

Innovations

in sustainable agriculture



2023 Annual Report

About Northeast SARE

The Northeast Sustainable Agriculture Research and Education (SARE) Program offers grants and education to farmers, educators, service providers, researchers and others to address key issues affecting the sustainability of agriculture throughout our region.

The program serves Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, and Washington, D.C.

The program is administered by Northeast SARE's host institution, the University of Vermont.

Northeast SARE is one of four regional SARE programs funded by the USDA National Institute of Food and Agriculture. The program is authorized under Subtitle B of Title XVI of the Food, Agriculture, Conservation, and Trade Act of 1990. SARE serves all states and Island Protectorates.

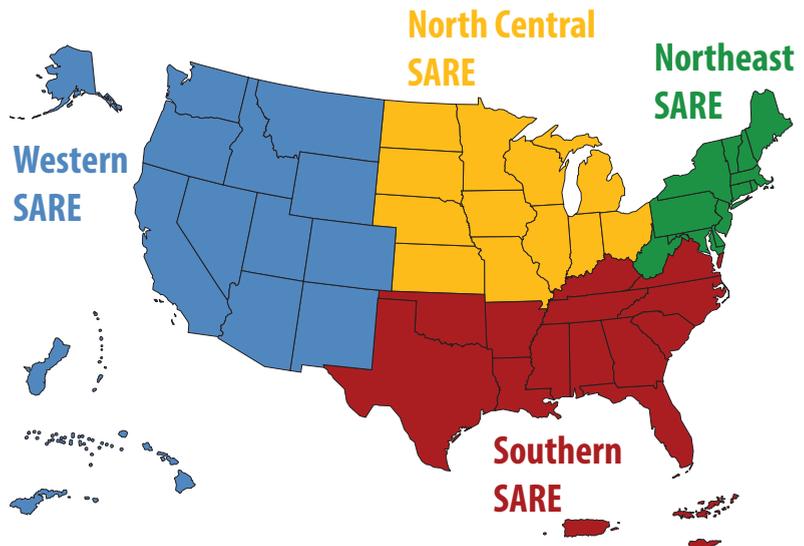
SARE's Nationwide mission is to advance, to the whole of American agriculture, innovations that improve profitability, stewardship, and quality of life by investing in groundbreaking research and education.

Northeast SARE offers six competitive grant programs: Research and Education, Research for Novel Approaches, Farmer, Partnership, Graduate Student Research, and Professional Development. Northeast SARE also operates a noncompetitive State Professional Development Program, which funds "train-the-trainer" projects led by Northeast SARE State Coordinators.

We are pleased to share this annual report which provides a summary of Northeast SARE's work in 2023. It includes a message from the outgoing director (page 3), an overview of outcomes reported by all projects completed in the past year (page 4), profiles of individual projects from each of our seven grant programs (page 7), a list of all projects selected for funding in 2023 (page 12), and a state-by-state summary of projects funded over the past five years (page 19). For more information about Northeast SARE please visit our web site www.northeastsare.org. To learn more about any individual project, go to SARE project data base at <https://projects.sare.org/search-projects/>

Northeast SARE's Outcome Statement:

"Northeast agricultural communities honor the holistic connection among land, water, air, and all living beings. Agriculture in the Northeast is accessible, sustainable, and just, addressing historic and current inequities so all farmers and farm employees can steward resources to ensure sustainability, resilience, economic viability, and a high quality of life."



From our Director Reflections on My SARE Journey

Time flies when you learn something every day. So, my three decades of working with SARE, as a grantee, state coordinator, and then director, have sped by. I have benefitted from the wealth of knowledge shared by people participating in our programs—applicants, grantees, project partners, and our administrative council, technical committee, state coordinators, and staff. My mental models have changed many times, as the information poured in from these creative, dedicated and thoughtful people.

A key lesson I've learned is to be open to new ways of knowing. The SARE program exemplifies that. We don't prescribe what topics can be funded, we let them come through the door from the agricultural community. And we don't just rely on academic experts to select projects for funding, we empower a wide range of people, including farmers, to do that, and to help us adapt our grant-making programs to meet emerging needs. This ability to engage widely and evolve continually is due to our unique mandate to be farmer-focused, to link research and education, and to have a decentralized structure led by people "on the ground."

SARE's authorizing legislation specifies that we "...shall give priority to projects that (A) closely coordinate research and extension activities; (B) indicate the manner in which the findings of the project will be made readily usable by farmers; (C) maximize the involvement and cooperation of farmers, including projects involving on-farm research and demonstration; (D) involve a multidisciplinary systems approach; and (E) involve cooperation between farms, non-profit organizations, colleges and universities, and government agencies."

The SARE program was also designed to be led by four regional Administrative Councils to "establish goals and criteria for the selection of projects authorized under this subchapter within the applicable region." These Councils are to be comprised of people from different agencies and organizations, and they include farmers.

To me, SARE's focus on audiences (farmers, graduate students, ag service providers, and researchers) rather than subject matter has also contributed to our success. Our grant programs have been developed to support the type of work people do, not to stipulate what topics they should be working on. By inviting a wide range of ideas under the banner of sustainable agriculture, we leave the door open to issues and ideas that come from the communities we seek to serve, not from a committee.

In its early years, SARE sowed its oats supporting "alternative" agriculture, funding projects that explored new ways of knowing about practices like cover cropping, direct marketing, organic farming, and rotational grazing. As knowledge was gained in these areas they became "mainstream." In subsequent years, a bevy of innovative ideas rolled in on emerging topics. Often these came in clusters of proposals, suggesting that something was gaining traction in our region. I think of aquaculture, hops, on-farm renewable energy, pollinators, soil health, and urban agriculture as examples.

Over time, our projects and programs increased their focus on social aspects of agriculture, addressing issues such as farm transfer, farmer well-being, labor, and recently, diversity, equity, inclusion, and justice. The latter has been a vertical learning curve for me; a journey to understand how we can remove the structural and cultural obstacles to full participation in our programs, by all agricultural communities.

It has been an honor to be a part of this organization, and the time has come for me to step aside. With great pleasure I am passing the director's baton to Dr. Teresa Leslie, who will bring new ideas and fresh perspectives to our team. I am confident that SARE will remain at the cutting edge of agricultural research and education as we continue to put farmers first, invite innovation without prescribing it, and keep working to make our programs as welcoming and relevant as possible to all communities that could benefit from participation.

Vern Grubinger
Northeast SARE Director (2007-2023)

Completed Project Outcomes in 2023

Northeast SARE considers a variety of outcomes in evaluating a project's impact on sustainability in our region. In 2023, 104 projects, representing \$5.4 million in grants, were completed.

 104 Projects completed

 \$5.4million
(Oct 2022- Sept 2023)



One-on-one consultations conducted

2,248



Farmers who participated in research

965



New collaborations and working relationships

362



Grants received to continue work, totaling \$11.6 million

60



Press articles and newsletters published

151



Farmers who learned through project activities

23,850



Farmers who made changes to practices

2,488



Journal Articles Published

31



Farmers who reported gaining knowledge and skills

5,442



Agricultural Service Providers who participated in education and outreach

6,561



Agricultural service providers who reported gaining knowledge and skills

1,151



Curricula, factsheets or educational tools

195



Educational activities

1,105

Research and Education Grant Program

LNE19-381 - \$242,071

Expanding Opportunities for Sustainable Management of Small Ruminant Gastrointestinal Parasites



In this project, Katherine Petersson, of University of Rhode Island, tested if cranberry vines used to control the progression of gastrointestinal infections could be used to protect vulnerable uninfected lambs from a nematode known as the barber pole worm.

From the report:

Gastrointestinal nematodes (GIN) are associated with increased mortality and reduced performance of small ruminants (SR) in pasture-based operations due primarily to the blood-feeding GIN, *Haemonchus contortus*, more commonly known as the barber pole worm. The barber pole worm commonly causes weight loss and anemia and in severe cases death. Young animals, such as lambs, are particularly susceptible due to their immature immune system. In addition, females are more susceptible to GIN during the periparturient period (late gestation to early lactation) because of immune suppression. Producers struggle to control GIN in lambs and periparturient ewes because of increasing parasite resistance to commercial dewormers, a lack of effective alternatives to chemical dewormers, and, in most cases, an inability to accu-

rately identify individuals that are genetically less susceptible to parasite infection. Effective tools for parasite control exist; the challenge is making these techniques widely available. The current project focused on improvement and expansion of an online training program to detect barber pole worm infections in sheep as well as a focus utilization of genetic selection for parasite resistant breeding stock.

The primary beneficiaries of this project were northeastern producers concerned about the deleterious effects of GIN infections in their sheep and goats. We updated and condensed the

existing videos of our English online IPM/FAMACHA© certification program, which enabled producers to detect anemia caused by

the barber pole thus identifying animals that either needed to be dewormed or culled from the flock. A Spanish language version of the program was developed thereby increasing access to this

material by a more culturally diverse audience. We developed a facilitated group format for the online program for producers who struggle with or have limited internet access. A group-based format also allowed us to offer this program to extension and youth groups as well as classes of agriculture, veterinary students.

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Research for Novel Approaches Grant Program

LNE19-386R - \$159,988

Creative Farm Business Models to Address Employee Hiring, Training, and Management Barriers



In this project, Kevin Cody, of New Entry Sustainable Farming Project in Massachusetts, conducted more than a dozen focus groups with farmers and farm owners to develop collaborative labor solutions.

From the report:

Key to our success to date has been having strong project management, a defined timeline, and a strong core partner (Farm Commons) who immediately launched into the project to develop a working draft of the four business models and a farmer focus group template/workbook to present to the core team for feedback and project planning. We discussed the draft business model workbooks, made substantive changes and suggested edits to it, and then scheduled the 2020 farmer focus groups to implement the guidebooks. Each focus group was facilitated by the local extension partner sessions were recorded, transcribed, and compiled into a written report for synthesis and to compare findings across the region to inform next iteration of the business models. Farm

Commons then developed a second round facilitation guide and process to take initial feedback and help the collaborators prepare for additional farmer input on the refined models. Second round focus groups were held in Winter 2021 and a follow up regional survey was distributed in spring 2022. Farm Commons' expertise in farm labor law has provided significant contributions, direction, and guidance throughout this project and they have already developed clear materials that could be replicated by other educators in different regions of the country.

Some quotes from survey respondents:
"For our farm, [this model] it

may offer some benefits to support us with seasonal support. We hire only 1-2 seasonal people at the moment, so we would not be a big user of the system. But it would save the Board and Farm Manager a good deal of time and effort. It would be great to be able

to resource seasonal part-time farm-based educators from this entity."

"I'm thrilled that you are trying to create a way for farmers/farm workers to make a real living wage. I think that as a society we ought to place value our farmers and farm workers more--since we all need to eat they are absolutely essential to everyone--and pay them a sustainable living!"

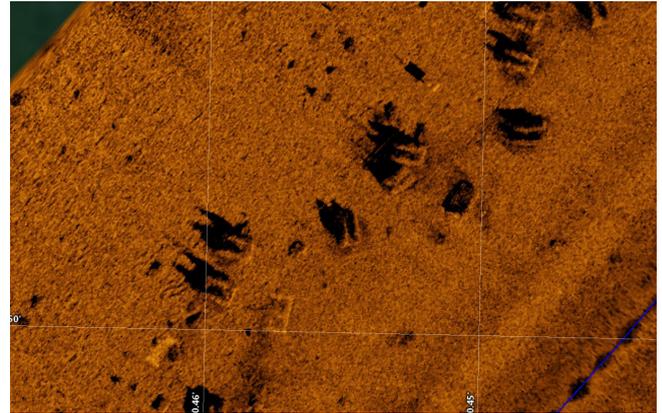
"I'm thrilled that you are trying to create a way for farmers/farm workers to make a real living wage."

LNE19-386R Participant

Farmer Grant Program

FNE21-989 - \$13,570

Managing and Monitoring Bottom Cage Placement in Deep Water Oyster Culture



In this project, Dr. Dale Leavitt of Blue Stream Aquaculture LLC in Massachusetts, adapted a fishing sonar for farming purposes and tested a number of solutions before developing a method of lowering oyster cages that was 100% effective.

From the report:

Releasing filled oyster cages from the surface in deeper waters is problematic as the farmer has no control as to the orientation of the cage when it rests on the bottom. To improve upon this condition, two tools were evaluated for dropping cages from the deck of a vessel. The first was to attach buoys to the top of the cage to act as a parachute in holding the cage in the proper orientation as it freefalls to the bottom. Numerous buoy configurations were tested with limited success. The second was to attach a line to the top of the cage and lowering the cage with a controlled descent while ensuring that the line could be released from the cage after the

drop to prevent vertical lines from proliferating on the farm site. Using a looped line through the cage top proved to be 100% effective in ensuring the cage landed on the bottom in the proper orientation while allowing the line to be easily retrieved from the deployment after the cage release.

The second objective with this project was to evaluate routinely available fish finder technology to locate and identify oyster cages on the bottom in deeper water. A Humminbird Solix

15 fish finder with integrated down- and side-imaging sonar was adapted to allow for

portability of the unit between work boats and utilized to generate a mosaic image of the bottom of the shellfish farm using a dedicated software package (SAR Hawk)

to integrate the side-scan data into a complete picture of the bottom. The Solix 15 proved to be an effective tool for visualizing oyster cages on the bottom as well as other structures, including debris left by previous managers of the farm.

Observations of cage releases controlled by line attachments consistently resulted in the cages arriving at the seafloor in the proper upright orientation, 100% of the time. The drop of 9-bag bottom cages can easily be controlled in hand by a single person on deck at the surface

Partnership Grant Program

ONE19-331 - \$27,280

The Ag Engineering Podcast: Tools, Tips and Techniques for Improving Sustainability on Your Farm



In this project, Andrew Chamberlin of University of Vermont Extension, produced 76 episodes of a topic-centered podcast. The podcast has continued post-project as “The Farmer’s Share”

From the report:

The farmer cooperators of the project have been excited to be a part of this new podcast which shares tools, tips and techniques to improve the sustainability of your farm. They shared that it makes them feel like they have a community of like-minded individuals who can relate to the similar challenges and struggles they are going through.

We know of two farmers who have purchased flail mowers to improve their farming practices as a result of listening to the podcast episode discussing this piece of equipment.

Over the course of the project social media engagement for UVM Extension Ag Engineering has increased from 415 Followers on Instagram to 1,806 and

212 followers on Facebook has grown to 625. Not all of this growth can be attributed to the podcast, but the podcast was a significant contribution to the posts and engagement made over this time.

One of the findings from this project relates to the manner in which peer learning is facilitated. This project developed a show that leaned heavily on allowing the interviewee to “direct” the production. They chose the topics of most interest to them or about which they had the most self-reported expertise. This enhanced the product because it brought their interest, excitement, and

knowledge to the table voluntarily. Feedback from listeners supports this as a positive outcome. The enthusiasm and genuine nature of the stories and experiences comes through to the listeners when they hear it from their peers.

Another unexpected outcome of this project has been the level of interest among educational and service provider peers. The project team has been approached by many of our peers with interest in learning more about our tools, methods, and approach.

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View the Ag Engineering Podcast Archive at <https://thefarmersshare.com/>

Graduate Student Grant Program

GNE20-234 - \$15,000

Development of an Automated Precision Spraying System for Sustainable Pest Management in Apple Orchards



In this project, Md Sultan Mahmud of Pennsylvania State University created a solution to save farmers money and protect the environment by adjusting how chemicals are sprayed based on the density of foliage on trees.

From the report:

Canopy foliage density is an important parameter for site-specific pest management. The developed section-based tree canopy density measurement system can provide information about where the tree has high/dense canopy density or low/light canopy density. Given the information about tree canopy density (appearance of the canopy in each tree section), adjustment of the nozzle flow rates is possible to guide the precision sprayer during the spraying operation. Tree canopy point correction is needed for accurate tree canopy characteristics measurements when there is a slope change, with the goal of reducing off-target spray deposition. The positioning error of apple tree canopy points was corrected using a sensor fusion-based LiDAR-guided system. The developed tree canopy correction

system could be used to acquire accurate tree canopy points and density measurements, which will help reduce off-target spray deposition for precision spraying and save a substantial amount of agrochemicals for the apple growers. The airflow discharged from orchard airblast sprayers is a primary component for successfully carrying spray droplets to the target trees. Because of variation in orchard tree canopies, control of the airflow to minimize off-target loss during spray application is essential. An automatic airflow control system for precision sprayers was developed to maximize spray droplet coverage on targets and minimize off-

target loss while considering the tree canopy densities. The overall results suggested that the automatic airflow control system could reduce spray drift and off-target losses and improve spray application efficiency in orchards. The size and characteristics of orchard tree canopies vary significantly depending

Conventional constant-rate airblast sprayers are mainly used to perform the spray operation in tree fruit orchards. These types of sprayers are estimated to deposit less than 30% of the agrochemical on target trees while the remainder is lost to the ground or drift.

on growth stages, cultivars, production practices, and growing season lengths. The development of an automated precision sprayer system is useful to reduce the excessive agrochemical usage by adjusting the application rate considering tree canopy density.

Professional Development Program
ENE20-164 - \$149,000
**The Northeast Climate Adaptation
Fellowship to Support Vegetable
and Fruit Farmers**



In this project, Dr. Rachel Schattman of University of Maine School of Food and Agriculture brought farmers and agricultural advisors together to enhance their knowledge of climate mitigation strategies.

From the report:

Overall, participants found the Climate Adaptation Fellowship (CAF) program to be valuable. We asked Fellows if participating in the program had changed any of their professional goals. Responses showed that the experience caused many participants to shift their perspectives on farming in a changing climate. As one farmer noted: "We are a diversified, organic, no-till, regenerative farm so we are practicing many of the methods we discussed in CAF. I think we are under-prepared for the wide variety of severe weather events that will likely take place with increasing frequency in the coming decade. As I mentioned, we will develop a comprehensive plan for all the possible contingencies." This statement encapsulates a sentiment echoed by many other

farmer participants. In addition, agricultural advisor (AA) Fellows discussed integrating climate change more holistically into the services that they provide to farmers. As one AA stated: "I feel like climate conversations are more central to my work and a goal is to express that more clearly." Some AAs continue to work together as a mini-cohort, supporting each other to respond to farmer needs and putting on "CAF-lite" workshops and adaptation planning seminars. The entire CAF cohort continues to exchange occasional listserv

announcements when opportunities to enhance climate learning or adaptation become available in our region.

One Farmer Fellow wrote: "We will view the practices on our farm more through the lens of climate adaptation than before. We've always thought about soil and crop health, but now we'll really think about the longer-

"We've always thought about soil and crop health, but now we'll really think about the longer-term future of our farm, the resilience in the face of extreme weather events, and ways in which we can actually help mitigate climate change"

ENE20-164 Farmer Fellow

term future of our farm, the resilience in the face of extreme weather events, and ways in which we can actually help mitigate climate change, even in some small way, as opposed to just adapt to it."

View the Climate Adaptation and Mitigation Fellowship website at <https://www.adaptationfellows.net/>

State Professional Development Program

SNE20-006

Cultivation of Asian Indian Vegetables on the Delmarva Peninsula



In this project, Northeast SARE State Coordinator Dr. Naveen Kumar Dixit of University of Maryland Eastern Shore hosted online and in-person trainings, as well as hands-on opportunities to harvest, cook, and eat.

From the report:

Stakeholder and agriculture service providers were invited to attend face-to-face workshops at the farm and online to learn the fundamentals of Asian Ethnic Vegetables (AEV) cultivation and associated challenges. In addition, cooking workshops were also conducted and YouTube videos were created to learn how to cook these vegetables and subsequently teach other populations to further popularize these AEVs. Growers were also invited to show how adverse weather, soil type, and poor irrigation practices could cause crop failure to provide live learning experience during the cultivation of these crops at UMES. Educational material was provided to participants as a printed material and soft copy through the email. Each

year AEV cultivation workshops were also conducted during the Annual Small Farm Conference at UMES to educate a large number of socially disadvantaged farmers on the Delmarva Peninsula. In addition, each year two AEV workshops were conducted for beginning veteran farmers at Therapeutic Alternatives of Maryland, Baltimore. Beginning farmers were also provided seedlings of AEVs to start cultivation of these vegetable crops. Individual farm demonstration events were also facilitated for interested beginning veteran farmers and agriculture service providers. The cultivation of

these four AEVs is novel to the growers and agriculture service providers on the Delmarva Peninsula. Through

“Each year two Asian Ethnic Vegetables (AEV) workshops were conducted for beginning veteran farmers at Therapeutic Alternatives of Maryland, Baltimore. Beginning farmers were also provided seedlings of AEVs to start cultivation.

this project, they learned techniques from sowing of seeds to provide the finally cooked product in the plate of the consumer for these four selected AEVs. Agriculture service providers and growers learned suitable

conditions required for seed priming before sowing, raised bed preparation, fertilizer application and calculations, irrigation technology, trellis construction, identification of pests and managements, postharvest storage, and marketing and economics of AEVs production.

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Projects funded in 2023

Research and Education

The Research and Education Grant program funds projects that result in gains in farmer knowledge, awareness, skills, and attitudes that are then applied to make measurable on-farm changes leading to greater sustainability.

Project Number	Project Title	Total Funding	Project Leader	Organization	State
LNE23-469	A Three-Pronged Strategy to Equitably Provide Planting Stock to Forest Farmers: Propagation Training, Seed Exchange, and Working with Wild Harvesters	\$246,505	Marlyse Duguid	Smokey House Center	CT
LNE23-468	Acres4Change Stewardship Education and Training Program	\$134,483	Pertula George-Redd	Acres4Change	MD
LNE23-461	Sustaining Urban Farming: Teaching Apprentices to Think Like Farmers and Researching Urban Farmers' Income and Quality of Life	\$288,853	Margaret Morgan-Hubbard	ECO City Farms	MD
LNE23-467	Building Community and Capacity of Care Farms Benefiting People with Intellectual or Developmental Differences in the Northeast United States	\$257,753	Woody Woodroof	Red Wiggler Community Farm	MD
LNE23-460	Aquaponic Systems, a Financially and Environmentally Sustainable Urban Farming Alternative in Maryland Taught Through Peer Learning Groups	\$183,663	Jose-Luis Izursa	University of Maryland	MD
LNE23-462	Farm Site Permit and Lease Application Workshop Development and Implementation for Fishermen Entering Maine's Expanding Seaweed Aquaculture Industry	\$109,158	Liz MacDonald	Atlantic Sea Farms	ME
LNE23-459	Northeast Kiwiberries: Jumpstarting a Regional Industry via Participatory Evaluation of Advanced Breeding Selections	\$226,392	Iago Hale	University of New Hampshire	NH
LNE23-471	Viable Working Farmlands: Succession Planning Advising and Education for New England Farmers	\$166,170	Shemariah Blum-Evitts	Land For Good	NH
LNE23-470	Elevating Weed Seedbank Management with Tailored Recommendations and New Tactics	\$249,977	Dr. Bryan Brown	Cornell University	NY
LNE23-466	Building Community Capacity to Increase Agroforestry Tree Planting through Participatory Listening Sessions, Training, and Peer-to-Peer Networks	\$248,180	Steve and Elizabeth Gabriel	Wellspring Forest Farm LLC	NY
LNE23-463	The Northeast Arugula Team (NEAT): Evaluation and Mitigation of Limitations to Profitability for Arugula and Brassica Leafy Green Production	\$237,756	Carolee Bull	The Pennsylvania State University	PA
LNE23-464	Got Worms? Breeding for Parasite Resistance to Ensure the Sustainability and Resilience of Small Ruminant Operations	\$318,874	Katherine Petersson	University of Rhode Island	RI
LNE23-465	Evaluation of Delayed Potato Planting for the Management of Insect and Disease Incidence on Northeastern Diversified Farms	\$188,658	Victor Izzo	University of Vermont	VT

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Projects funded in 2023

Research for Novel Approaches

The Research for Novel Approaches in Sustainable Agriculture Grant Program funds “proof of concept” projects to confirm the benefit and/or feasibility of experimentally viable practices and approaches.

Project Number	Project Title	Total Funding	Project Leader	Organization	State
LNE23-482R	Operationalizing Drone Imaging Technology to Detect Nutrient Deficiencies in Fruit Orchards	\$200,000	Dr. Chandi Witharana	University of Connecticut	CT
LNE23-477R	Hemp hurd fiber: a sustainable substitute for sphagnum peat moss in greenhouse and nursery plant production	\$161,414	Dr. Jessica Lubell-Brand	University of Connecticut	CT
LNE23-475R	Sustainability in Beekeeping: Improved Accuracy and Sensitivity of Sampling for the Honey Bee Parasite Varroa destructor	\$145,317	David Hawthorne	University of Maryland	MD
LNE23-474R	A Comparison of Forage Production, Livestock Performance, Soil Health, and Economics Between Perennial and Perennial/Annual Combination Forage Systems	\$99,899	Dr. Amanda Grev	University of Maryland	MD
LNE23-481R	Optimizing spring cover crop management for productivity, soil health and climate resilience	\$249,267	Dr. Ray Weil	University of Maryland	MD
LNE23-478R	Transitioning Sea Farms to Clean Battery Power	\$198,750	Nick Planson	The Boat Yard, LLC	ME
LNE23-479R	Proofing Mycelium-based Buoys in Aquaculture Applications	\$192,221	Sue Van Hook	Greenhorns	ME
LNE23-476R	Capturing Sunlight: Using Row Orientation to Maximize Photosynthesis, Soil Moisture, and Weed Suppression in Cover Crop-Based Systems	\$248,033	Natalie Lounsbury	University of New Hampshire	NH
LNE23-472R	Determining if Beneficial Fungi Increase Tree Growth and Reduce the Need for Fertilization and Irrigation of Newly Planted Apple Trees.	\$194,378	Michael Basedow	Cornell University Cooperative Extension	NY
LNE23-480R	Interseeding Cover Crops into Corn to Extend the Grazing Season and Improve Soil Health	\$196,105	Dr. Kathy Soder	USDA-ARS	PA
LNE23-473R	Maximizing the effectiveness of cover crop rolling/crimping for improved weed suppression in no-till organic systems	\$199,999	Dr. Madhav Dhakal	Rodale Institute	PA

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Projects funded in 2023

Farmer Grant Program

Farmer Grants explore new concepts in sustainable agriculture conducted through experiments, surveys, prototypes, on-farm demonstrations or other research and education techniques.

Project Number	Project Title	Total Funding	Project Leader	Organization	State
FNE23-066	Identifying and Selecting Wild Yeast Strains in Hard Cider	\$29,104	Jeff Rogers	Rogers Orchards	CT
FNE23-046	The Ask Aunt Nellie Project - A Crowd-Sourced Connecticut Farm Management Knowledge Base	\$15,797	Diane Dorfer	Cobblestone Farm	CT
FNE23-035	Technology Boosts Rate of Gain: Evaluating the Effects of Repurposed Poultry Housing Versus Intensive Grazing for the Modern Sheep Producer	\$29,997	Steven Breeding	Shepherd's Hope Farm	DE
FNE23-061	Wintering Honey Bee Colonies With & Without Upper Entrances: Comparing Internal Temperature, Humidity, Food Consumption, Spring Cluster Size & Survival	\$7,035	Amy Musante	Musante Farm	MA
FNE23-047	Farmer to Farmer Agroforestry Guidebook for the Northeast	\$30,000	Jono Neiger	Big River Chestnuts	MA
FNE23-058	Maximizing Bay Scallop Seed Performance in Bottom Cage and Suspended Net Culture for Subtidal Aquaculture Farms	\$27,202	Dan Martino	Martino's Seafood, LLC	MA
FNE23-054	2023 Weed Suppression Study and Analysis	\$10,539	Elizabeth Lamb	The 6th Branch	MD
FNE23-048	Optimizing Ginger Yields and Profit	\$6,436	Erica Emery	Rustic Roots Farm	ME
FNE23-039	Low Cost, High Volume Hard Clam Farm	\$29,250	Adam Campbell	North Haven Oyster Co.	ME
FNE23-055	Battery and Renewable Power for Oyster Farming	\$29,836	William Leathers	Maine Ocean Farms	ME
FNE23-049	Expanding Organic, Ecological, Regenerative Christmas Tree Agroforestry in Maine	\$20,311	Jonah T Fertig-Burd	Celebration Tree Farm & Wellness Center, LLC	ME
FNE23-060	Reducing Environmental Risk and Increasing Productivity on Mussel Farms	\$29,814	Matthew Moretti	Bangs Island Mussels / Wild Ocean Aquaculture, LLC	ME
FNE23-037	Developing Precision Oyster Farming Methods Using Environmental Data	\$21,268	Max Burtis	Ferda Farms LLC	ME
FNE23-052	Growing Bay Scallops on a Maine Oyster Farm as a Strategy to Diversify Crops and Adapt to a Warming Gulf	\$21,592	Jordan Kramer	Winnegance Oyster Farm	ME

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Farmer Grant Program (continued)

Project Number	Project Title	Total Funding	Project Leader	Organization	State
FNE23-052	Growing Bay Scallops on a Maine Oyster Farm as a Strategy to Diversify Crops and Adapt to a Warming Gulf	\$21,592	Jordan Kramer	Winnegance Oyster Farm	ME
FNE23-063	Muka-- Tree Hay as an Alternative Livestock Feed	\$10,706	John O'Meara	O'Meara Family Farm	ME
FNE23-036	Evaluating On Farm Leaf Composting Methods and the Impacts of Composted Leaves on Germination and Weed Suppression in Rye, Corn and Pumpkins	\$24,916	Bradley Burke	Longmeadow Farm	NJ
FNE23-038	Evaluation of Elevated Rack Height to Control Biofouling on an Intertidal Oyster Farm: Efficacy and Economics	\$20,088	Lisa Calvo	Sweet Amalia Oyster Farm	NJ
FNE23-056	Testing Practical Bird Deterrents for Floating Oyster Aquaculture	\$29,332	Scott Lennox	Barnegat Oyster Holdings	NJ
FNE23-045	Cost-Benefit Analysis of Using a Recirculating Fertigation System as an Alternative to Conventional Drain-to-Waste for Container Food Crop Production.	\$29,713	Kate Dix	Estell Farms	NJ
FNE23-041	Deaf New American Farm	\$30,000	Monu Chhetri	Deaf New American Advocacy Inc	NY
FNE23-034	Open Source Orchard	\$30,000	Josh Bailey	KC Bailey Orchards, Inc	NY
FNE23-065	Assessing the Socioeconomic and Environmental Impact of a Multi-Farm CSA for Urban Growers and City Residents in Buffalo, NY	\$29,853	Mayda Pozantides	Groundwork Market	NY
FNE23-040	Outreach Programs for Chinese Community to Access Culturally Relevant Foods Through Local CSA Models	\$15,322	Christina Chan	Garden Choy Division	NY
FNE23-057	Carbon Sequestration in Glacial Sand Soils in Haying, Cropping, and Soil Building Practices	\$27,843	Ian Magnus	Pitney Meadows	NY
FNE23-043	Mobile Seed Processing Trailer	\$27,837	Jean-Paul Courtens	Community Farm Philia Farm	NY
FNE23-068	Clean, Consistent Carrot Plantings: Seeding into Compost Strips for Reliable Germination and In-Row Weed Control in Organic Carrot Production	\$19,426	Benjamin Shute	Hearty Roots Community Farm	NY
FNE23-050	Is Climate Controlled Storage of Honey Bee Colonies During Winter an Economically Viable Option for Pennsylvania Beekeepers?	\$29,261	Mark Gingrich	Gingrich Apiaries, LLC	PA

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Farmer Grant Program (continued)

Project Number	Project Title	Total Funding	Project Leader	Organization	State
FNE23-067	Ramp Sustainability Trial - Replanting Root Plates	\$20,169	Steven Schwartz	Self	PA
FNE23-059	Adding Value and Reducing Food Loss for Small-Farm Seed Growers	\$24,070	Amirah Mitchell	Sistah Seeds	PA
FNE23-053	Profitably and Sustainably Converting Underutilized Forested Areas to Fertile Perennial Silvopasture Systems Using Swine	\$11,533	Charles Lafferty	Skyline Pastures	PA
FNE23-064	Adapting Brazilian Syntropic Farming Practices to Integrated High-Conservation-Value Nut Tree Species in Pennsylvania	\$26,918	Andrew Phillips	Homefields Inc.	PA
FNE23-070	Diversified & Profitable: Overcoming Challenges of Winter Mortality in Bay Scallop Culturing to Meet Increasing Demand Left by Wild Fishery Decline	\$12,042	Dan Torre	Aquidneck Island Oyster Company	RI
FNE23-042	Establishment and Evaluation of Deep-Rooted Perennial Cup Plant and Gamagrass as a Corn Silage Alternative in Dairy Systems	\$21,898	Scott Cleveland	Cleveland Farm	VT
FNE23-044	Monitoring and Management of Plum Curculio in Apple Using Odor-baited Trap Trees	\$5,610	Casey Darrow	Green Mountain Orchards	VT
FNE23-062	Off Grid Heating and Cooling for Greenhouses	\$30,000	Audra O'Dell	Random Rabbit LLC	WV

Innovations - 2023 Annual Report

Projects funded in 2023

Professional Development

The Professional Development Grant Program funds train-the-trainer projects that develop and share knowledge across the full range of service providers who work with farmers.

Project Number	Project Title	Total Funding	Project Leader	Organization	State
ENE23-183	Service Provider Succession Planning Programs To Address Land Access Inequities In The Northeast	\$149,554	Carmen Mouzon	The Farm School	MA
ENE23-180	Educational Support for Increasing the Acceptance of Federal Nutrition Benefits by Maryland Farmers	\$190,073	Megan Todd	Agriculture Law Education Initiative	MD
ENE23-185	Supporting Farm Transition Planning and Access in New England	\$149,181	Tricia Rouleau	Maine Farmland Trust	ME
ENE23-188	Implementation of Improved Nutrient Requirement and Supply Predictions to Reduce the Environmental Impact of Dairy Production in the Northeast US	\$150,000	Dr. Mike Van Amburgh	Cornell University	NY
ENE23-179	Using “Tag-Team Training” to Foster Education Program Sustainability Among Organizations Teaching Risk Management for Northeastern Farmers	\$123,249	Myron Thurston III	Cornell Cooperative Extension, Oneida Co.	NY
ENE23-181	Improving the Sustainability of Family Farms Through Increased Understanding of the Effects of Medicaid on Farm Assets	\$38,560	Darlene Livingston	Pennsylvania Farm Link, Inc.	PA
ENE23-187	SilvoPro: A Training Program for Silvopasture Professionals	\$135,320	Austin Unruh	Trees For Graziers	PA
ENE23-182	Agronomic Principles for Hayland and Pasture Management Education Program and Forage & Grazing Technical Assistance Professional Development Cohort	\$149,039	Andrew May	University of Vermont Extension, Center for Sustainable Agriculture	VT
ENE23-184	Agritourism and Land Use: Good Neighbors and Good Business for Rural Resilience	\$149,900	Jodi Richmond	WVU Extension - Mercer County Commission	WV
ENE23-186	Value-Added Coaching Program for West Virginia Agricultural Service Providers	\$149,999	Jennifer Totten	Future Generations University	WV

Innovations - 2023 Annual Report

Projects funded in 2023

State PDP Program

Through the State PDP Program, Northeast SARE State Coordinators conduct train-the-trainer projects that develop and share knowledge across the full range of service providers who work with farmers.

Project Number	Project Title	Total Funding	State Coordinator	Organization	State
SNE23-001-CT	Pasture Based Systems for Sustainable Livestock Production	\$264,997	Rachel Bspuda	University of Connecticut	CT
SNE23-016-DC	Urban Agriculture Production and Distribution for Enhancing Local Food Systems	\$119,078	Michael Whyte	The University of the District of Columbia	DC
SNE23-003-DE	Reaching out to Limited Resource Growers with Sustainable, Climate Resilient Production Techniques.	\$93,251	Dr. Rose Ogutu	Delaware State University	DE
SNE23-004-MA	Bringing the UMass Mentor Farm Model to Urban Agriculture	\$116,251	Clem Clay	UMass Extension	MA
SNE23-010-NY	The World We Want: Growing Benevolent Agricultural Communities	\$166,000	Violet Stone	Cornell Small Farms Program	NY
SNE23-011-PA	Methods, Collaboration and Communication in On-Farm Research and Demonstrations	\$165,902	Nicole Santangelo Thompson	Pennsylvania State University	PA
SNE23-012-RI	Plant Disease and Insect Scouting and Identification Resources for Urban Agriculture in Rhode Island	\$91,500	Keiddy Urrea-Morawicki	University of Rhode Island	RI

SARE in Connecticut

Grants awarded 2019–2023

Total awards: 24 grants

Total funding: \$1,756,680

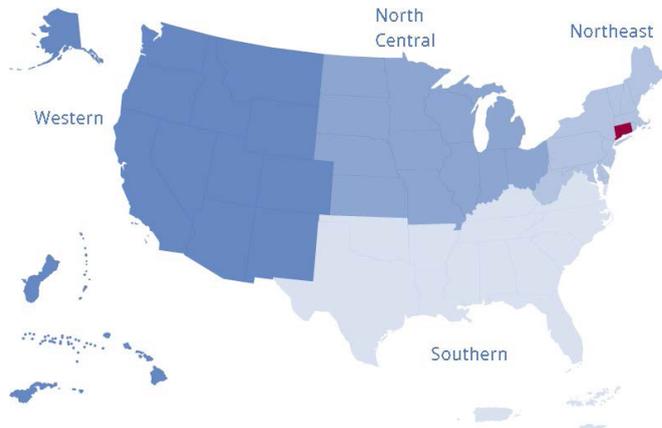
7 Farmer/Rancher — \$122,826

2 Research and Education — \$495,698

5 Partnership — \$117,787

4 Graduate Student — \$58,913

6 Research for Novel Approaches — \$961,456



1,039 farmers participated in projects, 484 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Assessment of a Composite Herbal Feed Additive on Reducing *Haemonchus contortus* in a Dual Purpose Sheep Operation

Dr. Erin Masurn, a veterinarian at Fork You Farms in Bantam, Connecticut, led a team of researchers to see if the herbal formula “Early Bird” could treat harmful parasites in sheep. Gastrointestinal nematodes are a type of parasite that can negatively impact the health and reproductive ability of sheep herds. “Early Bird” has shown to be successful at preventing gastrointestinal nematode propagation; however, researchers at Fork You Farms want to test the efficacy of “Early Bird” as a treatment method for sheep that have already been affected.

With the help of a Northeast SARE grant, Dr. Masurn ran an experiment to test how sheep infected with various parasites respond to the “Early Bird” treatment. According to researchers, “Early Bird” has the potential to increase the meat, fiber and dairy productivity of small ruminant and camelid operations by diminishing overall parasite burden. Using different species with varying parasite burdens gives producers the opportunity to gain a better understanding of the limits of herbal parasite control. This project will help veterinarians develop protocols for the usage of the product and help farmers determine its worth to their specific operations.

For more information on this project, see sare.org/projects and search for project number ONE21-399.

SARE in Delaware

Grants awarded 2019–2023

Total awards: 12 grants

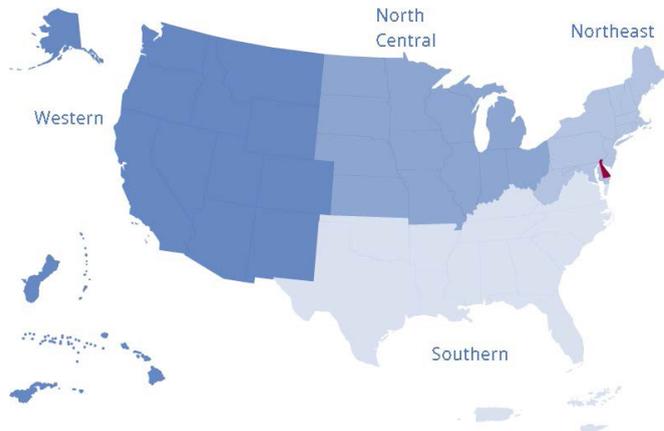
Total funding: \$426,218

2 Farmer/Rancher — \$59,992

1 Research and Education — \$199,992

3 Partnership — \$79,252

6 Graduate Student — \$86,982



1,417 farmers participated in projects, 2,231 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Using Drones to Measure Cover Crop Biomass as a Predictor of Soil Nitrogen And Corn Emergence Issues

Jamie Taraila, a graduate student at the University of Delaware, is using drone technology to investigate how seeding rates of cover crops impact crop yields. Cover crops are a common soil health management practice adopted by Delaware farmers who seek to capitalize on ecosystem services like N fixation, nutrient scavenging and soil cover. The services that cover crops provide make them valuable for increasing crop productivity; however, the timing of cover crop termination plays a significant role in the level of ecosystem services provided. The goal of this project was to integrate consumer drone technology into cover crop scouting to figure out how to improve productivity while maximizing the soil health benefits of cover crops.

With the help of a SARE grant, Taraila and a team of researchers from the University of Delaware used drone imaging technology to observe and compare cover crop biomass readings and stand counts. By using drones, the researchers were able to rapidly collect and analyze cover crop data to identify what termination timing and seeding rate provide the most opportunity for ecosystem services. This research will help producers improve crop productivity and will support future uses of drone technology for sustainable agriculture research.

For more information on this project, see sare.org/projects and search for project number GNE20-241.

SARE in Maine

Grants awarded 2019–2023

Total awards: 60 grants

Total funding: \$3,469,092

29 Farmer/Rancher — \$497,738

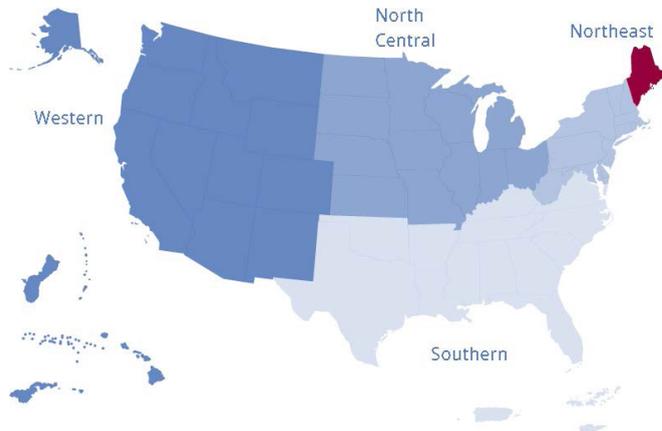
4 Research and Education — \$710,993

5 Professional Development Program — \$675,197

9 Partnership — \$257,647

6 Graduate Student — \$84,544

7 Research for Novel Approaches — \$1,242,973



4,251 farmers participated in projects, 1,719 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Assessment of Nursery Gear Technology to Optimize Growth, Survival and Economic Efficiency in Farming Atlantic Sea Scallops

Dr. Christopher Davis led a team of researchers at Pemaquid Oyster Company to study how producers can use nursery gear technology to develop new aquaculture businesses in Maine. For years, Maine has been characterized by a longstanding economic and cultural tradition of scallop fishing due to its ideal environmental conditions for sea scallop populations. Although there are numerous established Maine business entities with sea scallops, the abundance and profit opportunity of scallop harvesting indicates that this industry will continue to grow for years to come. To support the growth of this industry, Dr. Davis studied nursery technology to develop an innovative production strategy for sea scallop harvesters.

With the help of a SARE grant, Dr. Davis assessed five different nursery gear technologies by comparing growth rates, survival rates and the costs of using the different gear types. The results of this project are valuable to farmers looking to enter the sea scallop sector, especially existing aquaculture operations looking to diversify income and fishermen who rely on the competitive wild-caught market. The data from the study has the potential to optimize growth rates and survival of sea scallops, and may enable Maine sea-farmers to take advantage of the economic growth promised by sustainable sea scallop aquaculture.

For more information on this project, see sare.org/projects and search for project number FNE21-976.

SARE in Maryland

Grants awarded 2019–2023

Total awards: 43 grants

Total funding: \$3,139,563

10 Farmer/Rancher — \$173,036

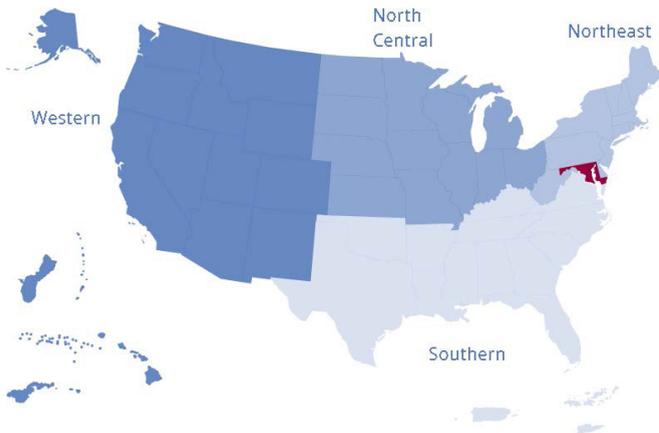
7 Research and Education — \$1,360,430

3 Professional Development Program — \$358,870

4 Partnership — \$112,471

13 Graduate Student — \$193,347

6 Research for Novel Approaches — \$941,409



7,031 farmers participated in projects, 1,689 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Maryland Extension Training: Solar Photovoltaic Options, Opportunities and Challenges

A team of researchers and educators at the University of Maryland collaborated to create an in-depth training curriculum to help producers learn about the options, opportunities and challenges associated with on-farm solar power. Due to increasing energy costs and decreasing costs of solar technology, many farms in Maryland are considering solar electric installations to power their operations. However, only 7.25% of farms in Maryland currently have solar panels installed, with many agricultural communities lacking the knowledge, technical expertise and experience necessary to facilitate this demand for on-farm solar. To address these challenges, Dr. Drew Schiavone, an energy conservation and technology specialist at the University of Maryland, obtained a SARE grant to create an educational training initiative.

The project launched a series of four regional “train-the-trainer” workshops designed to provide Extension educators and other agricultural service providers with the technical skills, knowledge, attitude and awareness needed to conduct training programs. In conjunction with these workshops, the University of Maryland also created a catalog of videos that are a great resource for farmers or anyone else looking to install solar panels. The educational curriculum and associated workshops explore the basic principles of solar PV technology and its appropriate on-farm applications, and provide an overview of solar contracts and leasing options relevant to Maryland farmers. By expanding access to this type of training, more producers will be able to produce clean energy and increase the sustainability of their farms.

For more information on this project, see sare.org/projects and search for project number ENE20-165.

SARE in Massachusetts

Grants awarded 2019–2023

Total awards: 48 grants

Total funding: \$3,469,092

16 Farmer/Rancher — \$319,970

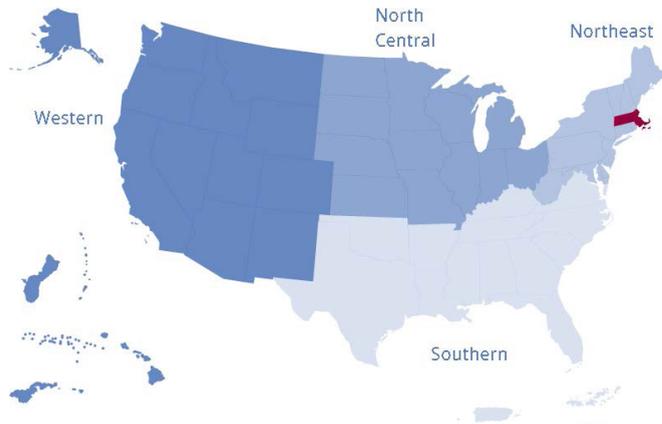
5 Research and Education — \$793,981

3 Professional Development Program — \$379,293

9 Partnership — \$208,916

9 Graduate Student — \$132,172

6 Research for Novel Approaches — \$842,182



8,736 farmers participated in projects, 2,207 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Assessment of a Composite Herbal Feed Additive on Reducing *Haemonchus contortus* in a Dual Purpose Sheep Operation

Jan Yoder of Woodmetalcanvas in Westport, MA, collaborated with local farmers to build, test and refine a light electric walking tractor to increase production efficiency. Weed management is crucial on vegetable farms of all scales, but it can be particularly challenging for small-scale farms as hand weeding is time consuming and tractor cultivation may not fit with smaller acreages. To address this, Yoder developed the Weed Weasel, an electric walking tractor that can be used for quickly cultivating beds of vegetables and other produce.

With the help of a SARE grant, Yoder was able to fund the construction and testing of three Weed Weasels, as well as to provide support to local farms in their adaptation and use of the Weed Weasel. The trial runs Yoder did during this project showed that the Weed Weasel is safe, creates no pollution in the field and minimizes soil compaction, making it the perfect tool to assist farmers in creating more sustainable and efficient crop production. The success of the Weed Weasel drove Yoder to develop step-by-step instructions that farmers can use to build their own Weed Weasel.

For more information on this project, see sare.org/projects and search for project number ONE18-324.

SARE in New Hampshire

Grants awarded 2019–2023

Total awards: 20 grants

Total funding: \$1,986,308

3 Farmer/Rancher — \$51,376

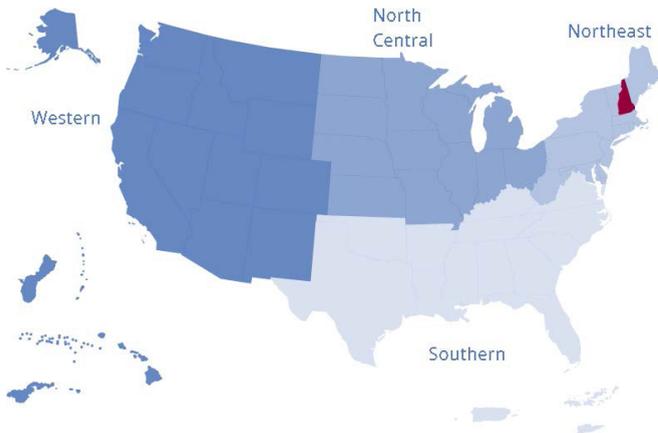
5 Research and Education — \$1,014,236

3 Professional Development Program — \$361,992

3 Partnership — \$71,336

4 Graduate Student — \$59,020

2 Research for Novel Approaches — \$428,348



3,400 farmers participated in projects, 946 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Exploring the Feasibility of Growing Microgreens in a Modified Cold Storage Room

Jennifer Wilhelm led a team of researchers at Fat Peach Farm in New Hampshire to determine if growing microgreens in a modified cold storage room can increase farm revenue. In the Northeast, producers are challenged with bringing in sufficient crop yield while facing significantly shorter growing seasons. Most small-scale farms have cold storage rooms that are only in use during the summer months to keep products fresh for market, but they remain untouched during the colder months. This gives New Hampshire farmers the opportunity to extend their growing season and increase profits by modifying their cold storage rooms to grow microgreens.

To explore the viability of this venture, researchers at Fat Peach Farm obtained a SARE grant to determine the economic benefits and shortcomings of growing microgreens in modified storage rooms. With this grant, the recipients were able to fund a series of experiments aimed at evaluating different production methods for producing microgreens in a controlled indoor environment. The researchers tested four varieties of microgreens under two different methods of light treatment in order to determine the crop viability. To assess economic profitability, the researchers tracked start-up costs as well as all production costs including electricity for heat, fans and lighting. Ultimately, the research found that microgreens provide a simple and efficient way for producers to increase the sustainability and profitability of their farms.

For more information on this project, see sare.org/projects and search for project number FNE20-966.

SARE in New Jersey

Grants awarded 2019–2023

Total awards: 29 grants

Total funding: \$1,385,137

11 Farmer/Rancher — \$205,341

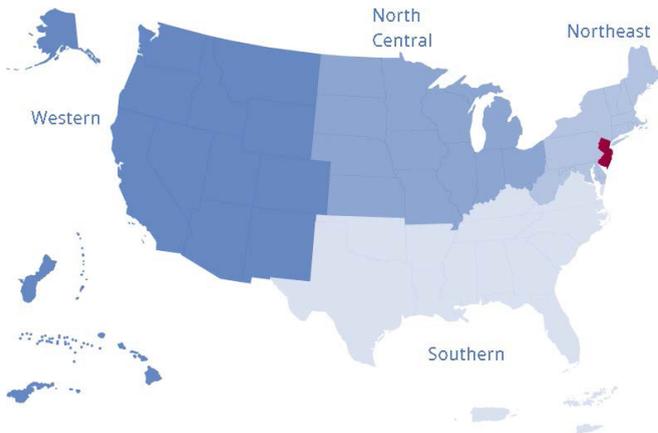
1 Research and Education — \$137,819

2 Professional Development Program — \$284,425

3 Partnership — \$73,293

9 Graduate Student — \$134,494

3 Research for Novel Approaches — \$549,765



4,937 farmers participated in projects, 445 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Reduced-Tillage and Tarping for Small Scale Commercial Potato Growing in New York

Nook & Cranny Farm in Brooktondale, New York, participated in a research project to assess the effects of reduced tillage, tarping and mulching on potato production. To grow potatoes, most farmers depend heavily on tillage for soil preparation and weed management despite the potential negative impacts that deep tillage can have on soil health. Recently, a new method called tarping has gained a lot of attention from potato farmers due to its potential to improve soil health, reduce labor costs and increase productivity. Since tarping is a relatively new method, many farmers do not know how to successfully integrate it into their crop rotation. This inspired Dr. Tuori, the head of Nook & Cranny Farm, to conduct a series of experiments that explore the short- and long-term benefits of tarping on small-scale commercial farms.

Dr. Tuori and his team planted potatoes in a reduced-tillage strip and compared three experimental growing methods: tarping with mulching, tarping without mulching and no tarping with mulching. The researchers analyzed the effects of the different growing methods by measuring biological indicators of the soil. Ultimately, the experiments indicated that the tarping method offers a more environmentally sustainable approach to small-scale potato production than conventional tillage and hilling methods. This research shows that when done correctly, tarping is an accessible and versatile tool that small-scale farmers can use to produce a marketable potato yield while also fostering healthy soils.

For more information on this project, see sare.org/projects and search for project number FNE21-995.

SARE in New York

Grants awarded 2019–2023

Total awards: 97 grants

Total funding: \$5,544,108

37 Farmer/Rancher — \$589,593

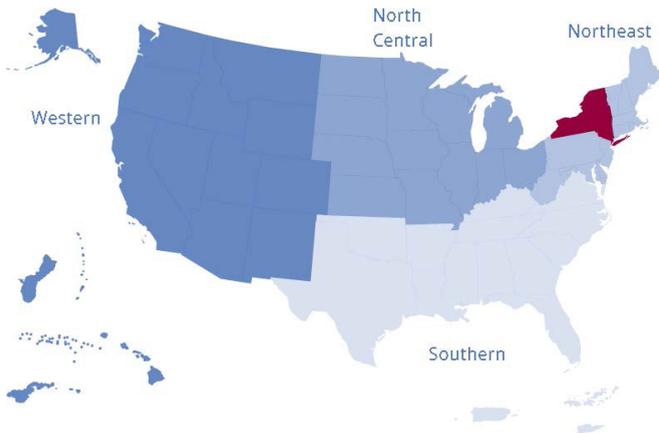
12 Research and Education — \$2,236,813

6 Professional Development Program — \$854,280

20 Partnership — \$511,538

15 Graduate Student — \$219,270

7 Research for Novel Approaches — \$1,132,614



15,397 farmers participated in projects, 2,881 reported a change in knowledge, awareness, skills or attitude

Project Highlight: To Improve the Soil, First to Know the Soil

The importance of soil health cannot be overstated. It supports vigorous plant growth by promoting the efficient use of nutrients and water, protecting against erosion and compaction, and aiding in disease and pest management. Soil health drives farm productivity and resilience against weather extremes. But the soil is an incredibly complex environment, and for farmers to improve their ground, they first need to learn about its condition.

That is why, with SARE funding, a multidisciplinary team from Cornell University created a new kind of soil assessment. Traditional soil tests, which are also important management tools, are typically limited to measuring nutrient levels and pH. They do not reveal anything about the physical structure or microbial life present in the soil, yet such characteristics strongly influence crop yields as well as the efficiency of inputs such as water and fertilizer. In contrast, Cornell's soil health assessment reports typically include management recommendations to address specifically identified constraints and promote soil-building practices such as cover cropping, reduced tillage, the use of compost or manure, and diversified rotations that include perennial crops. The Cornell lab handles about 2,000 samples a year and is expanding in use.

For more information on this project, see sare.org/projects and search for project numbers LNE03-175, LNE06-235 and ENE09-110.

SARE in Pennsylvania

Grants awarded 2019–2023

Total awards: 70 grants

Total funding: \$3,436,760

11 Farmer/Rancher — \$212,758

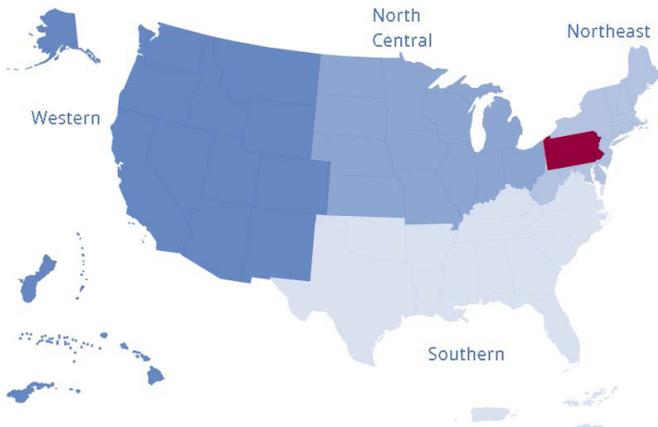
8 Research and Education — \$1,496,791

3 Professional Development Program — \$322,546

10 Partnership — \$278,107

34 Graduate Student — \$501,310

4 Research for Novel Approaches — \$625,248



15,996 farmers participated in projects, 1,127 reported a change in knowledge, awareness, skills or attitude

Project Highlight: On-Farm Demonstration and Evaluation on the Use of Landscape Fabric in Mixed Produce and Cut Flower Production

At Full Circle Farms in Spring Mills, Pennsylvania, a group of researchers conducted an experiment to explore how landscape fabric can impact crop productivity and weed management. Many farmers use black plastic mulch to manage weeds and mitigate soil erosion; however, this method has the potential to damage the health of the soil and the environment. To combat this, Sabine Carey from Full Circle Farms obtained a SARE grant to fund a project that demonstrated the effectiveness of using landscape fabric for supporting healthy soil while creating less plastic waste, requiring less tillage and reducing soil erosion.

To accomplish this, Ms. Carey and her team tested the use of landscape fabric in mixed produce and cut flower production on three Pennsylvania farms. The researchers measured a variety of factors including soil pH, overall cost and time spent weeding. These measurements were then compared to black mulch and typical straw/hay mulch in order to demonstrate that the use of landscape fabric is beneficial for developing a sound production system. The results from this project will allow farmers to make a more informed decision on the use of landscape fabric as they evaluate methods to reduce weeds, tillage and use of non-renewable resources such as black plastic.

For more information on this project, see sare.org/projects and search for project number FNE20-949.

SARE in Rhode Island

Grants awarded 2019–2023

Total awards: 9 grants

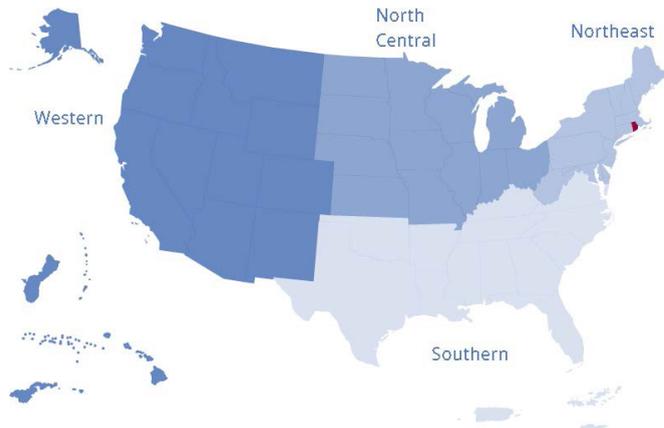
Total funding: \$658,598

4 Farmer/Rancher — \$38,266

2 Research and Education — \$560,945

1 Partnership — \$29,496

2 Graduate Student — \$29,891



2,334 farmers participated in projects, 702 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Evaluation of Microclover Black Beauty as a Semi-Permanent Cover Crop and Living Mulch in Organic Tomato Production

Sodco, a Rhode Island turf farm, is making strides towards improving productivity on their farm by testing the effects of using Microclover Black Beauty sod as a living mulch and cover crop. Many farmers use cover crops between production crops to replenish soil nutrients and biological activity. However, this can be challenging on small-scale farms like Sodco where land is scarce, making it difficult to fit cover crops into profitable vegetable crop rotation. To address this, John Eidson, the farm manager at Sodco, led a research project to see if planting Microclover Black Beauty could increase crop productivity while improving soil health.

With the help of a SARE grant, Eidson and his team planted organic tomato crops in three Microclover Black Beauty treatment areas to see how it would impact fruit yield and soil nutrient status. The results did not show a noticeable difference in nutrient status or yield between experiment and control groups; however, the use of the treatment had multiple other benefits. The research showed that Microclover Black Beauty promotes better rainfall filtration, soil structure and organic matter accumulation. Microclover Black Beauty is also a more cost effective fertilizer option that naturally suppresses weeds between the rows, sparing farmers the labor and cost to mulch or cultivate the weeds by other means. Overall, the use of Microclover Black Beauty has potential to improve soil health and reduce input costs, making it a potentially viable option for improving profitability.

For more information on this project, see sare.org/projects and search for project number FNE19-927.

SARE in Vermont

Grants awarded 2019–2023

Total awards: 63 grants

Total funding: \$4,078,435

10 Farmer/Rancher — \$132,549

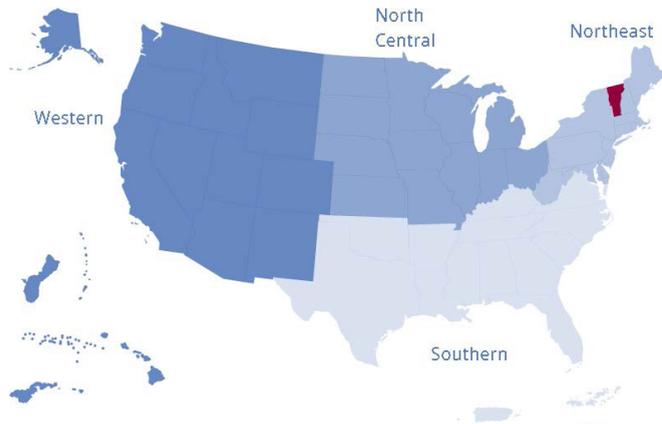
10 Research and Education — \$1,628,537

2 Professional Development Program — \$334,410

27 Partnership — \$769,440

8 Graduate Student — \$116,875

6 Research for Novel Approaches — \$1,096,624



20,882 farmers participated in projects, 1,625 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Establishing populations of ground-nesting native bees (Colletes) for orchard pollination services

In Jeffersonville, Vermont, John Hayden of The Farm Between is leading a group of researchers to try and improve native bee pollination services in Northeastern orchards. Unfortunately, due to climate change and other environmental factors, pollinator populations are declining, leading many farmers to worry about the pollination and production of spring flowering crops. To address this, Hayden and his team attempted to create suitable habitats for native ground nesting bee species, such as the Colletes bee, in hopes of managing production and improving crop yield.

After obtaining a SARE grant, Hayden was able to fund the testing of three experimental methods to determine if they would be able to establish native bee populations. These methods included 1) attempting to naturally bring in bees by removing vegetation and creating sand patches, 2) bringing newly emerged and captured adult bees to the orchards and 3) digging up bee pupae from heavily populated areas and bringing them to the orchards. The researchers faced many challenges throughout the experiment; however, they were able to gain a new understanding of the intricacies behind bee habitats. This research provides a solid foundation for producers looking to enhance their awareness of management practices for maintaining local pollinators.

For more information on this project, see sare.org/projects and search for project number FNE17-871.

SARE in West Virginia

Grants awarded 2019–2023

Total awards: 31 grants

Total funding: \$2,364,468

5 Farmer/Rancher — \$81,409

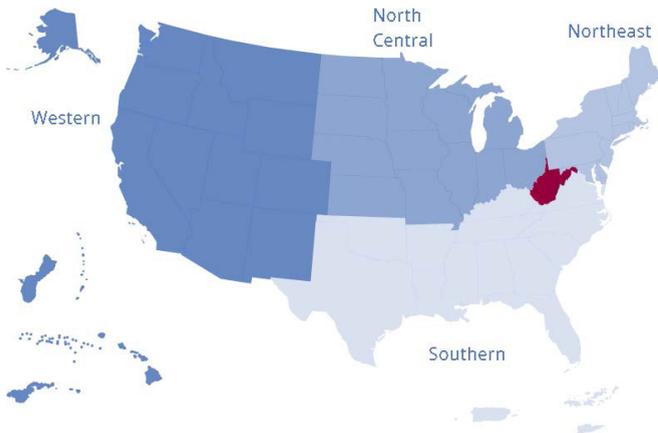
2 Research and Education — \$492,651

6 Professional Development Program — \$798,506

11 Partnership — \$310,745

3 Graduate Student — \$44,810

4 Research for Novel Approaches — \$636,347



1,832 farmers participated in projects, 2,638 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Low Cost Self-Sustaining Year-Round High Tunnel Temperature Control

A group of researchers from Caldwell, West Virginia, worked with SARE to discover if they can use solar and wind energy to power temperature-controlled farming tunnels. For years, farmers who live in climates with highly variable weather conditions have struggled to maintain stable crop production. As a result, many producers whose farms are susceptible to these extreme temperature conditions have turned to temperaturecontrolled tunnels as a solution. Unfortunately, the energy costs that it takes to maintain these tunnels are very expensive and are therefore not readily available to most producers. To combat this, Tommye Lou Rafes from T. L. Fruits and Vegetables LLC partnered with SARE to fund an experiment to see if powering the tunnels with solar and wind energy would be more cost effective.

After obtaining a SARE grant, Rafes and her team compared the cost of operating the tunnels using three different energy sources: 1) a propane/natural gas heating system, 2) a geothermal network that is not self-sustaining and 3) a self-sustaining solar/wind energy system. The researchers compared and analyzed every aspect of these three conditions, including energy output, equipment and installation costs, labor fees, etc. to find out which type of tunnel would be most beneficial for producers. This research provides a great insight into the costs and benefits of each method, providing producers with an educational resource that they can use to help decide which type of energy would be best for them. Overall, the data collected indicated that solar energy was the most cost effective and provided the most sustainable source of energy for farmers who want to grow crops in extreme weather conditions.

For more information on this project, see sare.org/projects and search for project number FNE20-962.

SARE in Washington D.C.

Grants awarded 2019–2023

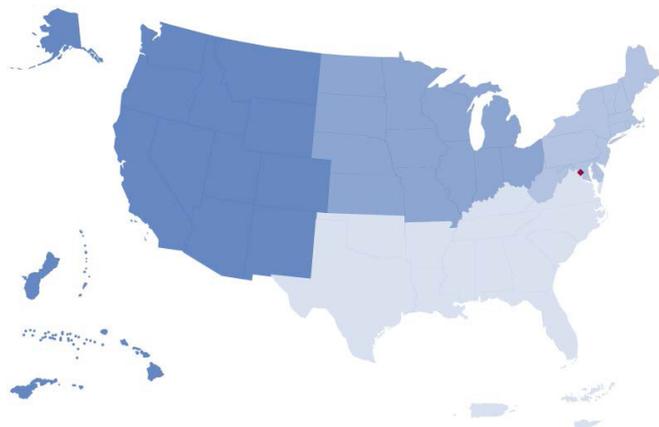
Total awards: 3 grants

Total funding: \$154,914

1 Professional Development Program — \$89,914

1 Graduate Student — \$15,000

1 Research for Novel Approaches — \$50,000



102 farmers participated in projects, 31 reported a change in knowledge, awareness, skills or attitude

Project Highlight: Women for the Land: New Voices for Conservation and Water Quality in Virginia

The American Farmland Trust (AFT) is enacting a new program that is designed to provide women in agriculture with the resources they need to be successful. Over the years, the population of female farmers has significantly increased, with about one third of the nation's farmland currently managed by women. Research suggests that this number is only going to increase, with an estimated seventy percent of the nation's farmland to be operated by women in the next twenty years. Despite their growing numbers, women are underrecognized for their tremendous contribution to farming and are fundamentally underserved by the programs that provide farmers with advice, funds and resources. To address this, the American Farmland Trust obtained a SARE grant to fund an educational program designed specifically for women to learn how to incorporate sustainable agriculture practices on their farms.

The AFT invited women agricultural landowners to engage in a three-part learning program about local conservation agencies and how to integrate sustainable farm practices on their land. The program used participatory, women-only Learning Circles designed to build confidence and to empower women to take conservation action. The participants were also provided with an abundance of resources on how to maintain a sustainable yet profitable production strategy. Over the course of this project, fifty six women successfully completed the program, with several of them going on to successfully implement the strategies and practices they learned. This project provides a model for how other organizations can actively include women in the agricultural field while increasing conservation efforts.

For more information on this project, see sare.org/projects and search for project number EDS19-304

Scan for access to Sustainable Agriculture Research and Education
program resources available as PDFs.



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