

2021-2022

SARE



NORTH CENTRAL



SOUTH



NORTHEAST



WEST

SUSTAINABLE AGRICULTURE RESEARCH & EDUCATION



REPORT FROM THE FIELD

“Our online community, which started with only 24 local producers, has grown to represent nearly 400 local farmers and another 500 farmers from the tropics around the world, all sharing their issues and solutions with each other.”

Noa Lincoln
University of Hawai'i at Mānoa
(See story on page 19.)



Letter from the Director

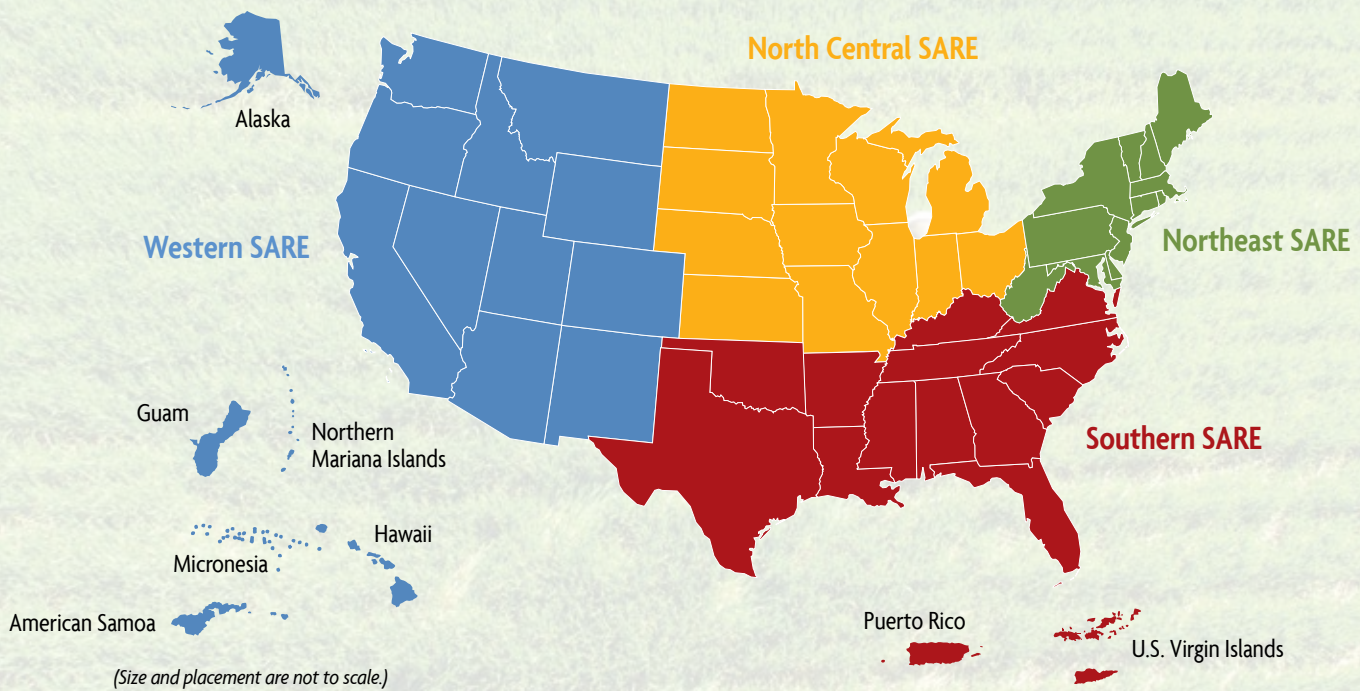
When I started at USDA's National Institute of Food and Agriculture (NIFA) in August 2020, I was excited to learn that SARE was one of the programs I would have the opportunity to work with. I have long admired the SARE program for being farmer focused and regionally adapted, which makes it unique among NIFA programs in its ability to develop relevant and meaningful solutions to today's challenges. While a faculty member at South Dakota State University, I worked on projects with one of SARE's South Dakota state coordinators and later had the opportunity to serve on the North Central SARE Administrative Council.



I appreciate the work that applicants put into their proposals when they apply for SARE funding. Because the work of developing a proposal is so significant, I am also extremely appreciative of the time and effort put in by the reviewers of these proposals, including the administrative council members, technical review panelists and ad hoc panelists. This is a weighty responsibility, but it is one that allows SARE to select excellent projects that advance sustainable agriculture across the country.

As you read through the diverse stories in this issue of *Report from the Field*, I am confident you will be pleased to see the way SARE projects help us better understand and apply sustainable agricultural practices, as well as how they help to enhance the environment, improve economic resilience, and build healthy and robust communities. Whether grazing hay bales in the cold environs of North Dakota or growing breadfruit in Hawaii, identifying key strategies for proactively mitigating the effects of climate change in Vermont, or giving South Carolina farmers better access to wholesale markets, SARE projects are having a positive impact on agriculture throughout the United States. I hope you enjoy all the stories.

Vance Owens, SARE Director
2021



SARE is...

INVESTMENT IN SUSTAINABLE FARMING AND RANCHING

Since 1988, more than \$26.6 million in research funds have gone directly to America's most innovative farmers and ranchers. In total, SARE has invested over \$334 million in more than 7,700 projects.

GRANTS FOR INNOVATIVE RESEARCH AND EDUCATION

SARE offers grants to farmers, ranchers, educators, researchers, graduate students and others for on-farm research, education, and professional and community development.

LOCAL LEADERSHIP, NATIONAL IMPACT

Four regional administrative councils—including farmers, educators, scientists, government, NGOs and other stakeholders—set priorities and make grant award decisions.

FARMER LEADERSHIP

As grantees and administrative council members, hundreds of farmers and ranchers from all corners of the nation share their on-farm research results and advise SARE.

EDUCATION AND TRAINING

SARE shares research results by funding trainings, requiring project outreach and producing a library of practical, how-to books, bulletins and other information products.

Learn more at www.sare.org.

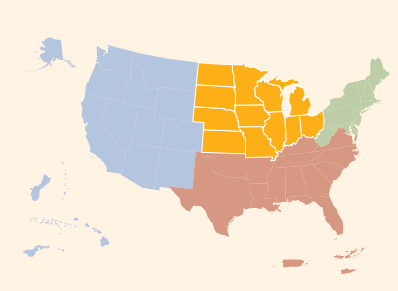
Cover photos by: Noa Lincoln, University of Hawai'i (main photo); all inset photos by Deb Heleba, Northeast SARE, except the fourth, by Stacie Clary, Western SARE. **Left page:** photos by Deb Heleba; livestock photo by Candace Pollock, Southern SARE. **This page:** inset photos, from left: Stacie Clary; Deb Heleba; Lance Cheung, USDA; Edwin Remsburg; Deb Heleba; Preston Keres, USDA. **Credits:** Production by Andy Zieminski and Lizi Barba, SARE Outreach. Design by Peggy Weickert, University of Maryland Design Services. Printed by the University of Maryland Printing Services.



United States
Department of
Agriculture

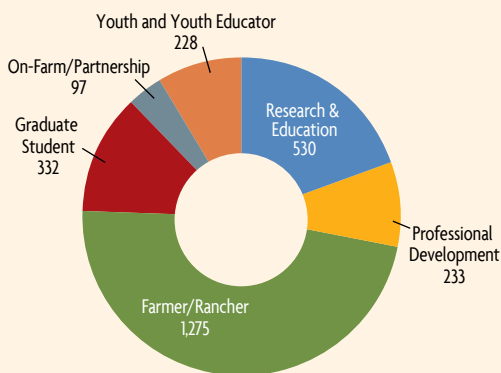
National Institute
of Food and
Agriculture

NORTH CENTRAL SARE

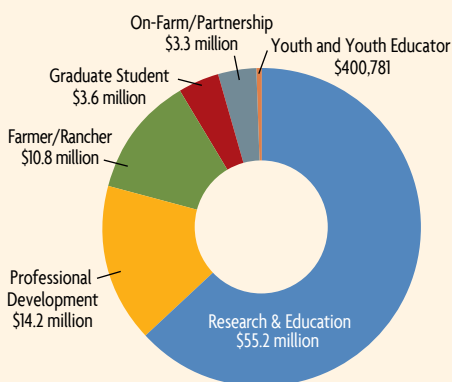


Total Grant Awards, 1988–2021¹

2,695 GRANTS



\$87.5 MILLION



Photos by (clockwise from left): Miranda Meehan; R. Christianson; Hongmei Li-Byarlay

Recent Highlights from the North Central Region

- Across the region, producers and organizations found themselves navigating online sales due to COVID-19, and North Central SARE made it a priority to help. We put together online resources and made quick supplemental funding available so that SARE state coordinators and regional organizations could help farmers and ranchers set up online marketing.
- Many SARE grantees have been tasked with converting in-person field days to virtual field days since March 2020. North Central SARE partnered with Maggie Norton, a farmer outreach coordinator for Practical Farmers of Iowa, to offer two webinars about hosting virtual field days. We shared the recorded webinars online and included equipment recommendations and costs.
- North Central SARE is working to encourage fuller participation and to build relationships with a diversity of producers in the region. Working alongside SARE state coordinators and 1994 institutions, we are providing mini-grants for food sovereignty projects at 14 of the twenty 1994 institutions in the region.
- Farmers Forums are events that give regional SARE grant recipients the chance to share information about sustainable agriculture practices at conferences. We are working with conference planners across the region to expand our Farmers Forums. Eventually, we hope to have SARE grantees presenting their work at existing conferences in each of our 12 states.

Grant Proposals and Awards, 2020–2021

Grant Type	Preproposals Received ²	Full Proposals Invited	Full Proposals Received	Proposals Funded	Funding Total
Research and Education	299	66	64	28	\$6,675,364
Professional Development Program	N/A	N/A	45	22	\$1,830,933
Farmer/Rancher	N/A	N/A	205	113	\$1,418,542
On-Farm Research/Partnership	N/A	N/A	82	31	\$1,220,623
Graduate Student	N/A	N/A	106	46	\$654,028

¹These totals exclude additional direct funding given each year to Cooperative Extension in every state to support state-level programming on sustainable agriculture.

²The use of a preproposal process varies by region. It serves to screen project ideas for the larger and more complex grant programs, and to reduce applicants' proposal preparation burden as well as the proposal review burden for SARE's volunteer reviewers.

Increasing Food Security in a Mohican Tribal Community

“ We had a number of people reach out wanting to grow vegetables for the first time or for the first time in a long time. ”

Kellie Zahn, Stockbridge-Munsee Community Agriculture Agent

THE CHALLENGE

Like many rural communities, the Stockbridge-Munsee Community, a Mohican Indian tribe in north central Wisconsin, wants to increase its access to fresh produce but faces multiple barriers. For one, the tribe owns 500 acres of farmland that has become depleted of nutrients and organic matter after many years of improper management by previous tenants. Local gardeners and farmers lack knowledge of the soil management practices that improve

fertility, such as taking and interpreting soil tests, making compost and using cover crops. Also, some community members are reluctant to grow produce because of the intensive labor required to control weeds. Food preservation and season extension are other areas where there's an opportunity to improve food security, but also a lack of knowledge on how to do so.

THE ACTIONS TAKEN

Funded by two SARE grants, Stockbridge-Munsee Community Agriculture Agent Kellie Zahn is working with local educators to give new and existing farmers hands-on training in many areas that she hopes will improve the tribe's ability to grow fresh produce. Based at a community farm called “Keek-oché” in Mohican or “From the Earth” in English, Zahn and her collaborators have organized events and

demonstrations on soil testing, crop rotation, cover crops, composting and intercropping with the traditional “Three Sisters” of corn, beans and squash.

They have made weed management a primary focus as well. Zahn has shown community members how to adopt effective tools such as flame weeding, landscape fabrics and mulches. Other demonstrations showed how to extend the growing season by using low tunnels and by starting seeds indoors with simple pots made of newspaper. Food preservation, composting, beekeeping and promoting beneficial insects were other topics they addressed.

They also collected data on crop yield from the demonstration farm and on sales at the local farmers' market to help small-scale growers assess the profit potential of selling produce within the community.

THE IMPACTS

The Stockbridge-Munsee Community's food sovereignty committee is happy with the team's progress and is eager to see it continue, Zahn reports. Specific impacts include:

- **Sharing new information:** The project team reached more than 200 farmers through workshops and online events. They also produced a series of fact sheets and videos throughout the project to supplement their events.
- **Increased farmer knowledge:** More than 50 farmers reported that they learned something new in the areas of soil health, weed management, vegetable production, beekeeping and indigenous farming techniques.
- **Leveraged funding:** The project team has received five new grants to continue their food security work in the community.

Learn more: Visit projects.sare.org and search for projects ONC18-050 and LNC18-414.



Heritage beans grown at the Keek-oché community farm of the Stockbridge-Munsee Community, a Mohican Indian tribe in Wisconsin. Photo by Kellie Zahn

North Dakota Farmers Lead the Way With Bale Grazing

“Bale grazing, like any other strategy or practice, can be implemented in many unique ways, which is important because each operation is different.”

Erin Gaugler, Gaugler Farm and Ranch

THE CHALLENGE

When siblings Erin and Drew Gaugler, who grew up on a farm, decided to turn to agriculture full time as adults, they found themselves ranching on land in North Dakota that had been severely degraded from years of mismanagement by previous occupants. Farming and overgrazing had left the soil with low fertility and susceptible to wind and water erosion. The Gauglers began to

rejuvenate the land with cover crops and intensive rotational grazing. They also became interested in bale grazing, or the practice of leaving hay bales in fields during the winter for livestock to graze. University research has shown that bale grazing can increase soil health and reduce winter feeding costs, but the Gauglers couldn't find good examples of how to bale graze on a working ranch, giving them little guidance on how to move forward.

THE ACTIONS TAKEN

Supported by a SARE Farmer/Rancher grant, the Gauglers set up and monitored a system that involved planting multi-species cover crops and grazing them in the fall, then putting out bales for livestock to graze over the winter. Permanent and

temporary fencing was used to rotate the animals and control their access to the hay, and bales were placed in areas that had especially low levels of organic matter. The Gauglers took soil samples and tracked body condition scores.

In 2020 the Gauglers received a second SARE grant to continue their evaluation of bale grazing and to integrate sheep into the system. A benefit of adding sheep is that manure is more evenly distributed across the field and soil compaction is limited. Also, cattle and sheep don't share parasites, which helps break pest life cycles. Sheep are able to browse closer to manure deposits than cattle are, which can result in improved feeding efficiency.

While they used cover crops in conjunction with bale grazing during the first project, the Gauglers observed that bale grazing on established perennial fields was a more effective strategy to build soil health and to improve both forage production and economic sustainability.

THE IMPACTS

While some of their work is ongoing, the Gauglers have achieved one of their primary goals: showing themselves and their neighbors that bale grazing is viable. “Folks in the local area have asked us several questions about what we are doing with the bales, and they wonder how it works,” said Erin. “Drew and I have noticed that a handful of those same people have begun to implement bale grazing on their own operation.” Other impacts include:

- **Outreach to peers:** Through tours, talks, podcasts, flyers and other outreach, the Gauglers reported sharing project information with 1,500 local farmers and 200 agriculture professionals.
- **Farmer adoption:** While the Gauglers report that 10 local farmers have changed or adopted a new practice after learning about their work with bale grazing, the impact across the region is harder to track.

Learn more: Visit projects.sare.org and search for projects FNC20-1218 and FNC18-1123.



Sheep and cattle grazing bales in the winter at the Gaugler ranch. Photo by Erin Gaugler



Shawntez Young (seated), a Hendrick House employee, plays a version of bingo that teaches about pollinators with children visiting the Hendrick House Farm. Photo by Ann Swanson, Hendrick House Farm

Bringing Fresh Foods to Illinois Schools and Institutions

“We hope to make a change in institutionalized food that will be ongoing beyond the scope of this grant.”

Ann Swanson, Hendrick House Farm

THE CHALLENGE

While fresh, local foods have become very popular in grocery stores, restaurants and farmers’ markets, “institutionalized food is the forgotten part of the food revolution,” says Ann Swanson, the farm director at Hendrick House, a private business that offers housing, catering and dining hall services for University of Illinois Urbana-Champaign. The institutions that provide dining services for grade schools and higher education tend to favor pre-packaged, processed foods over fresh, homemade foods because they are cheaper to source and nutritional guidelines are easier to track. Also, food service employees often lack the skills or training to prepare fresh foods. To ensure the long-term survival of the Hendrick House Farm and to create new opportunities for other local farmers,

Swanson set out to bring the local food revolution to her company and to schools in her community.

THE ACTIONS TAKEN

Supported by a three-year SARE Farmer/Rancher grant, Swanson launched a series of educational activities for multiple audiences, based out of Hendrick House’s kitchens and at its 10-acre farm, which includes a one-acre demonstration area. She created a guidebook and held workshops for food service staff on storage and preparation of fresh foods, and worked with chefs on how to plan for and procure local, seasonal produce.

Swanson also teamed up with area nonprofits and schools to bring youths to her demonstration farm so they could see where food comes from and learn how to make healthy food choices. She hosted a range of groups, including kindergarteners, middle and high schoolers, STEM classes and a group of at-risk boys. During the course of the project, her outreach grew to include the Illinois Master Gardeners and Parkland College, which held horticulture and culinary classes on the farm.

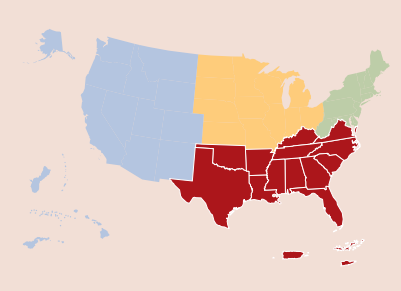
THE IMPACTS

“This project has changed our company immensely over the last two years,” says Swanson, who also cites new partnerships with area schools and nonprofits as positive results. Specific impacts include:

- **Sourcing from local farms:** Every chef in the Hendrick House company is now using produce from its farm, whereas before the project only 30% were. Also, the company more than doubled the amount it spent on local food from outside farms, and it doubled the number of farms it bought produce from to 12.
- **More institutions on board:** The farm-fresh produce Hendrick House buys is now being served through other institutions it contracts with, including a community college, a medical center and a drug rehabilitation clinic.
- **Ongoing youth education:** The number of youth workshops held at the farm went from two in 2017 to 20 in 2019.

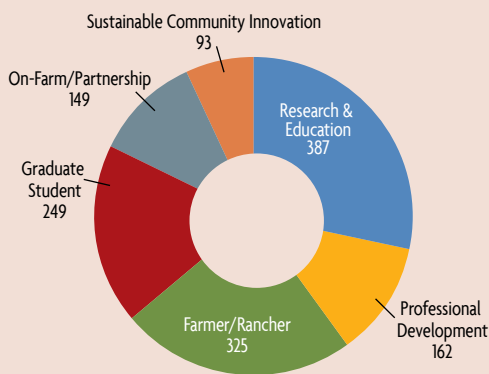
Learn more: Visit projects.sare.org and search for project FNC17-1101.

SOUTHERN SARE

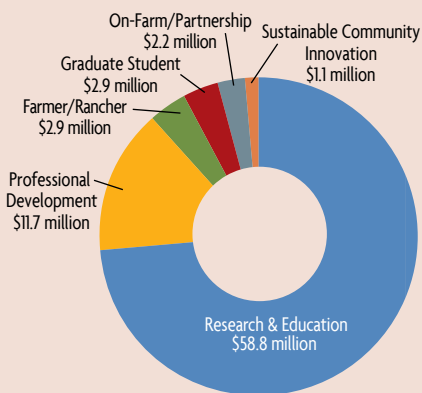


Total Grant Awards, 1988–2021¹

1,365 GRANTS



\$79.6 MILLION



Photos (clockwise from left): Preston Keres, USDA; Candace Pollock, Southern SARE; Laura McKenzie, Texas A&M AgriLife

Recent Highlights from the Southern Region

- In 2020, Southern SARE launched a new program, called the Sustainable Agriculture Leadership Program, to enhance the resiliency and vivacity of historically underserved farmers and ranchers. The program provides sponsorship support for recipients to conduct education and training activities in their communities, and it provides them with ways to access the resources they need. To date, the program has reached 30 recipients with sponsorships totaling nearly \$50,000.
- One of the hallmarks of the SARE program is to encourage a systems approach to sustainable agriculture, and Southern SARE continues to advance systems research through its Large Systems grants program. In 2020, the program funded a 9-year, \$1.8 million project at Langston University in Oklahoma focused on sustainable meat goat production and marketing. This project is unique in that its research is driven by a consortium of 1890 land-grant institutions and farmers seeking to strengthen the goat industry across the Southern region. In addition, we awarded our first \$1 million Systems Research grant in 2021 on regenerative agriculture, funded through the National Center for Appropriate Technology.
- What does “quality of life” mean for sustainable agriculture research? We provided a working document to offer some guidance to those social scientists seeking clarity on where quality of life fits into SARE’s three-legged stool of sustainability. Examples that help bring the quality of life perspective into the program include examining issues through the lens of social health (civic agriculture, regional processing, locavores, governance structures) as well as ethical health (animal welfare, human rights, food security, fair reimbursement for farmers and farm workers).

Grant Proposals and Awards, 2020–2021

Grant Type	Preproposals Received ²	Full Proposals Invited	Full Proposals Received	Proposals Funded	Funding Total
Research and Education	287	118	104	41	\$9,081,641
Professional Development Program	72	36	30	16	\$1,220,258
Farmer/Rancher	N/A	N/A	84	17	\$217,867
On-Farm Research/Partnership	N/A	N/A	72	18	\$345,005
Graduate Student	N/A	N/A	202	35	\$539,536

¹These totals exclude additional direct funding given each year to Cooperative Extension in every state to support state-level programming on sustainable agriculture.

²The use of a preproposal process varies by region. It serves to screen project ideas for the larger and more complex grant programs, and to reduce applicants’ proposal preparation burden as well as the proposal review burden for SARE’s volunteer reviewers.

Giving South Carolina Farmers Better Access to Wholesale Markets

“In the long term, the project will result in a greater number of local farms that are able to sell products to wholesale market outlets, thereby increasing farmers’ market diversity and economic viability.”

Geoff Zehnder, Clemson University

THE CHALLENGE

More and more, large supermarkets, restaurants, food businesses and institutions are willing to offer local, sustainably raised products. Many small- and mid-scale farmers who are used to selling directly to consumers in small venues are interested in supplying these large buyers, but supplying crops to a distributor or supermarket is very different from selling at a farmers’ market; scaling up to wholesale requires a lot of changes in how farmers grow, harvest, package and deliver their products. A team of Extension and nonprofit educators in South Carolina found that the key knowledge gaps preventing farmers from scaling up their operations to meet strong local demand were best practices in food safety, postharvest handling, packing and business management.

THE ACTIONS TAKEN

To address these gaps, the team, led by Clemson University Professor Geoff Zehnder (now retired), organized a series of state-wide training events for Extension agents and other agricultural service providers. Over two years, the team developed a “wholesale success” training curriculum tailored to the needs of their stakeholders and delivered it through multi-day events. Along with classroom and field sessions, participants visited nearby produce processing facilities to learn about best practices. The lead instructor was Atina Diffley of FamilyFarmed, a leading expert on harvest and postharvest handling for wholesale markets.

The series focused on fruits and vegetables and covered topics such as proper pre/post-harvest handling techniques; maintaining the cold chain; produce washing, grading and packing; developing relationships with buyers and identifying needs of wholesale buyers; best food safety practices; and scale-appropriate equipment and infrastructure for affordable processing.

THE IMPACTS

The greatest impact of the project was the creation of a core group of Extension

professionals in South Carolina who now have the tools and knowledge to help farmers tap wholesale markets, according to Zehnder. Some of the people trained through this project have gone on to hold their own events for Extension colleagues, which further expands the network. Other project impacts include:

- **New knowledge:** Of the 122 agricultural service providers who attended a training event, 81% reported that they gained new knowledge, skills and/or attitudes related to the topic. “We learned valuable tips on proper cleaning and storage of veggies,” said one. “The Wholesale Success manual has been very helpful as well.”
- **New collaborations:** The project team received one new grant to build on their work and established 12 new working collaborations.
- **New training infrastructure:** The team upgraded two Clemson facilities for vegetable postharvest handling so that they could be used for ongoing training and demonstration beyond the project’s scope.

Learn more: Visit projects.sare.org and search for project ES17-137.



Atina Diffley of FamilyFarmed leads a “wholesale success” workshop for South Carolina farmers. Photo by Geoff Zehnder, Clemson University

Texas Farmers and Scientists Explore Carbon Markets for Soil Health Practices

“While farmer participants were already knowledgeable about cover cropping and conservation tillage practices ... they were not familiar with the concept of potentially obtaining payments for carbon credits.”

Barbara Bellows, Tarleton State University

THE CHALLENGE

We know carbon can be taken out of the atmosphere and sequestered in the soil to help curb climate change. Practices like cover crops, crop rotations, reduced tillage, rotational grazing and agroforestry are among the most effective. Many kinds of financial programs exist to encourage farmers to adopt sustainable practices, and as

the need to address climate change becomes increasingly urgent, more attention is turning to cost-effective programs that target carbon specifically. One approach is voluntary market trading, where agrifood businesses achieve carbon neutrality by paying farmers to sequester carbon. But for these programs to work, we need to know exactly how much carbon is sequestered by farming practices in the context of site-specific conditions such as climate and soil type. Also, to get farmers to participate, they need to learn about how these programs work and how they might fit into their decision-making.

THE ACTIONS TAKEN

Supported by a SARE Research and Education grant, a multi-disciplinary team of scientists, service providers and farmers led by Barbara Bellows of Tarleton State University took on this challenge in the

Southern Great Plains. Through a multi-faceted, three-year project, the team collected soil samples from 14 farms to determine the impact of farming practices, soil type and climate conditions on carbon sequestration and other soil health characteristics. They also interviewed farmers to learn what motivated them to use soil conservation practices, what discouraged them and whether carbon markets would influence their decision-making. The group engaged in extensive farmer outreach to share information about the many benefits of soil health practices, their potential for storing carbon, and current and future market opportunities for doing so.

THE IMPACTS

The project's biggest impact, according to Bellows, was that it shared useful information with area farmers about ecosystem service markets for both carbon sequestration and water conservation that they previously knew little about. Other impacts include:

- **Practical knowledge:** The team learned that soil type and climate influence carbon sequestration potential and other soil health characteristics. An economic and environmental analysis of participating farms found that using multiple conservation practices was better than simply adopting conservation tillage. These findings can help service providers make soil management recommendations that are better tailored to local conditions.
- **Continuing research:** Bellows and partners at Texas A&M received a \$300,000 USDA NIFA grant to buy soil research equipment that will allow them to carry on this research more effectively.
- **Impacts of incentives:** The research team learned that farmers in the semi-arid areas of north-central Texas are hesitant to adopt cover crops unless provided with long-term incentives due to the irregularity of spring rainfall.

Learn more: Visit projects.sare.org and search for project LS17-277.



Cotton is growing after a wheat cover crop in a conservation tillage system in Texas.
Photo by USDA NRCS Texas

Low-Cost Energy Solutions for Appalachian Greenhouse Growers

“Our initial results show significant energy savings that will benefit resource-limited farmers.”

Ok-Youn Yu, Appalachian State University

THE CHALLENGE

The demand for locally grown food is high in western North Carolina, and having a robust local food economy brings many benefits to both farmers and their communities. But many farms in the area have limited access to productive land because of the rugged Appalachian terrain, and the long, cold winters result in a short growing season. These factors result in smaller operations that have low on-farm income and limited resources, making it harder for them to meet local demand to the fullest. Any strategy that helps them cut costs, increase production and extend the growing season would be welcome news to farmers and to the communities that value them.

THE ACTIONS TAKEN

One promising approach is to improve the energy efficiency of heated high tunnels and greenhouses, structures that extend the growing season into winter but carry a high energy cost. Supported by a 2018 On-Farm Research grant, Appalachian State University engineering professor Ok-Youn Yu worked with two area farms to install and test pilot systems that use alternative energy and improve heating efficiency. The systems



were based on research Yu and colleagues are conducting at a university greenhouse in Boone, N.C. Before the project, one of the farms used propane to heat its greenhouse, and the other farm's structure was unheated.

The pilot system uses solar power and a biochar kiln to heat a propylene glycol/water-based solution that is piped through greenhouse growing benches, along with tanks to store hot water. The kiln can use on-farm biomass such as wood, manure and food waste. One of its advantages is that it can use biomass that isn't easily composted, and the resulting biochar can be applied as a soil amendment. The system includes a food dehydrator that can be powered during warm seasons when the greenhouse doesn't need energy.

THE IMPACTS

By successfully installing this alternative heating system at two farms, Yu and his

team are creating new opportunities for Appalachian farmers to increase profitability, lower their carbon footprint and serve local markets. Impacts include:

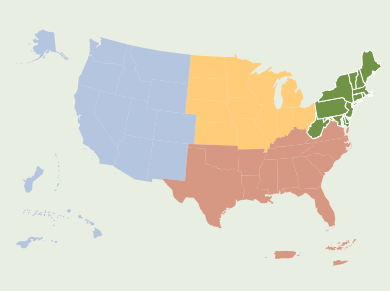
- **Reduced use of fossil fuels:** One farm cut its propane use by more than half when it switched from using the fuel as a primary heat source to as a backup source only, while maintaining productivity.
- **Lessons learned:** The project team learned that the 40-gallon storage tank they installed at one of the farms to store energy wasn't large enough to heat the entire greenhouse. Also, system efficiency is improved when growing benches are well insulated to prevent heat loss from the root zone heating system.

Learn more: Visit projects.sare.org and search for project OS18-123.



Features of a system that Appalachian State University engineering professor Ok-Youn Yu is piloting on two farms (from left): a solar thermal collector and food dehydrator; a biochar kiln; the system's main plumbing; and a water heater. *Photos by Ok-Youn Yu, Appalachian State University*

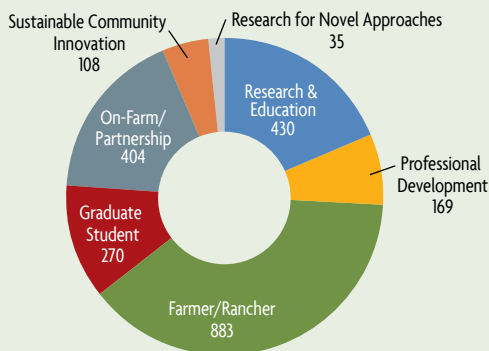
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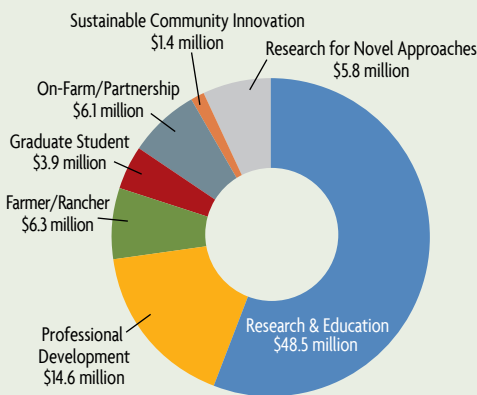
Photos by Deb Heleba, Northeast SARE

Total Grant Awards, 1988–2021¹

2,299 GRANTS



\$86.6 MILLION



Grant Proposals and Awards, 2020–2021

Grant Type	Preproposals Received ²	Full Proposals Invited	Full Proposals Received	Proposals Funded	Funding Total
Research and Education	144	65	55	21	\$3,655,067
Professional Development Program	51	38	33	15	\$1,933,176
Farmer/Rancher	N/A	N/A	111	49	\$621,689
On-Farm Research/Partnership	N/A	N/A	91	53	\$1,402,320
Graduate Student	N/A	N/A	131	49	\$721,365
Research for Novel Approaches	171	62	55	19	\$2,954,326

¹These totals exclude additional direct funding given each year to Cooperative Extension in every state to support state-level programming on sustainable agriculture.

²The use of a preproposal process varies by region. It serves to screen project ideas for the larger and more complex grant programs, and to reduce applicants' proposal preparation burden as well as the proposal review burden for SARE's volunteer reviewers.

Recent Highlights from the Northeast Region

- Farmers are the core of every aspect of Northeast SARE, and they engage in the program as teachers, learners, teammates and, as in our Farmer grant program, researchers and project coordinators. Acknowledging the importance of providing adequate funding to farmers, Northeast SARE raised the Farmer grant program maximum request to \$30,000 per project to better support projects that include multi-farm collaboration, provide intensive education for other farmers and/or service providers, and conduct applied research that is replicated over multiple years or locations.
- To better center Black, Indigenous and People of Color (BIPOC) and other historically marginalized communities in the work of Northeast SARE, we have begun a three-year partnership with an experienced educational organization that will assess our program, provide professional development training and develop a strategic plan to help us better address unconscious bias and to incorporate diversity, equity, inclusion and justice in our program operations.
- Despite challenges created by the pandemic, Northeast SARE staff supported our grantees who were able to complete 154 projects over the past two years. These projects reached 31,589 farmers and 9,752 agriculture service providers through education and outreach; as a result, 1,530 farmers reported making changes on their farms based on what they learned.

Centuries-Old Nursery Methods Prove Successful in Rice Paddies

“This is what we know: grow what you eat; eat what you grow.”

Nfamara Badjie, Ever-Growing Family Farm

THE CHALLENGE

Rice is a staple in the diets of more than half the world’s population, but U.S. consumers often rely heavily on imported rice from thousands of miles away in order to meet their needs. As rice has grown in popularity in the United States, farmers have begun producing the crop locally to both meet domestic demand and to cut its carbon footprint. Though a number of rice varieties can be grown in the United States, the tropical crop is somewhat at odds with the shorter growing season of the Northeast. Farmers in this region need best practices to optimize their rice production within a shorter time period than those in other parts of the country. The spring planting window is small, so successfully establishing the crop from transplants is critical.

THE ACTIONS TAKEN

Using funds from a SARE Farmer grant, Dawn Hoyte and Nfamara Badjie of Ever-Growing Family Farm in Ulster Park, N.Y., set out to compare two different nursery methods for rice production in the Northeast. The research objective was to determine more robust seedling establishment methods that shorten the rice production cycle and increase rice productivity. Badjie, originally from Gambia, wanted to compare the established plug-tray method to the Diola-style field nursery, a centuries-old method of the Diola (or Jola) people of West Africa, in which field nurseries are constructed as raised beds next to rice paddies. With guidance from their technical advisor, Erika Styger of Cornell University, the team—which included Badjie, his cousin Moustapha Diedhiou and his son Malick—established a randomized block experimental design that looked at sowing and transplanting timing for both nursery methods. They used two rice varieties in the study: an Asian rice variety now commonly grown in the Northeast and Ceenowa, an heirloom

rice from Africa and the farm’s commercial flagship variety.

THE IMPACTS

Over the course of the experiment, the team hosted over 200 people at community transplant days, community harvest days, school trips, farmer organization field trips and frequent visitors. Specific impacts include:

- **Enhanced productivity:** The team found that, on their farm, the Diola-style nursery method resulted in more robust seedlings and required less transplanting time.
- **Season extension:** The Diola method allowed the farmers to extend the window to transplant and shortened the overall production cycle.
- **Ease of use:** The nursery method is a simplification of established strategies and does not depend on costly materials. It is easy to adopt and farmers can further adapt it to their local conditions.

Learn more: Visit projects.sare.org and search for project FNE19-933.



Nfamara Badjie (left) and Moustapha Diedhiou (right) transplant rice seedlings into paddies that they started using the Diola-style field nursery.
Photo courtesy Ever-Growing Family Farm

Farmer-Focused Research Identifies Practical Climate Change Adaptation Strategies

“Our project directly influenced the level of comfort and conversation about climate change among the vegetable and fruit growing community in the Northeast.”

Alissa White, University of Vermont graduate student

THE CHALLENGE

Farmers and outreach professionals find themselves on the front lines as the effects of climate change disrupt the success and viability of farm businesses worldwide. Most farms across the United States are not adequately prepared to deal with the extreme weather events associated with climate change, and farmers find themselves in need of data-driven solutions that can support them as they adapt their farms to a changing climate.

THE ACTIONS TAKEN

A recent SARE Graduate Student Research grant project drew upon the expertise of

vegetable and berry farmers in northern New England to identify information critical to supporting climate change adaptation and to assist in overcoming the climate information usability gap—the divide between climate science data and adaptation strategies farmers can implement. University of Vermont graduate student Alissa White, assisted by advisors and a group of undergraduate students, partnered with farmer organizations to conduct surveys with 250 regional growers. The survey sought to collect information on 1) adaptation practices already in use that address drought and extreme precipitation, 2) promising strategies for extreme weather challenges, 3) perceived barriers and tradeoffs associated with adaptation strategies and 4) farmers’ use of cover crops, a practice that has shown to buffer the effects of both droughty and wet field conditions.

Top strategies identified for proactively mitigating the effects of climate change included soil health improvements, cover crop use, crop diversification and efficient water management. Respondents noted a

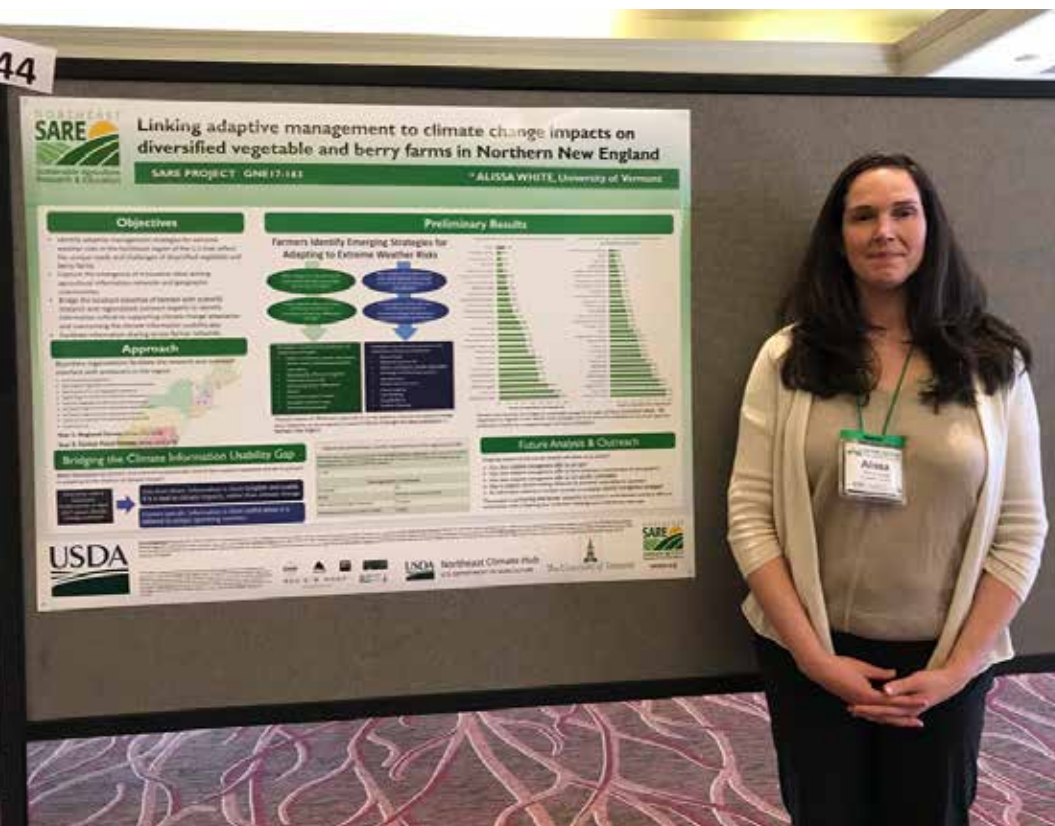
lack of adequate on-farm technical assistance, and a need for both adaptive management cost-share programs and collaborative problem-solving opportunities as potential barriers to successful adaptation to climate change.

THE IMPACTS

When the project completed in 2019, results showed that 72% of participants had made changes on their farm because of an experience with, or concern about, heavy precipitation or flooding, and 61% planned to make changes to help manage that risk. Another 66% of participants had made changes due to drought, while 39% planned to make changes to manage that risk. Specific impacts include:

- **Stakeholder feedback:** Following the completion and evaluation of the surveys, the team convened 90 farmers in focus groups to make recommendations about how to support peers as well as vulnerable community members in planning for extreme weather events.
- **Broad reach:** The data and recommendations were presented to farmer networks and regional Extension agents at numerous outreach events, in online materials and at conference poster sessions and panels.
- **Critical insights:** This farmers-first, context-specific research offers an important perspective into the adaptation efforts and needs of farmers as increasingly extreme weather events lead to crop loss nationwide.

Learn more: Visit projects.sare.org and search for project GNE17-163.



University of Vermont graduate student Alissa White presents findings from her project on strategies Northeastern farmers can use to adapt to climate change. *Photo courtesy Alissa White*

Attracticidal Spheres and IPM Help Wage War on Invasive Pest

“When spotted wing drosophila densities are extremely high, other strategies ... will be necessary as well, though attracticidal spheres can provide an additional mechanism for managing this pest.”

Kevin Rice, USDA Agricultural Research Service

THE CHALLENGE

Spotted wing drosophila (SWD) has become a serious threat to small-fruit growers in the United States. The spread of SWD across the Northeast in recent years has decimated crop yield and quality, with annual losses estimated to reach \$718 million. This invasive fruit fly attacks healthy blueberries, brambles, strawberries and cherries by laying eggs in ripening fruit. Emerging maggots feed in the fruit causing quality decline and making the fruit unsellable. Tens of thousands of acres in the Northeast are threatened, and farmers may need up to five or more insecticide applications per season to manage the pest, causing some producers to cease production altogether. It is clear that in the war against SWD, integrated pest management (IPM) strategies that reduce the number of insecticide applications, prevent outbreaks of secondary pests and improve ecosystem services from beneficial organisms are needed.

THE ACTIONS TAKEN

Researchers from the USDA Agricultural Research Service (ARS) Appalachian Fruit Research Station secured a SARE Research and Education grant to investigate potentially effective, economically viable IPM strategies for managing SWD and to educate growers about the threat of SWD and the benefits of IPM tactics. Attracticidal spheres, which look like fruit and combine an attractant and insecticide, are not yet commercially available, but the project team partnered with seven growers to deploy these experimental devices on fields and to observe their efficacy over the course of two growing seasons. They hoped that the sphere system would reduce damage, delay the need for insecticide and increase the time between sprays. Results were mixed but promising: At low to moderate

populations, the study indicated that attracticidal spheres reduced fly densities and infestations in raspberry and blueberry crops, but less so in blackberry brambles. At higher densities, the spheres needed to be supplemented with insecticide applications for appropriate pest control. The team suggested that the spheres may be used as a monitoring trap and would be a useful tool to provide a threshold indicating the need for insecticide application.

THE IMPACTS

A key component of this grant was the research team's outreach to small-fruit growers in the Northeast. Specific impacts include:

- **Grower involvement:** Nearly 400 growers attended meetings where a comprehensive SWD curriculum was provided, including the benefits and

challenges of using the attracticidal sphere system. The need for monitoring traps was also discussed.

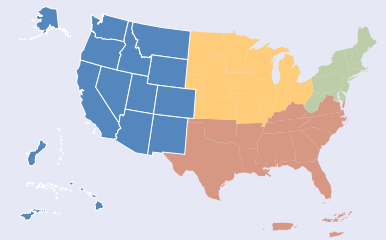
- **Behavioral change:** Grower survey responses indicated a strong interest in IPM tactics and monitoring tools. Subsequent surveys following the SWD curriculum showed an increase in their use. If it was commercially available, growers indicated they would likely use the sphere system on their farms.
- **Commercial interest:** Two meetings were held with commercial businesses that had visited the research facilities and expressed interest in making the attracticidal sphere system commercially available to farmers.

Learn more: Visit projects.sare.org and search for project LNE16-350.



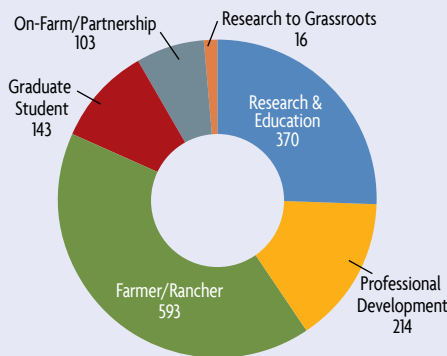
An attracticidal sphere deployed among raspberry bushes. Photo courtesy Tracy Leskey, USDA ARS

WESTERN SARE

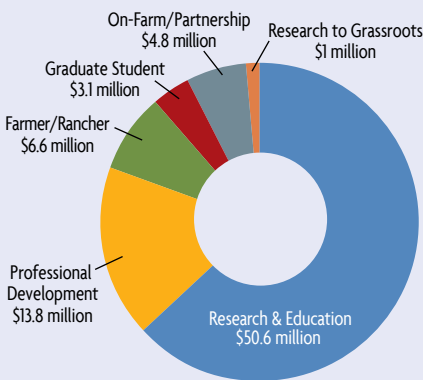


Total Grant Awards, 1988–2021¹

1,439 GRANTS



\$80 MILLION



Photos (clockwise from left): USDA NRCS Oregon; USDA NRCS New Mexico; the Xerces Society

Recent Highlights from the Western Region

- In 2020, Western SARE developed the Sabbatical Research and Education grant program. Sabbatical grants provide an opportunity for faculty from around the world to partner with Western region farmers, ranchers, agricultural professionals and researchers to exchange ideas and work on topics of mutual importance. Projects focused on unexplored topics in underserved communities and understudied geographic locations are of special interest.
- To better understand information gaps and future directions for research and outreach efforts related to sustainable agriculture in our region, Western SARE released a call for proposals seeking applicants to conduct a needs assessment with Extension educators and NGOs. We are working with Drs. Alexa and Kevan Lamm, professors of agricultural leadership, education and communication at the University of Georgia, and plan to have the resulting report out by March 2022.
- Western SARE regularly publishes a series of how-to “Quick Guides” with the goal of getting project results into the hands of farmers and ranchers quickly and in an easily accessible format. These two-page guides distill information from Extension and researchers into a short, easy-to-digest format. They are intended to supplement the more extensive publications.

Grant Proposals and Awards, 2020–2021

Grant Type	Preproposals Received ²	Full Proposals Invited	Full Proposals Received	Proposals Funded	Funding Total
Research and Education	214	62	62	19	\$6,545,478
Professional Development Program	N/A	N/A	53	18	\$1,458,795
Farmer/Rancher	N/A	N/A	52	31	\$656,225
On-Farm Research/Partnership	N/A	N/A	44	16	\$918,793
Graduate Student	N/A	N/A	52	27	\$664,084
Research to Grassroots	N/A	N/A	21	14	\$880,310

¹These totals exclude additional direct funding given each year to Cooperative Extension in every state to support state-level programming on sustainable agriculture.

²The use of a preproposal process varies by region. It serves to screen project ideas for the larger and more complex grant programs, and to reduce applicants’ proposal preparation burden as well as the proposal review burden for SARE’s volunteer reviewers.

Trainings Support Tribal Management of Blackfoot Nation's Agricultural Strategic Plan

“By building capacity internally, the Tribe can ensure the success of projects managed by dedicated professionals who are attuned to realities on the reservation: cultural, political, climatic or otherwise.”

Loren BirdRattler, ARMP project manager

THE CHALLENGE

The Blackfoot Nation in northwestern Montana is home to nearly 7,000 registered members of the Blackfoot Tribe. It encompasses an area of 1.5 million acres, much of which is used for farming and ranching. The Blackfoot Agricultural Resource Management Plan (ARMP), a recent tribal undertaking, is an ambitious strategic plan focused on the “utilization, protection, conservation and restoration of agricultural lands for the benefit of the Blackfoot people and future generations.” The ARMP is set to change not only agriculture on the Blackfoot Nation but also the economic futures of nearly 500 producers and their families. In the past, many tribal programs heavily relied on outside, contract-based professionals to carry out projects such as the ARMP. These temporary solutions have hindered the development of the professional capacity of tribal employees.

THE ACTIONS TAKEN

After securing a SARE Professional Development Program grant, Loren BirdRattler set to work building internal capacity for the implementation of the ARMP by professionalizing the current workforce through classroom and field courses, as well as through attendance at professional conferences. He then focused on developing an Extension sponsored, train-the-trainer series on sustainable agriculture that will benefit the full ARMP team and producers.

Before the project team built the training program, they communicated with stakeholders including agricultural producers and those working in grocery stores, schools and food transportation. That feedback ensured everyone had a place in the planning efforts. “Ideally this project will become a framework for continual training in a variety of agricultural subjects of importance,” says BirdRattler.

The Sustainable Agriculture Train-the-Trainer course topics included soil integrity, tribally sanctioned water use, and pest and weed management techniques that don't further soil or water degradation. Project management software and GIS were integrated into the curriculum to allow for more effective planning and evaluation. Training young ag professionals was particularly important, as they will carry on the vision of the Blackfoot Tribe for years to come.

THE IMPACTS

Funding from the SARE grant allowed for tribal employees to attend and present at

more than 50 new venues. Specific impacts include:

- **Spreading the word:** By attending agricultural conferences and meetings, program staff were able to share progress updates and offer information on how the ARMP was developed within the Blackfoot tribal community.
- **Practical training:** Train-the-trainer participants learned about the Food Safety Modernization Act and how it applies to commercial food production within the Nation, as well as about biological invasive species management and mitigation.
- **Significant outreach:** More than 500 agricultural professionals learned of the ARMP methodologies and implementation strategies through conferences and meetings.

Learn more: Visit projects.sare.org and search for project EW18-027.



Attendees at a Blackfoot Nation 4-H livestock show. Photo by J. Pecora Photography

Seed Production in Southern Oregon has a Promising Future

“Students appreciated the season-long series of classroom discussions and hands-on field training. Growing a seed production garden from start to finish, and observing the changes, concepts and work that occurred along the way, provided a thorough understanding of the seed production process.”

Sebastian Aguilar, Chickadee Farm and Organic Seed Alliance

THE CHALLENGE

Southern Oregon has a climate well suited for seed production, and there are already more than a dozen farmers in the area who are selling commercial seed on contract for regional, national and international seed

companies. But growing seed is a complex venture with its own set of challenges, and those who want to get started in it need proper training and education. Though the region has the potential to become an organic seed production hub, farmers interested in the industry need to learn how to do it well.

THE ACTIONS TAKEN

A SARE Professional and Producer grant project led by Oregon State University (OSU) Extension Agent Maud Powell aimed to increase the number, capacity and success of organic vegetable seed producers in southern Oregon. The project team offered a training course, “Growing Seed Agripreneurs,” at the OSU Southern Oregon Research and Extension Center (SOREC) and conducted research on the barriers and challenges to creating a regional market for

local seed producers. The course, which was offered to both beginning and established farmers interested in growing seed, consisted of weekly meetings over the course of seven months. The 29-class curriculum covered topics including the planning, field preparation, growing, harvesting and cleaning of seed crops, as well as seed business and marketing concepts. Six field trips to local seed farms were included, and participants also planted and maintained an organic seed garden of market crops, all of which were harvested, threshed and cleaned by the group. Two half-day workshops open to anyone interested in seed production were held at a nearby farm with a focus on seed cleaning and equipment.

The second part of the project involved research into developing a market for local seed producers. The project team surveyed 15 seed producers and produce farmers to gather opinions on seed production and purchasing issues including quality, customer service, genetics and financial concerns. Possible solutions were identified that would increase regional producer interest in locally grown seed: demonstrating good quality through germination and disease-testing reports, offering direct sales and shipping to local growers, and offering varieties that meet the needs and criteria of growers.

THE IMPACTS

Ten farmers completed the extensive training course that set them up for a potential future in organic seed production. Specific impacts include:

- **Onsite learning:** 39 people attended the workshops, which guided attendees through the seed harvesting and cleaning process.
- **Identifying the best seeds:** A variety trial during the project compared the quality of local and national seeds, and results were shared online for producers in southern Oregon.
- **Local market potential:** Feedback from the research shows if barriers are overcome, a market for locally grown organic seeds may succeed.

Learn more: Visit projects.sare.org and search for project OW17-008.



Radishes grown during a variety trial organized by Oregon State University Extension for farmers interested in producing organic seed. Photo by Sebastian Aguilar, Chickadee Farm



Richard Kodani intercroops breadfruit with turmeric and bananas on his farm in Paukaʻa, Hawaiʻi. Photo by Noa Lincoln, University of Hawaiʻi at Mānoa

On-Farm Assessments Provide Data on Improving Breadfruit Production

“Our online community, which started with only 24 local producers, has grown to represent nearly 400 local farmers and another 500 farmers from the tropics around the world, all sharing their issues and solutions with each other.”

Noa Lincoln, University of Hawaiʻi at Mānoa

THE CHALLENGE

Breadfruit offers many ecological, social and economic benefits for Hawaiʻi. As one of the few staple, carbohydrate-rich foods that grows on a long-lived tree, breadfruit has the potential to transform food security in the tropics. Hawaiʻi has a long history with breadfruit based in indigenous and local knowledge, particularly with growing the high-yield crop in diversified agroforestry settings. Today, farmers produce breadfruit using a variety of approaches, including modern systems with minimal biodiversity and high inputs, traditional systems with high biodiversity and low to no inputs, and systems in between. With demand for breadfruit increasing, there’s a need for

on-the-ground research that helps farmers weigh the pros and cons of different production practices so they can make informed decisions that improve the sustainability of their operations.

ACTIONS TAKEN

A SARE Research and Education grant led by Noa Lincoln at the University of Hawaiʻi at Mānoa set out to answer some of the basic production questions posed by growers. The team partnered with 43 farms across four islands to visit and assess growing practices, soil health, tree health, foliar nutrition and fruit quality. The site visit with each participant yielded an individualized report, which then allowed for comparison of all of the participating farms. “This was a very important baseline,” Lincoln indicates, “because the breadfruit industry is still in its infancy, and there is a great opportunity to develop good, sustainable practices as the norm from the very beginning.” In addition to providing assessment and feedback to the growers, Lincoln and team also worked to help facilitate farmer-to-farmer sharing.

THE IMPACTS

Data generated from the study laid an essential foundation for understanding breadfruit orchard management in Hawaiʻi. Specific impacts include:

- **Better nutrient management:** Data from the assessments provided the first research-backed guidance for nutrient management and foliar nutrient evaluation, which will improve overall management and has already demonstrated higher yields on several farms.
- **A changing approach:** Results showed that visual assessment of breadfruit trees—the previous standard—offered a poor indication of health and productivity. The best way to assess foliar nutrients was to test the plant petiole rather than the leaf itself.
- **New educational materials:** This project yielded new, printed guidance on breadfruit pruning, nutrient management, and propagation and postharvest handling that was offered to growers as Extension publications.

Learn more: Visit projects.sare.org and search for project SW17-050.

SARE Shares

SARE's work does not stop when it awards a grant; SARE follows through with a robust regional and national outreach effort to share useful findings with farmers and ranchers, researchers, and ag educators. Here are some of the ways SARE shares.

EDUCATIONAL RESOURCES

www.SARE.org/Resources
Hundreds of educational resources on dozens of topics.

DATABASE OF PROJECT REPORTS

www.SARE.org/Project-Reports
Results from more than 7,700 SARE-funded research and education projects.

STATE PROGRAMS

www.SARE.org/State-Programs
SARE coordinators in every state and island protectorate offer learning opportunities.



Photo by Candace Pollock, Southern SARE

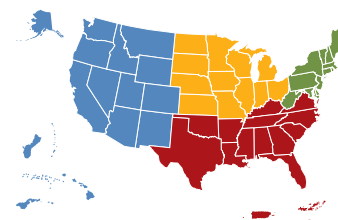


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(hosted by the University of Minnesota)
www.northcentralsare.org
(612) 626-3113
nrcsare@umn.edu

WESTERN SARE
(hosted by Montana State University)
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(406) 994-4789
wsare@montana.edu

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ssare@uga.edu

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