was implemented in two phases: 1) a web-based and paper survey (i.e., mixed mode survey) of a random sample of certified organic producers (closed distribution survey) followed by 2) an open distribution convenience non-probability web survey (open distribution survey). The same survey instrument was used in both phases of implementation and contained a total of forty-four questions (see *Appendix A*). Farmers who participated in the survey were eligible to win a $100 REI gift card.

For the closed distribution survey, we used the Organic INTEGRITY Database to select a random sample of 2,000 certified organic farmers and ranchers who had an email address listed in the database. The goal was to achieve a 20% response rate; typical response rates for farmer surveys range from 20-30% (Yammarino et al., 1991) and can be as low as 15% (Pennings et al., 2002, Prokopy, 2011). The online survey was implemented by the SESRC at WSU using their NetSurveyWorks software. The closed survey was initiated with a personalized email invitation and an introductory postal letter with a web link to the survey. The invitation email provided a web link to the organic survey and a unique access code for each recipient. An email and postcard reminder were sent to the 2,000 organic producers in the random sample one week after the email and postcard invitations were sent. One month later, a hardcopy of the survey instrument was mailed to all non-respondents. Following the mailing of the hardcopy survey, three additional email reminders were sent along

with a replacement survey questionnaire to non-respondents. Staff at SESRC also made phone calls to non-respondents to encourage participation.

The closed distribution survey was open from December 2019 through June 2020. We received 158 fully completed web-based surveys in addition to 242 fully completed hardcopy surveys that were submitted in the mail. We also received 48 partially complete surveys that were eligible for analysis. In total, out of the random sample of 2,000 certified organic farmers, 448 respondents completed or partially completed the organic survey resulting in a 22.53% response rate for the closed distribution survey, which exceeded our target 20% response rate.

After launching the closed distribution survey, SESRC implemented the same survey instrument via an open distribution method on February 17, 2020. To announce the open distribution survey, SESRC directly emailed all certified organic producers — excluding the 2,000 organic growers randomly identified for the closed distribution survey — at the email address listed in the USDA Organic INTEGRITY Database. We sent an email reminder along with a mailed postcard reminder. OFRF, OSA, and our advisory committee and outreach partners also advertised the survey through multiple mechanisms, including electronic announcements via organization websites, newsletters, social media, and organization publications.

The open distribution organic survey was open from February through September 2020. We received 349 fully completed web surveys and 262 partially complete web surveys that were eligible for analysis, for a total of 611 survey responses. From the closed and open distribution surveys combined, we received a total of 1,059 eligible responses that were used in the analysis.

Transition Survey

To understand the unique challenges facing farmers and ranchers transitioning to USDA certified organic production, we developed a survey instrument for transitioning producers. The transition survey contained thirty-eight questions, including twenty-six core questions from the organic survey related to farm size and operations, and farmer demographics. It also included questions specific to the transition operation, such as how much land was in transition to organic production, farmer motivations for transitioning. Other questions probed the challenges and barriers specific to transitioning farmers and ranchers. These questions addressed the ability to access land and/or start-up capital, acquire new knowledge and skills essential for successful organic production, and overcome social stigmas associated with adopting organic practices (Moncada et al., 2010). The transition survey instrument is included as *Appendix B*.

The transition survey was launched on February 18, 2020, and promoted alongside the open distribution organic survey through September 2020, and was hosted by the SESRC on their NetSurveyWorks platform. Since the goal of the transition survey was to hear from producers transitioning land to organic certification for the first time, we directed producers with both certified organic and transitioning land to the organic survey.

There is no national list of transitioning producers and while the 2017 Census of Agriculture identified about 700 transitioning producers (USDA NASS, 2019), there is no definitive number of farmers currently in transition. Therefore, to identify survey participants, we employed a snowball sampling method where survey participants recruited additional participants from among their acquaintances. This nonprobability sampling method is applied when potential participants with the target characteristics are hard to find (Naderifar et al., 2017). We collaborated with partner organizations such as Oregon Tilth and Iroquois Valley Farmland Real Estate Investment Trust, who have established relationships or networks with transitioning farmers

and ranchers across the country. This approach allowed us to reach our target population directly, as well as connect with other organizations that also work with transitioning farmers and ranchers.

In addition, SESRC advertised the transition survey jointly with the open distribution organic survey via email, websites, and physical postcards, all of which provided a link to the transition survey. We anticipated that organic producers contacted through these venues would share the transition survey with producers they knew were actively transitioning. Despite these efforts, the response for the transition survey was quite low. In total, we received twenty-five complete surveys and forty-six partially complete surveys that were eligible for data analysis for a total of seventy-one responses. Based on the 2017 Census of Agriculture estimate of 700 transitioning producers, roughly 10% of transitioning growers responded to the survey.

Focus Group Design

To complement the survey data, we conducted sixteen focus group discussions with certified organic and transitioning farmers and ranchers across the country. Our goal was to interview transitioning producers separately from certified organic producers, but some focus groups contained a mix of transitioning and certified producers. The focus groups were meant to be in-person discussions, and one took place at the January 2020 Southern Sustainable Agriculture Working Group Conference. The other fifteen focus groups were hosted virtually due to the COVID-19 pandemic.

To ensure diverse farmer voices were heard ten of the focus groups were facilitated by agricultural organizations identified through a national call for applications. Prior to facilitating a focus group, the host organizations received a two-hour, in-depth virtual training from social scientists at SESRC and a focus group toolkit outlining the discussion protocol. The remaining six focus groups were facilitated by OFRF staff. OFRF staff hosted all virtual focus groups on Zoom.

OFRF staff developed a moderator's guide to outlining topics to be discussed at all focus groups to ensure consistency (see *Appendix C*). Participants were identified using one of two methods: 1) participants were randomly selected from an existing conference registration or membership list; or 2) if there was not an existing list, an open call for participants was released and participants were then randomly selected from the list of those who responded. Once participants were identified and prior to the focus group, we emailed participants a description of the research project and a voluntary survey to collect information on their farm characteristics and demographics.

Each focus group session lasted approximately two hours. Sessions were recorded and transcribed verbatim by a court reporter. At least two researchers from either OFRF or the agricultural organizations selected to host focus groups attended each discussion, one to facilitate the conversation and another to take notes to accompany the transcript. An OFRF staff member was also present at each focus group to provide technical assistance, if needed. This format allowed the facilitator to focus on managing the discussion and ensuring all participants had the opportunity to speak. We reached our target number of between four and twelve participants for each session. Each participant received a $25 VISA gift card as a thank you for participating.

The sixteen focus groups were held between January 2020 and March 2021. Over 100 organic and transitioning producers participated in the focus group discussions and represented all regions of the U.S.

Data Analysis

Organic Survey Analysis

In the following analysis of the organic survey data, we combined the data from the closed and open distribution surveys to maximize the number of organic producers represented in the NORA report. This combined dataset includes 749 fully complete survey responses and 310 partially complete responses for a total of 1,059 responses from organic producers.

Data were analyzed using SPSS statistical software to present descriptive statistics. In addition to analyzing the aggregate responses from all survey respondents, we used demographic descriptors related to geography, race/ethnicity, and farming experience to group the survey participants. The percentages provided in all tables and figures were rounded to the nearest integer.

In addition to the quantitative analysis, open-ended question responses were thematically coded by OFRF staff. In the initial round of coding, the team identified twenty-seven general themes and 132 sub-themes (specific varieties or issues). Two separate coders then used these themes to code the full organic survey open-ended responses related to production challenges and non-production challenges. The coded responses were then cross-checked for reliability. Themes were ranked based on how many times they appeared through open-ended questions.

A comparison of the geographic distribution of the survey respondents with the broader organic farming population, using the zip codes of farms/ranches from the 2017 Census of Agriculture (USDA NASS, 2019), suggests our respondents are representative of different geographic regions (*Table1 .3*).

In addition to presenting survey results for the entire sample of certified organic producers, we cross-tabulated data by geographic region, farming experience, and racial/ethnic identity. Presenting the results for these different groups allowed us to better describe the diverse needs of organic producers and provide targeted policy and research recommendations. The results of analyses by farming region (i.e, SARE region or agro-ecoregion), farmer race/ethnicity, and farming experience were included in the main report when there were notable differences between groups. In all other instances, these analyses were placed in the Supplements. Not all survey participants responded to every question, so the number of responses — denoted by "n" in tables and figures —varied across questions.

Farming Region

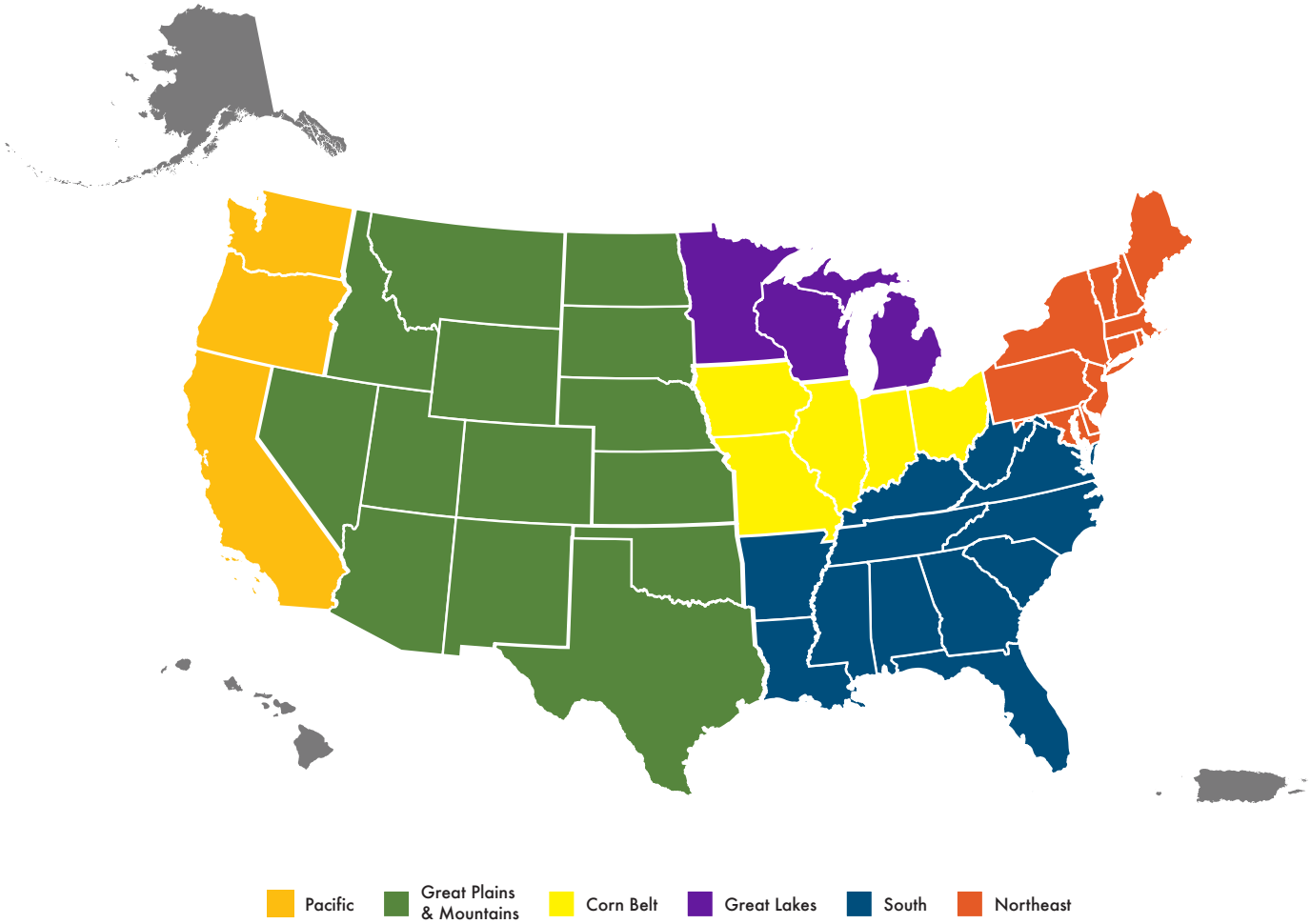
To understand how current organic practices, challenges, and needs varied regionally, zip code data provided by organic survey respondents was used to group respondents geographically by SARE region and agro-ecoregion. The four SARE regions — Northeast, North Central, Southern, and Western — are widely recognized and used by many organizations and institutions, so this grouping was particularly useful for providing regional research and policy recommendations. For this report, West Virginia data was grouped in the Southern SARE region. Regional recommendations based on SARE regions were also provided in the 2016 NORA report, which allowed for comparisons between the 2016 and 2022 reports.

Respondents were also grouped into six agro-ecoregions as follows (see *Figure 5.1*):

- Northeast: MD, DE, PA, NJ, NY, CT, RI, MA, VT, NH, ME
- South: NC, TN, VA, KY, WV, SC, GA, AL, FL, AR, LA, MS
- Great Lakes: MN, WI, MI
- Corn Belt: OH, IN, IL, MO, IA
- Great Plains and Mountains: ND, SD, NE, KS, TX, OK, MT, ID, WY, NV, UT, CO, AZ, NM
- Pacific: CA, OR, WA

Figure 5.1

Visual map of six agro-ecoregions.



These were created based on the ten USDA production regions (Aillery et al., 2005). Due to low survey response rates in some regions the Appalachian, Southeast, and Delta States regions were combined into one category referred to in the report as the "South" region (these three production regions have warm, rainy climates and highly weathered soils in common), and the Southern Plains, Northern Plains, and Mountain Region (which are predominantly low-rainfall regions) were combined into a category referred to in the report as the "Great Plains and Mountains" or simply "Great Plains" region. Grouping respondents by agro-ecoregions provided a finer scale of categorization that reflected geographical specialization of farm commodities, and regional differences in soil types, climates, and environmental stressors.

Farmer Race/Ethnicity

Demographic data collected in the organic survey was also used to compare survey responses from BIPOC and White farmers to determine if research needs and priorities differed between these two farmer groups. Survey respondents were given the opportunity to provide information about their race and/or ethnicity. Survey respondents could select "yes" or "no" for the following categories: "Asian/Pacific Islander," "Black or African American," "Hispanic or Latinx," "Native American or American Indian," "White," and/or "Other." Respondents had the option to skip any part of the question. For example, if a survey participant identified solely as "White," it was possible for them to answer "yes" to that option and leave the other race/ethnicity options blank.

Farming Experience

The report also examines how farming experience influences the practices an organic farmer chooses to implement and the challenges they face. Survey respondents were asked to indicate how long they had been farming and this data was used to place participants into two groups. One group included beginning farmers with less than ten years of farming experience, which is based on the USDA definition of a beginning farmer, and the second group included experienced farmers with more than 10 years of experience.

Transition Survey Analysis

Data from the transition survey were also analyzed using SPSS statistical software to present descriptive statistics. The report only presents results for the full transition survey sample; analyzing the transition survey data by farming region, farmer race/ethnicity, and farming experience was not feasible due to the low survey response rate. As with the organic survey, not all survey participants responded to every question, so the number of responses—denoted by "n" in tables and figures—varied across questions. The percentages provided in all tables and figures were rounded to the nearest integer.

Focus Group Analysis

The focus group transcripts were analyzed by SESRC using NVivo 12 Pro, a qualitative data analysis software that facilitates the organization and analysis of focus group data. Qualitative analysis of the focus group transcripts was an iterative process starting with identifying major themes across the focus group discussions followed by exploratory content analysis of the focus group transcripts. Direct quotations of key ideas were used in the report and, when applicable, edited only for clarity; the names and places of respondents were not disclosed to maintain confidentiality. Findings and quotes from the focus group analysis were integrated with the survey results to provide greater detail about farmer needs and priorities using their own words.

Photo credit: David Rossman

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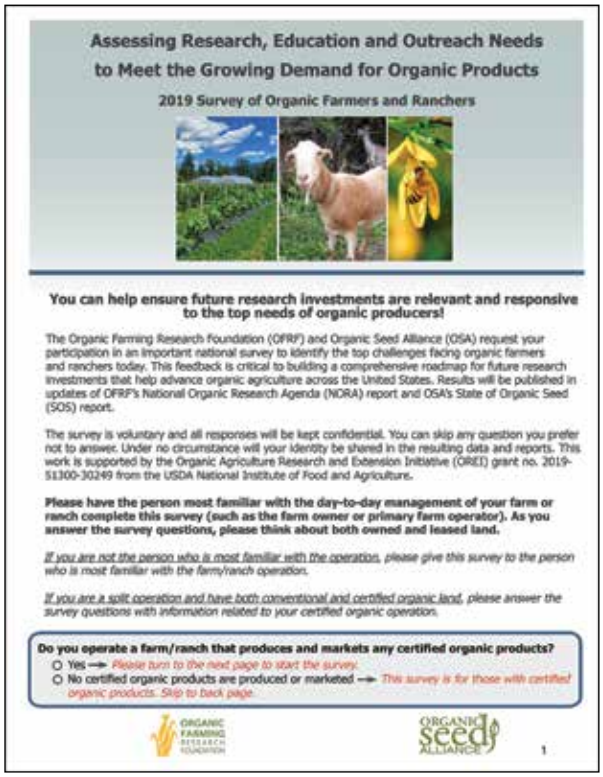
* For project proposal summaries, progress and final reports for USDA funded Organic Research and Extension Initiative (OREI) and Organic Transitions (ORG) projects, enter proposal number under "Grant No" and click "Search" on the CRIS Assisted Search Page at:

http://cris.nifa.usda.gov/cgi-bin/starfinder/0?path=crisassist.txt&id=anon&pass=&OK=OK.

APPENDICES

Appendix A: Organic Survey Instrument

"Accessing Research, Education and Outreach Needs to Meet the Growing Demand for Organic Products" questionnaire for organic producers is available online at https://bit.ly/NORA2022-organic-survey.



Assessing Research, Education and Outreach Needs to Meet the Growing Demand for Organic Products

2019 Survey of Organic Farmers and Ranchers

You can help ensure future research investments are relevant and responsive to the top needs of organic producers!

The Organic Farming Research Foundation (OFRF) and Organic Seed Alliance (OSA) request your participation in an important national survey to identify the top challenges facing organic farmers and ranchers today. This feedback is critical to building a comprehensive roadmap for future research investments that help advance organic agriculture across the United States. Results will be published in updates of OFRF's National Organic Research Agenda (NORA) report and OSA's State of Organic Seed (SOS) report.

The survey is voluntary and all responses will be kept confidential. You can skip any question you prefer not to answer. Under no circumstance will your identity be shared in the resulting data and reports. This work is supported by the Organic Agriculture Research and Extension Initiative (OREI) grant no. 2019-51300-30249 from the USDA National Institute of Food and Agriculture.

Please have the person most familiar with the day-to-day management of your farm or ranch complete this survey (such as the farm owner or primary farm operator). As you answer the survey questions, please think about both owned and leased land.

If you are not the person who is most familiar with the operation, please give this survey to the person who is most familiar with the farm/ranch operation.

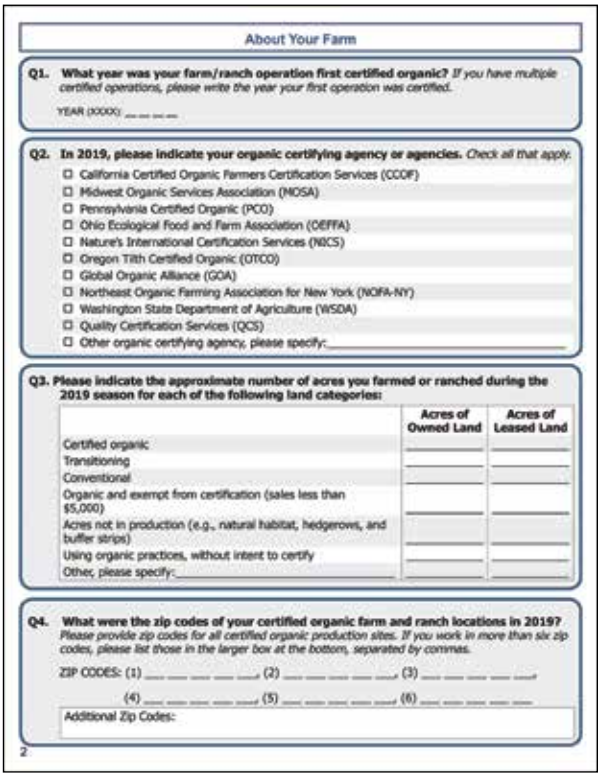
If you are a split operation and have both conventional and certified organic land, please answer the survey questions with information related to your certified organic operation.

Do you operate a farm/ranch that produces and markets any certified organic products?

- ○ Yes → *Please turn to the next page to start the survey.*
- ○ No certified organic products are produced or marketed → *This survey is for those with certified organic products. Skip to back page.*

ORGANIC FARMING RESEARCH FOUNDATION — ORGANIC seed ALLIANCE

1



About Your Farm

Q1. What year was your farm/ranch operation first certified organic? *If you have multiple certified operations, please write the year your first operation was certified.*

YEAR (XXXX): ____

Q2. In 2019, please indicate your organic certifying agency or agencies. *Check all that apply.*

- ☐ California Certified Organic Farmers Certification Services (CCOF)
- ☐ Midwest Organic Services Association (MOSA)
- ☐ Pennsylvania Certified Organic (PCO)
- ☐ Ohio Ecological Food and Farm Association (OEFFA)
- ☐ Nature's International Certification Services (NICS)
- ☐ Oregon Tilth Certified Organic (OTCO)
- ☐ Global Organic Alliance (GOA)
- ☐ Northeast Organic Farming Association for New York (NOFA-NY)
- ☐ Washington State Department of Agriculture (WSDA)
- ☐ Quality Certification Services (QCS)
- ☐ Other organic certifying agency, please specify:_____

Q3. Please indicate the approximate number of acres you farmed or ranched during the 2019 season for each of the following land categories:

	Acres of Owned Land	Acres of Leased Land
Certified organic		
Transitioning		
Conventional		
Organic and exempt from certification (sales less than $5,000)		
Acres not in production (e.g., natural habitat, hedgerows, and buffer strips)		
Using organic practices, without intent to certify		
Other, please specify:_____		

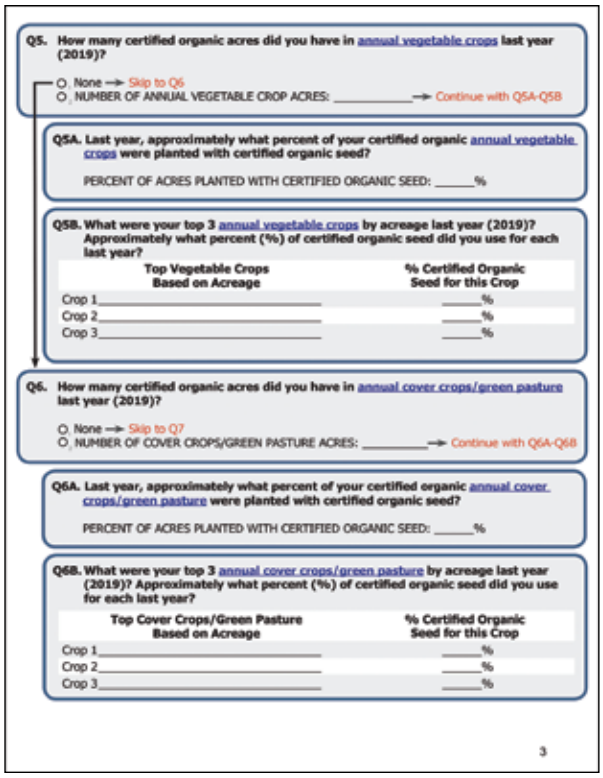
Q4. What were the zip codes of your certified organic farm and ranch locations in 2019? *Please provide zip codes for all certified organic production sites. If you work in more than six zip codes, please list those in the larger box at the bottom, separated by commas.*

ZIP CODES: (1) ____ (2) ____ (3) ____

(4) ____ (5) ____ (6) ____

Additional Zip Codes:

2



Q5. How many certified organic acres did you have in annual vegetable crops last year (2019)?

- ○ None → Skip to Q6
- ○ NUMBER OF ANNUAL VEGETABLE CROP ACRES: _____ → Continue with Q5A-Q5B

Q5A. Last year, approximately what percent of your certified organic annual vegetable crops were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q5B. What were your top 3 annual vegetable crops by acreage last year (2019)? Approximately what percent (%) of certified organic seed did you use for each last year?

Top Vegetable Crops Based on Acreage	% Certified Organic Seed for this Crop
Crop 1_____	_____%
Crop 2_____	_____%
Crop 3_____	_____%

Q6. How many certified organic acres did you have in annual cover crops/green pasture last year (2019)?

- ○ None → Skip to Q7
- ○ NUMBER OF COVER CROPS/GREEN PASTURE ACRES: _____ → Continue with Q6A-Q6B

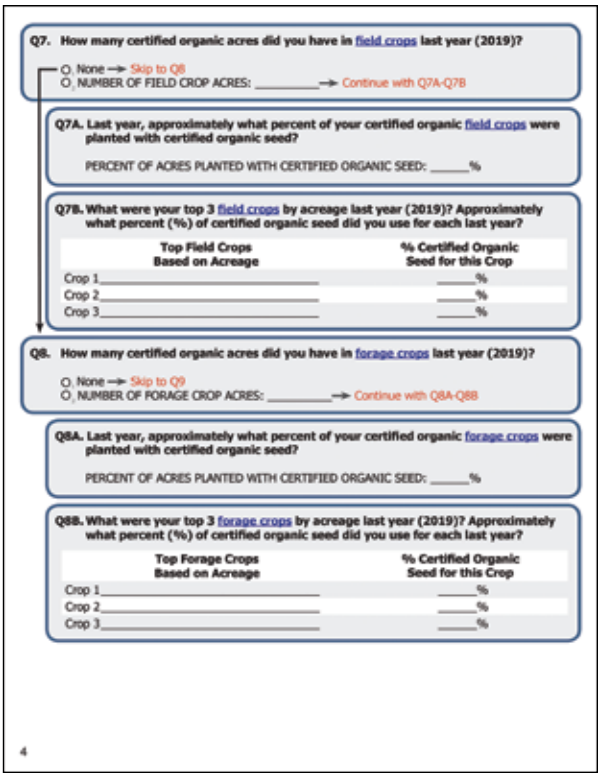
Q6A. Last year, approximately what percent of your certified organic annual cover crops/green pasture were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q6B. What were your top 3 annual cover crops/green pasture by acreage last year (2019)? Approximately what percent (%) of certified organic seed did you use for each last year?

Top Cover Crops/Green Pasture Based on Acreage	% Certified Organic Seed for this Crop
Crop 1_____	_____%
Crop 2_____	_____%
Crop 3_____	_____%

3



Q7. How many certified organic acres did you have in field crops last year (2019)?

- ○ None → Skip to Q8
- ○ NUMBER OF FIELD CROP ACRES: _____ → Continue with Q7A-Q7B

Q7A. Last year, approximately what percent of your certified organic field crops were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q7B. What were your top 3 field crops by acreage last year (2019)? Approximately what percent (%) of certified organic seed did you use for each last year?

Top Field Crops Based on Acreage	% Certified Organic Seed for this Crop
Crop 1_____	_____%
Crop 2_____	_____%
Crop 3_____	_____%

Q8. How many certified organic acres did you have in forage crops last year (2019)?

- ○ None → Skip to Q9
- ○ NUMBER OF FORAGE CROP ACRES: _____ → Continue with Q8A-Q8B

Q8A. Last year, approximately what percent of your certified organic forage crops were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q8B. What were your top 3 forage crops by acreage last year (2019)? Approximately what percent (%) of certified organic seed did you use for each last year?

Top Forage Crops Based on Acreage	% Certified Organic Seed for this Crop
Crop 1_____	_____%
Crop 2_____	_____%
Crop 3_____	_____%

4

Q9. Do you grow or raise the following certified organic products for sale? *Mark Yes or No for each.*

	Yes	No		Yes	No
Grains for livestock and poultry feed	○	○	Herbs	○	○
Grains, dry beans, and pulses for human consumption	○	○	Cut flowers	○	○
Oil seeds	○	○	Mushrooms	○	○
Cotton	○	○	Berries	○	○
Forages	○	○	Vineyard	○	○
Livestock and poultry (sold live)	○	○	Tree fruit	○	○
Meat	○	○	Tree nuts	○	○
Poultry (meat)	○	○	Maple syrup	○	○
Dairy	○	○	Peanuts	○	○
Eggs	○	○	Nursery crops	○	○
Animal fiber	○	○	Seeds for planting (all crops)	○	○
Vegetables	○	○	Other, please specify: _____	○	○

Q10. What are the top three certified organic products by dollar value that you grow or raise for sale?

Product 1: _____

Product 2: _____

Product 3: _____

Q11A. For your certified organic operation, how often do you use the following inputs? *Select one response in each row or mark "Not applicable" for those that do not apply to your certified organic operation.*

	Never	Sometimes	Often	Very often	Not applicable
Compost	○	○	○	○	○
Compost teas and other microbial inoculants	○	○	○	○	○
Manure and other animal byproducts	○	○	○	○	○
Organic or natural mineral fertilizers/amendments	○	○	○	○	○
Reduced irrigation or water conservation	○	○	○	○	○
Other, please specify: _____	○	○	○	○	○

Q11B. For your certified organic operation, how often do you use the following practices? *Select one response in each row or mark "Not applicable" for those that do not apply to your certified organic operation.*

	Never	Sometimes	Often	Very often	Not applicable
Cover crops and green manures	○	○	○	○	○
Crop rotations	○	○	○	○	○
Intercropping	○	○	○	○	○
Other, please specify: _____	○	○	○	○	○

Q11C. Please indicate the approximate number of acres of the following buffers or habitat plantings you have on your certified organic land.

	Number of Acres
Buffer strips or border rows	_____
Hedgerows, windbreaks, or shelterbelts	_____
Wildflower strips	_____
Other, please specify: _____	_____

Q12. Over the next 5 years, which of the following categories best describes what you plan to do with regard to your certified organic operation?

- ○ Increase certified organic acreage
- ○ Maintain current levels of certified organic acreage
- ○ Decrease certified organic acreage
- ○ Discontinue certified organic acreage
- ○ Discontinue all agricultural production

Challenges and Research Needs

Q13. Below is a list of production challenges that certified organic farmers and ranchers might face when farming organically. How much has each of these been a challenge to you in your certified organic farm operation? *Select one response in each row or mark "Not applicable" for those that do not apply to your farm or ranch.*

	Not a challenge ←				Strong challenge	Not applicable
Finding appropriate organic crop varieties and seed for your operation	○	○	○	○	○	○
Seed production/seed saving	○	○	○	○	○	○
Maintaining adequate yields	○	○	○	○	○	○

Q13 continued on next page

Q13. *(continued from previous page).* **How much has each of these been a challenge to you in your certified organic farm operation?** *Select one response in each row or mark "Not applicable" for those that do not apply to your farm or ranch.*

	Not a challenge ←				Strong challenge	Not applicable
Managing production costs	○	○	○	○	○	○
Managing animal production and health	○	○	○	○	○	○
Grazing and pasture management	○	○	○	○	○	○
Managing crop rotations	○	○	○	○	○	○
Utilizing cover crops and green manures	○	○	○	○	○	○
Integrating perennials and permaculture design	○	○	○	○	○	○
Managing soil fertility and crop nutrition	○	○	○	○	○	○
Optimizing soil structure, avoiding soil erosion and degradation	○	○	○	○	○	○
Minimizing adverse impacts of tillage on soil health	○	○	○	○	○	○
Drought management	○	○	○	○	○	○
Access to water resources	○	○	○	○	○	○
Irrigation and water use	○	○	○	○	○	○
Post-harvest handling methods	○	○	○	○	○	○
Controlling weeds	○	○	○	○	○	○
Controlling insect pests	○	○	○	○	○	○
Controlling disease pressure	○	○	○	○	○	○
Adapting to climate change	○	○	○	○	○	○
Enhancing agricultural biodiversity	○	○	○	○	○	○
Managing pollinators and habitat for pollinators	○	○	○	○	○	○
Managing the farm as a system (moving away from input-substitution to obtain desired outcomes)	○	○	○	○	○	○
Other, please specify: _____	○	○	○	○	○	○

Q14. Please tell us about the top two production challenges on your certified organic operation and explain what additional research and information would be helpful (please be specific).

Production Challenge #1: _____

What additional research and information would be helpful?

Production Challenge #2: _____

What additional research and information would be helpful?

Q15. Below is a list of non-production challenges that certified organic farmers and ranchers might face when farming organically. How much has each of these been a challenge to you in your certified organic farm operation? *Select one response in each row or mark "Not applicable" for those that do not apply to your farm or ranch.*

	Not a challenge ←				Strong challenge	Not applicable
Accessing labor	○	○	○	○	○	○
Accessing land	○	○	○	○	○	○
Accessing capital and/or financing	○	○	○	○	○	○
Managing business activities	○	○	○	○	○	○
Farm business planning	○	○	○	○	○	○
Developing infrastructure	○	○	○	○	○	○
Finding and developing markets for organic products	○	○	○	○	○	○
Cost of organic certification	○	○	○	○	○	○
Meeting organic certification requirements	○	○	○	○	○	○
Meeting recordkeeping requirements of organic certification	○	○	○	○	○	○
Understanding and following food safety standards	○	○	○	○	○	○
Risk of contamination from genetically engineered crops	○	○	○	○	○	○
Community relations	○	○	○	○	○	○

Q15 continued on next page

Q15. *(continued from previous page).* **How much has each of these been a challenge to you in your certified organic farm operation?** *Select one response in each row or mark "Not applicable" for those that do not apply to your farm or ranch.*

	Not a challenge				Strong challenge	Not applicable
Relations with other farmers	O	O	O	O	O	O
Social pressure to not farm organically	O	O	O	O	O	O
Farm succession planning	O	O	O	O	O	O
Other, please specify: _____	O	O	O	O	O	O

Q16. Please tell us about the top two non-production challenges on your certified organic operation and explain what additional research and information would be helpful (please be specific).

Non-production Challenge #1: _____
What additional research and information would be helpful?

Non-production Challenge #2: _____
What additional research and information would be helpful?

Q17. Overall, how well do you feel that your current certified organic production and non-production research and information needs are being met?

- O Not well at all
- O Not very well
- O Somewhat well
- O Very well
- O Don't know

Q18. How concerned are you about the following topics for organic agriculture?

	Not concerned	Somewhat concerned	Concerned	Very concerned	Not applicable
Access to certified organic seeds	O	O	O	O	O
Access to seeds bred for organic systems	O	O	O	O	O
Access to certified organic animal feed	O	O	O	O	O
Imbalance of domestic certified organic supply and demand	O	O	O	O	O
Industrial organic	O	O	O	O	O
Lack of skilled labor	O	O	O	O	O
Organic fraud and integrity of USDA organic label	O	O	O	O	O
Animal welfare	O	O	O	O	O
Crop contamination (e.g., GMOs, pesticide drift)	O	O	O	O	O
Use of a transitional label	O	O	O	O	O
Availability of organic research funds	O	O	O	O	O
Access to agricultural service providers who are knowledgeable about certified organic operations	O	O	O	O	O
Adaptation to climate change	O	O	O	O	O
Other, please specify: _____	O	O	O	O	O

Q19. Do you hold a certified organic handler license?

- O Yes → Continue with Q19A
- O No → Skip to Q20
- O Don't know → Skip to Q20

Q19A. If yes, what is your greatest challenge being a certified organic handler?

Marketing Outlets

Q20. For 2019, please estimate the percent of your certified organic sales in the following marketing outlets. *The sum of the percentages in A through F should equal 100%.*

		% of All Certified Organic Sales
A.	Direct to consumer (e.g., farmer's market, CSA, website sales)	_____%
B.	Direct to retail (e.g., local food store, supermarket, restaurant)	_____%
C.	Wholesale (e.g., processor, distributor, broker)	_____%
D.	Food hub or cooperative	_____%
E.	Institutions (e.g., schools, hospitals)	_____%
F.	Other, please specify: _____	_____%
		TOTAL = 100%

Q21. For 2019, please estimate the percent of your certified organic sales in the following geographic locations. *The sum of the percentages in A through D should equal 100%.*

		% of All Certified Organic Sales
A.	Local (within 100 miles)	_____%
B.	Regional (more than 100 miles, but less than 500 miles)	_____%
C.	National (500 miles or farther)	_____%
D.	International	_____%
		TOTAL = 100%

How You Get Information

Q22. For your certified organic operation, what is your need for technical assistance on the following topics?

	No need	Little need	Some need	Strong need	Not applicable
Land access	O	O	O	O	O
Labor needs	O	O	O	O	O
Access to capital/resources	O	O	O	O	O
Business and financial planning	O	O	O	O	O
Securing sales channels	O	O	O	O	O
Logistics of product distribution	O	O	O	O	O
Transportation options	O	O	O	O	O
Legal assistance	O	O	O	O	O
Livestock production and health	O	O	O	O	O
Integrating livestock into organic production	O	O	O	O	O
Production assistance	O	O	O	O	O
Soil fertility and management of crop nutrients	O	O	O	O	O
Soil conservation and soil health	O	O	O	O	O
Organic weed, insect pest, and disease management	O	O	O	O	O
Water management	O	O	O	O	O
Risk management/crop insurance	O	O	O	O	O
Technology assistance with processing/value added products	O	O	O	O	O
Food safety, FSMA, and other food safety requirements	O	O	O	O	O
Organic certification regulations	O	O	O	O	O
Organic system planning	O	O	O	O	O
Meeting National Organic Program (NOP) requirements for biodiversity and resource conservation	O	O	O	O	O
Other, please specify: _____	O	O	O	O	O

Q23. Please list the top two areas where you are having trouble accessing technical assistance for your certified organic operation, and explain why (please be specific).

Area #1: _____
Why are you having trouble accessing technical assistance in this area?

Area #2: _____
Why are you having trouble accessing technical assistance in this area?

Q24. Please indicate your preferred ways of getting information for your certified organic operation.

	Not preferred	Slightly preferred	Preferred	Highly preferred
Conferences and workshops	O	O	O	O
Email newsletters, groups, and listservs	O	O	O	O
Films or documentaries	O	O	O	O
In-person classes and/or coursework	O	O	O	O
On-farm demonstrations and field days	O	O	O	O
Online courses and webinars	O	O	O	O
Online materials (digital materials and/or websites)	O	O	O	O
Online videos	O	O	O	O
Printed materials (books, manuals, pamphlets, magazines)	O	O	O	O
Scientific journals	O	O	O	O
Social media (Facebook, Instagram, Twitter)	O	O	O	O
Other, please specify: _____	O	O	O	O

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Q25. How useful have each of the following resources been to you in obtaining information about organic production and non-production topics?

	Not at all useful	Slightly useful	Mostly useful	Very useful	Haven't used this resource
Certified organic farmers	O	O	O	O	O
Other farmers	O	O	O	O	O
Extension personnel focusing on organic production	O	O	O	O	O
Extension personnel focusing on conventional production	O	O	O	O	O
Handlers and processors	O	O	O	O	O
Organic certifiers	O	O	O	O	O
Crop consultants	O	O	O	O	O
State agriculture department	O	O	O	O	O
Natural Resources Conservation Service (NRCS)	O	O	O	O	O
Online resources	O	O	O	O	O
Non-profit agriculture organizations	O	O	O	O	O
Grower association	O	O	O	O	O
Buyers	O	O	O	O	O
Suppliers	O	O	O	O	O
Other, please specify: _____	O	O	O	O	O

Seed Information

Q26. Last year, by amount spent, approximately what percentage of your seed (organic or non-treated conventional) did you get from the following sources? *Fill in your best general estimate below. The sum of the percentages for each item should add up to 100%.*

☐ I do not use seed on my farm → Skip to Q32

Source for Seed:	% From Each Source
Produced your own	_____%
Supplied by processor or buyer	_____%
Purchased from seed company (via sales representative, catalog, website or other source)	_____%
Garden centers or farm supply stores	_____%
Other farmers	_____%
Other, please specify: _____	_____%
Other, please specify: _____	_____%
	TOTAL = 100%

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Q27. Over the last 3 years (2017-2019), by amount spent, have you decreased or increased the percentage of organic seed that you use for each of the following crop types?

Crop Type	Decreased the %	About the same %	Increased the %	Already at 100%	Did not grow this crop type
Vegetable crops	O	O	O	O	O
Cover crops/green pasture	O	O	O	O	O
Field crops	O	O	O	O	O
Forage crops	O	O	O	O	O

Q28. Over the last 3 years (2017-2019) has your certifier requested that you take greater steps to source organic seed?

O Yes → Continue with Q28A
O No → Skip to Q29

Q28A. Which additional steps has your certifier requested?

Steps For Sourcing Organic Seed	Yes	No
Conducting trials of available organic varieties	O	O
Searching Organic Seed Finder or another online database	O	O
Researching more than 3 seed catalogs	O	O
Requesting seed in a timely manner	O	O
Contracting organic seed production	O	O
Other, please specify: _____	O	O

Q29. Over the last three years (2017-2019), how much were each of the following a factor in your decision NOT to purchase organic seed?

	Not a factor	Slight factor	Moderate factor	Significant factor
Lack of seed treatments, such as pelleting or priming	O	O	O	O
Processor (buyer) requires or supplies varieties that are not available organically	O	O	O	O
Insufficient quantity of seed	O	O	O	O
Save my own seed	O	O	O	O
Distrust of organic seed quality	O	O	O	O
Price	O	O	O	O
Specific variety not available as organic seed	O	O	O	O
Lack of desirable genetic traits	O	O	O	O
Other, please specify: _____	O	O	O	O

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Q30. Please indicate the extent to which you disagree or agree with the following statements.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Seed companies should conduct testing and report rates of GE (GMO) crop contamination in organic and conventional seed.	O	O	O	O	O
The federal regulations that oversee GE crop (GMO) approvals are adequate for protecting my organic farm product(s) from potential contamination by GE crops (GMOs).	O	O	O	O	O
Unintentionally planting GE-contaminated seed on my farm puts at risk the integrity of my organic products.	O	O	O	O	O
Organic seed is important to the integrity of organic food production.	O	O	O	O	O
Varieties bred for organic production are important to the overall success of organic agriculture.	O	O	O	O	O

Q31. Do you think there are crops in need of organic plant breeding?

O No → Skip to Q33
O Yes → Continue with Q32

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Q32. In this next section, please choose two crops you think are most in need of organic plant breeding (crop improvement). Then for both of these crops, please indicate which two traits are most in need of improvement.

32A: FIRST CROP IN MOST NEED OF IMPROVEMENT: _____

32B. Referring to the crop listed above, select the TOP 2 TRAITS of that crop in need of improvement from the list below.

- ☐ Nutrient use efficiency
- ☐ Flavor
- ☐ Appearance
- ☐ Cold hardiness/season extension
- ☐ Drought tolerance
- ☐ Heat tolerance
- ☐ Yield
- ☐ Disease resistance/tolerance (please specify): _____
- ☐ Germination/seedling vigor
- ☐ Competitiveness with weeds
- ☐ Maturity/earliness
- ☐ Quality
- ☐ Other trait, please specify: _____
- ☐ Other trait, please specify: _____

32C: SECOND CROP IN MOST NEED OF IMPROVEMENT: _____

32D. Referring to the crop listed above, select the TOP 2 TRAITS of that crop in need of improvement from the list below.

- ☐ Nutrient use efficiency
- ☐ Flavor
- ☐ Appearance
- ☐ Cold hardiness/season extension
- ☐ Drought tolerance
- ☐ Heat tolerance
- ☐ Yield
- ☐ Disease resistance/tolerance (please specify): _____
- ☐ Germination/seedling vigor
- ☐ Competitiveness with weeds
- ☐ Maturity/earliness
- ☐ Quality
- ☐ Other trait, please specify: _____
- ☐ Other trait, please specify: _____

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Q33. Which of the following categories best fits your situation pertaining to producing organic seed?

- ○ Produce both organic seed for on-farm and for commercial use → Skip to Q37
- ○ Produce organic seed for commercial use only → Skip to Q37
- ○ Produce organic seed for on-farm use only → Continue with Q34
- ○ Do not produce organic seed either for on-farm or for commercial use → Continue with Q34

Q34. Are you interested in producing organic seed for commercial use at some point in the future?

- ○ Not interested → Skip to Q36
- ○ Somewhat interested → Continue with Q35
- ○ Interested → Continue with Q35
- ○ Very interested → Continue with Q35

Q35. How interested are you in taking a training on producing organic seed for commercial use?

- ○ Not interested
- ○ Somewhat interested
- ○ Interested
- ○ Very interested

Q36. Are you interested in conducting plant breeding (crop improvement) on your farm?

- ○ Not interested → Skip to Q38
- ○ Somewhat interested → Continue with Q37
- ○ Interested → Continue with Q37
- ○ Very interested → Continue with Q37

Q37. How interested are you in learning about economic opportunities related to plant breeding (crop improvement) on your farm?

- ○ Not interested
- ○ Somewhat interested
- ○ Interested
- ○ Very interested

Q38. How interested are you in trainings that help you conduct plant breeding (crop improvement) on your farm?

- ○ Not interested
- ○ Somewhat interested
- ○ Interested
- ○ Very interested

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About You

Q39. How many years have you been farming or ranching? *Please respond in number form (e.g., 17).*

Number of years farming or ranching: _____

Q40. Where or how did you learn to farm organically? *Check all that apply.*

- ☐ Farm apprenticeship
- ☐ On-farm training program
- ☐ Mentor farmer
- ☐ Family member
- ☐ Self-taught
- ☐ Work experience on a farm or ranch
- ☐ Higher education in an agricultural field
- ☐ Other, please specify: _____

Q41. In what year were you born? *Please respond in number form (e.g., 1957).*

YEAR: __ __ __ __

Q42. Please specify your race/ethnicity: *Please select Yes or No for each row.*

	Yes	No
Asian/Pacific Islander	○	○
Black or African American	○	○
Hispanic or Latinx	○	○
Native American or American Indian	○	○
White	○	○
Other, please specify:_____	○	○
Prefer not to say	○	○

Q43. Please specify your sex:

- ○ Male
- ○ Female
- ○ Non-binary
- ○ Other, please specify:_____

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Q44. What is the primary language you speak at home?

- ○ English
- ○ Spanish
- ○ Mandarin
- ○ Other, please specify:_____

Thank you for your participation in the OFRF and OSA 2019 Survey of Organic Farmers and Ranchers.

1. To be entered into a drawing to win a $100 gift card to REI, please provide:
   Email Address: _____
2. If you are interested in participating in a follow up organic seed producer survey, please provide:
   Email Address: _____
   Phone Number: _____
3. If you are willing to be contacted for additional information, please provide:
   Email Address: _____

Final Comments

If you have any final comments or concerns for the researchers, please add them here. Also, please provide any comments you have about organic farming or feedback regarding this survey.

If you have any questions for the researchers, feel free to contact them at the email/phone numbers provided in your invitation.

20 ver.A

Appendix B: Transition Survey Instrument

"Accessing Research, Education and Outreach Needs to Meet the Growing Demand for Organic Products" questionnaire for transitioning producers is available online at https://bit.ly/NORA2022-transition-survey.

1

Assessing Research, Education and Outreach Needs to Meet the Growing Demand for Organic Products

2020 Survey of *Transitioning* Farmers and Ranchers

You can help ensure future research investments are relevant and responsive to the top needs of organic and transitioning producers!

The Organic Farming Research Foundation (OFRF) and Organic Seed Alliance (OSA) request your participation in an important national survey to identify the top challenges facing farmers and ranchers who are **transitioning land to certified organic**. This feedback is critical to building a comprehensive roadmap for future research investments that help advance organic agriculture across the U.S. Results will be published in updates of OFRF's National Organic Research Agenda (NORA) report and OSA's State of Organic Seed (SOS) report.

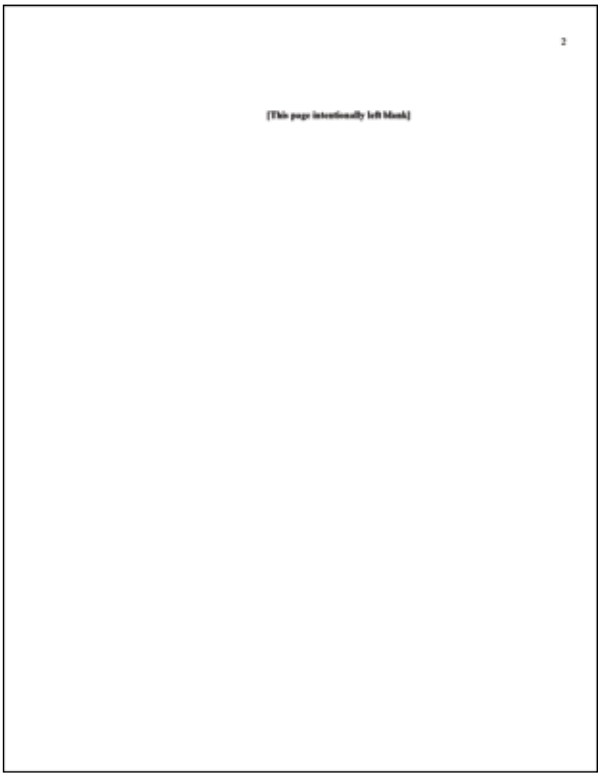
The survey is voluntary and all responses will be kept confidential. You can skip any questions you prefer not to answer. Under no circumstance will your identity be shared in the resulting data and reports. This work is supported by the Organic Agriculture Research and Extension Initiative (OREI) grant no. 2019-51300-30249 from the USDA National Institute of Food and Agriculture. If you have any questions about the survey, please contact Lauren Snyder from the Organic Farming Research Foundation at lauren@ofrf.org.

Please have the person most familiar with the day-to-day management of your farm or ranch complete this survey (such as the farm owner, farm manager, or primary farm operator).

If you are not the person who is most familiar with the operation, please give this survey to the person who is most familiar with the farm/ranch operation.

Please think about both owned and leased acres that are managed by your operation and are currently in transition from conventional production to organic production.

This survey is targeted to operations that are transitioning land to certified organic. We will refer to this process throughout the survey as "transitioning" or "transition."



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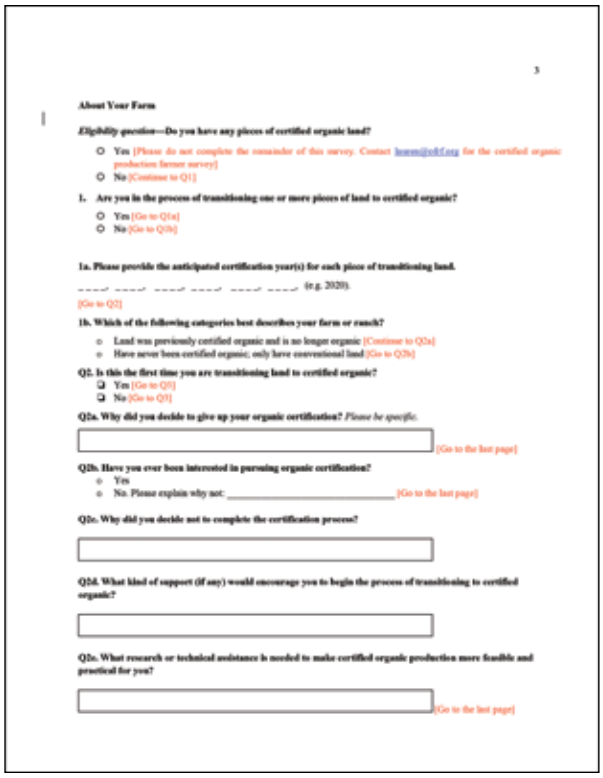

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About Your Farm

***Eligibility question*—Do you have any pieces of certified organic land?**

- ○ Yes [Please do not complete the remainder of this survey. Contact lauren@ofrf.org for the certified organic production farmer survey]
- ○ No [Continue to Q1]

1. Are you in the process of transitioning one or more pieces of land to certified organic?

- ○ Yes [Go to Q1a]
- ○ No [Go to Q1b]

1a. Please provide the anticipated certification year(s) for each piece of transitioning land.

_____, _____, _____, _____, _____, _____ (e.g. 2020).

[Go to Q2]

1b. Which of the following categories best describes your farm or ranch?

- ○ Land was previously certified organic and is no longer organic [Continue to Q2a]
- ○ Have never been certified organic; only have conventional land [Go to Q2b]

Q2. Is this the first time you are transitioning land to certified organic?

- ❑ Yes [Go to Q3]
- ❑ No [Go to Q3]

Q2a. Why did you decide to give up your organic certification? *Please be specific.*

[Go to the last page]

Q2b. Have you ever been interested in pursuing organic certification?

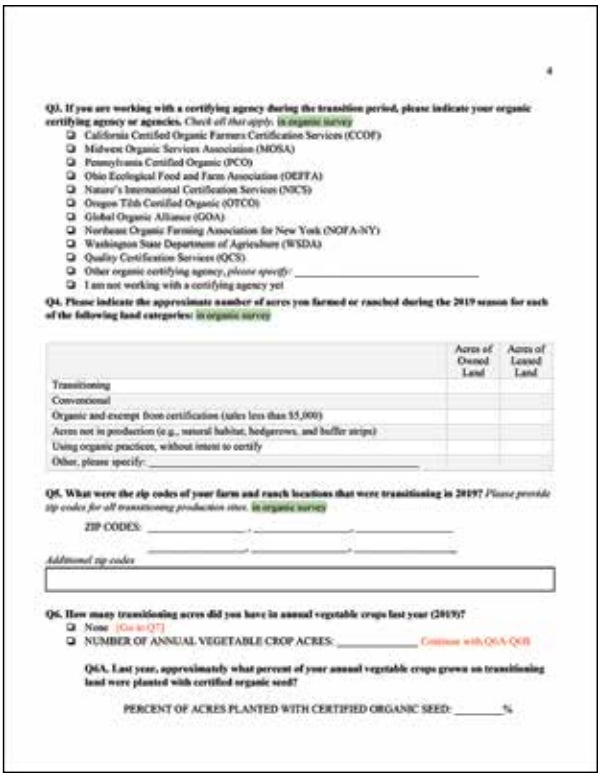
- ○ Yes
- ○ No. Please explain why not: _____ [Go to the last page]

Q2c. Why did you decide not to complete the certification process?

Q2d. What kind of support (if any) would encourage you to begin the process of transitioning to certified organic?

Q2e. What research or technical assistance is needed to make certified organic production more feasible and practical for you?

[Go to the last page]



4

Q3. If you are working with a certifying agency during the transition period, please indicate your organic certifying agency or agencies. *Check all that apply.* in organic survey

- ❑ California Certified Organic Farmers Certification Services (CCOF)
- ❑ Midwest Organic Services Association (MOSA)
- ❑ Pennsylvania Certified Organic (PCO)
- ❑ Ohio Ecological Food and Farm Association (OEFFA)
- ❑ Nature's International Certification Services (NICS)
- ❑ Oregon Tilth Certified Organic (OTCO)
- ❑ Global Organic Alliance (GOA)
- ❑ Northeast Organic Farming Association for New York (NOFA-NY)
- ❑ Washington State Department of Agriculture (WSDA)
- ❑ Quality Certification Services (QCS)
- ❑ Other organic certifying agency, *please specify:* _____
- ❑ I am not working with a certifying agency yet

Q4. Please indicate the approximate number of acres you farmed or ranched during the 2019 season for each of the following land categories: in organic survey

	Acres of Owned Land	Acres of Leased Land
Transitioning		
Conventional		
Organic and-exempt from certification (sales less than $5,000)		
Acres not in production (e.g., natural habitat, hedgerows, and buffer strips)		
Using organic practices, without intent to certify		
Other, please specify: _____		

Q5. What were the zip codes of your farm and ranch locations that were transitioning in 2019? *Please provide zip codes for all transitioning production sites.* in organic survey

ZIP CODES: _____, _____, _____

_____, _____, _____

Additional zip codes

Q6. How many transitioning acres did you have in annual vegetable crops last year (2019)?

- ❑ None [Go to Q7]
- ❑ NUMBER OF ANNUAL VEGETABLE CROP ACRES: _____ Continue with Q6A-Q6B

Q6A. Last year, approximately what percent of your annual vegetable crops grown on transitioning land were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q6B. What were your top 3 annual vegetable crops by acreage last year (2019) grown on transitioning land? Approximately what percent of certified organic seed did you use for each last year?

Top Vegetable Crops Based on Acreage	% Certified Organic Seed for this Crop
Crop 1	%
Crop 2	%
Crop 3	%

Q7. How many transitioning acres did you have in annual cover crops/green pasture last year (2019)?

- ❑ None [Go to Q8]
- ❑ NUMBER OF COVER CROP/GREEN PASTURE ACRES: _____ [Continue with Q7A-Q7B]

Q7A. Last year, approximately what percent of your annual cover crops/green pasture grown on transitioning land were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q7B. What were your top 3 annual cover crops/green pasture by acreage last year (2019) grown on transitioning land? Approximately what percent of certified organic seed did you use for each last year?

Top Cover Crops/Green Pasture Based on Acreage	% Certified Organic Seed for this Crop
Crop 1	%
Crop 2	%
Crop 3	%

Q8. How many transitioning acres did you have in field crops last year (2019)?

- ❑ None [Go to Q9]
- ❑ NUMBER OF FIELD CROP ACRES: _____ [Continue with Q8A-Q8B]

Q8A. Last year, approximately what percent of your field crops grown on transitioning land were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q8B. What were your top 3 field crops by acreage last year (2019) grown on transitioning land? Approximately what percent of certified organic seed did you use for each last year?

Top Field Crops Based on Acreage	% Certified Organic Seed for this Crop
Crop 1	%
Crop 2	%
Crop 3	%

Q9. How many transitioning acres did you have in forage crops last year (2019)?

- ❑ None [Skip to Q10]
- ❑ NUMBER OF FORAGE CROP ACRES: _____ [Continue with Q9A-Q9B]

Q9A. Last year, approximately what percent of your forage crops grown on transitioning land were planted with certified organic seed?

PERCENT OF ACRES PLANTED WITH CERTIFIED ORGANIC SEED: _____%

Q9B. What were your top 3 forage crops by acreage last year (2019) grown on transitioning land? Approximately what percent of certified organic seed did you use for each last year?

Top Forage Crops Based on Acreage	% Certified Organic Seed for this Crop
Crop 1	%
Crop 2	%
Crop 3	%

Q10. For your transitioning land, do you grow or raise the following products for sale? *Mark Yes or No for each.* in organic survey

	Yes	No		Yes	No
Grains for livestock and poultry feed	O	O	Herbs	O	O
Grains, dry beans, and pulses for human consumption	O	O	Cut flowers	O	O
Oil seeds	O	O	Mushrooms	O	O
Cotton	O	O	Berries	O	O
Forages	O	O	Vineyard	O	O
Livestock and poultry (sold live)	O	O	Tree fruit	O	O
Meat	O	O	Tree nuts	O	O
Poultry (meat)	O	O	Maple syrup	O	O
Dairy	O	O	Peanuts	O	O
Eggs	O	O	Nursery crops	O	O
Animal fiber	O	O	Seeds for planting (all crops)	O	O
Vegetables	O	O	Other, please specify:_____	O	O

Q11. What are the top three products by dollar value that you grow or raise for sale on your transitioning land? in organic survey

Product 1: _____
Product 2: _____
Product 3: _____

Q12. For your transitioning operation, how often do you use the following inputs? *Select one response in each row or mark "Not applicable" for those that do not apply to your transitioning operation.* in organic survey

	Never	Sometimes	Often	Very often	Not applicable
Compost					
Compost teas and other microbial inoculants					
Manure and other animal byproducts					
Organic or natural mineral fertilizers/amendments					
Reduced irrigation or water conservation					
Other, please specify: _____					

Q13. For your transitioning operation, how often do you use the following practices? *Select one response in each row or mark "Not applicable" for those that do not apply to your transitioning operation.* in organic survey

	Never	Sometimes	Often	Very often	Not applicable
Cover crops and green manures					
Crop rotations					
Intercropping					
Other, please specify: _____					

Q14. Please indicate the approximate number of acres of the following buffers or habitat plantings you have on the land you are transitioning. in organic survey

	Number of Acres
Buffer strips or border rows	
Hedgerows, windbreaks, or shelterbelts	
Wildflower strips	
Other, please specify: _____	

Decision to Transition

Q15. When you first decided to pursue organic certification for this farm or ranch, which of the following were motivating factors? *Mark Yes or No for each.*

	Yes	No
Potential increase in profit	O	O
Access to the expanding market for organics	O	O
Specific market opportunity or contract from a buyer	O	O
Response to a community need for organically produced products	O	O
Concerns about human health	O	O
Concerns about farm worker well-being	O	O
Concerns about the environment and biodiversity	O	O
Potential enhancement of farm environmental sustainability	O	O
Greater resilience to the impacts of climate change through organic practices	O	O
Personal and/or family values	O	O
Other, *please specify*: _____	O	O

Q16. In your own words, please tell us why you decided to transition land to certified organic.

Q17. Please indicate the approximate number of acres you farmed or ranched on transitioning land during the 2019 season for each of the following land categories:

	Acres of Owned Land	Acres of Leased Land
Fallow (Please describe the condition of your fallow land: Sod, wooded, brushy, invasive vegetation, native vegetation, green manure, bare soil, etc.) _____		
Cover crops		
Pasture or hay		
Growing products that will be sold as conventional		
Growing products that will be sold with a "Transitional" label		
Other, please specify: - _____		

9

Challenges and Research Needs

Q18. Below is a list of production challenges that farmers and ranchers might face when transitioning to organic certification. How much has each been a challenge to you during your operation's transition to organic certification? *Select one response in each row or mark "Not applicable" for those that do not apply to your farm or ranch.* in organic survey

	Not a challenge 1	2	3	4	Strong challenge 5	Not applicable
Finding appropriate organic crop varieties and seed for your operation						
Seed production/seed saving						
Maintaining adequate yields						
Managing production costs						
Managing animal production and health						
Grazing and pasture management						
Managing crop rotations						
Utilizing cover crops and green manures						
Integrating perennials and permaculture design						
Managing soil fertility and crop nutrition						
Optimizing soil structure, avoiding soil erosion and degradation						
Minimizing adverse impacts of tillage on soil health						
Drought management						
Access to water resources						
Irrigation and water use						
Post-harvest handling methods						
Controlling weeds						
Controlling insect pests						
Controlling disease pressure						
Adapting to climate change						
Enhancing agricultural biodiversity						
Managing pollinators and habitat for pollinators						
Managing the farm as a system (moving away from input-substitution to obtain desired outcomes)						
Other, please specify: _____						

Q19. Please tell us about the top two production challenges on your transitioning operation and explain what additional research and information would be helpful (please be specific). in organic survey

Production Challenge #1: _____

- What additional research and information would be helpful for addressing this challenge?

10

Production Challenge #2: _____

- What additional research and information would be helpful for addressing this challenge?

Q20. Below is a list of non-production challenges that farmers and ranchers might face when transitioning to organic certification. How much has each been a challenge to you during your operation's transition to organic? *Select one response in each row or mark "Not applicable" for those that do not apply to your farm or ranch.* in organic survey

	Not a challenge 1	2	3	4	Strong challenge 5	Not applicable
Accessing labor						
Accessing land						
Accessing capital and/or financing						
Managing business activities						
Farm business planning						
Developing infrastructure						
Finding and developing markets for organic products						
Cost of organic certification						
Meeting organic certification requirements						
Meeting recordkeeping requirements of organic certification						
Understanding and following food safety standards						
Risk of contamination from genetically engineered crops						
Community relations						
Relations with other farmers						
Social pressure to not farm organically						
Farm succession planning						
Other, please specify: _____						

Q21. Please tell us about the top two non-production challenges on your transitioning operation and explain what additional research and information would be helpful (please be specific). in organic survey

Production Challenge #1: _____

- What additional research and information would be helpful for addressing this challenge?

11

Production Challenge #2: _____

- What additional research and information would be helpful for addressing this challenge?

Q22. Overall, how well do you feel that your current production and non-production research and information needs are being met as you transition to organic certification? in organic survey

- ○ Not well at all
- ○ Not very well
- ○ Somewhat well
- ○ Very well
- ○ Don't know

Q23. How concerned are you about the following topics for organic agriculture? in organic survey

	Not concerned	Somewhat concerned	Concerned	Very concerned	Not applicable
Access to certified organic seeds					
Access to seeds bred for organic systems					
Access to certified organic animal feed					
Imbalance of domestic certified organic supply and demand					
Industrial organic					
Lack of skilled labor					
Organic fraud and integrity of USDA organic label					
Animal welfare					
Crop contamination (e.g., GMOs, pesticide drift)					
Use of a transitional label					
Availability of organic research funds					
Access to agricultural service providers who are knowledgeable about certified organic operations					
Adaptation to climate change					
Other, please specify: _____					

12

Marketing Outlets

Q24. For 2019, please estimate the percent of your sales from your transitioning operation in the following marketing outlets. *The sum of the percentages in A through F should equal 100%.* in organic survey

	% of All Certified Organic Sales
A. Direct to consumer (e.g., farmer's market, CSA, website sales)	_____%
B. Direct to retail (e.g., local food store, supermarket, restaurant)	_____%
C. Wholesale (e.g., processor, distributor, broker)	_____%
D. Food hub or cooperative	_____%
E. Institutions (e.g., schools, hospitals)	_____%
F. Other, please specify: _____	_____%
TOTAL	= 100%

Q25. For 2019, please estimate the percent of your sales from your transitioning operation in the following geographic categories. *The sum of the percentages in A through D should equal 100%.* in organic survey

	% of All Certified Organic Sales
A. Local (within 100 miles)	_____%
B. Regional (more than 100 miles, but less than 500 miles)	_____%
C. National (500 miles or farther)	_____%
D. International	_____%
TOTAL	= 100%

13

How You Get Information

Q26. For your transitioning operation, what is your need for technical assistance on the following topics? in organic survey

	No need	Little need	Some need	Strong need	Not Applicable
Land access					
Labor needs					
Access to capital/resources					
Business and financial planning					
Securing sales channels					
Logistics of product distribution					
Transportation options					
Legal assistance					
Livestock production and health					
Integrating livestock into organic production					
Production assistance					
Soil fertility and management of crop nutrients					
Soil conservation and soil health					
Organic weed, insect pest, and disease management					
Water management					
	No need	Little need	Some need	Strong need	Not Applicable
Risk management/crop insurance					
Technology assistance with processing/value added products					
Food safety, FSMA, and other food safety requirements					
Organic certification regulations					
Organic system planning					
Meeting National Organic Program (NOP) requirements for biodiversity and resource conservation					
Other, please specify: _____					

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Q27. Please list the top two areas where you are having trouble accessing technical assistance for your transitioning operation, and explain why (please be specific). in organic survey

Area #1: _____

- Why are you having trouble accessing technical assistance in this area?

Area #2: _____

- Why are you having trouble accessing technical assistance in this area?

Q28. Please indicate your preferred ways of getting information for your transitioning operation. in organic survey

	Not preferred	Slightly preferred	Preferred	Highly preferred
Conferences and workshops				
Email newsletters, groups, and listservs				
Films or documentaries				
In-person classes and/or coursework				
On-farm demonstrations and field days				
Online courses and webinars				
Online materials (digital materials and/or websites)				
Online videos				
Printed materials (books, manuals, pamphlets, magazines)				
Scientific journals				
Social media (Facebook, Instagram, Twitter)				
Other, please specify: _____				

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Q29. How useful have each of the following resources been to you in obtaining information about organic production and non-production topics? in organic survey

	Not at all useful	Slightly useful	Mostly useful	Very useful	Haven't used this resource
Certified organic farmers					
Other farmers					
Extension personnel focusing on organic production					
Extension personnel focusing on conventional production					
Handlers and processors					
Organic certifiers					
Crop consultants					
State agriculture department					
Natural Resources Conservation Service (NRCS)					
Online resources					
Non-profit agriculture organizations					
Grower association					
Buyers					
Suppliers					
Other, please specify: _____					

Q30. Have you received training, information, or support on the following topics? *Please check all that apply and indicate where you received the training, information, or support in the blank space next to each option.*

- ❑ Accessing transportation _____
- ❑ Writing an organic system plan _____
- ❑ Keeping necessary records for organic certification _____
- ❑ Receiving technical advice on organic standards _____
- ❑ Finding affordable land _____
- ❑ Navigating the federal cost share program _____
- ❑ Obtaining financial assistance or cost share for certification _____
- ❑ Obtaining a price premium during transition period _____
- ❑ Obtaining financial incentive to transition to organic _____
- ❑ Obtaining capital resources _____
- ❑ Receiving on-farm organic production advice _____
- ❑ Receiving on-farm production advice specifically for land in transition _____
- ❑ Restoring soil and ecosystem health on land in transition _____
- ❑ Managing costs to maintain economic viability during transition _____
- ❑ Other, please specify: _____

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Q31. Please tell us about the resources you have relied on to navigate the transitioning period. What people, programs, or organizations have provided you with financial or informational resources, and for what specific topics?

Q32. What resources and information do you wish you had to help you during the transitioning period?

About You

Q33. How many years have you been farming or ranching? *Please respond in number form (e.g., 17).* in organic survey

Number of years farming or ranching: ____

Q34. Where or how did you learn to farm? *Check all that apply.* in organic survey

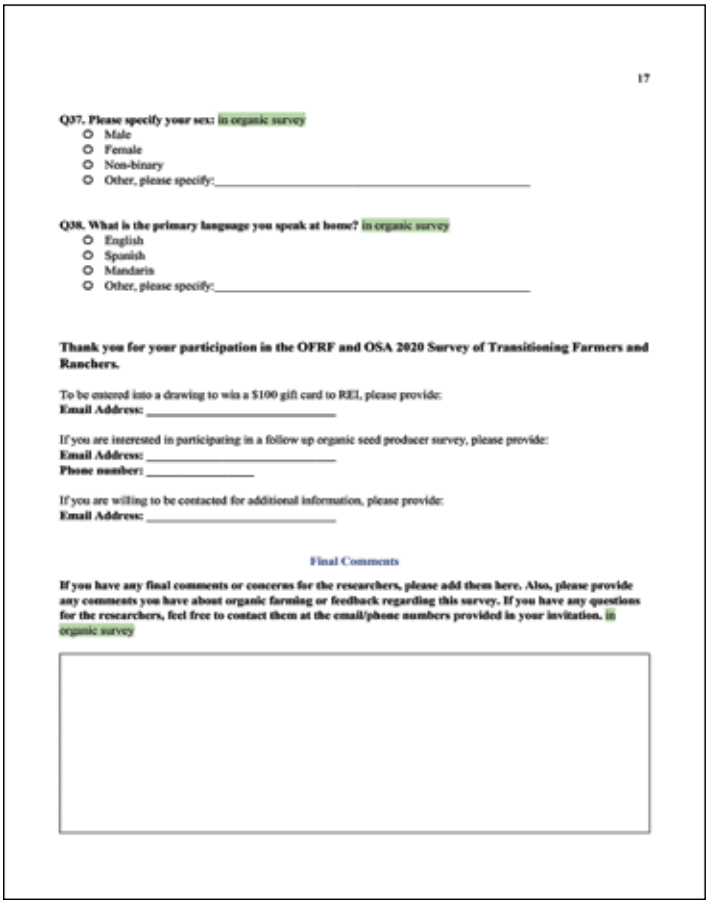
- ❑ Farm apprenticeship
- ❑ On-farm training program
- ❑ Mentor farmer
- ❑ Family member
- ❑ Self-taught
- ❑ Work experience on a farm or ranch
- ❑ Higher education in an agricultural field
- ❑ Other, please specify: _____

Q35. In what year were you born? *Please respond in number form (e.g., 1957)* in organic survey

YEAR (YYYY): _____

Q36. Please specify your race/ethnicity *Please select Yes or No for each row.* in organic survey.

	Yes	No
Asian/Pacific Islander	○	○
Black or African American	○	○
Hispanic or Latinx	○	○
Native American or American Indian	○	○
White	○	○
Other, please specify: _____	○	○
Prefer not to say	○	○



17

Q37. Please specify your sex: in organic survey

- Male
- Female
- Non-binary
- Other, please specify:_____

Q38. What is the primary language you speak at home? in organic survey

- English
- Spanish
- Mandarin
- Other, please specify:_____

Thank you for your participation in the OFRF and OSA 2020 Survey of Transitioning Farmers and Ranchers.

To be entered into a drawing to win a $100 gift card to REI, please provide:
Email Address: _____

If you are interested in participating in a follow up organic seed producer survey, please provide:
Email Address: _____
Phone number: _____

If you are willing to be contacted for additional information, please provide:
Email Address: _____

Final Comments

If you have any final comments or concerns for the researchers, please add them here. Also, please provide any comments you have about organic farming or feedback regarding this survey. If you have any questions for the researchers, feel free to contact them at the email/phone numbers provided in your invitation. in organic survey

Appendix C: Focus Group Moderator's Guide

WARM UP QUESTION: If you are not certified organic, what is the biggest obstacle keeping you from transitioning? If you are certified organic, what was the biggest obstacle you faced when you transitioned to certified organic production?

PROBE: Who, if anyone, did you go to for help (e.g., other farmers, Extension personnel, specific organizations, etc)? What resources, if any, were of value to you?

PROBE: What are or would be your main reasons for becoming certified organic? What has/would motivate you to become certified?

**We are getting ready to move to the next topic, does anyone else want to chime in?

QUESTION 1: What are the main production challenges you currently face?

PROBE: How, if at all, have these challenges changed since you first started farming?

**We are getting ready to move to the next topic, does anyone else want to chime in?

QUESTION 2: What are the main non-production challenges you currently face?

PROBE: How, if at all, have these challenges changed since you first started farming?

**We are getting ready to move to the next topic, does anyone else want to chime in?

QUESTION 3: What research, information, or resources do you currently use to address the production and non-production challenges we just discussed?

PROBE: Where do you get this information or these resources, and from whom do you receive support?

PROBE: How could these resources be improved?

PROBE: Are there resources you think would be really helpful, but you don't currently have access to?

PROBE: What are the biggest obstacles you face when trying to obtain information or resources?

PROBE: Have agricultural extension personnel or resources been useful for you?

**We are getting ready to move to the next topic, does anyone else want to chime in?

—FIVE MINUTE BREAK—

QUESTION 4: We have been hearing from many farmers and ranchers that healthy soils are the foundation to successful production. To what extent do you agree with this perspective? If you tend to disagree, what do you see as your most important natural resource?

PROBE: What techniques do you use to build soil health?

PROBE: Do you have trouble balancing soil health with weed management, and if so how do you address this challenge?

PROBE: Certain organic techniques to build soil health, like cover cropping, require an upfront investment and the benefits are not realized immediately. How do you measure/determine whether these long-term investments are ultimately worth it?

PROBE: How do you cope with that upfront cost? Are there financial resources or programs that have helped you address this challenge? Are there financial resources or programs that don't exist that you wish did?

**We are getting ready to move to the next topic, does anyone else want to chime in?

QUESTION 5: In your experience, what has been the riskiest part of farming organically?

PROBE: What steps have you taken to manage that risk?

PROBE: What research, information, or resources were helpful?

PROBE: Are there resources you think would be really helpful, but you don't currently have access to or that don't exist?

**We are getting ready to move to the next topic, does anyone else want to chime in?

QUESTION 6: To what extent do you feel livestock and poultry play an integral role in the sustainability of farming systems?

[THANK PARTICIPANTS FOR COMING AND REMIND THEM TO COMPLETE THE SURVEYMONKEY SURVEY, IF THEY HAVE NOT ALREADY DONE SO. EXPLAIN WHEN/HOW THEY WILL RECEIVE THEIR $25 VISA GIFT CARD]

SUPPLEMENTAL FIGURES

Table S1

Use of organic certification agencies by organic survey respondents (full organic survey sample).

Survey respondents had the opportunity to indicate which of the listed certifying agencies they use; not all survey participants responded to this question.

Organic Certification Agency	Number of Respondents
California Certified Organic Farmers Certification Services (CCOF)	128
Midwest Organic Services Association (MOSA)	97
Oregon Tilth Certified Organic	96
Ohio Ecological Food and Farm Association (OEFFA)	55
Northeast Organic Farming Association for New York (NOFA-NY)	51
Quality Certification Services (QCS)	50
Washington State Department of Agriculture (WSDA)	50
Global Organic Alliance (GOA)	39
Nature's International Certification Services (NICS)	36
Pennsylvania Certified Organic (PCO)	36

Figure S1:

Use of best management practices by organic survey respondents across commodity categories.

"n" denotes the total number of survey participants who grew the commodity type indicated and provided a response to the corresponding question.

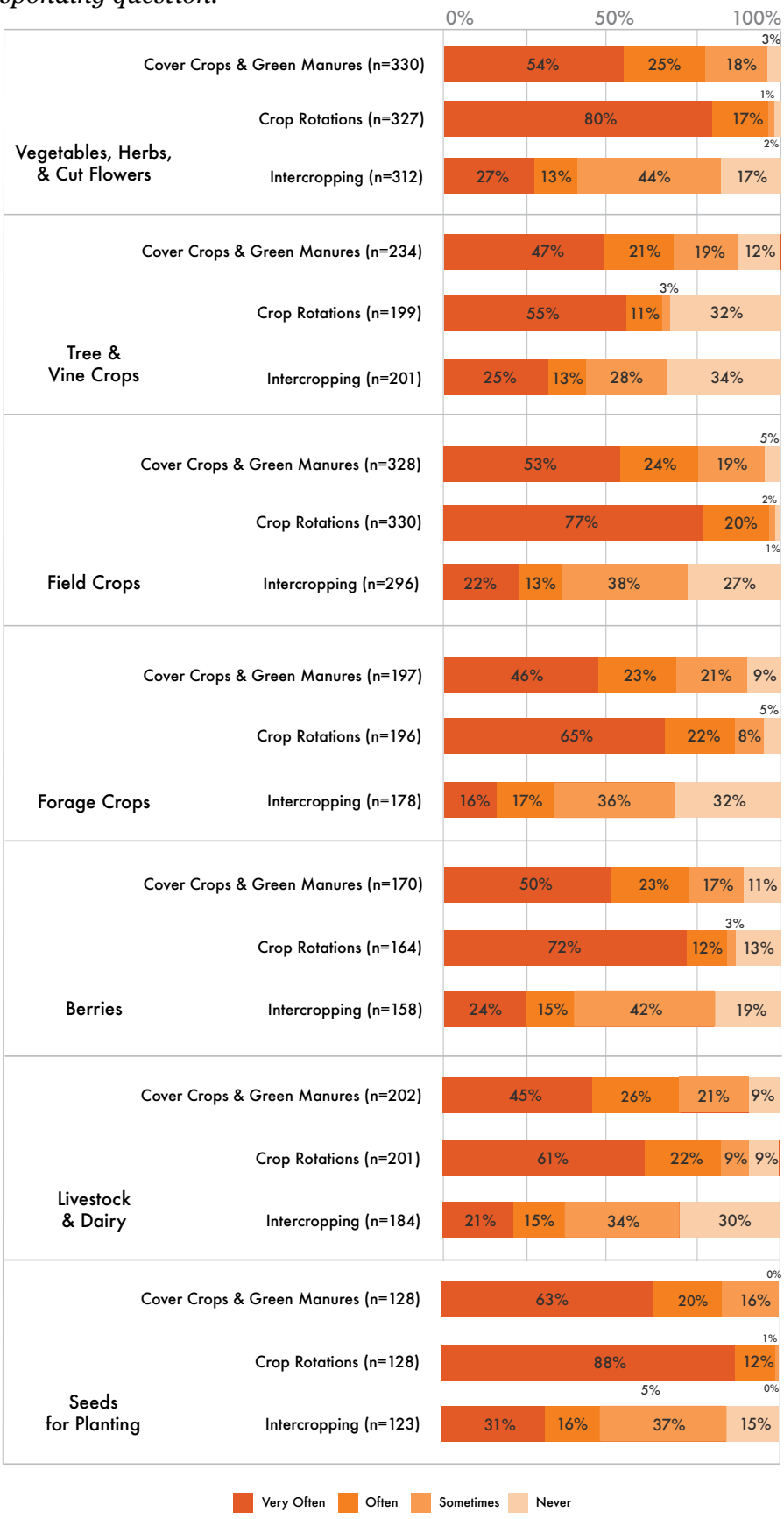


Figure S2

Frequency of implementation of soil health management practices by organic farmers across the four SARE regions.

"n" denotes the total number of survey participants from each SARE region who provided a response for the corresponding practice (i.e., cover crops and green manures, crop rotations, intercropping).

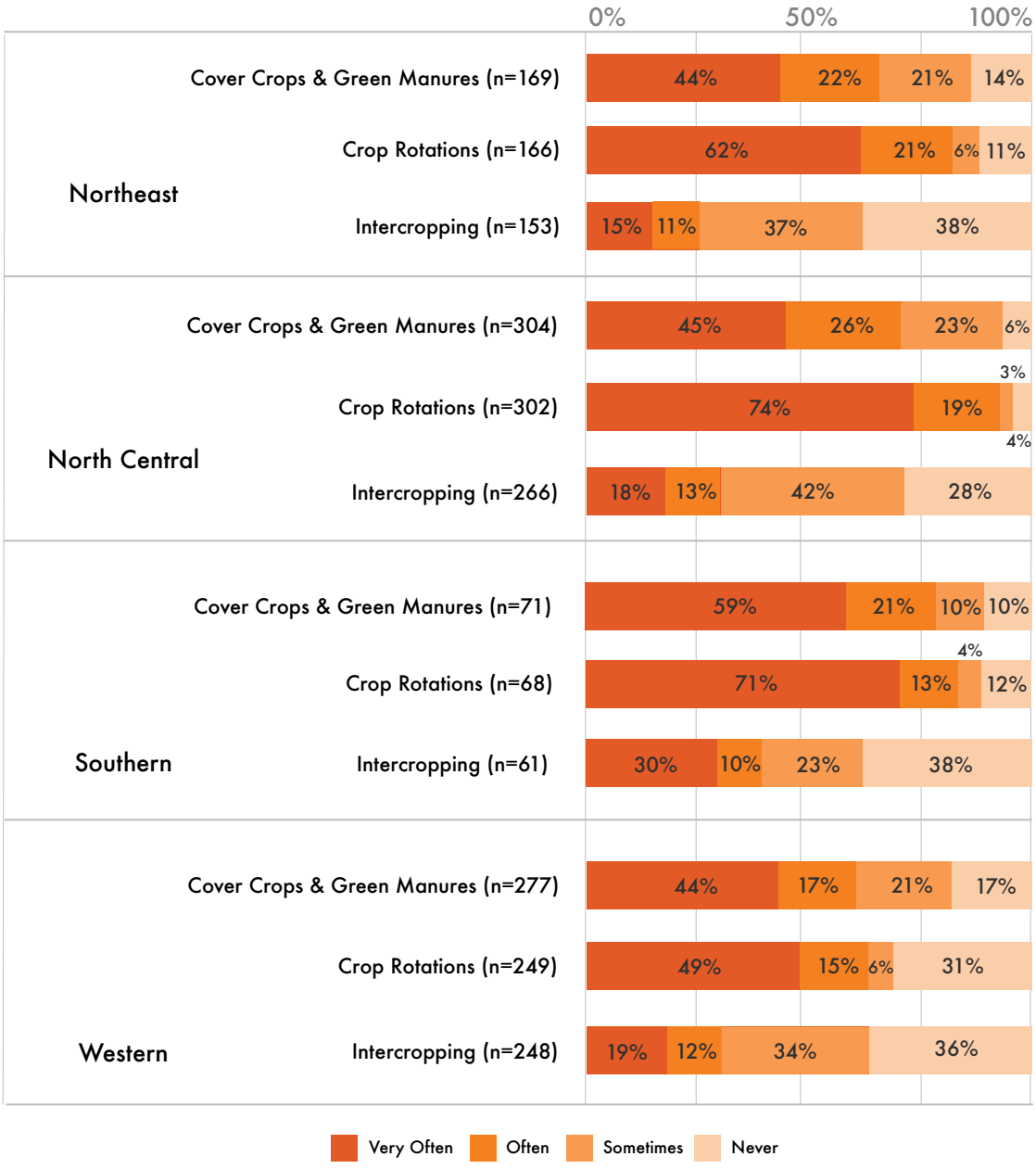


Figure S3

Frequency of implementation of soil health management¬ practices by BIPOC and White organic farmers.

"n" denotes the total number of survey participants in each group who provided a response for the corresponding practice (i.e., cover crops and green manures, crop rotations, intercropping).

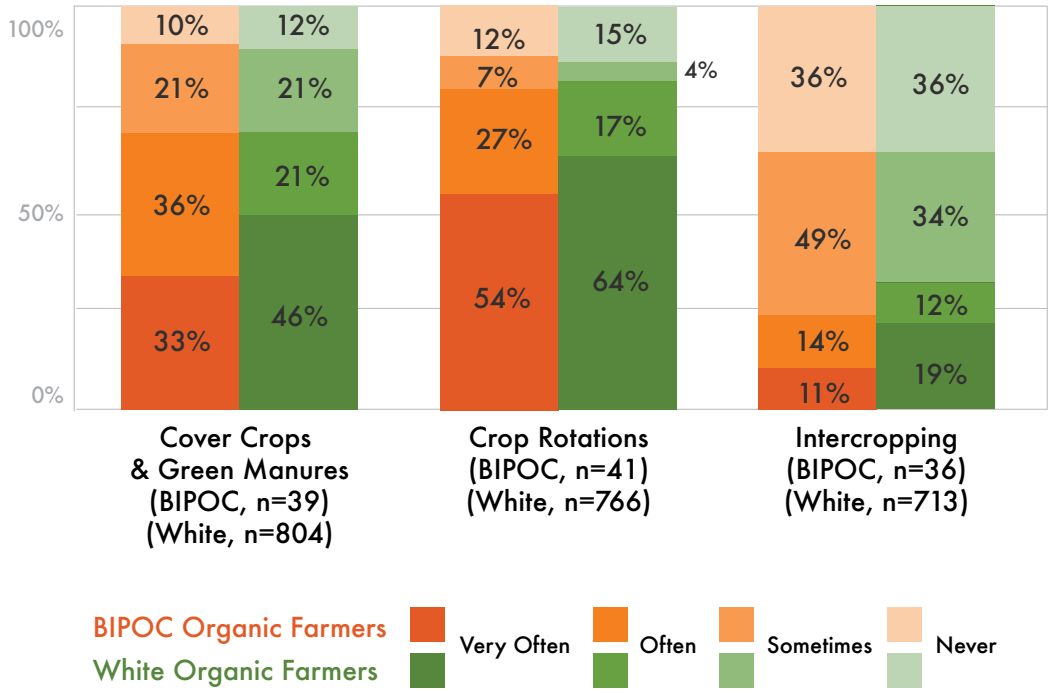


Figure S4

Frequency of implementation of water conservation practices by organic farmers across the four SARE regions.

"n" denotes the total number of survey participants from each SARE region who provided a response.

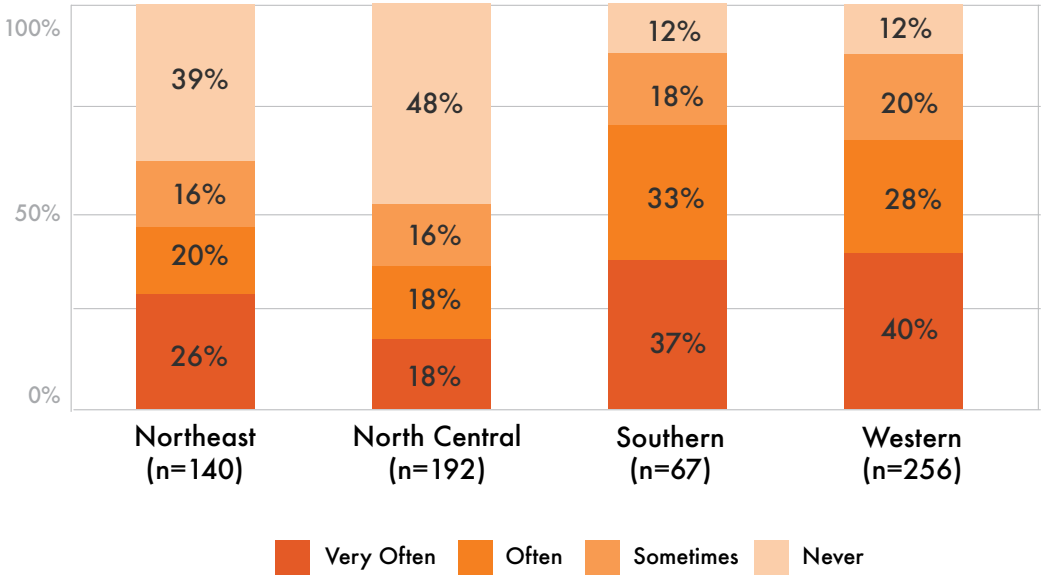


Figure S5

Frequency of implementation of water conservation practices by BIPOC and White organic farmers.

"n" denotes the total number of survey participants in each group who provided a response.

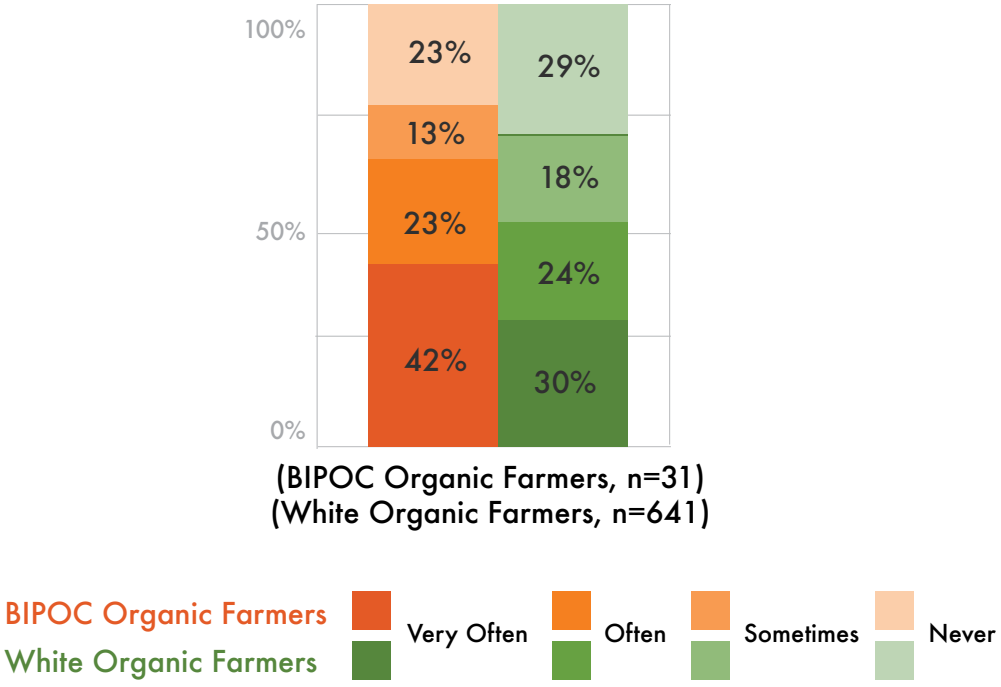


Figure S6

Frequency of use of various types of organic inputs by organic farmers across the four SARE regions.

"n" denotes the total number of survey participants from each SARE region who provided a response for the corresponding input type (i.e., compost, compost teas, manure, organic fertilizers).

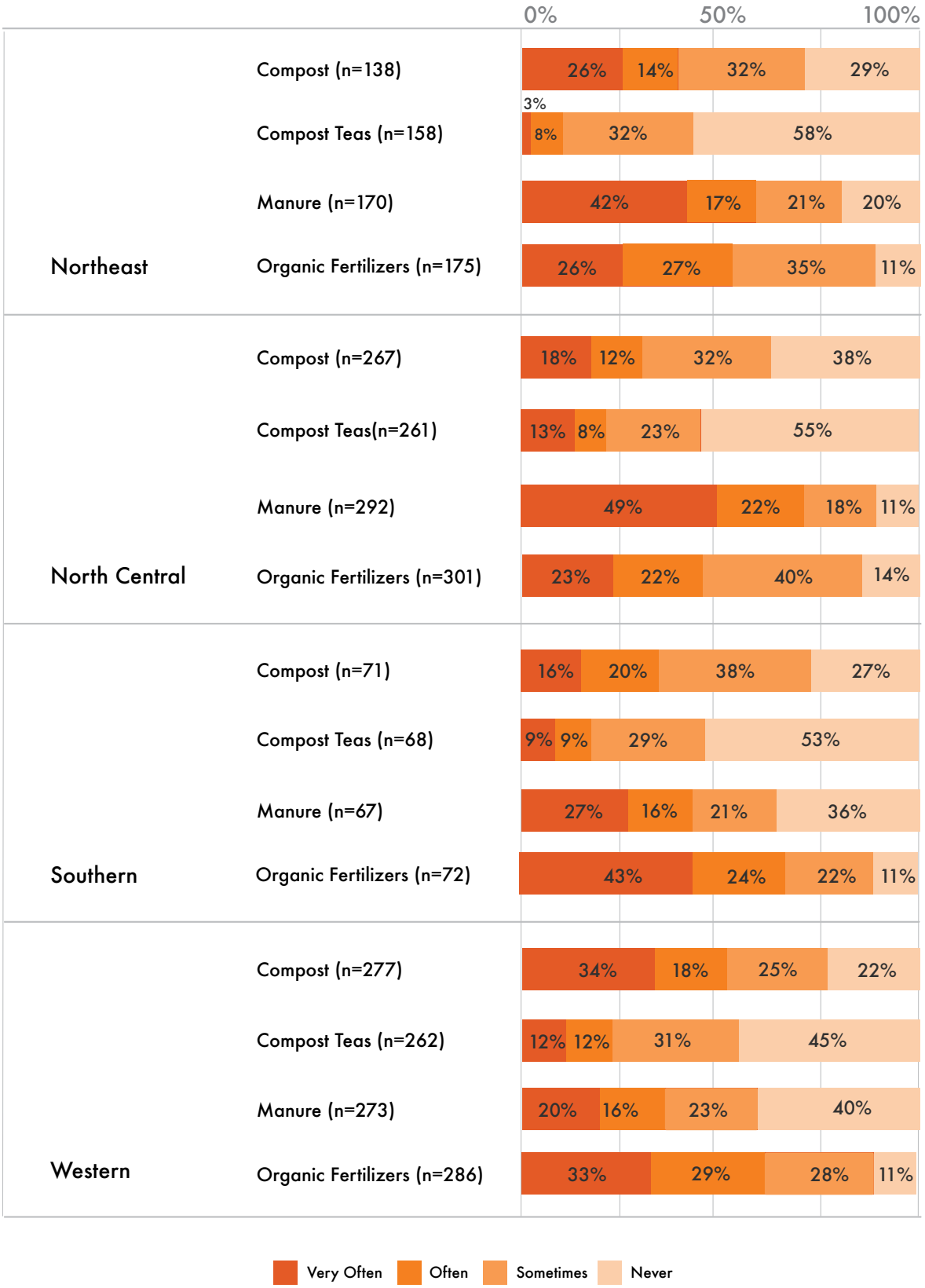


Figure S7

Frequency of use of various types of organic inputs by BIPOC and White organic farmers.

"n" denotes the total number of survey participants in each group who provided a response for the corresponding input type (i.e., compost, compost teas, manure, organic fertilizers).

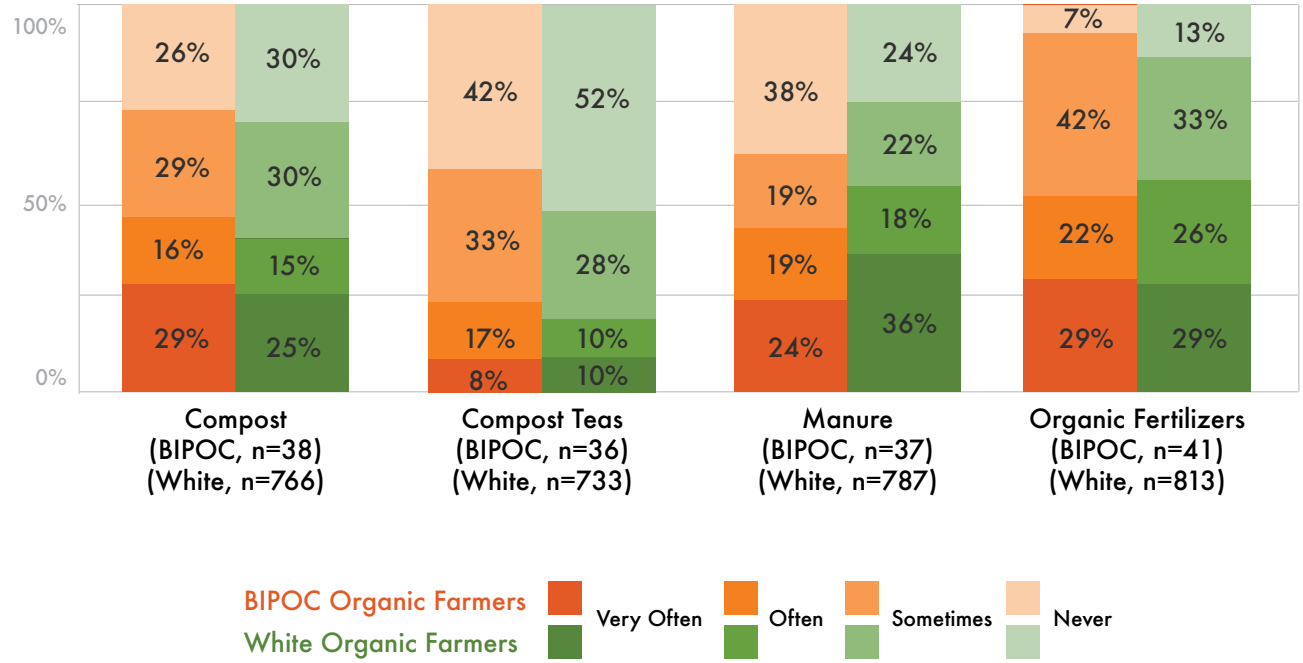


Figure S8

Frequency of use of various types of organic inputs by beginning and experienced organic farmers.

"n" denotes the total number of survey participants in each group who provided a response for the corresponding input type (i.e., compost, compost teas, manure, organic fertilizers).

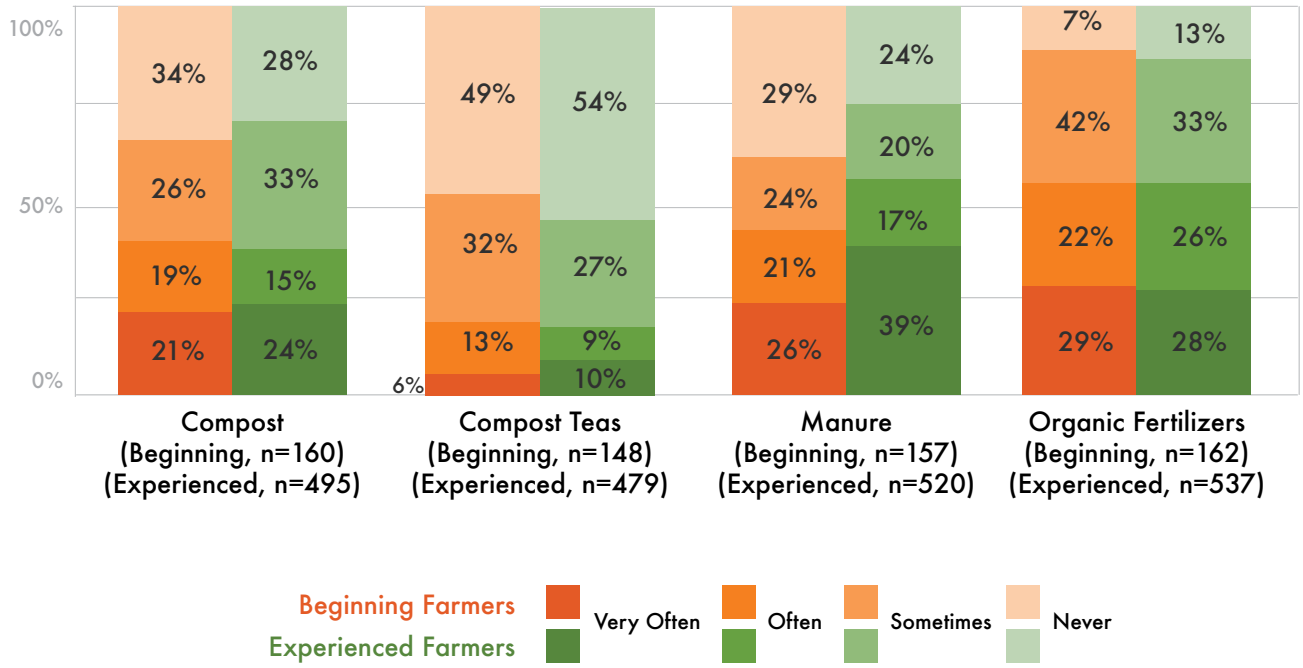


Figure S9

Degree of challenge for the top five production challenges identified in the full organic survey sample.

"n" denotes the total number of survey participants who provided a response for the corresponding challenge.

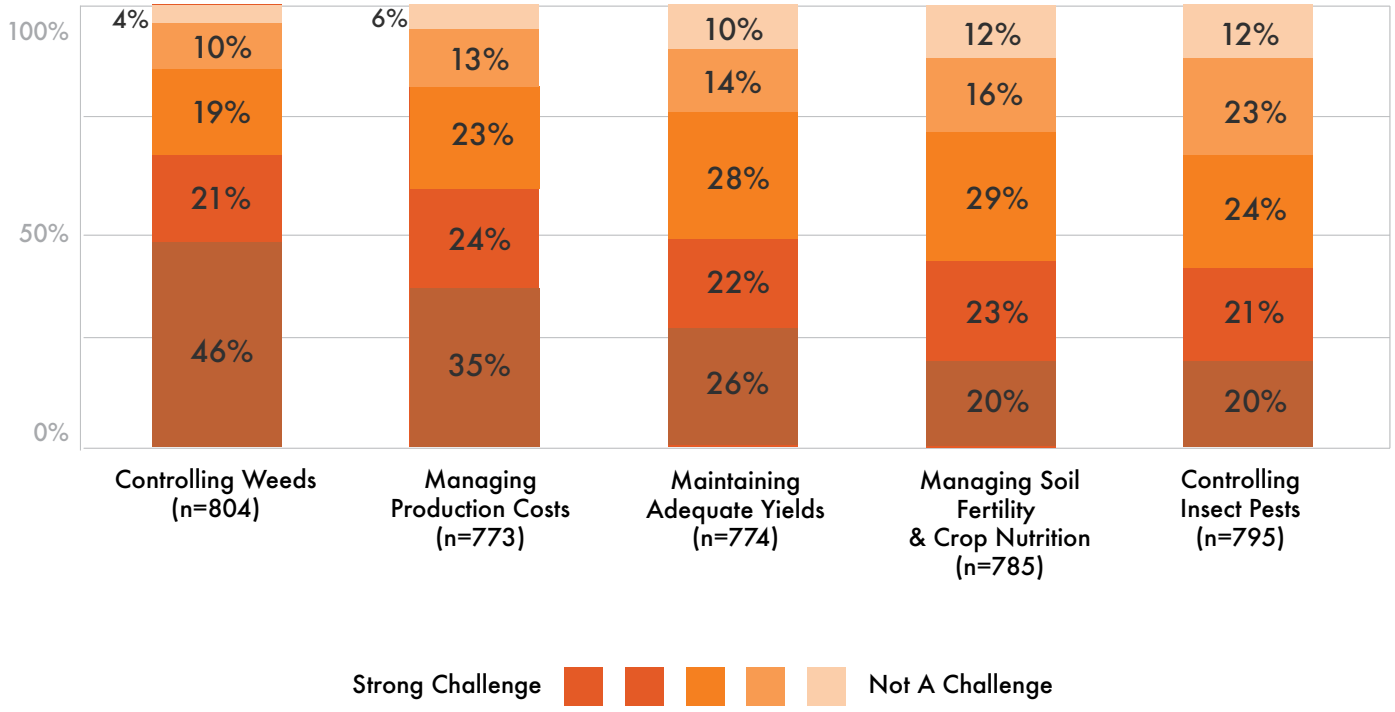


Table S2

Top five production challenges in each SARE region ranked in descending order from strongest to weakest challenge.

Production challenges were quantified by calculating the percent of respondents who rated a substantial production challenge as either a "challenge" or "strong challenge." "n" denotes the number of respondents.

SARE Region	Production Challenge	% of Respondents Rating as a Substantial Challenge
Northeast	Managing production costs (n=106)	61%
	Controlling weeds (n=98)	57%
	Maintaining adequate yields (n=74)	44%
	Managing soil fertility and crop nutrition (n=69)	42%
	Controlling insect pests (n=63)	37%
North Central	Controlling weeds (n=190)	66%
	Maintaining adequate yields (n=145)	52%
	Managing production costs (n=134)	49%
	Managing soil fertility and crop nutrition (n=118)	42%
	Controlling insect pests (n=97)	34%
Southern	Controlling weeds (n=51)	79%
	Managing production costs (n=44)	71%
	Finding appropriate organic crop varieties and seed for your operation (n=42)	69%
	Controlling insect pests (n=38)	59%
	Controlling disease pressure (n=33)	55%
Western	Controlling weeds (n=186)	72%
	Managing production costs (n=160)	65%
	Maintaining adequate yields (n=118)	48%
	Controlling insect pests (n=121)	47%
	Managing soil fertility and crop nutrition (n=114)	44%

Figure S10

Degree of challenge for the top five non-production challenges identified in the full organic survey sample.

"n" denotes the total number of survey participants who provided a response for the corresponding challenge.

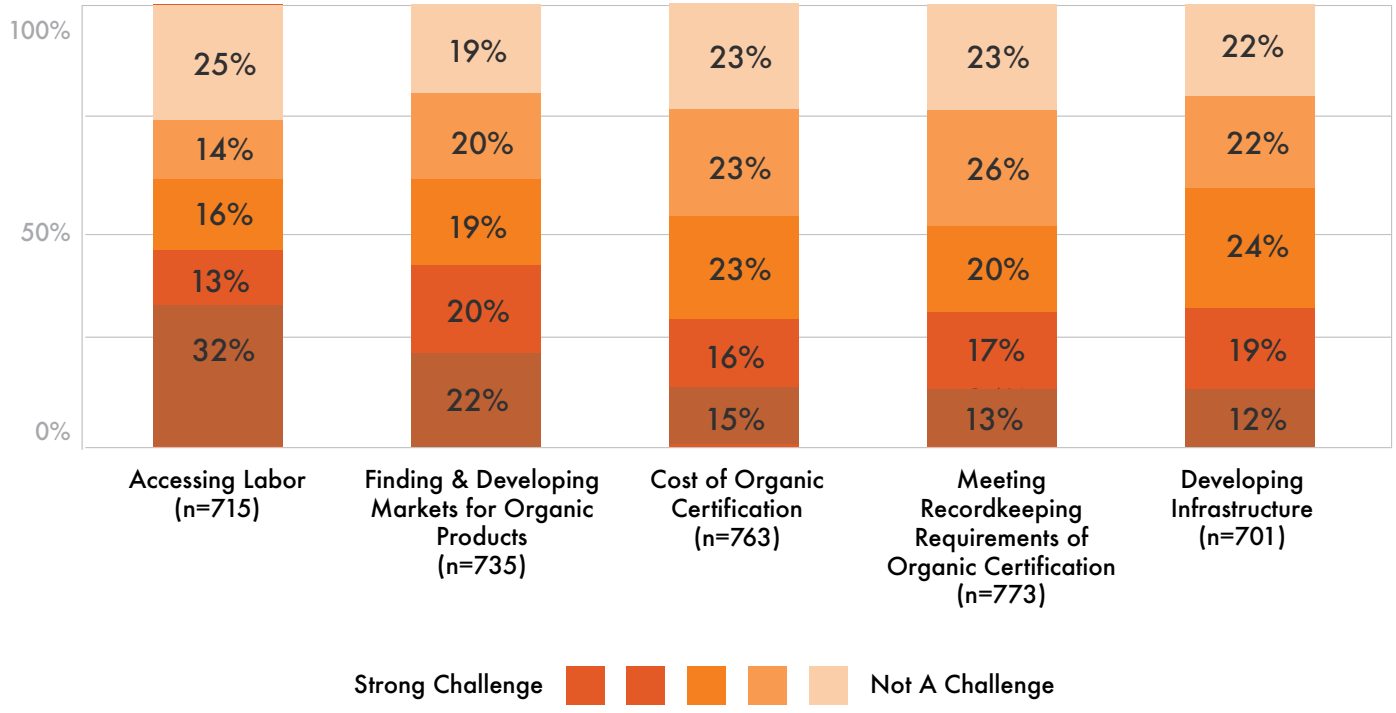


Table S3

Top five non-production challenges in each agro-ecoregion ranked in descending order from strongest to weakest challenge.

Non-production challenges were quantified by calculating the percent of respondents who rated a substantial non-production challenge as either a "challenge" or "strong challenge." "n" denotes the number of respondents.

Agro-ecoregion	Non-Production Challenge	Percent of Respondents Rating as a Challenge
Northeast	Accessing Labor (n=53)	36%
	Developing Infrastructure (n=44)	30%
	Meeting Recordkeeping Requirements of Organic Certification (n=46)	28%
	Finding and Developing Markets for Organic Products (n=43)	28%
	Farm Business Planning (n=40)	26%
South	Accessing Labor (n=31)	62%
	Finding and Developing Markets for Organic Products (n=20)	42%
	Developing Infrastructure (n=17)	35%
	Cost of Organic Certification (n=16)	33%
	Understanding and Following Food Safety Standards (n=12)	28%
Great Lakes	Finding and Developing Markets for Organic Products (n=53)	46%
	Accessing Labor (n=43)	40%
	Cost of Organic Certification (n=43)	36%
	Developing Infrastructure (n=37)	34%
	Meeting Recordkeeping Requirements of Organic Certification (n=38)	31%
Corn Belt	Accessing Labor (n=40)	39%
	Finding and Developing Markets for Organic Products (n=42)	38%
	Developing Infrastructure (n=37)	33%
	Risk from Contamination from Genetically Engineered Crops (n=34)	32%
	Meeting Recordkeeping Requirements of Organic Certification (n=36)	32%
Great Plains	Finding and Developing Markets for Organic Products (n=59)	56%
	Accessing Labor (n=50)	52%
	Accessing Capital and/or Financing (n=31)	31%
	Farm Succession Planning (n=29)	31%
	Developing Infrastructure (n=32)	31%
Pacific	Accessing labor (n=104)	55%
	Finding and developing markets for organic products (n=82)	44%
	Meeting recordkeeping requirements of organic certification (n=71)	36%
	Managing business activities (n=64)	35%
	Cost of organic certification (n=67)	34%

Figure S11:

Strength of need for the top five technical assistance needs identified by organic farmers in the U.S.

"n" denotes the total number of survey participants who provided a response for the corresponding technical assistance need.

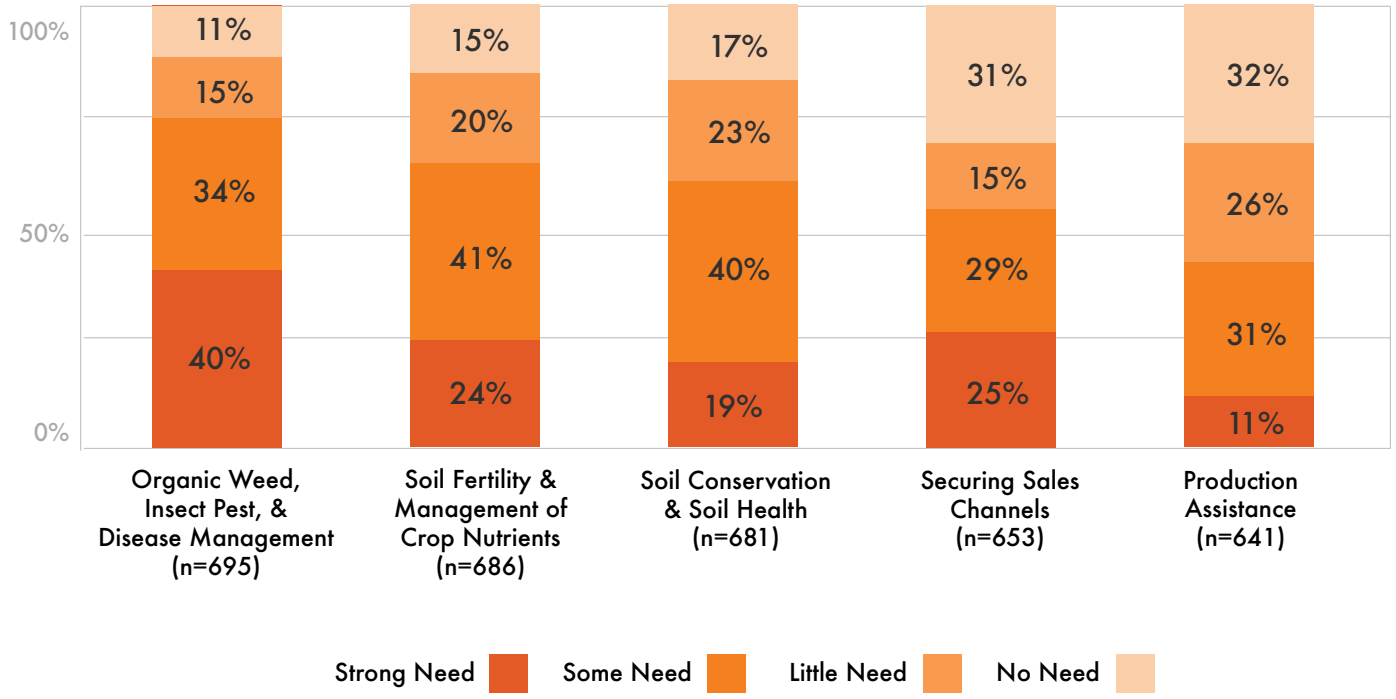


Table S4

Top five technical assistance needs in each agro-ecoregion ranked in descending order from strongest to weakest need.

Technical assistance needs were quantified by calculating the percent of respondents who indicated they had either "some need" or a "strong need" for a particular topic. "n" denotes the number of respondents.

Agro-ecoregion	Topics of Concern in Organic Agriculture	Percent of Respondents Rating as a Concern
Northeast	Industrial organic (n=131)	85%
	Organic fraud and integrity of USDA organic label (n=128)	80%
	Crop contamination (e.g., GMOs, pesticide drift) (n=15)	61%
	Animal welfare (n=75)	56%
	Adaptation to climate change (n=80)	53%
South	Organic fraud and integrity of USDA organic label (n=40)	82%
	Access to agricultural service providers who are knowledgeable about certified organic operations (n=35)	74%
	Lack of skilled labor (n=34)	72%
	Adaptation to climate change (n=33)	72%
	Industrial organic (n=31)	70%
Great Lakes	Organic fraud and integrity of USDA organic label (n=105)	85%
	Industrial organic (n=91)	81%
	Crop contamination (e.g., GMOs, pesticide drift) (n=81)	66%
	Imbalance of domestic certified organic supply and demand (n=73)	63%
	Availability of organic research funds (n=69)	58%
Corn Belt	Organic fraud and integrity of USDA organic label (n=89)	81%
	Industrial organic (n=74)	73%
	Crop contamination (e.g., GMOs, pesticide drift) (n=76)	69%
	Imbalance of domestic certified organic supply and demand (n=66)	62%
	Access to agricultural service providers who are knowledgeable about certified organic operations (n=57)	51%
Great Plains	Organic weed, insect pest, and disease management (n=71)	76%
	Securing sales channels (n=65)	71%
	Soil fertility and management of crop nutrients (n=57)	63%
	Soil conservation and soil health (n=57)	62%
	Risk management/crop insurance (n=44)	49%
Pacific	Organic weed, insect pest, and disease management (n=130)	75%
	Soil fertility and management of crop nutrients (n=109)	64%
	Soil conservation and soil health (n=97)	57%
	Securing sales channels (n=83)	51%
	Labor needs (n=78)	48%

Figure S12

Responses from organic survey participants across six agro-ecoregions indicating how well their organic production and non-production research and information needs are being met.

"n" denotes the total number of survey participants from each agro-ecoregion.

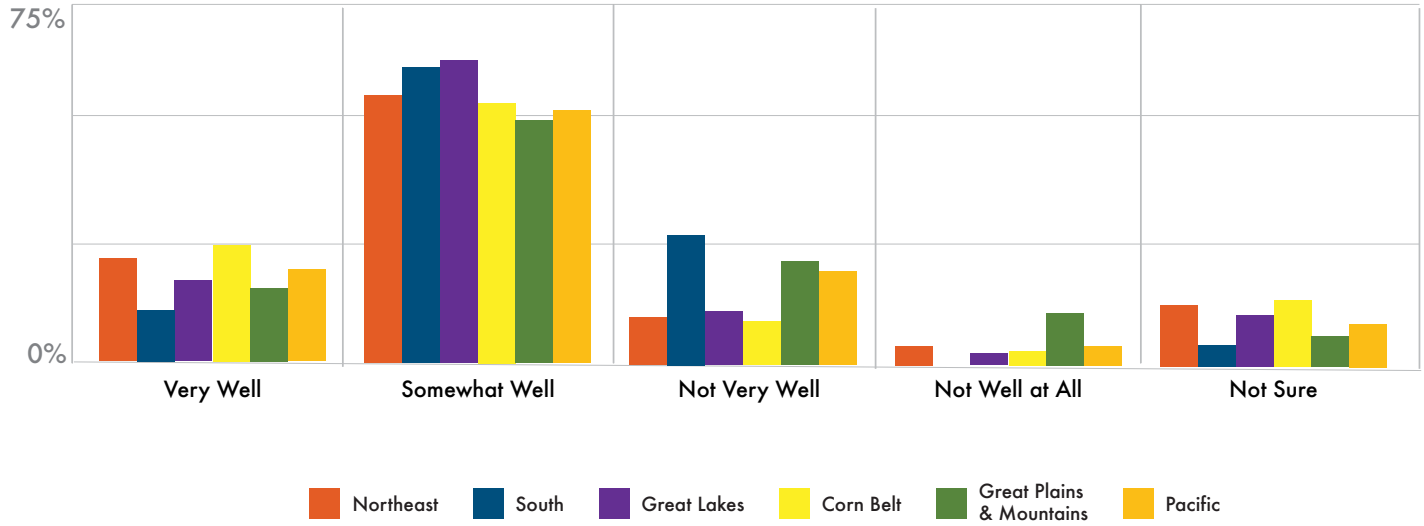


Figure S13

Breakdown of the top five topics of concern in organic agriculture identified by organic farmers in the U.S.

"n" denotes the total number of survey participants who provided a response for the corresponding topic of concern.

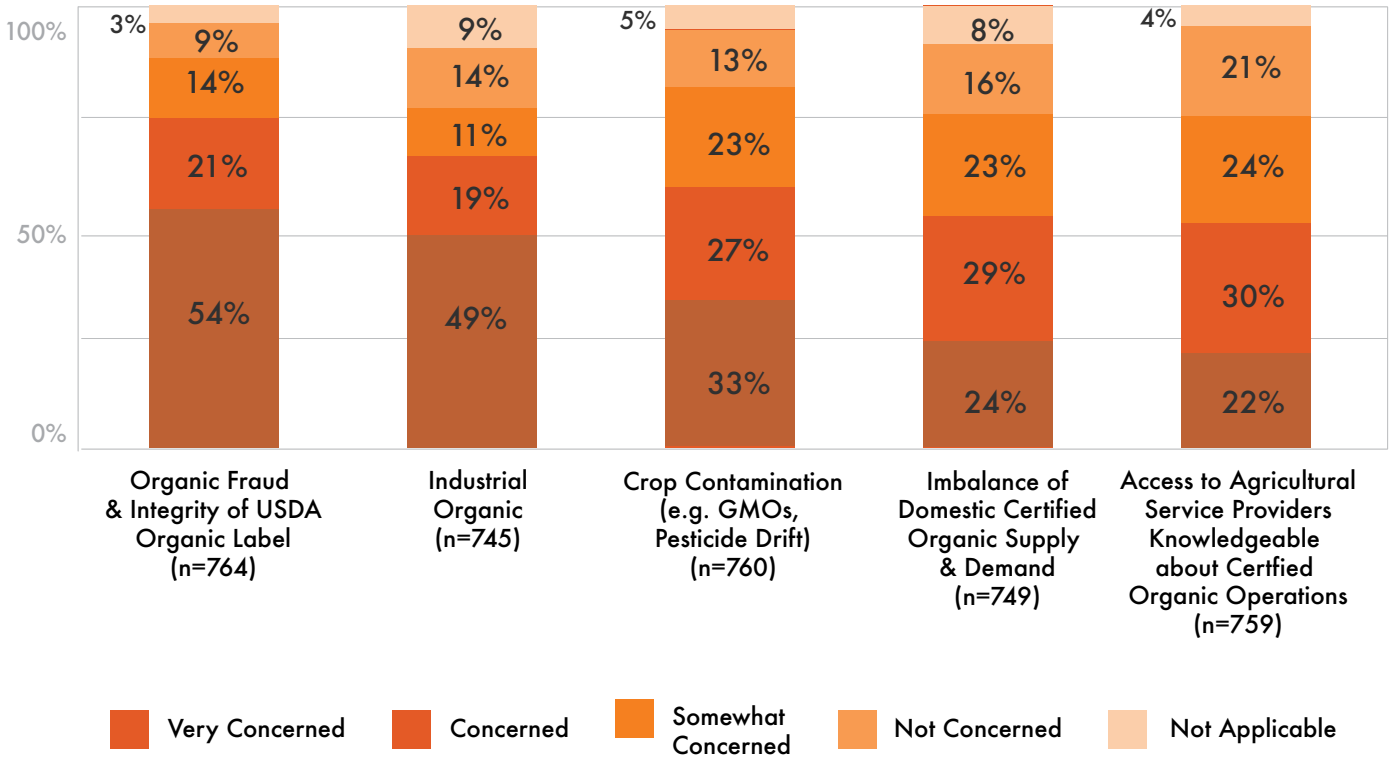


Table S5

Top five topics of concern for organic farmers in each agro-ecoregion ranked in descending order from strongest to weakest need.

Topics of concern were quantified by calculating the percent of respondents who indicated they were either "concerned" or "very concerned" about a topic. "n" denotes the number of respondents.

Agro-ecoregion	Topics of Concern in Organic Agriculture	Percent of Respondents Rating as a Concern
Northeast	Industrial organic (n=131)	85%
	Organic fraud and integrity of USDA organic label (n=128)	80%
	Crop contamination (e.g., GMOs, pesticide drift) (n=15)	61%
	Animal welfare (n=75)	56%
	Adaptation to climate change (n=80)	53%
South	Organic fraud and integrity of USDA organic label (n=40)	82%
	Access to agricultural service providers who are knowledgeable about certified organic operations (n=35)	74%
	Lack of skilled labor (n=34)	72%
	Adaptation to climate change (n=33)	72%
	Industrial organic (n=31)	70%
Great Lakes	Organic fraud and integrity of USDA organic label (n=105)	85%
	Industrial organic (n=91)	81%
	Crop contamination (e.g., GMOs, pesticide drift) (n=81)	66%
	Imbalance of domestic certified organic supply and demand (n=73)	63%
	Availability of organic research funds (n=69)	58%
Corn Belt	Organic fraud and integrity of USDA organic label (n=89)	81%
	Industrial organic (n=74)	73%
	Crop contamination (e.g., GMOs, pesticide drift) (n=76)	69%
	Imbalance of domestic certified organic supply and demand (n=66)	62%
	Access to agricultural service providers who are knowledgeable about certified organic operations (n=57)	51%
Great Plains	Organic fraud and integrity of USDA organic label (n=78)	78%
	Imbalance of domestic certified organic supply and demand (n=66)	73%
	Crop contamination (e.g., GMOs, pesticide drift) (n=69)	71%
	Industrial organic (n=63)	71%
	Availability of organic research funds (n=62)	65%
Pacific	Organic fraud and integrity of USDA organic label (n=119)	63%
	Lack of skilled labor (n=107)	61%
	Industrial organic (n=98)	59%
	Adaptation to climate change (n=97)	54%
	Crop contamination (e.g., GMOs, pesticide drift) (n=93)	53%

Figure S14

Usefulness of the top five preferred sources of information identified in the full organic survey sample.

"n" denotes the total number of survey participants who provided a response for the corresponding information source.

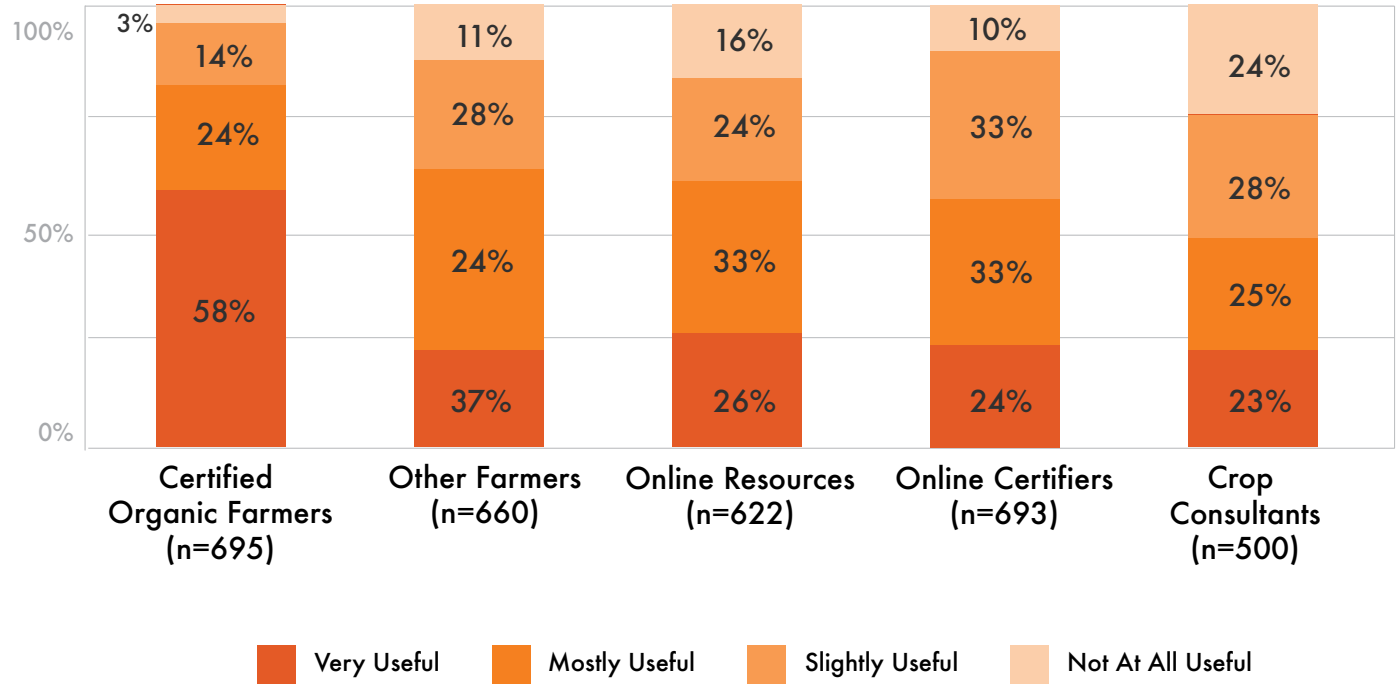


Figure S15

Degree of preference for the top five preferred information modes identified by organic farmers in the U.S.

"n" denotes the total number of survey participants who provided a response for the corresponding format.

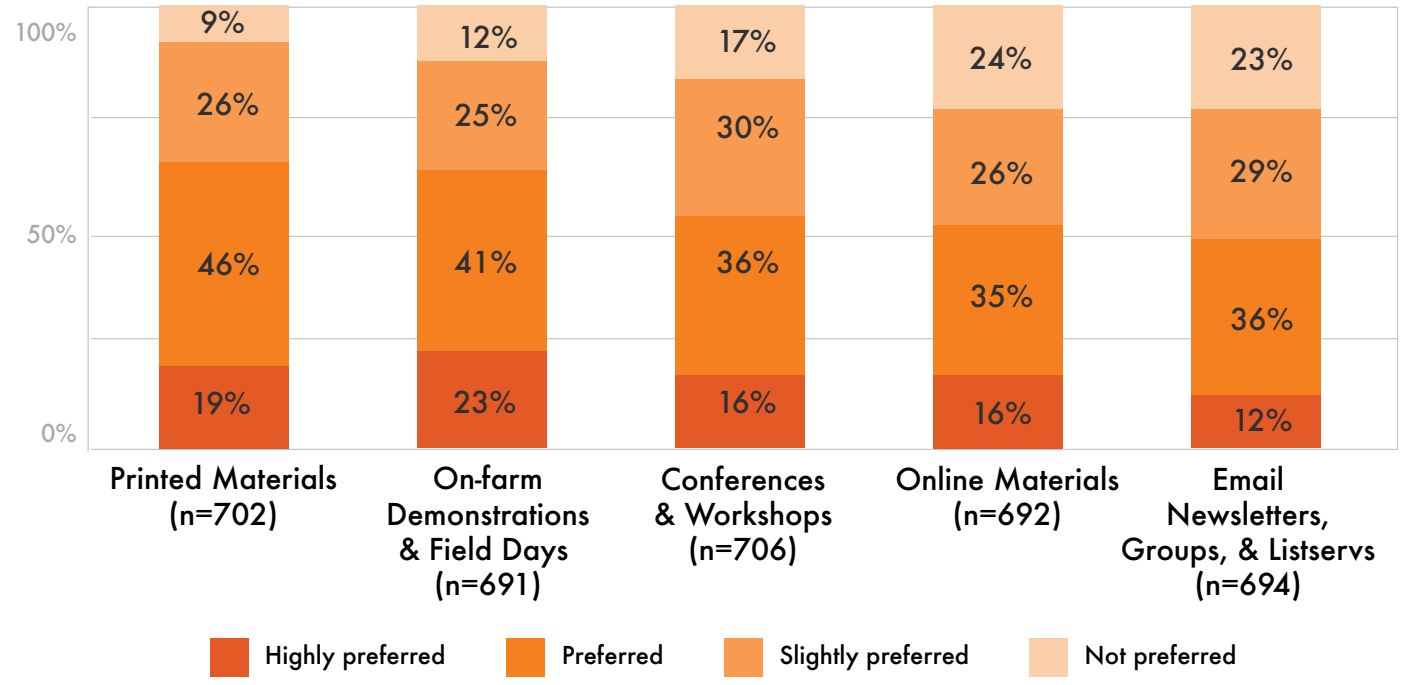


Table S6

Top five sources of information for organic farmers in each agro-ecoregion ranked in descending order from most preferred to least preferred.

Sources of information were quantified by calculating the percent of respondents who rated an information source as either "mostly useful" or "very useful." "n" denotes the number of respondents.

Agro-ecoregion	Sources of Information	Percent of Respondents Rating Source as Useful
Northeast	Certified organic farmers (n=127)	83%
	Other farmers (n=97)	68%
	Online resources (n=74)	56%
	Organic certifiers (n=80)	53%
	Crop consultants (n=54)	53%
South	Online resources (n=28)	72%
	Certified organic farmers (n=25)	63%
	Nonprofit agriculture organizations (n=20)	61%
	Other farmers (n=25)	60%
	Organic certifiers (n=22)	55%
Great Lakes	Certified organic farmers (n=107)	91%
	Organic certifiers (n=74)	64%
	Other farmers (n=66)	59%
	Online resources (n=55)	56%
	Crop consultants (n=47)	50%
Corn Belt	Certified organic farmers (n=96)	88%
	Other farmers (n=60)	58%
	Organic certifiers (n=57)	55%
	Online resources (n=47)	55%
	Crop consultants (n=36)	43%
Great Plains	Certified organic farmers (n=77)	83%
	Organic certifiers (n=57)	61%
	Online resources (n=52)	60%
	Other farmers (n=45)	52%
	Nonprofit agriculture organizations (n=32)	43%
Pacific	Certified organic farmers (n=127)	75%
	Online resources (n=107)	64%
	Other farmers (n=101)	63%
	Extension personnel focusing on organic production (n=76)	54%
	Crop consultants (n=63)	54%

Table S7

Top five information formats for organic farmers in each agro-ecoregion ranked in descending order from most preferred to least preferred.

Preference for information formats was quantified by calculating the percent of respondents who rated a format as either "preferred" or "highly preferred." "n" denotes the number of respondents.

Agro-ecoregion	Information Formats	Percent of Respondents Rating as Preferred
Northeast	Printed materials (books, manuals, pamphlets, magazines) (n=115)	73%
	On-farm demonstrations and field days (n=95)	62%
	Conferences and workshops (n=87)	56%
	Email newsletters, groups, and listservs (n=73)	47%
	Online materials (digital materials and/or websites) (n=64)	42%
South	Printed materials (books, manuals, pamphlets, magazines) (n=31)	70%
	On-farm demonstrations and field days (n=27)	63%
	Online materials (digital materials and/or websites) (n=27)	61%
	Online videos (n=23)	55%
	Conferences and workshops (n=24)	53%
Great Lakes	On-farm demonstrations and field days (n=80)	71%
	Printed materials (books, manuals, pamphlets, magazines) (n=77)	67%
	Conferences and workshops (n=65)	57%
	Online materials (digital materials and/or websites) (n=53)	49%
	Online videos (n=53)	48%
Corn Belt	On-farm demonstrations and field days (n=74)	75%
	Printed materials (books, manuals, pamphlets, magazines) (n=69)	66%
	Conferences and workshops (n=64)	61%
	Email newsletters, groups, and listservs (n=40)	40%
	Online materials (digital materials and/or websites) (n=39)	39%
Great Plains	On-farm demonstrations and field days (n=58)	64%
	Online materials (digital materials and/or websites) (n=56)	60%
	Printed materials (books, manuals, pamphlets, magazines) (n=52)	57%
	Online videos (n=50)	54%
	Email newsletters, groups, and listservs (n=49)	53%
Pacific	Printed materials (books, manuals, pamphlets, magazines) (n=103)	60%
	Online materials (digital materials and/or websites) (n=103)	59%
	Email newsletters, groups, and listservs (n=92)	53%
	On-farm demonstrations and field days (n=89)	51%
	Online videos (n=87)	51%

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